Wellbeing Impacts of Sustainably Designed Community Gardens: A Capability Approach

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Abstract

In early 2011 there were over 1782 community garden sites officially registered with the Federation of City Farms and Community Gardens. In addition to promoting healthy food and healthy eating, many of these sites contain a number of sustainable design features and associated activities. They also claim to deal with value-laden ethical and social issues relating to human wellbeing. In this way they aim to be ecologically sustainable. Using a normative framework for evaluating wellbeing - the Capability Approach - this research reports on the multiple impacts that the design of such spaces may have on the subjective wellbeing of site users. Qualitative research methods of data collection and analysis in five community garden sites in the UK and Ireland were carried out for adult, youth and child users. Results show that although producing a food yield was found to have most impact on wellbeing for all user groups, the overall wellbeing impacts of site activities go beyond physical health and healthy eating, impacting most on capabilities of stimulation, psychological wellbeing and purpose. Two key aspects of site design and associated valued activities - agency and dynamic balance - were found to enhance both the sustainability of the community garden sites and the wellbeing of site users. These are the essence of enhancing wellbeing in the sustainably designed community garden sites. The thesis concludes that not only is there a requirement for new conceptualizations of sustainable design and wellbeing for the urban environment but we also require new methodological approaches to better capture the multi-layered and multidimensional complexities of such spaces within our everyday lives.

il faut cultiver notre jardin

Voltaire

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Go raibh maith agaibh go léir.

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List of Abbreviations

ACE Alternative Centre for Education
APF Adaptive Preference Formation
ART Attention Restoration Theory
BTCV British Trust for Conservation Volunteers
CA Capability Approach
CABE Commission for Architecture and the Built Environment
DoE Department of the Environment
DTLR Department for Transport Local Government and the Regions
EA Environment Agency
FCFCG Federation of City Farms and Community Gardens
GST General Systems Theory
HCA Housing and Communities Agency
HDCA Human Development and Capability Association
HDI Human Development Index
MEA Millennium Ecosystem Assessment
ODPM Office of the Deputy Prime Minister
SNCG Scottswood Natural Community Garden
UA Urban Agriculture
WCED World Commission on Environment and Development
WEMWBS Warwick Edinburgh Mental Wellbeing Scale

Glossary of terms

Adaptability: The capacity of a system (organisms, communities, landscapes) to respond to change in ways that preserve its ability to persist.

Adaptive cycle: A model of the dynamics of systems (both human and natural) that maps changes through four phases (exploitation, conservation, release, and reorganisation) that are linked in a loop.

Agency: Having choice and opportunity in learning and pursuing and realising goals that one values.

Biodiversity: The complexity that contributes to the resilience of biological life as measured in the diversity of biological forms at many scales, from molecules to organisms to habitats to ecosystems.

Biomass: The weight of organic matter, living or dead, in a given area.

A Capability: One dimension of wellbeing. Capabilities are freedoms that people have to achieve the lifestyle that they have reason to value.

Capability set: The set of functionings and capabilities an individual possesses and the freedom he/she has to enjoy various functionings.

Capability space: The conceptual space within which decisions about wellbeing are made and realised.

Carrying capacity: Amount of plant life, animal life, human life, and /or industry that can be supported on available resources in a given geographic area for significant time spans without any prolonged loss of system resilience.

Climax species: A mature stage of succession in which the variability in diversity, biomass, and productivity is minimised by a set and dominant species in a presumed steady state that usually is the prelude to reorganisation of the system.

Complexity: A property of organised systems that are deeply hierarchical.

Dynamic balance: Flux involved in continuous learning and design in an ever changing non-rigid system resulting in somewhat uncertain site processes and outcomes.

Ecology: A branch of biology concerned with the relationship between living organisms and their surroundings.

Ecological design: Any form of design which minimises environmentally destructive impacts by integrating with living processes.

Ecological integrity: Ecological integrity is about three facets of the self-organisation of ecological systems: current wellbeing; resiliency and capacity to develop, regenerate, and evolve.

Ecological sustainability: A view of sustainability that looks to changing the way we think about and use our resources and to rethink our values surrounding these by linking individual and collective community wellbeing to foster a partnership with the natural environment.

Ecological literacy: A systems approach to learning and design which requires ecological knowledge and understanding.

Ecological system: A community of organisms in interaction with the environment.

Ecosystem: The interaction of both the biological (biotic) and physical (abiotic) constituents of the environment together form a spatial unit, which is termed an ecosystem.

Efficiency: The ratio of input to output energy or materials in a system.

Emergence: Changes in system structure or organisation that are too novel to have been predicted from understanding of its parts.

Emergy: The energy that was required and used to make a product or service – its embodied energy.

Entropy: The tendency of all systems to lose organisation as they approach a steady state of thermal equilibrium with their environment.

Equilibrium: A stable state without available energy for change; dynamic equilibrium, a steady state.

Exergy: Represents the useful part of energy for a system in its environment. That part of energy that is convertible into all other forms of energy.

Functioning: The ‘beings’, ‘doings’ and ‘havings’ that people value and have reason to value.

General Systems Theory: The essential properties of an organism, or living systems, are properties of the whole, none of which of the parts have and certain general principles apply to systems irrespective of their nature.

Hierarchy: Organisation of objects or elements in a graduated series.

Human ecology: A support system within which human society and the environment function as a self organising and adaptive system. Humans therefore adapt to and are limited by their environment.

Interbeing: A set of beings, doings and havings that users value and have reason to value in using the sustainably designed sites.

Resilience: The speed with which a system returns to normal function.

(Ecologically) Sustainable design: Pertains to the aim of ecological design which is any form of design which minimises environmentally destructive impacts by integrating with living processes while also taking into account the social and ethical concerns of such design.

Sustainability literacy: Pertains to ecological literacy in that it advocates a systems approach to learning and design which requires ecological knowledge and understanding but also takes into account more social and ethical concerns in awareness raising and education.

Sustainable livlihoods: Sustainable livelihoods are derived from people's capacity to make a living by surviving shocks and stress and improve their material condition without jeopardising.

System: A collection of parts related to each other directly or indirectly by interaction terms.

Valued freedom: Sub-functionings are termed 'valued freedoms' (a subset of functionings). They are a way in which people may engage with their sustainably designed setting to enhance their wellbeing. They provide insight into the aspects of site activity which impact on wellbeing.

Chapter 1

Introduction

1. INTRODUCTION

1.1. Introduction to research

Community gardening and interest in food in the UK and Ireland is growing and land demand for this purpose is exceeding supply. In the UK, allotment lists with local authorities are in many places at record highs and are in the region of 100,000 with a ten year waiting list in some cities (Iles, 2010). There are currently 1782 community garden sites in the UK and Ireland that are registered with the Federation of City Farms and Community Gardens, a 65% increase since 2010 (pers. comm. FCFCG, January 2011). In addition to establishing spaces where individuals can access nature and wildlife, many of these sites are designed with sustainable features and activities such as rainwater recycling, composting, solar water features, building with natural materials, and have food growing and learning as a central activity. The resurgence of such sustainably designed spaces may impact on human wellbeing by providing food, knowledge and skills, or relieving financial pressure and the pressure of living in an urban built-up environment.

Using urban community garden sites in the UK and Ireland as a locus for research, this thesis examines impacts of such sustainably designed spaces on human wellbeing. Such impacts have not been fully explored or understood for their contribution to the fields of wellbeing, sustainability and sustainable design research and practice.

1.2. Research rationale

There is a prevalent view that humans have a desire or even a psychological need for contact with the natural environment (Ulrich, 1986; Kellert and Wilson, 1993; Orr, 2002; Kellert, 2005). Nature in remote areas of rural countryside is not subjected to such urban issues of density and overcrowding and hence escapes the fine-scale planning and design that urban areas are subjected to (Forman, 1986). In densely populated urban areas, however, nature is often polarised and fragmented as development is focused around the progressive needs of the human species.

In 1996 the UK New Labour government launched the 'Greening the City' initiative (DoE, 1996) to promote discussion and ideas about green spaces and places in urban areas. In 2002 the 'Cleaner, Safer, Greener Public Spaces' initiative stated that 'The Government's aim is for everyone to have access to attractive, high quality and sustainable public spaces and local environments that cater for the diverse needs of the communities' (ODPM, 2002). A report from the Urban Green Spaces Taskforce put parks and green spaces at the centre of the renaissance of towns and cities (DTLR, 2003). This report recognised the ecological benefits and also the positive health and wellbeing benefits of green spaces and stated that communities were showing increased interest in caring for their local space. The government's 'Liveability' agenda recognised the valuable contribution of 'good quality', parks, gardens and green spaces to the

wellbeing of our towns and cities and the people who live and work in them. The importance of green space has been acknowledged as a key component of 'good' urban design by organisations such as the Office of the Deputy Prime Minister (ODPM), Homes and Communities Agency (HCA) and Commission for Architecture and the Built Environment (CABE). A range of good practice guides and guidance notes were published but they often lack an evidence base, tending mostly to contain principles or objectives rather than practical design solutions.

In terms of urban planning and design, urban green space has been placed within the context of the sustainable city and particularly sustainable urban form. The idea of a 'sustainable' city may be seen as an oxymoron (Girardet, 2004; Forman, 2008) as given a city's huge concentration of people and massive inputs and outputs, the gain in energy, materials, food and other resources from 'sustainable' proposals may be seen as small or negligible. Urban sustainability lies within the concept of sustainable development, which had its origins in embryonic debates in the late 1960s and 1970s, then crystallised in the Bruntland Report (WCED, 1987: 9-10). This report defined sustainability as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Sustainable development emphasises the need to consider social, economic and environmental concerns in providing green space in urban areas.

One argument is that the physical form (size, shape, density, uses) of urban areas can impact on its sustainability and the provision of urban green space (Williams et al., 2000). The Commission of the European Communities Green Paper on the Urban Environment (CEC, 1990) strongly endorsed the avoidance of urban sprawl and instead recommended that new development be guided into existing areas and abandoned land in need of redevelopment. This leads to a more compact urban form. However, economic pressures on land resources and zoning for different land uses have caused the reduction and fragmentation of green areas (Williams et al., 2000). Although higher urban densities in the compact city tend to involve the loss of green space (Breheny, 1992), it has been suggested that well-planned versions may be more successful, as public enjoyment of urban green space may be related as much to quality as quantity (Bentley et al., 1985; Breheny, 1992).

The need for clarity on design quality and 'good design' in the built environment was acknowledged and analysed in the Egan review (Egan, 2004). This review into the skills needed to deliver the vision and aims of sustainable communities demonstrated the need for a common shared goal among practitioners and policy makers. The following year, an Urban Task Force report reflected on the government's progress in encouraging people to live in good quality more compact urban areas (UTF, 2005). It emphasised increased quality of the built environment for all, based on the principles of design excellence, social wellbeing and environmental responsibility. However, the links that exist between these sets of principles and how such links can be realised has not been fully explored and is the topic of this research.

One typology of green space – community gardens – encourages a participatory approach for using green space in a more compact urban form. The approach implies a greater emphasis on 'ecological sustainability'. This view of sustainability (Orr, 1992; Stibbe, 2009; Atkisson, 2011a,b) calls for a systems perspective on design that looks to changing the way we think about and use our resources. Ecologically sustainable design integrates human wellbeing with the health of the natural environment (Van der Ryn and Cowen, 1996). It minimises environmentally destructive impacts by integrating itself with natural processes. This integration implies that the design respects species diversity, minimises resource depletion, preserves nutrient and water cycles, maintains habitat quality and encourages urban inhabitants to design their own urban spaces (Orr, 1992). It is a particular way of understanding and implementing sustainability that aims to link individual and collective community wellbeing with fostering of a partnership with the natural environment in an urban setting. This research will focus on such partnerships in order to analyse wellbeing in the context of sustainably designed community gardens. As a result, design solutions for enhancing both sustainability and wellbeing in urban areas will be suggested.

1.3. Summary of research and research objectives

In addition to establishing compact urban green spaces where individuals can grow food (Irvine et al., 1999; Pink, 2008) and participate in community activities (Holland, 2004; Teig et al., 2009), many community garden sites are designed with sustainable features and processes such as rainwater recycling, composting, biological pest control, solar powered water features, and building with natural materials. The design of these sites may therefore impact on multiple dimensions of human wellbeing. This research uses urban community garden sites in the UK and Ireland as a locus to examine impacts of such sustainably designed sites on human wellbeing.

In developing the definition of sustainability and sustainable design for use in this research, it was found that although it is now almost 25 years since the inception of the terms 'sustainability' and 'sustainable development' as multidisciplinary concepts, there is still an absence of a shared definition of the terms (Toman, 1993; Basiago, 2006; Selman, 2008). Sustainability is often seen to be merely a theoretical concern maintaining the 'status quo' (e.g. Orr, 1992; Swyngedouw, 2007) rather than a practical application of innovative design implementation (Derbyshire, 2011).

The concept of wellbeing is equally as nuanced but has pre-occupied a wide range of disciplines, dating as far back as Aristotle (384-220 BC) and early Greek philosophy. There has however been a recent shift to the recognition of the significance of human wellbeing in national development with the promise to establish, in 2011, a national wellbeing index (number10.gov.uk). Potential indicators will include both objective and subjective measures including education, inequality of income, and the environment (Mulholland and Watt, 2010). However, wellbeing is a multi-faceted approach which crucially includes how people interact with

the world around them (Michealson, 2010). Therefore the reduction of wellbeing to particular measures may fail to adequately capture the more individual value based experiences of the everyday.

In this research a normative framework to evaluate wellbeing developed by Amartya Sen - the Capability Approach (CA) – is used to examine wellbeing. The CA examines individual subjective wellbeing, i.e. how individuals perceive and value their own wellbeing, and collective wellbeing is taken into account insofar as it impacts on individual wellbeing. It looks to the freedom people have to enjoy and achieve what they value and have reason to value. In this way, it provides a 'freedoms' approach through which to consider and discuss multidimensional aspects of wellbeing in the sustainable built environment.

The sustainable design principles underpinning community gardens and the impact these principles and features may have on the wellbeing of individual users has not been fully explored or understood. This thesis specifically addresses the gap in our knowledge on how the sustainable design of community gardens may impact on our values and interpretations of our sense of wellbeing. In addressing this gap in knowledge, the research objectives are fivefold:

1) To establish sustainable design principles and sub principles for community gardens;
2) To develop wellbeing capabilities associated with these spaces;
3) To identify key features of sustainably designed community gardens;
4) Using community gardens as a locus, to identify any links which may exist between features of sustainable design and human wellbeing, and subsequently to identify the core principles and features that have the most positive impact on different capabilities of human wellbeing;
5) To establish from these findings best practice in sustainable design in terms of maximising human wellbeing.

Drawing on the Capability Approach and the application of qualitative, participant-led visual methods, an in-depth understanding of the benefits of community garden sites on the wellbeing of end users is achieved.

1.4. Background to concepts

This research has developed concepts of wellbeing and sustainable design in the context of a particular sustainable urban environment – community gardens. In capturing wellbeing, governments and social institutions take into account basic needs fulfilment, measuring objective service level provision of for example nutrition, housing, education, mortality, poverty environmental quality and so forth.

One of the principal ways of understanding wellbeing has been the adoption of 'utility' by

economists, which equates wealth and consumption with life satisfaction (Searle, 2008). The most widely used measure of success has been Gross Domestic Product (GDP). However, it is now argued that the relationship between economic prosperity and wellbeing has broken down (Easterlin, 1996; Offer, 2006). Global wellbeing measures have been used to provide convincing and robust evidence to show that as income has increased life satisfaction and happiness have plateaued. Attempts to adjust economic measures to take account of non-market goods and services include the Human Development Index (HDI), launched in 1990. More recently, attempts have been made to take into account the impact of global ecosystems on human wellbeing. The Millennium Ecosystem Assessment (2005) (MEA) has provided a scientific account of the provisional, supporting, regulatory, and cultural provisions ecosystems and ecosystem change provides for human wellbeing from local to global scales.

Both the HDI and the MEA are influenced by Amartya Sen's Capability Approach (CA) (Sen, 1999). This normative approach to wellbeing attempts to understand wellbeing as being more than just the adequacy or inadequacy of income but the freedom that people have to achieve what they value. Sen's ideas will also inform the UK government's forthcoming wellbeing index (parliament.uk). This index will act as a headline measure of the country's progress, with a power to shape high-level government decisions, on a par with GDP.

The capability approach has been further developed by a number of academics (Nussbaum, 1988; Sen, 1999; Alike, 2002) who look to individuals as agents of change in enhancing their own wellbeing. In adopting such a value based conception of wellbeing, it is recognized that people react differently to the same circumstances, and they evaluate conditions based on these unique values, expectations and previous experiences, i.e. one's own evaluation of one's wellbeing – the subjective elements of wellbeing (Diener, 1984). However, a core element of the CA is the idea that preferences of individuals in deprived circumstances may be formed in response to their restricted options. People might therefore adapt to certain unfavourable circumstances and any self evaluation of life satisfaction or happiness will in this case necessarily be distorted (Comin, 2005). This is called Adaptive Preference Formation (APF). Originally introduced by Elster (1982), the issue of adaptive preference has subsequently been examined by Sen (1984, 1999) and Nussbaum (2000) amongst others. It was formed as a solution to distorted subjective measurements of people's evaluation of their own wellbeing. To evaluate people's wellbeing using the CA, it is necessary to identify and remove adaptive preference and the barriers to the realisation of what one values and has reason to value. In this way it may be viewed as being akin to the emancipatory ideas of critical social theory. Fay (1987: 31) uses the term 'false consciousness' in examining how people become reconciled to their particular circumstances asserting that the identification of the roots of and the elimination of false consciousness may lead to social change.

With such emancipatory ideas as removing adaptive preference at its core, the CA is used most pervasively in poverty and development studies. Its growth is now marked by its own Association, The Human Development and Capability Association (HDCA). It has more recently emerged as a normative approach to evaluating wellbeing in a developed world context in the field of the built and natural environment, for example in: environmental policy (Holland, 2008); housing (Gilroy, 2005); and urban development (Samuels and Tibaijuka, 2006). In addition to adaptive preference formation, the approach provides a particular language to assist in operationalising the value-based conception of wellbeing. These include agency, defined as the ability to act and bring about change (Sen, 1999) and to pursue and realise goals that a person values (Nussbaum, 2000). The term 'functionings' refers to the 'beings', 'doings' and 'havings' that people value and have reason to value such as poise, knowledge, a warm friendship, an educated mind, a good job (Alkire, 2003: 5). The set of functionings an individual possesses and the freedom he/she has to enjoy various functionings is the 'capability set'.

There is potential use for the CA in the context of sustainable design and the built environment. Both the CA and sustainable design are multidimensional approaches. They are both open-ended and prone to change and flux. However, an individual's behaviour and consumption is embedded in social and institutional contexts (Granow and Warde, 2001; Shove and Warde, 2002; Shove, 2003) and consumers can become stuck, i.e. 'locked in' to a process of behaviour and consumption over which they have very little individual control (Sanne, 2002). Jackson (2005) applies this idea of being 'locked in' to unsustainable behaviours in that there may be many instances where members of the public would prefer greater sustainability but require policy-makers to make the necessary capital investments, e.g. where recycling opportunities are limited or where people cannot afford capital investment in alternative energy sources, their preferences may not be realised. People may want to purchase local, organic food, but it may be too expensive.

The concept of being 'locked in' may have parallels with adaptive preference formation in that in both cases there are barriers to the realisation of what one may value and has reason to value. Using the CA and the idea of adaptive preference in this context examines not only choice and opportunities offered to the individual but the freedom to make such choices. The focus is on the activities or 'functionings' (beings, doings, havings) which people value as a result of their interactions with others and their environment. A central role of agency sees individuals as active agents rather than patients of their environment complementing the concept of 'ecological sustainability' wherein sustainability will rest on foundations that require an active competent citizenry (Orr, 1992: 30).

A component of ecological sustainability is a systems approach to learning and design which requires ecological knowledge and understanding – ecological literacy (Orr, 1992) or sustainability literacy (Stibbe, 2009) along with a practical know-how in design (Todd and Todd,

1984; Mc Harg, 1992; Van der Ryn & Cowan, 1996). This philosophy of design represents not just a shift in the way things are made and designed but also a shift in language and epistemology. This paradigm of ecological sustainability has evolved around the concept of interrelatedness and involves what Gregory Bateson (1979: 13-15) has called the 'pattern that connects' in that we are not outside the ecology for which we plan, but are always and inevitably a part of it. The search for interrelatedness is a revolt from Cartesian logic, reductionism, and the fragmentation characteristic of modern science, conventional economics, and even some of modern ecology (Goldsmith, 1996). It also recognises that the world is paradoxical and that our understanding will always be open-ended and incomplete.

The current thesis research was developed at a time (2006-2010) when community garden sites were receiving a great deal of attention in the UK and Ireland, not only in the field of sustainability in the built environment but in wider social, cultural and environmental movements (Parkins and Craig, 2006; Hopkins, 2008; Pink, 2008). A number of these sites were found to exhibit sustainable design principles and features. The resurgence of such sites may play a role not only in relieving urban dwellers from the stresses and strains of the built up environment (Kaplan, 1987) but may enable and enhance individual and collective responsibility towards global issues – which may in turn enhance individual human wellbeing. Using community gardens as a locus for research, intra and interpersonal functionings of wellbeing are explored by examining the links between sustainable design and the capability approach to wellbeing.

A qualitative approach using semi-structured interviews with adult groups and participant-led video and photography methods with more difficult to access younger users operationalise the CA in this research context. The combination of these methods is innovative in the analysis of both sustainable design and the CA approach to wellbeing. The focus is on the activities or 'functionings' (beings, doings, havings) which people value as a result of the interaction between individuals and between individuals and their environment. Using the CA in such a built environment context provides a flexible multidimensional and multidisciplinary approach to wellbeing.

1.5. Thesis structure and overview

Part one of the thesis contains a literature review detailing the development of the concepts of ecological sustainability, sustainable design and of human wellbeing to be used in this research. A particular approach to wellbeing, the CA is described. A number of principles of sustainable design and dimensions of wellbeing are developed to be applied in the methodology in Chapter 6. The findings are presented and discussed in part two of the thesis which comprises Chapters 7 to 11.

Chapter 1 provides a rationale and summary for the research. It provides an outline of how the research question originated and developed around the concepts of sustainability and wellbeing

in the built environment. A set of objectives are listed and an overview of the content of the thesis is explained.

Chapter 2 proposes a working definition of 'wellbeing' in the context of this research. In explicating the nuances of the term wellbeing a number of different components of general wellbeing are discussed in order to inform a set of capabilities and functionings of wellbeing to be developed in Chapter 5.

Chapter 3 frames sustainable design within the paradigm of sustainability in the built environment. The nuances of the term 'sustainable design' are discussed. The chapter provides a particular definition of sustainability – ecological sustainability – to be used in this research which informs the definition of community gardens as a locus for this research in Chapter 4 and the establishment of sustainable design principles and sub principles for community gardens developed in Chapter 5.

Chapter 4 introduces community gardens as sustainably designed spaces and describes the manifestation of community gardens in a UK, Irish and international context. It explores the social context of their development around the world and particularly the formal role of UK green space policy in their evolution. A broad categorization of community gardens is provided to reflect the diversity of such sites and a definition of community gardens to be used in this research is developed.

Chapter 5 provides a table of sustainable design principles and sub principles particularly for sustainably designed community gardens. This table is derived from reviewing and merging literature on sustainable design, ecological design, landscape design and permaculture design as introduced in Chapter 3. It provides a set of sustainable design features which is used to develop a checklist of sustainable design features. Literature on nature and wellbeing, green space and wellbeing and an emerging body of literature examining the impact of environmental behaviours on wellbeing (Dolan et al., 2006; Marks et al., 2006) is synthesised in order to seek out a provisional set of capabilities and functionings of wellbeing that may be impacted by such sustainably designed sites. This set of capabilities and functionings of wellbeing along with the tables of sustainable design principles and sub principles are used to inform the choice of methods discussed in Chapter 6 and the display and discussion of the findings in Chapters 7 to 10.

Chapter 6 sets out the methodology describing the qualitative methods developed to operationalise the capability approach in this sustainably designed setting. The methodology is concerned with establishing the types of data required, and the methods of gathering this data. Two sets of data are gathered. First, data on community garden design features which is displayed in chapter 7, and secondly, end user participant views. Participant views were gathered

through the implementation of semi-structured interviews and participant-led photography and video methods. This resulted in rich, value laden data which was prepared for analysis and presented in Chapters 8 to 10.

Chapter 7 gives a description of the five case study sites of sustainably designed community gardens in the UK and Ireland. The site specific history and context is displayed visually using maps and aerial photographs. The sites have a variety of sustainable design features. Using the table of principles and sub principles for sustainably designed community gardens developed in Chapter 5, a survey of sustainable design features was undertaken in each site. These features were analysed for their impact on the wellbeing of the end user participants using qualitative methods of semi-structured interviews and the visual methods of participant-led video and photography techniques.

Chapters 8 and 9 detail the analysis of the research. The analyses are set out in two main stages:

1) The principles of sustainable design are analysed to seek out the impact of specific sub principles and features on single and multiple wellbeing capabilities (Chapter 8).
2) Key wellbeing capabilities are analysed by the functionings – the beings, doings, havings that people experience and value within all of the sites (Chapter 9).

The essence of how emerging functionings and underlying valued freedoms may contribute to wellbeing are further analysed and reflected on in chapter 10. In synthesising the empirical evidence provided in the research, the theoretical development of ecological sustainability and capability theory is reflected on in Chapter 11. The use and replication of the theoretical approach and methods along with the limitations of the research methodology and findings are discussed in this concluding chapter.

Chapter 2

Dimensions of Wellbeing

2. DIMENSIONS OF WELLBEING

2.1. Introduction

This chapter describes the nuances of meaning of the term wellbeing in order to establish a working definition of wellbeing to examine the wellbeing impacts of sustainably designed community gardens. In doing so, a general review of literature on conceptualising and measuring wellbeing is undertaken. A normative approach to wellbeing – the Capability Approach (CA) is then described. This approach to wellbeing provides a framework for evaluating wellbeing to be operationalised in this research.

2.2. Measuring and defining wellbeing

In the developed (Western) world, interest in trying to measure wellbeing or happiness or quality of life has increased since the 1950s. Wellbeing tends to be synonymous with quality of life or happiness, which may also be viewed as only one dimension of human wellbeing.

The theoretical definitions of happiness, life satisfaction, wellbeing, the 'good life' and quality of life (QoL) have attracted much conceptual confusion (Bowling, 2001). In particular, there are competing views about the relationship between QoL and wellbeing (Haas, 1999). Some regard the terms as interchangeable, while others regard wellbeing as one component of the broader concept of QoL (Diener and Suh, 1997). In a systematic review of health-related QoL models (Taillefer et al., 2003) a quarter to one third of QoL models utilised the concept of wellbeing, and some defined QoL as wellbeing (e.g. Felce and Perry, 1995; Kahn and Juster, 2002).

Writers who view wellbeing as interchangeable with quality of life, sometimes differentiate between wellbeing which may incorporate objective and subjective conditions (Helliwell and Putnam, 2004; Cummins et al., 2003). Objective conditions identify what constitutes a good quality of life level including features deemed important for society's welfare and are easily measured at the population level. Subjective wellbeing, is wellbeing as defined, or assessed, by individuals themselves and may include subjective responses to objective conditions. In evaluating wellbeing, Mc Allister (2005) argues that at a generalised level, it is useful to make such a distinction between objective and subjective dimensions of wellbeing.

2.2.1 Objective and subjective wellbeing

Objective indicators are used at a population level as everyone is assessed by the same indicators, allowing comparability, and so are of interest at a policy-making level. The pursuit of objective indicators of wellbeing began in the 1950s and '60s with the realisation that happiness could not be measured just by looking at material standards. In the 1960s, the 'social indicators' movement highlighted the need to measure non-economic aspects of people's lives that could

not be captured from income measures of wellbeing. What followed were a range of what were often interpreted as measures of basic needs fulfilment capturing levels of nutrition, housing, education, health, mortality, environmental quality, poverty and so forth (McGillvray 2006; Offer, 2006).

Objective indicators are monitored by governmental and social institutions. However, the approach assumes that there are 'standard needs' common to all individuals and that these can be determined by 'experts' (Campbell, 1976). Also, it is believed by some that social indicators alone do not define quality of life as people react differently to the same circumstances, and they evaluate conditions based on their unique expectations, values and previous experiences i.e. the subjective element is essential (Diener, 1984). In response to this, researchers and theorists turned their efforts to measuring *subjective wellbeing.*

> *As the term indicates, subjective wellbeing is primarily concerned with the respondents' own internal judgements of wellbeing, rather than what policymakers, academics, or others consider important* (Diener and Suh, 1997: 201).

Subjective wellbeing can be divided into affective (one's mood and emotions) and cognitive components. The affective component can be short term perceptions of how we *feel* about our life – i.e. how happy/unhappy one is. The cognitive component looks at longer term evaluations of how we *think* about life, how satisfied we are with life. Evidence from psychology studies show that individuals' expressions of life satisfaction reflect a number of different aspects of their self-perception, related to their life opportunities and outcomes. These may be both subjective and objective, 'inner' and 'outer' qualities (Veenhoven, 1998: 334), and the extent to which individuals value each of these may vary. Outer qualities may include living in a good environment and being of worth for the world. Inner qualities include being able to cope with life and enjoying life. These bring life chances and life results.

Diener and Suh (1997) propose a model of subjective wellbeing which requires measures of three factors: life satisfaction, presence of positive mood, and absence of negative mood. An individual can have high subjective wellbeing on one of these, but be low on the others (ibid). Happiness questions are said to be more appropriate for capturing short term reflections influenced by mood, whereas life satisfaction questions are measuring more long term stable evaluations (Helliwell and Putnam, 2004).

Many scales are used to measure the affective/happiness element of subjective wellbeing (e.g. the Bradburn scale which takes into account feeling low during the day at a particular time but generally feeling good otherwise). Hird (2003) states that it is important to note that many of these scales such as those in the General Health Questionnaire (GHQ) may have been designed

with the health of a patient rather than general population in mind, therefore may be measuring one dimension of wellbeing - health-related quality of life rather than wellbeing *per se*.

In a Scottish Executive report (1996: 7) it is argued that wellbeing is a subjective assessment but it is concerned with all dimensions of life. A review by Felce and Perry (1995) found that, despite wide disagreement on the definition of wellbeing, there was considerable overlap among researchers on relevant domains that make up wellbeing. They concluded that the majority of aspects mentioned in the 15 key sources they reviewed could be grouped under five domain headings: physical wellbeing, material wellbeing, social wellbeing, development and activity, and emotional wellbeing.

Michalos (1985) analysed how cognitive satisfaction within a dozen domains of life contributes to global satisfaction and happiness with life as a whole. Examples of domains of life satisfaction include predominantly service led assessments of health, finances, family, job, friends, housing, and area of residence, recreation, religion, self-esteem, transportation, and government services. One main criticism is that the domains are usually chosen by the investigators, not by the individuals (Prince and Prince, 2001). However, comparison cannot be made between individuals' chosen domains as there could be an infinite variety of domains being chosen. In addition, it assumes that people have thought about and are able to describe their wellbeing, and can be asked to do so (Kahn and Juster, 2002). It has been suggested that this may not be the case for all people.

For instance, some philosophers would argue that to be able to assess what constitutes the 'good life', individuals need to know what is actually possible (Qizilbash, 1998). Campbell (1976) suggests that individuals judge their own situation in various life domains according to standards of comparison based on aspiration, expectations, feelings of what would be just, reference group comparisons, personal needs, and personal values. More recently Layard (2005) also refers to reference group comparisons when evaluating ones own life circumstances.

However, people's circumstances and options to date may make them more prone to having low expectations, which might result in the reporting of satisfaction in situations that the majority would find intolerable (Felce and Perry, 1995). This is akin to Sen's (1998, 1999) idea of 'adaptive preference', and Fay's, (1987: 31) 'false consciousness' where participants are in a state of resignation, passivity and conformity, and hence people's ability to choose could be compromised perhaps by their adverse social, economic or institutional situations.

It has been argued that although subjective and objective assessments of wellbeing do not necessarily correlate, there is a degree of overlap that could be considered complementary (Kahn and Juster, 2002; Diener and Lucas, 1999). It has been suggested that combining subjective with objective indicators would avoid the problems associated with the difficulties some

individuals may have in assessing their own wellbeing (Felce and Perry 1995). In addition, objective indicators are limited by the fact that the objective conditions in which individuals live may *influence* the experience of life, but may not *reflect* that experience (Campbell, 2002) because individuals have different values and experience life in different ways.

More value laden approaches to evaluating wellbeing lie in literature which distinguishes between more experiential hedonic and more reflective value laden eudemonic approaches to wellbeing (Waterman, 1993; Kahneman et al., 1999, Ryan and Deci, 2001, Keyes et al., 2002).

2.2.2 Hedonic and Eudemonic approaches to wellbeing

'Hedonic psychology' has been described by Kahneman et al. (1999) as the study of what makes experiences and life pleasant and unpleasant focusing largely on the preferences and pleasures of the mind and body. This may affect mood and emotion and is therefore similar to the 'affective' element of subjective wellbeing.

As noted by Ryan and Deci (2001: 144), most scholars within this school of thought view wellbeing as comprising subjective happiness and the 'experience of pleasure versus displeasure'. The primary focus of such research is to find ways to maximise 'happiness'. Kahneman et al. (1999) suggest that the terms wellbeing and hedonism are essentially equivalent. However, even though they are pleasure producing, some outcomes of hedonic behaviour are not good for people and would not promote wellbeing. A simple example would be cigarette smoking. Therefore it can be argued that subjective happiness cannot be equated with wellbeing and a list of dimensions of wellbeing should comprise something other than hedonic components. In her review of wellbeing in the natural environment, Newton (2007) asserts that most of the work on subjective wellbeing measures comprises hedonic measures (focusing on preferences and pleasures of the mind and body) and that further work is required to develop other wellbeing measures such as those of eudemonic wellbeing.

Eudemonic theorists clearly distinguish wellbeing as separate from happiness and hedonic elements of wellbeing by making this argument that not all desires and pleasures will contribute to wellbeing and may even cause harm. Rather, wellbeing (drawing from the work of Aristotle) should extend beyond 'pleasure' to capture the concept of human flourishing that incorporates the idea of realising one's true potential (Waterman, 1993; Ryff, 1995; Ryff and Keyes, 1995; Keyes et al., 2002). It defines wellbeing in terms of the degree to which a person is fully functioning and engaging in modes of thought and behaviour that provide engagement and fulfilment. It incorporates the idea that wellbeing is about achieving a sense of purpose and meaning in life rather than pursuing pleasure. Ryan and Deci's (2001) Self Determination Theory (SDT) has been particularly influential in specifying what eudemonic wellbeing entails. They argue that eudemonic wellbeing is fulfilled through the satisfaction of three psychological needs: autonomy (having a sense of control over one's life), competence (a sense that one is functioning

effectively) and relatedness (having positive interactions with others). They also stress that the relative importance of these varies across different cultures.

However, in the way hedonic approaches may neglect the fact that positive feelings do not always lead to personal growth and fulfilment and may be transitory and acquired through unsustainable means (Newton, 2007) similarly, a state of wellbeing cannot be achieved entirely by eudemonic approaches. The eudemonic aspect of realising one's potential for instance may not necessarily lead to happiness and contentment (ibid) and the ability to act out ones goals and potentials may therefore not be realised. Some of the literature further discusses these eudemonic elements of wellbeing under the realm of 'psychological wellbeing' and Positive Mental Health.

2.2.3 Psychological wellbeing and Positive Mental Health

Psychological wellbeing relates to Positive Mental Health (PMH) and concepts such as self-esteem, resilience and coping. Measures of these would give an idea of what might be needed to facilitate a *change* in ones level of wellbeing. McDowell and Newell (1987) consider psychological wellbeing to be synonymous with subjective wellbeing. However, measuring subjective wellbeing or happiness gives no indication of *why* happiness may be high or low – whereas measuring psychological wellbeing might give a handle on how to facilitate change in an individual's level of wellbeing.

The Department of Health has built on research commissioned by NHS Health Scotland to develop and test the suitability of a measure of Positive Mental Health at the population level. The new measure developed through this research is the Warwick Edinburgh Mental Wellbeing Scale (WEMWBS), which asks respondents to score how often a set of 14 positive statements of mental wellbeing applies to them. WEMWBS covers most dimensions of positive mental health currently in the academic literature, including both 'hedonic' and 'eudemonic' perspectives of wellbeing: positive affect (feelings of optimism, cheerfulness, and relaxation), satisfying interpersonal relationships and positive functioning (energy, clear thinking, self acceptance, personal development, mastery and autonomy) (healthscotland.com).

Ryff (1989) proposed a multidimensional model of psychological wellbeing with six components - autonomy, environmental mastery, personal growth, positive relationships, purpose in life and self acceptance. Fulfilling these multidimensional needs is presented as the natural aim of human life, which influences many of the meanings and purposes behind human action.

2.2.4 A multidimensional approach to wellbeing

It is evident that authors often cite a 'list' or 'indicators' or 'dimensions' of wellbeing which are the ingredients of human wellbeing. Such lists may be deliberately incomplete. Max-Neef (1993: 20)

states of his list that 'Fundamental human needs are infinite, few and classifiable.' It may be offered as one person's opinion of what may be universally true. One author states 'It does not matter if you disagree with my list' (Griffin 1996: 30). Such lists may also be used, revised, and offered as a best attempt at a general account (Finnis, 1980).

After an extensive survey of the Quality of Life literature, Robert Cummins identified seven domains which together constitute wellbeing. He developed a Comprehensive Quality of Life Survey instrument that collects subjective and objective indicators in these seven domains (Cummins, 1996). Based on her interpretation of Aristotle, Marta Nussbaum has widely circulated and defended a list of 10 central 'human capabilities', with the express intention that these should provide the basis for 'constitutional principles that should be respected and implemented by the governments of all nations' (Nussbaum, 2000: 5).

Abraham Maslow (1943) established what is known as Maslow's hierarchy of needs. It is often depicted as a pyramid consisting of five levels: the four lower levels are grouped together as being associated with physiological needs, while the top level is termed growth needs associated with psychological needs. The higher needs in this hierarchy only come into focus when the lower needs in the pyramid are satisfied. Once an individual has moved upwards to the next level, needs in the lower level will no longer be prioritized. If a lower set of needs is no longer being met, the individual will temporarily re-prioritize those needs by focusing attention on the unfulfilled needs, but will not permanently regress to the lower level.

A criticism of Maslow's theory may be that it is too hierarchical, linear, rigid and driven towards actualisation. Chilean professor and activist Manfred Max Neef has argued that human needs are non-hierarchical. He constructed a matrix of 10 human needs. He argues that consideration of these needs in a participatory manner enables a community to interpret their own situation holistically (Max-Neef, 1993). In the context of wellbeing this may lead one to focus not only on basic needs, but things that may enable actualization in the future. In addition, there are stages towards 'self actualisation' in Maslow's model. However, individuals may not only pursue things that will lead to something else i.e. people's motivations are not all instrumental. Some stages may perhaps be goals in themselves and might not be 'realizing' or 'actualizing' anything at all. It is also an individualistic theory, about individual motivations and the interface between the individual and the collective has not been taken into account

As these examples suggest, wellbeing is multidimensional. According to the complete Oxford English Dictionary (2nd Edition, 1989), 'Dimension' means 'the competent aspects of a particular situation'. Key features of dimensions are that they are component aspects of something that coexist with other components (Alkire, 2002). Wellbeing is the result of a number of individual and social phenomena. Hence, a certain number of main dimensions can be defined to assess the situation at a given moment in time. What exactly each dimensions refers to will depend on

the cultural and social context and will evolve over time. In her survey of the major 'lists' of dimensions that have been published in quality of life indicators, moral philosophy, cross-cultural psychology, poverty studies and basic needs, Alkire (2002) argues that such lists can also be supported by appeal to a particular philosophical argument, literary example, qualitative or quantitative evidence, broad consensus or common sense.

Newton (2007) states that as wellbeing is a multi-dimensional state comprising of both objective and subjective components, therefore, any attempts to explore the wellbeing benefits of the natural environment needs to capture both dimensions. The wellbeing literature emphasises the importance of people's experiences of the natural environment, particularly its influence on cognitive dimensions of how people think and affective dimensions of how they feel about their lives (Newton, 2007). She states that focusing on green spaces as a component of the natural environment provides a useful case study to explore the benefits of both ecosystem and wellbeing approaches to valuing the natural environment.

Furthermore, the role of wellbeing changes through one's life course and hence the role of the relationship between wellbeing and one's environment changes. Older adults tend to refer to life satisfaction and health in their spontaneous descriptions of self and life, whereas young adults focus more on self, personality, happiness, work, and education (Westerhof et al. 2001). Middle-aged individuals were found to emphasise self-confidence, self-acceptance, and self-knowledge, as well as job and career issues (Ryff and Heidrich 1997). For children[1] Biggeri (2006) found, education, love and care are primary in terms of relevance for children conceptualizing their own wellbeing.

This research therefore interprets wellbeing as a multidimensional concept. It examines both hedonic (stimulation, enjoyment and pleasure) and also eudemonic aspects of wellbeing - how one is fully functioning and engaging in modes of thought and behaviour that provide engagement and fulfilment (having a goal and purpose; positive interactions with others).

A number of dimensions are developed as a starting point to examine the multiple dimensions of wellbeing to be used in this study. In this way, all individuals are assessed by the same indicators, allowing comparability in analysis, and also possibilities for replicability and policy recommendations. More normative, 'objective' dimensions of wellbeing (e.g. the dimensions of health and security) are included in the list of ten dimensions of wellbeing developed for this research (chapter 5). However, it is subjective wellbeing that is examined in that it is an assessment of peoples own perception of their wellbeing. It looks to both short term affective emotional expression and reflection (mood and emotions) and cognition (how one thinks about one's life) and also longer term components of life satisfaction such as personal growth, self

[1] 'A child means every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier' (article 1 of the UN CRC; Detrick, 1999).

esteem, resilience and coping. It includes cognitive aspects of psychological wellbeing and positive mental health to provide an insight into what might be needed to facilitate a change in one's level of wellbeing.

Developing a list of dimensions of wellbeing overcomes any problems associated with the difficulties some individuals may have in assessing their own wellbeing (Felce and Perry 1995). For the development of dimensions of wellbeing for sustainably designed community gardens it is user's values that are being examined and a particular value based conception of wellbeing has been developed for this research. Such a value based conception of wellbeing is used in order to seek out both the inter- and intra personal elements of subjective wellbeing in such a sustainably designed setting.

2.3. Theorising Wellbeing: A capabilities approach

People attach different meanings, values and derive wellbeing benefits from their environment. The relationship between environment, activities and meanings has been explored by Gibson (1979) in his theory of environmental affordance. 'Affordances' describe the activities or meanings that are enabled by the characteristic of an environment (ibid). Gibson's work stresses the creation of opportunities but focuses on the physical qualities of the environment rather than the more value laden and affective meanings that can be ascribed to design and design of a particular space.

Newton (2007) argues that wellbeing methodologies have the potential to provide new ways to value the environment that do not rely exclusively on monetary techniques, since not all natural environments benefits can be expressed in monetary terms. In terms of theories of wellbeing, Amartya Sen's capability theory is applied to dimensions of human wellbeing in this research. Sen's theory takes into account both the wellbeing and agency aspects of humans and their enabling environment in evaluating individual wellbeing. This particular approach to wellbeing chosen for this research presents a pluralistic and open-ended framework that provides room for a value-based conception of wellbeing. The approach therefore fits with the premise that in order to give one choice and information about one's individual wellbeing, one's value system must be taken into account. The framework takes into account the freedom that people enjoy to achieve the 'beings' and 'doings' that they value. Sen's ideas have been taken on board by different academics that have developed his concepts into a framework called the Capability Approach (CA). The aim of these academics is to develop a broad normative framework for the evaluation of individual wellbeing and social arrangements (Nussbaum 1988; Sen 1999; Chiappero Martinetti, 2000; Jasek-Rysdahl, 2001; Alkire, 2002; Clark 2002; Robeyns, 2003).

The CA approach looks to individuals as agents of change in enhancing their own wellbeing. The core characteristic of the CA is to move away from income-led evaluation methods and focuses

on the ability people have to achieve the things that they value. The core concepts within the capability framework are 'functionings' which are the 'beings' and 'doings' people value and have reason to value; capability - different combinations of functionings that one can achieve or choose from, and human agency - a person's ability to pursue and realise the goals that he/she values. These concepts are used to broaden the informational space for evaluative judgements affecting different dimensions of human wellbeing. The way in which terms relating to the CA are used within this research are explained below:

Functionings

A functioning is an achievement of a person: what he or she manages to do or be, and any such functioning reflects a part of the state of that person (Sen, 2005). According to Alkire 'functionings' is an umbrella term for the resources and activities and attitudes people spontaneously value and recognise to be important – such as poise, knowledge, a warm friendship, an educated mind, a good job (Alkire, 2003: 5).

Capability

There are different combinations of functionings that one can choose from. Gore (1997) notes that while functionings refer to achievements, capabilities refers to the opportunity set. Capability can be viewed as a conceptual space within which decisions are made. It represents a person's ability to choose and be involved in valuable acts or reach valuable states of being (Nussbaum and Sen, 1993). There is a certain freedom to choose one's functionings and hence one's capability set. The place and setting within which such decisions about wellbeing are made and operationalised is termed the capability space. Each individual has a particular capability set and hence a particular capability space within which values are realised and everyday decisions made. This is illustrated in figure 2.1 where an individual makes a choice between a number of options (x,y,z). The conceptual space within which a decision is made is termed the 'capability space'. The ways in which decisions are made depend on one's personal capability, and freedom of choice and opportunity, all of which combine to form the agency of the individual. It also depends on the enabling environment – the physical, social and cultural environment in which the decision is made. The decision then has resulting achievements or 'functionings' i.e. beings, doings and havings which impact on individual wellbeing. Robeyns (2003) argues that an evaluation of social arrangements based on Sen's writings would not only be concerned with choice and the opportunity set, but also with the forces that contribute to convert opportunities into achievements. Such conversion factors are influenced by one's environment and the agency of an individual.

Agency

In his structuration theory, Giddens (1984) refers to human agency as the capability of an individual/group to influence the state of affairs or course of events and this in turn implies power. 'Power is the means of getting things done and, as such, directly implied in human action' (ibid:

283). Giddens argues that power is not a resource but it is through resources and structures that power is exercised. The need for an understanding of human agency is therefore according to Giddens, part socially and determined and part psychologically determined. In this way, people acquire vast 'stocks of knowledge' termed 'practical consciousness', through engagements with routinised daily activities and practices across space and time (ibid: 21). The awareness of social and codified rules, which form an important part of 'structure', is 'the very core of the knowledgeability which characterises human agents' (ibid). Therefore, Giddens asserts that human practices are the result of what is contained in the unconscious, practical consciousness and a continuous reflexive monitoring of daily activity. He also stresses that action can have unintended consequences which may feedback to create conditions for further acts.

Structuration theory has been the subject of widespread academic debate (Cloke et al., 1991). One of the criticisms focuses on the fact that structuration concepts do not transfer directly across into empirical enquiry. Moreover it has been said that Giddens is reluctant to see structuration theory applied in any conventional way but it has a useful purpose as a sensitising device (Johnston et al., 1994: 603). The relevance of Giddens structuration theory for this research is not to provide a blueprint for the empirical enquiry but rather to tacitly acknowledge the insights the duality of structure offers when tackling complex matters such as wellbeing.

Sen asserts that an agent is someone who acts and brings about change. Agency is concerned with the individual freedom to choose and bring about the things a person values (Nussbaum, 2000). It is affected by three conversion factors: personal characteristics (e.g. metabolism, physical condition, sex, reading skills, and intelligence) social characteristics (e.g. public policies, social norms, discriminating practices; gender roles, societal hierarchies, power relations) and environmental characteristics (e.g. climate, infrastructure, public goods and resources) (Robeyns, 2003). The concern for agency therefore means that expression - participation, public debate, democratic practice and empowerment are fostered alongside wellbeing. In this way, the CA takes into account counterfactuals, the freedom to set out and choose alternatives and the freedom to choose the functionings that one values.

Figure 2.1: General Conceptualisation of the Capability Space (adapted from Frediani, 2010)

2.4. Operationalising the Capability Approach

The CA uses value judgements in examining the multidimensionality of individual wellbeing. As it is an open ended and multidimensional framework, functionings and capabilities are defined for a particular research context.

Sen's approach can be used and developed in a variety of contexts and he does not define a comprehensive list of functionings and capabilities that should be used. He gives no practical guidelines to practitioners on how to assess or identify a list or number of capabilities (Comin, 2001). In this way, Sugden (1993) states that the CA's broad, multidimensional, and context dependent nature, may prevent it from having practical significance. In addition, Sen (1992) argues that evaluation of wellbeing should be measured within the space of capabilities and not functionings, thus evaluation should focus on opportunities rather then achievements. Nussbaum (2000) argues by not specifying a list of 'freedoms' or 'capabilities' developing an operational tool for the CA, it becomes amoral and too flexible, satisfying various and contradictory purposes. Therefore authors have proposed a list of 'capabilities' with the objective to operationalise Sen's writings. Nussbaum (2000: 78-80) in particular identifies a list of 'functional capabilities' – life (not dying prematurely), bodily health, bodily integrity (mobility, security, expression of choice), sense imagination and thought, emotions, practical reason, affiliation (ability to interact socially), other

species (concern for animals, plants and the world), play (enjoyment of recreational activities), control over one's environment (freedom of political expression). However, Qizilbash (2002) argues that this list is too complete, thus vulnerable to criticism as being too universal and not taking into account individual and cultural differences. Griffins (1996) put forward similar approaches to reach a middle ground between Sen and Nussbaum. They argue for an irreducible list of elements that would be associated with any functioning identified by individuals with different preferences.

Sen (2005: 158) states 'The problem is not with listing important capabilities, but with insisting on one pre-determined canonical list of capabilities, chosen by theorists without any general discussion or public reasoning. To have such a fixed list, emanating entirely from pure theory, is to deny the possibility of fruitful public participation on what should be included and why'.

Both theoretical and empirical evidence on pre-established links between various principles and features of sustainably designed community gardens and human wellbeing, is merged with the theoretical aspects of wellbeing developed in this chapter in order to develop a list of wellbeing capabilities to operationalise the CA for use in this research. This list (as developed in chapter 5) is then used to examine wellbeing impacts of such a sustainably designed space using the capability approach.

2.5. Conclusion

This chapter provides a working definition of wellbeing for this research as a value laden multidimensional concept. It comprises affective, cognitive, hedonic and eudemonic components, recognising short term and longer term subjective evaluations of one's wellbeing. At the core of this working definition of wellbeing is the freedom to achieve the things one values and has reason to value. A normative approach to evaluating wellbeing – the Capability Approach is developed which provides a language and framework for evaluating wellbeing in sustainably designed community garden spaces. This approach to wellbeing is combined with a particular approach to sustainable design as described in chapter 3 to form a set of wellbeing capabilities and design principles for sustainably designed community gardens in chapter 5. These capabilities and principles will be used to analyse the wellbeing impacts of sustainably designed community garden sites.

Chapter 3
Design and Ecological Sustainability

3. DESIGN AND ECOLOGICAL SUSTAINABILITY

3.1. Introduction

This chapter aims to provide a working definition and approach to sustainability for the purpose of this research, which is to examine wellbeing impacts of sustainably designed community gardens. A history and evolution of sustainability is provided in order to seek out how in particular ecological sustainability comes to the fore in design of the built environment. Next, the chapter reflects on how the development of principles of ecology may provide a way of understanding and implementing ecological thinking in design and development. Finally this chapter paves the way for examining a particular element of the built environment – urban green space – the community garden being one typology of urban green space that exhibits ecologically sustainable design principles and features and is used as a locus for this research.

3.2. Design and the sustainable development paradigm

Sustainability suggests an overall condition, often a global perspective. Sustainable development emphasises development and how to do it (Forman, 2008). However, there are many nuances and contradictions within the sustainable development paradigm (Redclift, 1987; Connelly, 2007; Krueger and Gibbs, 2007; Atkisson, 2011a,b). The choice of definition is usually tailored to the user's objective (Forman, 2008). Furthermore, the 'fuzziness' of the collective understanding of such a critical concept among design professionals is a basic but unresolved issue (Derbyshire, 2011).

The terms 'ecological', 'eco', 'sustainable', 'environmental' and 'green' are often used interchangeably. The political ecologist Andrew Dobson (1995) argues that ideologies have a definitive essential core of principles and values but he recognises that these principles and values are constantly being defined and revised. He makes a distinction at least between 'environmentalism' and 'ecologism' stating that 'environmentalism' argues for a managerial approach to environmental problems, secure in the belief that they can be solved without fundamental changes in present values or patterns of production and consumption. 'Ecologism' holds that a truly sustainable and fulfilling existence presupposes radical changes in our relationship with the non-human natural world and in our mode of social and political life (Dobson, 1995: 1). Dobson regards environmentalism as 'light green' and ecologism as 'dark green' (ibid).

A brief historical perspective is useful in order to trace the influence such 'ideologies' have had in design and development of our towns and cities. In the 1960s development was primarily measured by social cost benefit. This was a measure of profitability to society of policies. In 1962 Rachel Carson raised concerns about humanity's uncertain future in an ever degrading environment. The 1970s brought a rejection of the idea of the pursuits of higher outputs

regardless of the consequences (Birkeland, 2002). In 1972 *The Limits to Growth* was published (Meadows and Meadows, 1972). The authors were attempting to alert people to the dynamics of the World system, its tendency to overshoot and collapse. In the 1980s the green movement, looked to social change, which was seen to be needed to alter underlying belief structures, institutions and decision-making processes. The greening of development and 'green design' became the buzz word of the 1980s but has been viewed as a reactionary 'light green' approach rather than making any fundamental changes to how design is undertaken (Madge, 1997: 46). In the 1990's ecologically, environmentally–sensitive, or more generally 'ecodesign' became a widely accepted term but it was the term 'sustainable' that became the mantra of the 1990s (ibid).

The term 'sustainable' brought an attempt to allow social, economic and environmental development considerations to be assessed within a single framework – 'Sustainable Development' met this criterion. The term 'Sustainable Development' can be traced from *Our Common Future*. This report of the World Commission on Environment and Development (The Bruntland Report, 1987: 9-10) examined the relationships between economic development and environmental sustainability, defining sustainable development as:

…*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*.

Atkisson (2011a) argues that vagueness gathers not around the term 'sustainable', but around the concept of 'needs'. With a focus on human needs, it may be argued that the Brundtland definition is anthropocentric (Barton, 2000: 88). Dobson (1995: 62-64) makes the distinction between 'human-centred' (weak) and 'human instrumental' (strong) anthropocentrism stating that weak 'human-centred' anthropocentrism is an unavoidable feature of the human condition. In contrast Arne Naess (1989) argues that every human, animal or plant has equal rights. He emphasises the realisation of humans as part of an 'ecospheric whole' (ibid: 163-65). It is in this whole that our true ecological self can be realised and if one does not know how the outcomes of ones actions will affect other beings, one could not act.

The Brundtland definition therefore assumes that individuals understand environmental limits and are able to interpret the results of their actions in the everyday environment. The definition has its roots in the Malthusian theory of 'environmental limits' (Mebratu, 1998) and a similar sentiment is expressed in the IUCN report where human development occurs but within the limits of what the earth can supply at any one time (IUCN et al., 1991). At the heart of the Government's Sustainable Development Strategy 'Securing the Future' (HM Government, 2005), lies living within environmental limits and ensuring a just, healthy society. However, there are also differing concerns about what might be referred to as environmental sustainability, related to how we use the world's natural resources, as compared to justice-focused sustainability, which emphasises the costs and benefits both within and across different generations (Pearce, 1993). The definition

is also unclear about the capacity of the earth to sustain unlimited growth and development and some interpretations of the term have assumed unlimited economic growth, prompting further schisms in interpreting the meaning of the term.

Mebratu (1998: 504) considers three ways of perceiving sustainability.
1) The first is termed 'the ideological version' which deals more with the way in which people view the world and their place within it.
2) The second is termed 'the academic version' which turns the environment into a commodity and gives it a value in economic decision-making. Within this distinctions have been made between weak 'steady state' and strong 'utopian' sustainability. In a Scottish Executive (2006) report on sustainable development, weak sustainability assumes that human made capital such as technology will substitute natural capital when it is run down, providing a specified level is never breached. Strong sustainability, however, demands that natural capital is protected absolutely and that no substitute can be made if resources are depleted. Strong and weak sustainability are prominent in ecological economics (Victor, 2010), and focus on the substitutability between the economy and the environment (Ayres et al., 2005).
3) Mebratu's third way of perceiving sustainability is termed 'the institutional version'. The goal here is for clean, equitable sustainable economic growth. However, such 'sustainable growth', in the opinion of the economist Herman Daly (1990:71-76) 'implies an eventual impossibility of unlimited growth in a finite system'.

A number of authors (Hajer, 1995; Luke, 1995; Harvey, 1996; Drummond and Marsden, 1998) argue that sustainable development could be read as a power/knowledge discourse for accumulating power, continued capital growth and the maintenance of existing neo-liberal power relations fulfilling the requirements of continuous capitalist accumulation. Orr (1992) argues that when society is seen to become sustainable within such a neo-liberal paradigm, discussion and dialogue about environment and development is mostly centred on discussions about policy adjustments or technological fixes and the deeper causes are seldom mentioned.

Beatley (1994) describes promoting 'sustainability' as one of what might be called middle-range ethical principles that can provide for human action, and on which considerable agreement might be reached between different values and ethical camps. However, Torgerson (1995) comments that sustainability is so ambiguous that it allows actors from various backgrounds to proceed without agreeing on a single action. Likewise, Counsell (1999) argues that the recontextualisation of sustainability is a politically structured process in which it can be used to support opposite points of view. Raco (2007: 234) even talks of exploring 'the sustainability of sustainability agendas'.

Strong, utopian and ideological versions of sustainable development look to finding alternatives to rethink energy, design, transportation, economics and resource use and our central values

around these. Orr (1992: 23-24) refers to such interpretations as 'ecological sustainability' and the weak, steady state institutional versions as 'technological sustainability'. Atkisson (2011a) advocates a similar definition that is grounded in the discipline of system dynamics. He asserts that the word 'sustainability' simply refers to the ability of *any* system to keep going over time. 'Sustainable development' meanwhile means *change over time* in the direction of sustainability (Atkisson, 2011b: 3). It is this approach to sustainability – termed ecological sustainability which is used within this research.

3.3. Defining Ecological Sustainability

The belief in technological sustainability is that nature can be 'managed' by understanding and manipulating natural processes. Orr (1992) argues that such an approach to sustainability does not question the current economic worldview. It assumes that the causes of unsustainability are those of inaccurate pricing and poor technology. At the United Nations Conference on Environment and Development in 1992 (the Earth Summit in Rio de Janeiro) sustainable development had grown to embrace a broader notion of collective responsibility in the form of sustainable communities. However, Orr (1992) argues that there was still little evidence that the proponents of sustainability understand democratic process, or comprehend the power of an active, engaged, and sometimes enraged citizenry.

Advocates of technological sustainability believe that economic growth is essential and that humans are economic maximisers. Herman Daly (1990:71-76) states that we must confront issues of scale and efficiency and we must 'keep the economic scales within ecological carrying capacity'. Growth in the 'developed' economies depends on a steady flow of food, energy, and raw materials from the 'global south'. Sellers of raw materials are highly vulnerable to price fluctuations and materials substitution. Orr (1992) argues that developing countries should selectively disengage from the global economy and chart alternative strategies for meeting basic needs. Senghaas (1984) refers to such a strategy as 'de-linking'.

Atkisson (2011b: 9) provides a distinction between 'growth' and 'development' stating that development means *change* over time; growth means *expansion* or time. Development is the key concept here. In term of sustainability Atkisson believes that something has to grow for a system to be sustainable. New sources of energy must increase, new technologies must spread, and new policies must spread and replace the old. But for sustainability to be possible, something has to stop growing, or to shrink. Development on the other hand is a more qualitative improvement in humanity's technologies, way of life, patterns of governance, economic systems and creative expression (Atkisson, 2011a). For theorists of sustainability there are practical and ethical questions regarding scale of development such as to what extent must population and resource use stay within the limits of local, regional and national carrying capacity and what level of imports of which commodities constitutes unsustainability.

Ecological sustainability will not come primarily from top-down approaches but from the careful adaptation of people to particular places (Orr, 1992). It will require a patient and systematic effort (Atkisson, 2011b) to restore and preserve traditional knowledge of the land and its functions. This is knowledge of specific places and their peculiar traits of soils, microclimate, wildlife, and vegetation, as well as the history and the cultural practices that work in each particular setting. The crisis of sustainability has occurred only when and where this union between knowledge, livelihood, and living has been broken and Marten (2001) argues that today's human–environment system has failed and is in this way unsustainable. He advocates Human Ecology as a way in which human society and the environment function as a self organising and adaptive system. He advocates the creation of human relationships with this environmental support system.

Advocates of human ecology and ecological sustainability understand that humans must adapt to and are limited by their environment. Among the most important implications are issues of scale and centralisation. Wendell Berry (1987:22) describes two different kinds of limits: those on our ability to coordinate and comprehend things beyond some scale and those inherent in our nature as creatures with a limited sense of the good and willingness to do it (ibid: 67). At some larger scale it becomes difficult to detect diversity and subtle difference in local environments. In the same way as surface to volume ratios limit the size of biological organisms and naturally formed physical structures, proponents of decentralisation (Schumacher, 1974; Kohr, 1978) argue that there are these similar principles of optimum size decentralisation for cities, nations, corporations and technologies. One reason for this has to do with human limits to understand and manage complex systems. Orr (1992) argues, for example, that the ecological knowledge and level of attention necessary to good farming limits the size of farms. Beyond that limit, the 'eyes to acres' ratio is insufficient for land husbandry (ibid: 35-36). At some larger scale it becomes harder to detect subtle differences in soil types, changes in plant communities and wildlife habitats, and variations in topography and microclimate. The memory of past events like floods and droughts fades. As scale increases, the farmer becomes a manager who must simplify complexity and homogenise differences in order to control. Beyond some threshold, control therefore requires power not stewardship. Orr (1992: 36) argues that beyond this scale, it is not possible to see the outcomes of your actions and where your waste and energy goes. He argues that the same is true for things in the built and natural environment other than farms. Increasing scale increases the number of things that must be attended to and the number of interactions and interrelatedness between components. He states that 'rising scale also increases the cost of carelessness' (ibid: 36).

Sustainability is often recontextualised at a small scale locally and illustrated by way of case studies. Here, analysts have developed studies seeking to show sustainability in action in various localities. This is in part the result of the implementation of Local Agenda 21 (LA21) - the

result of a program run by the UN related to sustainable development at the earth Summit in 1992. In theoretical terms this approach may be informed by the "new localism" literature, a viewpoint that asserts the efficacy of localities in promoting sustainability (Krueger and Gibbs, 2007: 3). Massey (2007) advocates an assertion of local relational agency and can be rooted in the realities of recognisable interdependence. It can provide a locus for campaigns and can move away from the grounds of individualised culpability towards the terrain of collective responsibility. However, in order to achieve collective responsibility, the individual must be active and competent with information and choices available. A component of what Orr (1992: 30) terms 'ecological sustainability' has to do with the active role of the citizen in the creation of a sustainable future in that sustainability will rest on foundations that require an active, competent citizenry. 'Local place', states Massey (2007: 183) can be one potential basis for political organisation around responsibilities. However, what Massey suggests is a networked, practised, internationalism. It is a local internationalism. This is akin to the concept of 'glocalisation', which has been used to show the human capacity to bridge scales (from local to global) and to help overcome meso-scale bounded 'little box' thinking (Wellman and Hampton, 1999; Wellman, 2002).

Ecological sustainability has therefore evolved an epistemology of sorts around the concept of interrelatedness and appropriate scale. It involves what Gregory Bateson (1975: 13-15) called the 'pattern that connects' in that we are not outside the ecology for which we plan, but are always and inevitably a part of it. The search for interrelatedness is a revolt from Cartesian logic, reductionism, and the fragmentation characteristic of modern science, conventional economics, and even some of modern ecology (Goldsmith, 1996). It also recognises that the world is paradoxical and that our understanding will always be incomplete.

The definition of sustainability used in this research is oriented toward understandings of the ecological i.e. the interrelatedness of living things to one another and their environment. This approach advocates not only an element of learning through design but also a transformative shift in thinking about how we design our local environments. This is termed ecological literacy which has its roots in principles of ecology.

3.4. Principles of ecology

The term 'ecology' was coined in the mid 19th century by Ernst Haeckel to refer to a new branch of biology concerned with the relationship between living organisms and their surroundings. For Haeckel ecology had social and political implications (Bramewell, 1989). Ecologists contend that the interaction of both the biological (biotic) and physical (abiotic) constituents of the environment together form a spatial unit, which is termed an ecosystem (Tansley, 1935). The term ecosystem has been used both to define a unit of study and to describe a concept or approach – for examining environmental systems (McIntosh, 1989).

In the period up to the 1960s the idea of ecological science was based on a mechanistic view of ecological balance (Madge, 1997). A new ecology which developed from the 1970s onwards rejected the idea of nature as a balanced system and looked to disequilibrium - to nature as unpredictable, dynamic, evolving and self-adaptive (ibid).

The second law of thermodynamics states that energy tends to dissipate and systems drift inevitably towards chaos (entropy). However, in contrast to this, biological systems tend to become efficient at "grabbing" this energy to become increasingly complex and efficient (Prigogine, 1977). Within such biological systems a flow of energy leads to clearly defined (trophic) structures, biotic diversity, and material cycles (i.e. exchanges of materials between living and nonliving parts) within the system (Odum, 1983).

Lovelock (1979) showed that the biosphere, or Gaia, actually created these conditions that are required for its support and systematically builds up the stock of materials it requires to move towards increasing complexity, diversity, and stability. The biosphere contains the steady state system intermediate in the flow of energy between the high energy inputs of the sun and the thermal sink of space (Odum, 1983) and the earth and the biosphere can be considered a closed materials system with a finite mass.

Ecologically we therefore can conceive the earth as a unit. This finiteness defines the limit to which human use of the earth's resources is restricted. Therefore, the totality of the interactions between the biotic and abiotic constituents of all the ecosystems within the biosphere and the finite quantities of the earth's energy and material resources is our ecological context and as such can be considered the final limiting factor in all designed activity (Yeang, 1995). Mc Harg (1992) has argued that human society must fit with nature in that humans must understand that the integrity of human societal systems are inextricably linked to the integrity of natural ecosystems.

Capra (1997) has advocated that taking such an approach to human and natural systems harnesses new understanding for organised systems in business, politics, health care, education, and everyday life. In 20th century science such a holistic perspective became known as 'systemic' and the way of thinking it implies as 'systems thinking'. According to the systems view, the essential properties of an organism, or living systems, are properties of the whole, none of which of the parts have. In the 1920s the term 'emergent properties' was coined for those properties that emerge at a certain level of complexity but do not exist at lower levels. This concept of 'organised complexity' became the very subject of the systems approach (Checkland, 1981: 78). 'Emergence' suggests that self organisation within complex systems results in activity, structures, and behaviours that clearly emerge from within the system but have the effect of either transforming it or producing some completely new system (Holmgren, 2002).

It was Bertalanffy's (1969) concept of a General Systems Theory (GST) established systems thinking as a major scientific movement. He stated that the fact that there are general conceptions in different fields is a consequence of the fact that these are concerned with 'systems' and that 'certain general principles apply to systems irrespective of their nature' (Bertalanffy, 2008: 84). Ideas from systems theory have grown with diversified areas exemplified in the work of ecological systems which look to natural ecosystems as open, self-organised, complex and adaptive systems (Kay et al., 2002):

Ecosystems as open systems

Natural systems and human systems feed on a continual flux of matter and energy from their environment to stay alive. They are not static systems closed to the outside but rather material continually enters from, and leaves into, the outside environment (Bertalanffy, 1968). Open systems maintain themselves far from equilibrium in a 'steady state' characterised by continual flow and change. Spontaneous coherent behaviour and organisation occurs in open systems. Central to understanding such phenomena is the realisation that open systems are processing an enduring flow of high quality energy (exergy) from the sun. When the input of exergy and material pushes the system beyond a critical distance from equilibrium, the open system responds with the spontaneous emergence of new, reconfigured organised behaviour. Once a dissipative process emerges and becomes established, it manifests itself as a structure. As more exergy is pumped into the system, more organisation emerges.

Ecosystems as self organising systems

Self-organising 'dissipative' processes emerge whenever sufficient exergy is available to support them. These systems tend to get better and better at "grabbing" resources and utilising them to build more structure thus enhancing their dissipating capacity. These structures provide a new context, nested within which new processes can emerge, which in turn beget new structures. Thus emerges a Self Organising Hierarchical Open system (SOHO), a nested constellation of self-organising dissipative structures (Kay, 2002: 75). The theory of non-equilibrium thermodynamics suggests that the self-organisation process in SOHO systems proceeds in a way that captures increasing resources (exergy and material); makes ever more effective use of resources; builds more structure; and enhances survivability (Kay, 1984; Kay and Schneider, 1992; Schneider and Kay, 1994a). Kay (2002) also states that both natural ecosystems and societal systems cannot be understood without understanding them as SOHO systems. Which state is currently occupied is a function of its history. There is not a 'correct' state for the system, although there may be a state that is preferred by humans (ibid).

Ecosystems as complex systems

Solar energy (exergy) is transformed into chemical energy by the photosynthesis of green plants, which drives ecological cycles. As ecosystems develop or mature they should develop more complex structures and processes with greater diversity. They will develop in a way that

systematically increases their ability to degrade incoming solar exergy (Kay, 1984; Kay and Schneider, 1992; Schneider and Kay, 1994a,b). More cycling, and more hierarchical levels aid exergy degradation. The more processes or reactions of material and energy that there are within a system (i.e. metabolism, cycling, building higher trophic levels) the greater the possibility of exergy degradation. A number of expected changes in ecosystems occur as they develop (Kay, 2002: 77):

1. More energy capture.
2. More energy flow activity within the system.
3. More cycling of energy and material and cycling positive and negative feedback loops.
4. Higher average trophic structure.
5. Higher respiration and transpiration (exergy utilisation).
6. Larger ecosystem biomass (more pathways fro exergy utilisation).
7. More types of organisms (diversity), therefore more pathways for utilising exergy).

As various nutrients are passed along through the ecosystem, the relationships we observe are many forms of partnership, of cooperation. Ecosystems achieve stability and resilience through the richness and complexity of their ecological webs. Diversity means many links, many different approaches to the same problem, so a diverse community is a resilient community. The greater their biodiversity, the more resilient they will be as a diverse community can adapt to changing situations. When a link is destroyed, the ecosystem can still survive, as this destroyed link is not the only one of its kind (Capra, 2003). When one link is destroyed, the others should be able to partially fulfil the function and herein lays the relevance of diversity.

Ecosystems as adaptive systems

There is, however, in principle, an upper limit to this organisational response. Beyond a critical distance from equilibrium, the organisational capacity of the system is overwhelmed and the system's behaviour leaves the domain of self-organisation and becomes uncertain and chaotic. This is largely a function of positive and negative feedback loops. Holling (1986) has developed a general model of ecological change that proposes that the internal dynamics of ecosystems cycle through four phases: rapid growth (r), conservation (k), collapse or release (Ω) and reorganisation (α). The model proposes that, as weakly connected processes interact, some processes reinforce one another, rapidly building structure or organisation (rapid growth (r), and conservation (k) phases). However, the system becomes dependent upon structure and constraint for its persistence leaving it vulnerable to either internal fluctuations or external disruption. Eventually, the system collapses (Ω), allowing the remaining disorganised structures and processes to reorganise (α) (see fig 3.1). Exit from the cycle occurs when ecological reorganisation into a more or less productive and organised ecosystem is most likely to occur.

As the phases of the adaptive cycle proceed, an ecosystem's resilience expands and contracts. In ecology, an example of such a system is a mature forest. An ecological disturbance such as fires, floods or grazing or disease disturbs ecological processes. This results in a 'release' or collapse phase because it indicates the end of an existing organisation. It is this shift from release to reorganisation that creates uncertainty. This state is transitory. During this phase, an ecosystem can easily lose resources and new actors can enter it. The lack of control allows novel organisations to form. New species of plants and animals can invade the ecosystem as the ecosystem has little resilience. Such changes make it impossible for a given organisation to remain static and stable. This alternation between stages may represent a necessary tension between invention and efficiency.

Figure 3.1: Stylized adaptive cycle diagram

(Source: http://www.ecologyandsociety.org redrawn from Gunderson & Holling, 2002)

Such a conceptualisation of nature being uncertain, dynamic, complex and adaptive systems is in contrast to an often imaginary fixed 'idealised' nature that is harmonious and balanced. Zizek (2006) insists that the 'nature' we see and work with is necessarily radically imagined, scripted, symbolically charged, and radically distant from the various natures that are out there, which are complex, chaotic, often unpredictable, often radically contingent, risky, patterned in endlessly complex ways. Swyngedouw (2009: 19) refutes the singular idea of Nature which has a rightful point, is fixed and fundamentally benign. He states that a singular imagining of nature as fixed has resulted in 'the world's premature ending in a climatic Armageddon (which) seems easier to imagine (and sell to the public) than a transformation of (or end to) the neoliberal capitalist order that keeps on practicing expanding energy use and widening and deepening its ecological footprint' (ibid: 19).

Capra (2003) states that every living community is always a learning community and that development and learning are always part of the very essence of life because of this continually fluctuating network pattern. A community can learn from its mistakes, because the mistakes travel and come back along feedback loops. Then one can learn, and the next time around one

can do it differently. Then the effect will come back again and one can learn again, in steps. A community potentially has its own intelligence and its own learning capability. However, when precisely the change will occur and what state the system will change to, are generally not predictable.

Having its origins in systems ecology, these principles of ecology may be used in the design of the built and natural environment. This philosophy represents not just a shift in the way things are made and designed but also a shift in language and epistemology. Form and pattern are visualized and hence relationships cannot be measured and weighed. Capra (2003: 202) states that what is important is a pattern of organization to understand and his principles of ecology include networks; cycles; solar energy; partnerships; diversity and dynamic balance. This links to what Bateson refers to as the 'pattern that connects' (Bateson, 1979: 13-15).

Thinking ecologically is therefore a way of integrating human purpose with nature's own flows, cycles and patterns and its natural flux. Orr (1992) states that ecology is an applied subject. Its goal is not just a comprehension of the interrelationship between things and therefore how the world works, but, in the light of that knowledge, a particular worldview and a life lived accordingly. He uses the term ecological literacy which implies the ability to think broadly, to know what is linked to what - the interrelationships of things.

3.5. Becoming ecologically literate

Benyus (2000) argues that education ought to begin with the power of language, appropriately and carefully used, which needs to merge around a vision and a worldview. Such a qualitative and holistic ecological worldview is advocated by Edward Goldsmith (1996) and requires ecological knowledge and understanding, a concept described by Orr (1992) as ecoliteracy and by Stibbe (2009) as sustainability literacy.

Both terms have their intellectual grounding in systems thinking but sustainability literacy also explicitly takes into account more social and ethical concerns in awareness raising and education. Both take a 'holistic science' perspective looking to whole systems, linkages, processes, patterns, context, and nature's outcomes at higher systems levels. Odum (1983) argues that holistic science cannot be conducted through the reductionist methods characteristic of much science and Holmgren (2002) argues that many biologists are reluctant to accept the idea of 'emergence' and any higher-order control beyond the organism level. Holmgren sees this reluctance as reflecting the Cartesian mechanistic worldview and suggests that perhaps this reluctance is partly driven by a fear of the re-emergence of a spiritual wholism to explain nature. He argues that it is ironical that the life sciences are the last to discard this view and accept that higher-order system control operates at all levels in nature in the form of systems thinking.

Systems thinkers can be found in the many fields of education, organizational and business management, computer science and engineers regularly use the idea. However, systems theory has been debated and criticised for being a totalising grand theory which emphasises certain perspectives and relatively ignores other perspectives (Lilienfeld, 1978). It has also been criticised for ignoring institutional processes and power relations (Ryan and Bohman, 1998). To remedy this, Montuori (1998) has argued that the systemic critique of reductionism has to be broadened to include the tendency for modernist reductive/disjunctive thought to treat the context, the "other", purely in terms of instrumental/power relations. According to Bohm (1991) our very understanding of the "environment" must change, as he points out that traditionally we have thought of the environment as something abstract and "out there". Being abstract, the environment is consequently something from which the individual can be abstracted, and which, in turn, can be abstracted from the individual (Montuori, 1998). However, Odum (1983) has argued that to see things in their wholeness is politically threatening. To understand that our manner of living is linked to other people around the world and to the depletion of resources is to see the need for fundamental change in our way of life.

Disjunctive thought of the modernist era seeks to simplify matters leading to a mentality of control and prediction. Montuori (1998) states that such simplicity is valued because it allows leaders to "take a stand" and be "firm" about ones position. He advocates systems theory as reconciling the chaotic nature of postmodern thought while also reconstructing the disjuncture of modernist thinking where either there is order, or there is chaos whilst unmasking the arbitrary power displayed by those who are in a position to organise. What then becomes apparent is that order and disorder are forever intertwined – that one does not exist without the other in "complex thought" (Morin, 1994).

One of the goals of ecoliteracy is built on the recognition that the disorder of ecosystems reflects a prior disorder of mind, making it a central concern to those institutions that purport to improve minds (ecoliteracy.org). Being ecologically literate requires the capacity to observe natures systems with insight, 'a merger of landscape and mindscape' (Orr, 1992: 85). Benyus (2000) argues that the city needs to be reclaimed as part of the neo-agrarian world. People who do not know the ground on which they stand miss the capacity to distinguish between health and disease in natural systems and their relation to health and disease in human ones. In doing so, she argues we may have to think about the dichotomies of rural and urban, nature and resources. The physical manifestation of ecological literacy in our built environment is ecologically sustainable design.

Ecological designers Van der Ryn and Cowen (1996: 162) state that 'design transforms awareness' and in designing our built and natural environment we can learn valuable lessons from ecosystems. At each level, cell, organism, ecosystem, bioregion, ecoregion and biosphere – a series of critical design opportunities and constraints is presented (van der Ryn and Cowan,

1996: 103). An ecoregion for example specifically highlights biological distribution. It is a large area of land and water typically characterised and delineated by climate, geology, topography, and associations of plants and animals (Forman, 2008: 13). Hence it divides the land surface up biophysically rather than by political boundaries.

Rounsefell (2002) argues that a holistic approach to site evaluation, planning and design for both ecosystem and human needs (including psychological and social needs) is increasingly expected in 'best practice' design. The connection between design decisions for individual projects and global ecological threats such as loss of biodiversity and major climate change are examined and respected by practitioners who use ecological principles to inform design.

3.6. Introduction to ecologically sustainable design

Thinking ecologically about design is certainly not a new idea. Since ancient times designers looked to nature for solutions to their common problems - they saw nature as a perfect model to follow (Lomba-Otiz, 2003: 2). However, the increasing concern in the last few decades over the impairment of the earth's natural systems (i.e. ecosystems within the biosphere) has elicited a variety of reactions from designers resulting in many views toward ecological design (Yeang, 1995).

A number of designers who derive their design concepts and practices from ecological principles have developed their own frameworks to guide the design process (Lovins, 1977; Lyle, 1985; Todd and Todd, 1994; Van der Ryn and Cowan, 1996; Mc Donagh, 2002). A set of frameworks (termed principles/rationales/checklists by authors) in designing 'ecologically' in the built environment are detailed in appendix A. This list is includes examples from the disciplines of architecture, design, human ecology, landscape design, permaculture design, sustainable construction and industrial ecology and use varying terms such as ecological/sustainable/eco-/ecologic/green to describe their approach to design. What they have in common is that they all regard nature not just as a set of limits but as a model for the design of green spaces, housing, cities, neighbourhoods, farms, technologies, and regional economies. They all aim to minimise energy and waste inputs. A number specifically emphasise designing for nature, for humans to co-exist and be interdependent with nature in the developed sites (McDonagh, 2002; Rousenfell, 2002). The importance of place is also specified (Van der Ryn and Cowan, 1996; Rounsefell, 2002; Osmond, 2002; Williams, 2007) as is the need to consider the needs of future generations (McDonagh and Braungart, 2002; Williams, 2007). Although Mc Donagh (2002: 25) emphasises looking beyond human wellbeing (principle 4 – 'accept responsibility for the consequences of design decisions upon human wellbeing, the viability of natural systems and their right to co-exist'), the impact of the application of these sustainable design principles on human wellbeing is implied rather than made explicit. Mollison's (1988) permaculture principles place greater emphasis on human elements of design – citing 'people care' and 'fair shares'. However, it is

implicit that designing with nature, using nature as a model and the resulting designs which minimise waste and energy inputs and outputs, will impact on wellbeing in a positive manner. However, the way in which wellbeing may be impacted on has not been explored.

According to designers Van der Ryn and Cowen (1996: 28) the idea of looking to ecological processes as a model for design can be seen in the strong movements for ecologically sound town planning, healthy building, organic architecture, appropriate technology, renewable energy, and interdisciplinary approaches to design. They state that design pioneers such as William Morris's Arts and Crafts Movement, Rudolph Steiner's biodynamic agriculture, Ebenezer Howard's garden cities, Patrick Geddes's and Lewis Mumford's regional planning, and Frank Lloyd Wright's organic architecture – each celebrated design as a human scale firmly situated in a wider ecological context. The discipline of landscape design in itself may be regarded as a process of structuring relationships between humans and nature (Osmond, 2002), a relationship which is always continuously with natures processes.

Yeang (1995: 187) states that 'there is no central unifying theory or commonly accepted concept defining what ecological design is', arguing that it is evident that an interdisciplinary approach is needed in order to comprehensively minimise adverse effects of humans on the earths ecosystems and resources. Manzini and Jegou (2003) have described an ecological approach to design as a shift from the normalised ecological design of the 1980s and the new radicalism of the 1990s which increasingly recognises that ecological design necessitates changes in lifestyles that challenge the current global model of development. Derbyshire (2011: 24) asserts that the associated negative perception of the aesthetics of ecological design has maintained a 'play it safe' approach to the sustainable development of metropolitan centres maintaining the status quo. Mozingo (1997: 46) has stated:

> *Ecological design needs to teach and convey with greater emphasis the possibility: indeed historically the fact, that the dynamic interaction between humans and the ecological world can be positive and mutually beneficial.*

Furthermore, Lomba-Ortix (2003) has claimed that an examination of the paradigm driving the ecological design movement will show that it addresses issues in a reactionary and remediative fashion. She conflates ecological design with green design arguing that it is shaped by the dominant worldview, a highly westernised and human-centred view that in the end lacks ecological consciousness. Ecological consciousness is cultivated by 'deep ecology' and is the understanding that everything is interconnected (Devall and Sessions, 1985; Naess, 1989). It calls into question how ultimately technology relates to the environment, novel alternatives of materials and the socio-economic impact of their designs on local cultures (Lomba-Ortix, 2003).

Madge (1997: 52) states that 'sustainable design' refers to a broader long term vision of ecological design, analysing and changing the systems in which we make use and dispose of materials. Dewberry and Goggin (1994) have also explored the distinction between ecological design and sustainable design; arguing that, whereas ecological design can be applied at a micro scale, the concept of sustainable design, however, is much more complex and moves the interface of design outwards toward societal conditions, development and ethics. This suggests changes in design and the role of design, including an inevitable move to a systems based approach and will involve concepts such as dematerialisation and 'a general shift from physiological to psychological needs' (ibid: 7-8). They conclude that ecodesign/ecological design do fit into a global move toward sustainability, but has many limitations in this context in that there is a fear that ecological design will remain the luxury of the affluent countries while the cost of environmental standards would be shifted onto the shoulders of developing countries.

Van der Ryn and Cowen's five generic principles of ecological design (See appendix A) will be used as a starting point to further develop sub principles and resultant features of community gardens sites as ecologically designed urban green spaces. Some of the sub principles and features examined are ecologically based from a systems perspective, but others relate more to social and ethical concerns and go beyond the purely ecological. It is an ecologically sustainable approach to design which will be used in this research in order to explicitly take into account both an 'ecological' (open, complex and adaptive systems based approach) and a longer term 'sustainable' versions of design, taking into account such broader social and ethical issues.

3.7. Urban green space and ecologically sustainable design

There are many existing sustainable design solutions linking people and landscape that are particularly applicable to urban green space. The design principles detailed in appendix A contain some of those sets of principles which may be applied to the sustainable design of productive urban green space. The recent Continuous Productive Urban Landscapes (CPULs) concept for growing food in compact urban forms, aims to enhance quality of life in cities (Viljoen et al., 2005). Permaculture is one approach within the CPUL concept which takes a systems approach to design. It looks to producing food while designing in low energy and waste solutions for both rural and urban areas.

Permaculture arising from 'permanent agriculture' was initially conceived in the 1970s by Bill Mollison and David Holmgren as 'perennial agriculture for human settlements' (Mollison and Holmgren, 1978: 1). The initial concept was that sustainable agriculture was the essential base to a sustainable society, and that current agriculture practices, dependent as they are on fossil fuels, are doomed to 'slow degeneration, or total collapse, as non-renewable resources run out' (Mollison and Holmgren, 1978: 4). Mollison discusses the 'energy benefits' from design regarding permanent agriculture 'as a valid, safe, and sustainable, complete energy system' (Mollison, 1979:1). He states 'Permaculture as a design system contains nothing new. It

arranges what was already there in a different way, so that it works to conserve energy or to generate more energy than it consumes' (Mollison, 1988: 9).

In a series of books (Mollison, 1990, 1991) Mollison refined the Permaculture concept to a point where, in 1991, the term Permaculture was seen as 'a contraction not only of permanent agriculture but also of permanent culture, as cultures cannot survive for long without a sustainable agricultural base and land use ethic' (Mollison, 1991: 1). Mollision realised that 'self-reliance in food is meaningless unless people have access to land, information and financial resources' (Mollison, 1991: v).

Mollison redefined Permaculture as:

> *…the conscious designed maintenance of agriculturally productive ecosystems which have the diversity, stability and resilience of natural ecosystems. It is the harmonious integration of landscape and people providing food, energy, shelter and other material and non-material needs in a sustainable way* (Mollison, 1990: ix).

It also has an ethical basis, which Mollison encapsulates in three principles. The first, 'care of the earth' ensures the provision for all life to continue and multiply. The second, 'care of people', is the providing of access to those resources necessary for human existence, both physical and spiritual. The final principle advocates the devoting of any surplus, of money, information and yields; to further the above two needs (Mollison, 1990; 1991). In a UK context, Patrick Whitefield (2004) has developed a manual for permaculture in more temperate climates and individuals have advocated urban permaculture as a way to live more sustainability within our urban areas (Watkins, 1993). Holmgren (2002) has developed 12 principles (see appendix A) in applying permaculture to a post carbon economy – an environment where oil production has peaked as supply outruns demand.

Permaculture principles have manifested themselves in many different scales from urban balconies to roof gardens to allotment sites and farms. Its principles are evident in a number of urban community garden sites in the UK and Ireland. These sites are used by a diverse range of individuals for different purposes. They are ecologically sustainable in that their design aims to minimise environmentally destructive impacts by integrating their designs with living processes and by encouraging nature, learning and environmental behaviours in urban settings. However, the way in which these features of sustainable design impact on wellbeing has not been explored. Using community gardens as a locus for this research, an examination of the wellbeing impacts of sustainable design features will be examined.

3.8. Conclusion

The definition of ecological sustainability used in this research is one which advocates a shift in how we think about how we use resources in the built environment. It requires an active competent citizenry and individuals who are agents of change in their daily lives. In this way it complements the capability approach to wellbeing (as described in chapter 2) which looks to individuals as agents of change in enhancing their wellbeing. The way in which these approaches to both design and wellbeing manifest in community gardens has not been fully explored. In order to achieve this, the approach to sustainable design developed in this chapter is brought forward to develop a set of design principles and sub principles for community gardens as sustainably designed urban green spaces developed in chapter 4, and fulfils principle 1) of this research – To establish sustainable design principles and sub principles for community gardens.

Chapter 4

Community gardens as sustainably designed spaces

4. COMMUNITY GARDENS AS SUSTAINABLY DESIGNED SPACES

4.1 Introduction

The aim of this chapter is to explore different aspects of community gardens and provide an approach to community gardening to be used in this research. The chapter first describes the development of community gardens in a UK planning policy context and their occurrence internationally. However, community gardens are not a homogenised group and a categorisation of community gardens is made into those that are recognised as being contested spaces, enabling spaces and finally sustainably designed spaces. Finally, the chapter provides a definition of community gardens as sustainably designed spaces for use in this research – to examine the wellbeing impacts of sustainably designed community gardens on human wellbeing.

4.2 Community gardens and urban green space policy

In January 2011 there were 1782 community garden projects on the Federation of City Farms and Community Gardens (FCFCG) database, 582 of which were members of the organisation (pers. comm. FCFCG, January 2011). A web resource provided by the FCFCG in 2011 details 18 'growing trends' in food growing in the British Isles, community gardens being one of these (farmgarden.org.uk). Along with urban farms, community gardens are one typology of green space detailed in Planning Policy Guidance 17: Planning for open space, sport and recreation (ODPM, 2006). They encourage a participatory approach to using urban space in a compact urban form. In the United States, Frances et al. (1984) found that community gardens could be distinguished from other green spaces such as parks, as small-scale spaces which are low-cost, intensively used, locally controlled and resulting from a bottom-up design approach which utilises appropriate technologies. In the UK, they have been referred to as examples of 'good practice' for the wider development of public open space (Greenhalgh and Worpole, 1995; DoE, 1996).

In terms of UK government policy, over the last 25 years in particular, the value of urban green space has been regularly asserted among policy makers and campaigners alike (Swanwick et al., 2003; Woolley, 2003; CabeSpace, 2004). Green cities with urban parks, green belts, urban agriculture and enhanced urban wildlife preserves have been advocated by Gordon (1990) and Nicholson Lord (1987; 2003) and more recently attention has returned to the green infrastructure[2] of our towns and cities (Landscape Institute, 2009; Natural England, 2009).

[2] Green Infrastructure is a strategically planned and managed network of countryside in, around and between our towns and cities that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for communities and people (Benedict & McMahon, 2006).

Community involvement in the design and management of green space is especially considered to be a necessary component in the achievement of 'quality' urban environments (Dunnett et al., 2002). Such values reflect wider government strategies to encourage communities to engage with, and take responsibility for, the provision of services at a local level.

The Governments' 'Liveability' agenda recognises the valuable contribution of 'good quality', parks, gardens and green spaces to the wellbeing of our towns and cities and the people who live and work in them. Although contemporary regeneration initiatives in the UK have tended to overlook environmental issues, the emergence of 'liveability' has provided an approach to neighbourhood renewal that combines both social and environmental agendas (Renew.net). At the heart of neighbourhood renewal rhetoric is the concept of community-led regeneration, and the assertion that any regeneration programme or project must involve the community and where possible empower those communities that for any reason are unable to participate in this process (Social Exclusion Unit, 2001).

In terms of design, the importance of green space is acknowledged as a key component of 'good' urban design by organisations such as the Office of the Deputy Prime Minister (ODPM), the Homes and Communities Agency (HCA) and the Centre of Architecture and the Built Environment (CABE). The governments 'Living Places' (ODPM, 2002) saw the creation of a national agency for public open space – CABE Space. Mechanisms have been established to attempt to recognise the value of green space, including the promotion of green space strategies by local authorities and the Green Flag campaign – an award scheme for parks and open spaces. A range of strategies and good practice guides and guidance notes have been published but they often lack an evidence base, tending mostly to contain principles or objectives rather than practical design solutions.

The 2005 Urban Task Force report reflects on the government's progress in encouraging people to live in 'good quality' more compact urban areas. It is critical of much current urban development and emphasises increased quality of the built environment for all, based on the principles of design excellence, social well-being and environmental responsibility. Community garden sites may provide a locus for synergy between design, social wellbeing and environmental responsibility in a compact urban form. Their name suggests an emphasis on collective community wellbeing but the sites have individual users often in the form of volunteer positions and in addition groups of users attend site work days and events. In this way they aim to enhance both individual and collective components of wellbeing. However, the 'community' aspects of individual sites vary in both make up and definition.

4.3 The 'community' in community gardening

In the UK, there is a strong focus in national policy on addressing social cohesion which is said to occur within the settings of the community (Whitehead, 2004; ODPM, 2005). However,

community is a concept that may not be physically or geographically defined (Dominelli, 1995). Social commentators such as Beck (1992) describe a gradual disintegration of traditional community ties, once bound by common interest and closely associated with a particular place. Both Gilchrist (2000) and Barton et al. (2003) claim that communities are now based on interest and affinity rather than residential proximity, a situation facilitated by the rise in private transportation, and communication technologies such as the internet. Such 'imagined communities' (Anderson, 2006) may be in many forms based on hobbies or lifestyles e.g. boating or cycling or being involved in community environmental projects. Such imagined communities have 'members who will never know most of their fellow members….yet in the minds of each lives the image of their communion' (ibid: 6). The boundaries of such a community are imagined but have limited and finite elastic boundaries and the individual is simultaneously aware of other communities.

Some commentators argue that even the very notion of community can smother diversity by projecting a false sense of identity onto which is often an extremely diverse population. The process of treating a community as a single identity may therefore prevent the recognition that different cultural traditions and lifestyles will inevitably conflict and compete, therefore preventing the development of solutions to these problems (Greenhalgh and Warpole, 1995). Stocker and Barnett (1998) describe diverse communities based on commonality of interests, geographical proximity and shared cultural and ethical values. They argue that the making of a community place should involve the articulation and recognition of each. Holland (2004) states that a bottom up approach is successful, so as community members are involved from the outset and particular aspects of cultural expectations are addressed. Outside 'experts' may act as facilitators but insider knowledge is vital if the scheme is to be a success in terms of access and participation (ibid: 303).

Despite a growth in awareness of communal growing spaces, community gardens are not a recent development. Early agricultural practice was based on the premise of communal land management and it was only through societal development that land has gradually been distributed among an ever declining number of people (Hoskins, 1965). In community gardening, people come together united in a common purpose (Holland, 2004). However, individuals come from not just the local area or neighbourhood but from all over the urban area of which they are part. The FCFCG's definition of a well-functioning community is when: it allows self-development through training, skills acquisition, knowledge gained through community activity; there is equality of opportunity; there is involvement in diverse local structures; there is consultation and participation in decision-making; there is economic opportunity; the community is aware of the differing needs of its members and attempts to meet those needs; there is environmental awareness and responsibility; people feel safe; people feel part of the community and want to belong to it; it is established and has a feeling of longevity (farmgarden.org.uk).

Where a community garden is established a manifesto or principles may be put into place to allow the site to develop. These may be seen as a reflection of community values embodied in the people belonging to that community. These values sustain the site and in general recognise the effect of individual actions on others in that - individual and community values may have some synergy (Sun and Jiang, 2000).

4.4 Towards a definition of community gardening

In the same way that the idea of community is difficult to define, 'community gardens' are diverse in size, location, form and organisation. Their growth in the UK and Ireland is marked by their own association –the Federation of City Farms and Community Gardens (FCFCG). Established in 1980 the federation aims to provide a mutual support system for community gardens in Ireland and the UK as well as raising public awareness (farmgarden.org.uk). However, the term is not exclusive to the FCFCG.

In academic literature, research is largely focused on individual schemes (Stocker and Barnett, 1998; Howe and Wheeler, 1999; Irvine et al., 1999) and appears largely limited to the benefits of social processes and participation in health (e.g. Teig et al., 2009), education (e.g. Clavin, 2009) or the benefits of urban agriculture (e.g. Paxton, 1997; Howe and Wheeler, 1999).

One UK study defines community gardens as:

> …*open spaces managed and operated by members of the local community for a variety of purposes: in conjunction with vegetable growing, some schemes are experimental Permaculture plots, other use organic methods and yet others are concerned with health, education and training issues. All appear to be based in a sense of community, with participation and involvement being particularly strong features* …. (Holland, 2004: 285).

Ferris et al. (2001) state that it is not very useful to offer a precise definition of community gardens as this would impose arbitrary limits on creative communal responses to local need. In addition to a diversity of size and shape, Stocker and Barnett (1998) state they may range from a collection of plots worked individually, but with some communal management, to schemes that are explicitly engaging the community in communal activity. In order to establish a definition of community gardens for use in this research, a history of the development of these sites in the UK and internationally is described. Sites are not only food producing spaces but often politically contested spaces developed in a particular social context. An explanation of community gardens as food growing; contested and enabling spaces is explored. Finally a definition of community gardens as sustainably designed spaces is detailed and a definition of the term for use in this research is established.

4.4.1 Community gardens as food growing spaces

Irvine et al. (1999) define a community garden as a green space managed by a neighbourhood community in which urban agricultural activities take place. The nutritional and cultural benefits of growing food in urban areas (Garnett, 1996; Reynolds, 2002) are wide ranging and are seen as being greatly beneficial to all sectors of society. The research proposal was developed at a time when community garden sites were receiving a great deal of attention, not only in the field of sustainability in the built environment but in wider social, cultural and environmental movements in UK and Ireland and elsewhere in Europe. Community gardens have been developed as part of the Slow Living movement (Parkins and Craig, 2006) where they are established with the aim of growing local varieties of plants and the community actively support traditional methods of cooking and preparing food (Pink, 2008). Both the movement and the gardens are developed in response to the disappearance of such activities in the face of what may be seen as an increasing globalised and homogenised food market (Pollan, 2008).

Many national and local groups and organisations promote urban agriculture and particularly local food growing. Sustain – the alliance for better food, the British Trust for Conservation Volunteers (BTCV) and Groundwork all promote the growing of food in UK cities. The Local Government Association (LGA) advocates a role for allotments in supporting health and social capital. There are also many local authorities 'local food' initiatives (Grant, 2003) and WHO Europe encourages action for social cohesion and the reduction of health inequalities through local production and local consumption of food.

The practice of urban agriculture and local food production provides a source of food close to where people live. This has the effect of reducing food miles, thus having environmental benefits, providing a further source of employment, and so delivering economic benefits (DeKay, 1997). Impetus for the development of a system of urban agriculture was in the World Commission on Environment and Development's report *Our Common Future* (WCED, 1987). The report stressed that urban food growing would allow greater access to food for the urban poor, and support urban development. Howe et al. (1999) claim that the process of urban agriculture in projects such as community gardens can bring communities together and combat discrimination by involving marginalised groups.

4.4.2 Community gardens as contested spaces

Reflecting a perceived threat to many existing community gardens, the majority of literature on the subject has tended to focus on the benefits that community gardens can provide. Hinchley (2006) argues that the majority of this information is based on single case studies – the work being general in nature, giving overviews of the gardens in question, without exploring any one issue in any great depth and failing to address any problematic areas.

In many cities in the USA the typical scenario is for community gardens to be established during times of crisis on land that is considered to have little market value. The middle classes and major employers vacated the inner city to the so-called *Edge City* (Garreau, 1991) and community gardens have grown up in the wake of the abandonment of inner city areas. As an outcome of the civil rights struggles of the 1960s and 1970s with the availability of this open space as a result of this abandonment and unsuccessful urban renewal, community gardens experienced resurgence (Breslav, 1991). The bulk of gardens were rooted in vacant lots that rapidly became dumping grounds and magnets for prostitution and drug related activity (Frances et al., 1984). The community garden movement in the USA is therefore, in part, one of the positive responses in the struggle to restore these damaged neighbourhoods to ecological and social health. The development of the gardens generated local and participative forms of neighbourhood level politics but Schmelzkopf (1995) asserts that at the end of the crisis, although the problem of the urban poor persists, governments generally withdraw their support and focus instead on profitable real estate development on the former plots.

Ferris et al. (2001) claims that these issues are global. In the UK the loss of local green space became a major issue in the 1980s following the Local Government, Planning and Land Act of 1980. This removed much of the protection afforded to open space, and made them much more vulnerable to development. Modern urban sites have been particularly vulnerable in light of the governments pledge to provide 60% of new housing development on brown-field sites (DETR, 1999) however, the 2008-2010 downturn in the economy has made many urban sites abandoned and free for locals to begin the process of growing food and establishing a garden.

In the UK's Future of Allotments debate in the UK (House of Commons, 1998) it was brought to the fore that the government's policy to increase urban densities and build 60% of new housing on brownfield and inner city sites put pressure on local government to develop on underutilised allotment sites. Just as in New York City where the City Council claimed that there was a shortage of land for housing and closed community gardens (Ferris et al*.,* 2001) the same has happened in the UK and Ireland over the last 20 years. In the city of Dublin, Ireland the economic boom of the 1990's meant that urban land was scarce and land used for community garden sites (e.g. Dolphins Barn Community Garden, Dublin) was re-claimed by the city council. The same is true of allotment gardening in London as a result of development in preparation for the 2012 London Olympics at Manor Goody Allotments in East London.

The American experience of community gardens is more advanced then in the UK and Ireland, and the literature more abundant. In cities such as New York, the character and role of community gardens are defined by the scale and density of the built environment and the lack of both public and private open space. In the UK meanwhile, 85% of households have gardens (Greenhalgh and Worpole, 1995) and the density of development, even in the most urbanised areas, is by no means as extreme. Hinchley (2006) argues that this gives a different context for

community gardens in the Britain. He suggests that while similarities exist, the modern community garden movement in America (and New York in particular) seems to be based on a far more reactive response to government disregard than in Britain. Radical organisations such as 'Green guerrillas' seeded abandoned plots began to give advice to encourage others to do the same. Recently in the UK there has been recognition of the increased privatisation and fragmentation of our urban public spaces (Minton, 2009) and a reaction to this may be in the form of the guerrilla gardening network (guerrillagardening.org) and book (Reynolds, 2008). Many community gardens in the UK and Ireland have developed as a response to such issues as social exclusion and poverty, environmental degradation and a lack of local facilities for play and recreation. Furthermore, there are 10 million people within the UK who don't have private gardens (uknetguide.co.uk). As a response to specific local need and to reach particular channels of grant funding, often food growing does not become an explicit priority. Hinchley (2006) maintains that the availability of such resources and support provides the context in which the development of community gardens have evolved from a product of community activism to an element of the urban environment actively promoted and encouraged by central government

4.4.3 Community gardens as enabling spaces

The FCFCG argue that many modern community gardens owe their existence more to the community action of the 1960s, as communities reacted against a growing lack of control of public resources. The concept of the extent of public control goes some way categorising types to distinguishing community gardens from the many other elements of conventional public open space (FCFCG, 2001) and also categorising different types of community garden. The Federation particularly refer to public access when it distinguishes community gardens from private gardens being '…in some sense a public garden in terms of ownership, access, and degree of democratic control' (farmgarden.org.uk).

A number of sub groups can be identified, determined by the level of communal use (Stocker and Barnett, 1998). At one end of the scale lie those gardens split into plots, each one for the independent use of a participant, without any significant element of actual communal space. The English allotment system would fit such a group. Further up the scale lie those gardens communally tended for the exclusive use of those actively participating, a form of shared garden. Examples include food growing spaces in office environments, food growing plots in schools and other institutions.

There is another type of community garden considered within this study: a garden communally created and managed, not merely for the benefit of those involved, but for the wider community as well (being either freely accessible or open on a regular basis). These gardens may therefore contain an element of individual plot gardening, but only as part of a larger communal space. They use organic methods for growing food and are concerned with learning, health and community issues, with a strong focus on participation. In doing so, they are 'sustainably

designed'. It is this form of garden that is most commonly referred to by the phrase 'community garden' and the one which is considered within this study.

4.4.4 Community gardens as sustainably designed spaces

The particular type of community gardens used in this research are those that are sustainably designed. Although these spaces may also be enabling and contested spaces, and also places to grow food, it is the principles and features of sustainable design that are being examined in this research. Such sustainably design community garden sites have been a significant part and a core tool of the Transition Town movement in communities working towards greater food security and a life with less reliance on fossil fuels (Hopkins, 2008). These sites are often based on sustainable design principles and aim to encourage nature, learning and environmental behaviours through design. Such sustainably designed community gardens are the locus for this research. They aim to minimise environmentally destructive impacts by integrating their designs with living processes and encourage nature, learning and environmental behaviours in urban settings. This definition implies a greater emphasis on 'ecological sustainability'. As described in chapter 3, this particular view of sustainability (e.g. Orr, 1992; Wheeler et al., 2009; Atkisson, 2011a,b) provides a new way of understanding and implementing sustainability by linking individual and collective community wellbeing to foster a partnership with the natural environment. The way in which wellbeing is impacted on by the sustainable design of these sites is the subject of this research.

4.5 Conclusion

Sustainably designed community gardens may play a role not only in providing local food and relieving urban dwellers from the stresses and strains of the built up environment but also in enhancing individual and collective responsibility towards global issues. Sustainably designed community gardens are used as a locus to explore wellbeing impacts of sustainably design in five case study sites in the UK and Ireland. Chapter five provides the development of principles and sub principles and also the capabilities of wellbeing of community gardens as sustainably designed spaces to be used in this research.

Chapter 5

Wellbeing Capabilities & Sustainable Design Principles for Community Gardens

5 WELLBEING CAPABILITIES & SUSTAINABLE DESIGN PRINCIPLES FOR COMMUNITY GARDENS

5.1 Introduction

This chapter establishes a list of wellbeing capabilities and a set of design principles and sub principles of sustainable design in order to examine wellbeing impacts of community gardens of a particular type – those that are sustainably designed. For the purpose of this research community gardens are defined as being sustainably designed in that their designs aim to minimise environmentally destructive impacts by integrating with living processes and encourage nature, learning and environmental behaviours in urban settings. The set of preliminary sustainable design principles, features and the set of capabilities and functionings of human wellbeing are used to develop methods to best examine wellbeing impacts of sustainably designed community gardens in chapter 6. This chapter therefore fulfils the following objectives of this research:

1) To establish sustainable design principles and sub principles for community gardens;
2) To develop wellbeing capabilities associated with these spaces.

5.2 Wellbeing capabilities of community gardens

Understanding why wellbeing is to be measured should help in the decision of how it is to be measured (Handicap International, 2005). In seeking out the possible wellbeing impacts of sustainably designed community gardens, aspects of human wellbeing which may possibly be enhanced by using community gardens are explored. This is achieved by combining literature and empirical evidence already establishing links between community gardens as sustainably designed spaces i.e. literature on nature and wellbeing, green space and wellbeing; impacts of gardens and gardening on wellbeing and impacts of environmental behaviours on human wellbeing. In order to develop a list of wellbeing capabilities, this information is combined with a general multidimensional and value-laden framework for wellbeing – the capability approach as described in this chapter 2. A list of 10 wellbeing capabilities and associated functionings for sustainably designed community gardens to be used in this research is created. This is not a complete list and by using the findings of this research this list will be built on. This preliminary set of capabilities will be confirmed, refined and called in question in part two of the thesis.

5.2.1 Nature and human wellbeing

Many authors have recognised how wellbeing cannot be considered in isolation from nature and the natural environment. Leopold (1949) and Suzuki (1990) have argued that the protection of the natural environment is vital for human's wellbeing. In a more in depth reflection on the human–environment relationship, Pilgram (1993: 402) argues that humans have a 'genetically coded pre-disposition to respond positively to natural-environment content'. Likewise, in 1984, Wilson

presented the *Biophilia* hypothesis to describe an innate emotional affiliation of humans to nature that goes beyond nature's role in providing basic needs to include the need for aesthetic, intellectual, cognitive and spiritual meaning and satisfaction (Wilson, 1984). The hypothesis proposes that this has been crucial for guaranteeing genetic fitness and competitive advantage as well as contributing to personal fulfilment. Biophilia suggests that human identity and personal fulfilment are dependent on our relationship to nature. This relationship is not restricted to the human need to exploit the material components of environment for sustenance but is also related to its role in human emotional, cognitive, aesthetic, and spiritual development. Kellert (1993) further develops the biophilia notion to examine nine aspects of human's alleged biological basis for having an affiliation with the natural environment. These functions include various intrapersonal, interpersonal, objective and subjective and interpersonal dimensions of wellbeing for example the role of the natural environment in meeting objective/material basic needs, its role in promoting autonomy, relatedness and competence (Kellert and Wilson, 1993).

Whilst Kellert and Wilson (1993) suggest an affinity for nature is inbuilt in our genotype and essential to wellbeing, other authors like Thoreau (2004) see the sense of the wild as being essential to the health of the human spirit, thus necessitating a connection with nature.

Encoded in an intricate but eminently practical relationship with nature and the land is a conscious ecological ethos, a living land ethic that recognises people as playing a central environmental and spiritual role in nature (Margolin, 2000).

The ecological anthropologist Roy Rappaport (1992) argues that much ecological knowledge is coded as religious knowledge in traditional cultures. Anderson (1996) argues that in the modern world, as traditional control systems break down, we must find new ways to link the deepest human emotions with institutions that sanction ecological sanity. He asserts that it is not that ecology must be religious, but that anyone interested in convincing people to manage the environment in any particular way would be well advised to embed it in a rich texture of emotion and experience (ibid :101).

Leopold's 'Land Ethic' (1949) sought to encourage a spiritual partnership with the land and with nature. Malcolm Margolin (2000) speaks of humans as a keystone species consciously affecting the health and wellbeing of the greater biotic community. An example of Californian natives managing the land begins with a deeply detailed knowledge of place – climate, seasons and soil.

Burns (1998) argues that natural environments operate as a reciprocal inhibitor of depression. He explains that nature provides multiple stimuli that result in pleasurable input. In comparison to human-made environments, natural environments have softer, more pleasing stimuli that have a better 'biological fit'. He asserts that interaction with natural stimuli consequently makes it difficult to be depressed at the same time. He concludes that the psychological or mental benefits

gained from human-nature interactions can be found at the cognitive, affective and behavioural levels. Burns (ibid) also draws on McAndrew (1993) to demonstrate how natural landscapes are intrinsically satisfying and evoke contentment and, spiritual inspiration (Fredrickson et al., 1999).

Viewing natural scenes is shown to improve mental alertness, attention and better cognitive performance (Hartig, et al. 1991, 1996; Cimprich, 1993, 2003; Tennessen and Cimprich, 1995). Arguably the most cited research to demonstrate the physical wellbeing effects of nature has been the study by Ulrich et al. (1983) on the impact of a view of nature from a hospital window on recovery following gallbladder surgery. Patients with a view of trees performed better on a range of health outcomes compared to those with a view of a wall. They stayed in hospital for less time, required fewer and weaker medication, and had fewer negative comments on nurse's reports. Diette et al. (2003) investigates the impact of a view of nature (landscape) combining the sounds of birdsong and a babbling brook on patients preparing for bronchoscopy. The study revealed that the group exposed to the landscape and nature sounds had higher levels of pain control (50%) than those without the view. In Moore's (1981) investigation of prisoners in Michigan, prisoners whose cells faced farmlands and trees were found to have a 24% lower frequency of sick visits than those facing the internal yard.

Kaplan's (1993) study of 615 office workers investigated the impact of views of nature from the workplace. Views of natural elements were linked to fewer health problems amongst other factors. Some studies have demonstrated that plants do make people calmer and more relaxed (Randall et al., 1992, Ulrich and Parsons, 1992).

In a review of natural environment and wellbeing research, Newton (2007) argues that a range of theoretical frameworks is used to provide explanations, but few make explicit links between wellbeing and the natural environment. Two key explanatory frameworks used to elucidate the mental wellbeing impacts of contact with natural environment are Kaplan and Kaplan's *Attention Restoration Theory* (ART) (1989) and Ulrich's psycho-evolutionary *stress reduction theory* (1979; 1983; 1991). Both draw on Wilson's biophilia thesis to a certain extent. Ulrich (1983) argues that contact or simply looking at natural spaces triggers physiological and psychological responses underpinning recovery from stress (e.g. reduced blood pressure, muscle tension pulse rate). He relates this to our evolutionary relationship with nature, which stimulates an early-warning function located in the limbic system of the brain to interpret scenes of nature as places of safety and survival resulting in positive emotional reactions.

Kaplan and Kaplan's *Attention Restoration Theory* (1989) argues that contact with nature provides recovery from attention fatigue which describes a situation of memory loss, diminished ability to focus, irritability, frustration and impatience from overusing our existing attention mechanisms. Research on ART has demonstrated the role of nature in improving children's discipline and concentration (Wells, 2000; Taylor et al., 2002). In particular, contact with nature is

said to help with treatment of ADHD, which is common amongst children and is linked to social problems (e.g. anti-social behaviour, drug abuse) (Taylor et al., 2001).

Environmental quality (soil degradation, pollution and climate change) are known to affect children's overall objective wellbeing through its influence on food quality, air quality and opportunities for children to play in outdoor spaces (Huby and Bradshaw, 2006; SDC, 2007b). A study of the role of wild adventure space in young people's lives (age 12-18) shows that such natural or semi natural environments have the potential to confer a multitude of benefits on young people's physical development, emotional and mental health and wellbeing (Ward Thompson et al., 2006). Wohlwill and Heft examine how exploring the environment freely enhances children's cognitive development. A number of developmental psychologists such as Winnicott, Piaget and Searles have explored the role of interactions between humans and non-human environment These findings reinforce the multi-dimensional nature of wellbeing and the importance of eudemonic wellbeing (e.g. providing the skills to function effectively in society) to overall wellbeing. Louv (2006: 29-32) states that much research has taken the child-nature connection for granted and refer to the de-naturing of childhood in that children now are suffering from NDD 'nature-deficit disorder' due in part to outlawed unstructured outdoor nature play, often because of the threat of lawsuits, but also because of a growing obsession with order.

The policy relevance of these findings are significant in light of the substantial reduction in children's access to traditional play areas including wild spaces and woodlands. The loss of natural spaces for play is partly linked to increasing urbanisation and associated increases in traffic, parental fear of traffic, bullying and abduction (Tranter and Doyle, 1996; Valentine and McKendrick, 1997; Bird, 2007; Pretty, 2007). Gebhard (1994) has written extensively about the role of 'play' in the natural environment to children's socio-emotional development. 'Play' is an important component of a child's functional development, teaching them to enjoy freedom, exercise choice, explore risk etc. Playing in the natural environment is not only important for physical wellbeing (i.e. better agility and coordination) (Fjortoft, 2004); it also plays a role in mental wellbeing. According to Cooper (Urbio, 2004), if children miss out on the chance to experience natural areas, the repercussions are enormous as they have fewer social skills and find it difficult to mix. Playing allows children to test their boundaries and take risks; it generates a sense of freedom and adventure and teaches children important lessons of how to interact with other people (Maan, 2005).

The wider significance of this shift to more regulated play environments has been that children are losing an affinity with nature, which they may have developed had they had the opportunity to engage in play areas in natural environment at a younger age. Negative perceptions of young people to the 'wild' natural environment (Wohlwill, 1983) are often linked to preferences for manicured path settings and indoor social recreation activities (Bixler and Floyd, 1997). This has implications to attitudes and positive environmental beliefs amongst adults (Ewert et al., 2005).

Bird (2007: 54) asserts that adult's attitudes to the environment and the time they spend in woodlands and green spaces is strongly influenced by their experiences as children. A Scottish study (Ward Thompson et al., 2008) demonstrated that people who visited woodlands and other green or natural spaces as a child were more likely to visit them in adulthood. Similarly Bixler et al. (2002) and Ewert et al. (2005) carried out studies of adolescents that found that those who had more time outdoors, or interacting with wilderness were more likely to have positive perceptions of the environment. Kahn and Friedman (1995: 68) uses the term 'environmental generational amnesia' to describe how younger generations are using their experience of nature as children as a measure of environmental degradation in the future. As growing numbers of children have less experiences of connecting with nature, this benchmark is eroding. Pyle (1978: 64) describes this as an 'extinction of experience' which has implications for how people value the environment in the future.

There is a wealth of research exploring links between the nature and the natural environment on health and wellbeing. Much of this research agenda has been initiated by those interested in the public health and spatial planning agenda, especially in the provision of urban green space.

5.2.2 Urban green space and human wellbeing

A number of factors combine to make some urban areas healthier than others and amongst these is access to green space (Tzoulas, 2006). Forman, (2008: 105) describes 'greenspaces' as unbuilt areas in an urban region which may contain and may sustain natural systems within which ecological patterns, processes, and changes are in a most-natural or least-degraded condition. Community gardens are one typology of urban green space as described in Planning Policy Guidance 17 (Open space sport and recreation) (ODPM, 2006). A report on international policy interventions on wellbeing has identified a number of case studies where interventions promoting green space (parks, community gardens and allotments) had reported physical and mental wellbeing benefits (Levett-Therivel, 2007). These included improved communication between social groups, increased feelings of self-worth, relaxation, increased physical health and a greater sense of community.

Literature on wellbeing and green space can be divided into a number of dimensions of - green space and social wellbeing; green space and mental health; green space and physical health and green space, safety and feelings of control. These dimensions of wellbeing are included in the list of human capabilities which may be influenced by a particular type of urban green space - sustainably designed community gardens.

Green space and social wellbeing

Several studies show how green spaces in a range of forms (parks, allotments, streets etc) in urban areas encourage more social interaction and bring people together (Kuo et al., 1998;

Armstrong, 2000; Ward Thompson, 2002). Others have highlighted the specific link between social and mental wellbeing where close intimate social relationships based on trust and affection are vital for psychological growth (Burns, 2000, 2006; Reis and Gable, 2003).

Studies demonstrate stronger neighbourhood social ties (NST) in the areas with more green matter (Kuo et al., 1998; Taylor et al., 1998). These were measured by the extent of social activities; more visitors, those who knew more of their neighbours and reported more concern for helping and supporting one another, and had stronger feelings of belonging. A study focusing on older people (age 64-91), found higher levels of the social wellbeing of older people when there were higher levels of exposure to green spaces (Kweon et al., 1998).

Green spaces also contribute to a sense of place and this plays an important role in fostering social cohesion and identity (Frumkin, 2001; Henwood, 2003). Tuan (1971) argues that a sense of place and space contribute to a sense of who we are. These notions strike a chord with much of literature on eudemonic wellbeing which evokes that we strive to reach 'meaning' in our lives.

Green space and mental health

Poor people and disadvantaged communities often live in environments which exact a toll on their wellbeing (Worpole, 2000). Lewis and Booth (1994) found that people living in built up areas with access to gardens or green open spaces had a lower prevalence of mental disorder than people in built up areas with no such access. Bird (2007: 82) cites a number of studies that link mental fatigue with aggression and violence. The more tired a person is, the less likely they are able to think about alternatives (Dodge and Crick, 1990). Mental fatigue is linked to irritability which in turn is linked to aggression (Warm and Dember, 1986, Coccaro et al., 1997). Mental fatigue also leads to impulsive behaviour and losing control is a key dimension of violent behaviour (Kaplan, 1987; Brady et al., 1998).

Kuo (2001) argues that poor inner-city environments generate chronic mental fatigue through crowding, noise, together with the stresses of poverty and single parenting. He notes that these are linked with a sense of loss of control over one's life. Inspired by Kaplan's attention restoration theory, his research demonstrates that nature has a rejuvenating quality in tackling mental fatigue and enhances the ability of individuals to manage major life issues. He showed that mothers in homes with views of nature and trees displayed lower levels of aggression towards the adult partner and child. Another study found those residents living in 'greener' surroundings reported lower levels of fear, fewer incivilities, and less aggressive and violent behaviour (Kuo and Sullivan, 2001a).

Green space and physical health

A study in The Netherlands by de Vries et al. (2003) revealed that people living in areas with more green space experienced better general health. Urban vegetation provides many benefits to physical health, in part, that relate to atmospheric pollution (Krieps, 1989). Green areas and trees cleanse the air of dust and chemical pollutants and help cleanse the oxygen supply (ibid), which contribute to healthier living. Trees absorb pollution, which results in a better urban atmosphere and thus, better physical health (Moughtin, 1996). Urban vegetation also helps to filter out a small amount of some particulates and noxious gases (O'Brien, 2004).

Mabey (1999) argues that it is trees above all else that are needed to break up the hard-edged texture of urban living. Trees can also improve air quality directly by absorbing some polluting gases and trapping particulate pollution with some species such as pine, larch, and silver birch, having a more positive effect on air quality than others like oak, willow and poplar (Donovan et al. 2005). The latter emit higher levels of volatile organic compounds (VOCs) that, in turn, form other pollutants such as ozone and particulates (ibid).

In Tokyo, Takano et al. (2002) revealed a correlation between living in a neighbourhood with abundant green space and lower mortality rates. However, a major criticism of this study is it did not investigate whether the surrounding green spaces were actually *used* for walking (Newton 2007). There is substantial evidence demonstrating the positive impact that physical activity has on wellbeing (Morris, 2003; Bird, 2004; Williams, 2006). Less certain is the role that green space has in promoting physical activity and whether physical activity in green spaces results in greater wellbeing benefits more generally.

The therapeutic benefits of physical activity in green spaces (Reynolds, 2002; Pretty et al., 2005a,b) and the nutritional benefits of growing food in urban areas (Garnett, 1996; Rycroft, 2000) are wide ranging and are seen as being greatly beneficial to all sectors of society. These are significant findings in light of an increasingly sedentary society and declining quality and quantity of urban green spaces (Barber, 2007; Brown and Grant, 2007). Despite the fact that there is enough evidence to implicate the built environment in the obesity crisis (Butland et al., 2007), the exact dynamics of how the built environment encourages sedentary lifestyles and the consumption of energy dense foodstuffs are not well understood in the UK context (Lake and Townsend, 2006).

Much of the research on physical wellbeing has focused on the direction and magnitude of relationships between physical activity and the characteristics of the natural environment. For example, the frequency of physical activity in relation to perceptions of safety in parks, attractiveness, size and design (Humpel et al., 2002; Maller et al., 2002). Two large-scale Australian studies conclude that ease of access moderated by the attractiveness and size; influence the use of public open spaces. Attractiveness features that encouraged walking

included trees, water features, bird life and size (Giles-Corti and Donovan, 2002). Burns (2006) notes how positive emotional experiences results in a positive feedback mechanism that encourages people to seek more pleasurable interactions with nature and hence go walking more frequently.

Pretty et al. (2005a,b) highlight a number of physical, social and cultural factors that might inhibit participation in regular exercise and/or visiting green spaces activities. Physical constraints include the accessibility of green spaces, the presence of obstacles that might inhibit contact (i.e. major roads) and the extent to which different groups of people are independently mobile (adults, children, disabled etc). Social and cultural factors include the perception of areas related to fear of crime, or the fact that socio-cultural restrictions on mobility related to different social groups.

Green space and physical and mental health

The link between physical and mental wellbeing has been noted by the UK Chief Medical Officer's report (DoH, 2004): 'physical activity helps people feel better, as reflected in improved mood and decreased state and trait anxiety. It helps people feel better about themselves through improved physical self-perceptions, improved self-esteem, decreased physiological reactions to stress, (and) improved sleep'. Burns (2006: 416) cites a number of researchers to conclude that the 'happier a person is, the healthier they are likely to be, the better they will recover from illness, and the longer they are likely to live' (Maruta et al., 2000; Ostir et al., 2000; Danner et al., 2001). Fredrickson and Levenson (1998) demonstrated that positive and optimistic people had higher levels of physical wellbeing, suffering less from severe illnesses and if they did become ill had better recovery rates. Argyle (1997) has explored how positive attitudes have enabled the body to function more healthily, put less stress on the body and resulted in fewer reports of physical breakdowns.

Pretty et al. (2005b) draw on Berger (1996) to demonstrate the links between an active lifestyle and positive mental wellbeing benefits such as enhanced mood and stress reduction, positive self-concept and higher quality of life. Conversely, decreased levels of mental wellbeing have been linked to decreased physical wellbeing on a number of levels. For example, sustained stress or trauma increases vulnerability to viral infection and a weak immune system (Cohen et al., 1991, 1997; Stewart-Brown, 1998). Kubzansky et al. (1998) demonstrated that long-term states of anxiety increased the risk of heart disease and premature death. Depression has been associated with a range of chronic physical illness such as asthma, arthritis and diabetes, stroke and heart disease (Jonas and Mussolino, 2000; Turner and Kelly, 2000; Ostir et al., 2000).

An increasing number of studies have shown that engaging in physical activities has positive mental wellbeing impacts and these are further enhanced if they are carried out in green space (SDC, 2007a). Exercise has been shown to reduce anxiety, enhance recovery from short term psycho social stress (Taylor, 2000), reduces clinical depression and long term reduction in

clinical depression in the participation in green gyms. Green gym schemes are shown to have positive physical and mental wellbeing effects (decreased weight, increased fitness levels, lower depression and anxiety (Reynolds, 2002). 'Green exercise' includes a range of activities, which advocate the synergistic benefits of carrying out physical activities whilst simultaneously being exposed to nature (Pretty, 2003). Although most of the emphasis is on the physical wellbeing benefits, there is increasing evidence pointing to its mental wellbeing impacts. Both indoor simulations (ibid) and a study in situ environments (Pretty et al., 2007) highlight significant improvements in physical health and mental wellbeing from green exercise. Key findings included significant reductions in levels of anger, depression, confusion and tenseness after engaging in green exercise. Levels of self-esteem were also found to increase significantly.

The charity Mind has launched a campaign to advocate 'ecotherapy' as a clinically valid treatment for mental distress. Activities included gardening projects, walking groups, conservation work, running and cycling. 90% stated that the combination of nature and exercise was most important in determining how they feel. In terms of self esteem and mood, a 'green walk' was more effective than an indoor walk in terms of levels of depressions, feelings of anger, feelings of tension, feelings of fatigue and overall improvements of mood (Mind, 2007).

Green space, safety and feelings of control

For many, urban areas are associated with human control and influence, and nature is associated with a lack of human intervention. Kendle and Forbes (1997) argue that' perhaps the greatest distinction between the 'natural' and the 'unnatural' hinge on the degree of perceived control and human influence that is associated with the landscape. Similarly, Kuser (2000) contends that naturalness can be defined based on the variability of external energy resources required to maintain a system in its present state and the capacity for self-maintaining i.e. the required degree of external human intervention. There are many people for whom the essence of nature is that which is uncontrolled (Minter, 1993); whilst others value landscapes that are the result of more intervention.

Many people are brought up to expect a well-kept city landscape (Gilbert, 1989). The nurtured 'pedigree' landscape of lawns and flowerbeds has a high value in the public mind as an expression of care, aesthetic value and civic spirit (Hough, 1984). A study of green spaces in Sheffield concluded that the psychological benefits gained from using green space increased with levels of species richness (Fuller et al., 2007). Part of the attractiveness of natural sites is often their dynamic nature (Gilbert, 1989), with sites differing from season to season and from year to year through succession. Unkept landscapes have a far greater floral and faunal diversity than the intensely managed lawn or the city park (ibid).

Urban wildlife sites often attract rubbish tipping (Gilbert,1989) and 'as natural spaces are among the few private spaces left where we are away from the gaze of closed-circuit television, it is not

difficult to get the impression that they are places to go for illicit activities, including drug taking (O'Brien and Tabbush 2003). One of the social factors that constrain access to urban nature identified by Natural England (Harrison et al. 1995) is the fear of crime associated with public spaces and this effect on people's willingness to use natural spaces which are perceived to be 'risky'.

Safety issues therefore involve not just how people feel travelling around or adjacent to green spaces, but how safe they feel wandering around them. There is also a fear of nature associated with unkept wilderness, since people are anxious that undesirables might be lurking in the undergrowth (Gilbert, 1989). Women in particular fear open spaces in this way and they can believe that risks of personal safety are too great to walk in green spaces unaccompanied (Urbio, 2004).

In addressing safety issues however, CABE Space argues that if our local authorities continue to adopt a 'Safety first' approach, our public open spaces will become boring (Urbio, 2004). It fears that many of the features people value about great parks and public spaces could disappear because they are classified as too risky.

5.2.3 Gardens and human wellbeing

As the ways in which people interact with and view urban nature varies, some research distinguishes between the benefits of a) viewing nature b) being in the presence of nature as described in the above sections and c) active participation and involvement with nature (Pretty et al. 2005a,b; Brown and Grant, 2007). One way in which humans can actively participate in nature and the growing cycle is through gardening.

With 85% of households in the UK having gardens (Greenhalgh and Worpole, 1995) and two-thirds of British people saying that they are 'gardeners' (rhs.org.uk) there is a clear interest in the activity of gardening. The reported wellbeing benefits of garden work particularly amongst vulnerable groups span physical, mental and social wellbeing effects. These include improved psychological benefits of self-esteem and self confidence, development of work and social skills, improved independence, opportunities for emotional expression and reflection, enhanced spiritual and sensory awareness, useful employment, increased physical activity and exercise, better nutrition from the consumption of healthy food, improved opportunities for social interaction (Sempik et al., 2002; Morris, 2003).

In terms of immediate mental health benefits, literature shows that stressed individuals often turn to the natural world for relief, with gardens being sanctuaries of peace (Minter, 1993). Grahn (2005) has looked at the role of possible health effects for the design and activities of a rehabilitation garden in Alnarp in Sweden. He states that when we are ill, we are more dependent on the non-human environment, to determine what our emotional tone is (Grahn, 2005). He

argues that in situations of crisis, the individual may need to revert to simpler relations, more stable and clearer reality constancies. The act of gardening itself is also argued to have enduring therapeutic benefits (Minter, 1993). The response of plants to us (e.g. when they grow successfully) can produce self–efficacy and tremendous pleasure, particularly in those who feel isolated. Other research (Kuser, 2000) supports this contention, that actual involvement in tree planting has important positive benefits for people.

'Horticultural therapy' describes the use of plants by trained professions to reach clinically defined goals (Growth Point, 1999). 'Therapeutic horticulture' describes the process where individuals can develop their wellbeing using plants and horticulture and can be achieved through active or passive involvement (Lewis, 1990; Frumkin, 2001; Sempik et al., 2002). These concepts have also been linked to the notion of 'therapeutic landscapes' advanced by geographers (Gesler, 1992; Henwood, 2003). Palka (1999: 30) defines therapeutic landscapes as places that 'promote wellness by facilitating relaxation and restoration and enhancing some combination of physical, mental and spiritual healing'. It is in this context that therapeutic environments (such as gardening and allotments) are used to assist people suffering from physical or mental ill health.

The first study to explore the link between horticulture and mental health in 1955 demonstrated significant increases in improved self esteem, self confidence and social interaction amongst people with mental health problems and learning difficulties (O'Reilly and Handforth, 1955). The use of green environments as a form of therapy has a strong tradition in the institutional health care arena for people with poor mental health and vulnerable groups such as the elderly (Parr, 2005; Smyth, 2005).

However, in today's high-stress society, there is increasing recognition that horticultural activity need not be strictly clinically-orientated but can be used in a generalised way to improve the wellbeing of the individual (Sempik et al., 2002; Parr, 2005). The food writer Michael Pollan criticises the narrow definition of health as promoted by both nutritionists and food marketers and advocates food growing as one of his 'food rules' as advice on how we should eat (Pollan, 2008; 2009). Indeed, urban dwellers are now growing more food in their gardens and in allotments. This may provide a source of fresh and often organic local food as food purchased in shops and supermarkets may not be as fresh and nutritious as it could be, as length of time between farm and plate can be many days (Whitefield, 2004). The vitamin C content of fruits and vegetables, for example, starts to decline immediately after harvest (www.sustainweb.org). In terms of organic food, there is a lack of peer-reviewed evidence to show that organic food is healthier but there is evidence to show that nutrients are higher in organic tomatoes (Mitchell et al., 2007). However, with the increase in interest in urban food growing comes an increased interest in the use of urban community gardens initiatives (farmgarden.org.uk).

Community gardens are a way of providing gardens for people who often live in densely populated areas where the health benefits and tranquillity of gardening are most needed (Wright, 2000). What particularly distinguishes a community garden from a private garden is the fact that it is in some sense a public garden in terms of ownership, access, and degree of democratic control (Ferris et al., 2001). Although food growing is often a focus of community gardening activity, Holland (2004: 303) states that there is a multiplicity of purposes for the existence of community gardens which relate more to their function in community development, the sites thereby acting as 'agents of change' in more than one area. She argues that what is grown is secondary to what is achieved, and even where food growing is a stated aim, other objectives are also achieved.

In Western Australia, Stocker and Barnett (1998) have provided a model of community gardens as agents of change, acting through the promotion of physical and environmental sustainability by food growing; through social sustainability by communal interaction; and through economic sustainability by the use of gardens for training, research and skills development. However, the nature of such interconnections in an ecologically sustainable community garden setting and the resultant impact of human wellbeing have not been explored.

Community gardens are a means of helping break down social exclusion, as they bring together people from all parts of the community in a shared project (Wright, 2000). Research into a community garden in Melbourne examined the extent to which such a natural amenity provides opportunity to enhance social capital. Benefits include increased social cohesion (the sharing of values enabling identification of common aims and the sharing of codes of behaviour governing relationships), social support (having peopled to turn to in time of crisis) and social connections (the development of social bonds and networks) (Kingsley and Townsend, 2006). However, it is indicated that such benefits do not necessarily extend beyond the garden setting and issues of time and space need to be further explored (ibid).

Holland (2004) states that what links community garden sites is a sense of community participation and empowerment. Kingsley and Townsend (2006) have examined the role of community garden sites as enhancing social capital and urban social connectedness. When local people become involved in management it strengthens a sense of community (Carr and Lane, 1993) and enhances social relationships within the communities. If someone has 'hands on' involvement or a sense of ownership of a particular area their enjoyment may increase further (O'Brien, 2004).

The UK Federation of City Farms and Community Gardens claim that community gardens provide solutions to many of the problems and difficulties of modern urban life (farmgarden.org.uk). Environmentally they offer an opportunity to reduce the ecological footprint of towns and cities, by providing a local food source, as well as opportunities for composting and

material reuse (Ferris et al., 2001). In being within the remit of urban agriculture activity (Redwood, 2009) they may play a role in food security – where people have both physical and economic access to food to meet their dietry needs forboth a productive and healthy life (USAID, 1996).

Community gardens also offer benefits of increasing biodiversity in the urban environment (Paxton, 1997). For individual participants they offer the personal wellbeing fostered by gardening (Dunnett and Qasim, 2000) as well as the health benefits of exercise, and where applicable, a supply of fresh vegetables to improve diet (Garnett, 1996). In this way they may contribute to both wellbeing and sustainability. In his text *Cities and Natural Processes: A basis for sustainability*, Hough (2004) illustrates how the everyday learning experience in the allotment garden also makes connections to larger regional and international issues, but the nature and extent of these connections and the impact on wellbeing of users has not been explored.

5.2.4 Sustainable behaviour and human wellbeing

Dolan et al. (2006) distinguish between four main accounts of wellbeing in terms of sustainable behaviour: Objective lists; Preference satisfaction (fulfilling our desires to engage in environmental behaviours based on freedom, information and choice); Flourishing accounts (belonging, purpose, social relatedness) and subjective wellbeing – a combination of the hedonic account, based on how we feel, and the evaluative account, based on how we think and feel about our lives.

Our reason for valuing particular opportunities such as clean air and social justice need not always lie in their contribution to our living standards. Advocates of a flourishing account of wellbeing highlight the potential for Voluntary Simplicity (VS), which essentially means reducing income and the consumption of certain goods to enhance wellbeing through leading a simpler, more sustainable life (Brown and Kasser, 2005). Sen (2004) makes the point that one's desire to preserve species (such as the spotted owl) may have nothing to do with one's standard of living. This can be connected to Chamber's (1997) idea of 'responsible wellbeing', in that one may feel they have obligations future generations and that we should have a better understanding of the future consequences of our current actions, which in turn may enhance wellbeing.

The most common way in which wellbeing and sustainability are seen to conflict with one another is in relation to the time frame over which they operate (Dolan et al., 2006). Neumayer (2004), for example, argues that wellbeing is orientated to the present whilst environmental and inter-generational sustainability looks towards the future and is long term. This produces issues in looking to the trade off between short term satisfaction and pleasure and long term benefits. There is therefore a temporal discord as those who are alive have to endure difficulties for the benefit of future generations (Anand and Sen, 2000). In looking to humans and the natural landscape, Isis Brook comments that even though the time scale of growth is beyond human

lives, it is yet somehow not beyond our living imagination. She gives an example of trees acting not just as a record to a broader than human time span but also as indicators of that process of imagining time outside of ourselves, our lives, our futures (Brook, 1998).

The Millennium Ecosystem Assessment (MEA) does take note of the trade-offs on wellbeing over time across different groups and generations (Dolan et al., 2006) as illustrated by the following quote: 'the relationship between ecosystem change and human well-being has both current and future dimensions. The overexploitation of ecosystems may temporarily increase material well-being and alleviate poverty, yet it may prove unsustainable' (MEA, 2005: 81).

Dolan et al. (2006: 4) argue that at the heart of any concept of wellbeing in the context of sustainable development policy must lay the ability to identify and quantify the trade-offs that exist between: 1. Elements of an individual's current wellbeing; 2. Her current wellbeing and her well-being in the future; 3. Her current wellbeing and the current well-being of other people; 4. Her current well-being and the wellbeing of others in the future. However, this assumes a well thought out reflective range of values an individual may have when making decisions in daily life. Such a value based conception of wellbeing looks to flourishing accounts and considers people's agency aspects – what they are able to do about the causes they follow (Sen, 1985, 1992, 1999). As described in section 2.2, flourishing is akin to eudemonic accounts and defines wellbeing in terms of the degree to which a person is fully functioning and engaging in modes of thought and behaviour that provide engagement and fulfilment. Such accounts are not directly related to income or consumption. According to some, flourishing accounts of wellbeing are inherently associated with a more sustainable lifestyle (e.g. Kasser and Ryan, 1996; Kasser, 2002; Brown and Kasser, 2005).

5.2.5 Capabilities and functionings for community gardens

The evidence explored so far in this chapter suggests that access to nature, green spaces, gardens and involvement in environmental behaviours may have positive impacts on human wellbeing. However, the essence and extent of the interconnectedness between urban dwellers such aspects of the natural environment and how this partnership can be maximised to enhance both human capabilities and sustainability has not been fully explored.

To achieve this, this research examines wellbeing in urban community garden spaces whose designs aim to minimise environmentally destructive impacts by integrating their designs with living processes and encourage nature, learning and environmental behaviours in urban settings. A list of ten wellbeing capabilities is drawn from the general literature on wellbeing as described in chapter 2 and literature on nature and wellbeing; green space and wellbeing and environmental behaviour and wellbeing as described in the above sections.

Capabilities drawn for generic wellbeing benefits were included e.g. physical health, social wellbeing, security and psychological wellbeing and those that were more specifically related to nature and green space e.g. mental restoration, enjoyment, stimulation and spiritual wellbeing are included. These capabilities include short term affective, cognitive and longer term aspects of life satisfaction. In addition more flourishing accounts may consider people's agency aspects - what they are able to do about the causes they follow (Sen, 1984, 1992, 1999) and may include capabilities such as purpose and expression.

Rather than approaching agency only as a dimension of wellbeing, Alkire (2003) has argued that it is also appropriate to consider agency with respect to each capability. The reason for this is drawn from Sen's analysis, which rejects the view (held by some basic needs theorists) that agency can be adequately represented only as a dimension of wellbeing. In addition, as has been discussed in section 5.2.4, a person can have objectives other than the pursuit of his/her own wellbeing – i.e. overall goals-agency (Nussbaum and Sen, 1993: 35). In the context of sustainable design, this may have repercussions for pro-environmental behaviours for example as Sen (2004) suggests concerns about issues of wildlife conservation.

Nakamura and Csikszentmihalyi (2003: 84) argue that a person's goals influence transactions with the environment - but only through transactions with the environment will 'a self' be realized. Goodin (1992) links larger natural environmental processes to individual lives in noting that they provide some form of continuity and context in which humans understand their individual plans and projects. It is therefore both the intrapersonal and the interpersonal elements of wellbeing – those outer goal oriented values that are explored in this research through the examination of functionings of wellbeing associated with sustainably designed community garden sites.

The provisional set of capabilities and functionings for community gardens as sustainably designed spaces are summarised below and in table 5.1. This provisional set is further refined as a result of field work activity and analysed in part two of the thesis.

Social wellbeing

This capability looks to the eudemonic components of engaging, relatedness (positive interactions with others) and having fulfilling relationships. Research shows that stable and secure intimate social relationships play a significant role in people's experience of wellbeing (Seligman, 2002; Diener and Seligman, 2002; Dolan et al., 2006b). Current policy agendas recognise the role played by the environment in health and wellbeing of individuals, but they also include social elements through shared and collective use (Buonfino and Hilder, 2006). The term 'social wellbeing' is used here in its broadest sense to capture the positive wellbeing impacts on sustainably designed community garden spaces and includes the establishment of social networks and friendships; participation in social life and activities; aspects of social cohesion in participation in cultural activities; and a sense of community and belonging.

Mental restoration

Three functionings of mental restoration are examined: opportunities for relaxation; short term recovery and long term restoration. Contact with nature is said to have a restorative effect by enabling individuals to distance themselves from routine activities and thoughts (i.e. being away) and focus attention in a way that requires little effort (i.e. fascination). From environmental psychology literature, there are two major mental health benefits that arise from contact with nature. The first is the immediate mental health benefits, which help with stress recovery (Ulrich, 1986, 1991) and the second is the longer-term psychological benefits, which help with restoration (Kaplan and Kaplan, 1998). Hartig (2007) states that it is important to look to the duration of effects of discrete restorative experiences and the time span needed for meaningful cumulative effects to emerge. He looks to the cyclical character of restoration and how restoration becomes potentiated with the depletion of one's resources. He concludes that how depleted resources become renewed, become potentiated again and so on – compels questions about the structure of people's lives that might induce such cyclicality, and argues that restoration extends through time (Hartig, 2007). In addition, Hartig et al. (2001) have worked on the potential for restorative experiences in natural environments to enhance ecological behaviours. He argues that fear and threat of environmental issues may result in denial of environmental hazards and attention to fascination, restoration and other positive emotions may be better suited to encouraging pro environmental behaviour.

Psychological wellbeing

Rhode and Kendle suggest that urban nature brings cognitive benefits by reducing mental fatigue. Such restoration therefore also has psychological benefits in that ones cognitive skills can be maximised. Cognitive skills include problem solving; resourcefulness; seeing tasks to completion; making difficult and complex decisions (Kellert, 2005). Functionings that have been shown to be important for psychological wellbeing include the feeling fully engaged in one's activities and finding them challenging (Csikszentmihalyi, 1990) and having a sense of curiosity or willingness to learn new things (Kashdan et al., 2004). This dimension also includes long term eudemonic evaluations of personal growth and development and competence. Competence includes coping, resilience and self esteem. The capability of psychological wellbeing captures the elements – personal growth and development; cognitive skills (problem solving; resourcefulness; seeing tasks to completion; making difficult and complex decisions); and learning, communication and thought.

Purpose

This capability includes eudemonic 'outer' elements (Veenhoven, 1998) of feeling one is of worth to the world and having an interest outside of oneself (Sen, 2004). In this way, one feels fulfilled with a goal and sense of purpose. Having an aim relates to Little's (1993) work on personal projects – extended sets of personally meaningful action in a particular place or context. They

have demonstrated that human wellbeing is enhanced to the extent that individuals are pursuing projects that are meaningful, manageable and embedded in a sense of community and the local environment affords people such pursuits. The functionings of purpose include having an aim and achieving ones potential.

Enjoyment

This capability includes short term hedonic elements of enjoying life – of enjoying the feeling of being fully engaged in one's activities (Csikszentimihalyi, 1990) and experiencing pleasure and fun. Elements of play are particularly related to child wellbeing (Gebhard, 1994). Functionings include – enjoyment of the here and now, and having fun/play.

Expression

This capability focuses on long term impacts of life satisfaction such as choice and opportunities offered. It includes opportunities for emotional expression and reflection (Wilson, 1984); freedom of expression and choice of opportunity in participating in ones local environment (Ferris et al., 2001, O'Brien, 2004; Maan, 2005), and the freedom to express the causes one follows (Sen, 1984, 1992, 1999). Functionings include a sense of ownership; opportunities for exploration and discovery; opportunities to be creative, and the capacity to shape one's life.

Stimulation

This capability contains short term hedonic elements of wellbeing such as sensory stimulation (Wilson, 1984) and feelings of alertness (Hartig et al., 1991; 1996) and fascination (Kaplan and Kaplan, 1989) but also examines more long term evaluations of how the mind may be stimulated to thinking in new ways both temporally (Chambers, 1997; Brook; 1998; Neumayer, 2004) and geographically in terms of social justice (Massey, 2007; Sen, 1984, 1992, 1999). Functionings include sensory stimulation; feelings of increased energy and vitality; sense of longevity and time passing; stimulation of mind, new ideas, ways of thinking and multiple stimuli.

Security

The capability of security may comprise of 'outer' (Veenhoven, 1998) qualities of living in a 'good' environment; elements of feeling safe in ones environment (Gilbert, 1989), and feeling a sense of care and pride in ones local place. It also includes feeling in control of ones personal and local environmental resources (Kaplan and Kaplan, 1989; Kuo, 2001) including food resources (Redwood, 2009). Functionings include a feeling of safety and freedom to use ones local environment; a feeling of control; and a sense of civic pride.

Physical health

This capability of wellbeing includes perceptions of ones health (e.g. Ulrich, 1983; Kaplan, 1993; de Vries et al., 2003; Tzoulas, 2006); local environment (Krieps, 1989; Moughtin, 1996; O'Brien, 2004) and health relating to specific site activities (e.g. Garnett, 1996; Pretty et al., 2005a,b). Functionings specifically include having a healthy body; eating healthily; perception of a clean and healthy environment and being physically active.

Spiritual wellbeing

This capability reflects a spiritual land ethic (Leopold, 1949; Margolin, 2000) and spiritual experiences and emotion in nature (Wilson, 1984; Thoreau, 2004). Functionings include references to religion or morality i.e. harmony with some greater source of meaning and value, references to spiritual realisation and a resulting sense of renewed harmony and balance.

This provisional list is used to examine capabilities and functionings in sustainably designed community garden sites. How the wellbeing capabilities described are impacted on by these spaces is explored by unpacking principles and features of sustainable design. A broad set of design principles and sub principles for community gardens as sustainably designed spaces which may impact on different capabilities of human wellbeing is produced. These principles and sub principles are illustrated in table 5.2 and described in section 5.3.

Table 5.1 Wellbeing capabilities and functionings of community gardens

Capabilities	Examples of Functionings
Enjoyment	• Enjoying the 'here and now' (Csikszentimihalyi, 1990) • Having fun/play (Gebhard, 1994)
Stimulation	• Experiencing sensory stimulation (Wilson, 1984) • Feeling of increased energy and vitality (Kaplan and Kaplan, 1989) • Having a sense of longevity and time passing (Brook, 1998) • Stimulation of mind -having new ideas and ways of thinking (Cimprich, 1993, 2003; Hartig et al., 1991; 1996; Tennessen & Cimprich, 1995) • Having multiple stimuli (Burns, 2006)
Expression	• Having a sense of 'ownership' (O'Brien and Tabbush, 2003; Ferris et al., 2001) • Having opportunities for exploration and discovery (Maan, 2005; Rhode & Kendle, 1994) • Having opportunities to be creative (Maan, 2005; Rhode & Kendle, 1994) • Having the capacity to shape one's life (Kellert & Wilson, 1993; Sen, 1984, 1992, 1999)

Capabilities	Examples of Functionings
Purpose	• Having an aim/goal (Chambers, 1997; Little, 1993; Sen, 1984; 1992; 1999) • Achieving potential (Wilson, 1984)
Security	• Feeling of safety and freedom to use the local environment (Gilbert, 1989) • Feeling of control (Kuo, 2001; Kaplan & Kaplan, 1989; Redwood, 2009)) • Having a sense of civic pride/that environment is cared for (Ferris et al., 2001)
Social wellbeing	• Establishing social networks/friendship/relatedness (Armstrong, 2000; Kingsley & Townsend, 2006; Kuo & Sullivan, 2001a,b; Ward Thompson, 2002) • Participating in social life and activities (Holland, 2004; Kweon et al., 1998) • Participating in cultural activities (Wright, 2000) • Having a sense of community/belonging (Kingsley & Townsend, 2006)
Physical health	• Having a healthy body (Diette et al., 2003; Huby & Bradshaw, 2006; Kaplan, 1993; Ulrich, 1983; de Vries et al., 2003; Tzoulas, 2004) • Eating healthily (Garnett, 1996; Rycroft, 2000) • Having a perception of a clean and healthy the environment (Krieps, 1989; Moughtin, 1996; O'Brien, 2004) • Being physically active (Bird, 2004; Fjortoft, 2001; 2004; Morris, 2003; Pretty et al., 2005a,b; Reynolds, 1999; 2002; Williams, 2006)

Capabilities	Examples of Functionings
Spiritual Wellbeing	• Experiencing religion/morality/harmony with some greater source of meaning and value/ closeness to the transcendental/transpersonal. (Anderson, 1996; Leopold, 1949; Margolin, 2000) • Experiencing spiritual realisation -sense of coherence /Harmony/balance (Thoreau, 2004; Wilson, 1984)
Mental Restoration	• Having opportunities to relax (Lewis, 1990; Randall et al., 1992; Ulrich & Parsons, 1992) • Having opportunities for short-term recovery (Hartig et al., 2001; Kaplan & Kaplan, 1989; Taylor et al., 2002; Ulrich, 1983; Wells, 2000) • Having opportunities for long term restoration (Pretty et al., 2003; 2005a,b; 2007)
Psychological Wellbeing	• Experiencing personal growth and development (Kellert & Wilson, 1993) • Gaining cognitive Skills (problem solving; resourcefulness; seeing tasks to completion; making difficult complex decisions) (Cimprich, 1993; 2003; Hartig et al., 1991; Tennessen & Cimprich, 1995) • Learning, communication and thought (Holland, 2004)

5.3 Principles and sub principles of sustainable design for community gardens

Ecologically sustainable design has manifested itself in many different scales from urban balconies to roof gardens to allotment sites. Sustainable design principles are particularly prevalent in a number of community garden sites in the UK and Ireland. These sites are contained, small scale urban food growing green spaces, which exhibit a number of sustainable design features and processes. They are defined as being sustainably designed in that their design aim to minimise environmentally destructive impacts by integrating with living processes and encourage nature, learning and environmental behaviours in urban settings.

The landscape ecologist Richard Forman (2008: 111) purports 75 greenspace types recognised as familiar in cities worldwide, with 'community gardens' (including allotment garden, leisure garden, was garden) under the categorisation of a 'medium patch' equivalent to a small semi-natural area. This categorisation is described as being in the 'metro-area border and inner – region ring' – traditionally the market gardening areas. He describes the community garden as a more fine scale 'patch' – providing family food, social benefits and rich food for wildlife.

'Patches' are the building blocks of landscapes. A patch is a wide relatively homogenous area that differs from its surroundings (Forman, 1986: 83). Normally, patches in a landscape are plant and animal communities, that is, assemblages of species. However, some patches can be lifeless, or at least contain primarily microrganisms, and are then much more prominently characterised by the presence, for example, of rock, soil, pavement or buildings (ibid). Patches have familiar attributes, such as large or small, rounded or elongated, and straight or convoluted boundaries. These attributes, in turn, have widespread ecological implications for productivity, biodiversity, soil and water (Forman, 1995: 43). Each patch exhibits directionality, proceeding from initiation towards climax. A mosaic is a pattern of patches and the background ecosystem, or land-use type is a termed a mosaic. Succession is one of many mainly human caused (anthropogenic) processes determining the rate and direction of change in a patch.

When undisturbed, the horizontal structure of landscape tends to progress towards homogeneity. Human influence increases landscape heterogeneity in three primary ways (Forman: 1986: 310): 1) agricultural and forestry practices; 2) extracting renewable resources, constructing buildings and communication routes; 3) development of urbanised areas – which is related to the centralisation of necessities for human purposes. In this way, newly introduced 'patches' increase and natural disturbance and environmental resource patches decrease. Patch density and regularity in shape increase and patch size and variability decrease. Optimum patch size depends on the particular objectives of the designer or planner or land manager, but depend on energy, mineral nutrients and species (Forman, 1986: 99) – all of which are taken into account in the planning and design of sustainably designed community garden sites. In the way that

changes in the natural landscape are a product of both human influences and natural processes, sustainably designed community garden sites have both natural and designed features and processes.

The principles and sub principles of sustainable design under study are derived from literature including landscape ecology and design, permaculture design, sustainable design, organic horticulture and urban agriculture. Mollisson (1988) asserts that principles are for guidance. They differ from laws or dogmas in that there are no penalties of error, but only learning from error, which leads to evolution of ideas. The five main principles have been originally developed as 'principles of ecological design' by Van der Ryn and Cowen (1996) but were deemed to be broad enough to be used as headline principles to then develop a more integral list of design principles, sub principles and subsequent features for ecologically sustainable community garden spaces. These five principles are explicated and reinforced by citing other writers in the field of sustainability and ecology (in the broad use of the term) and summarised in Table 5.2. This table is then used to develop a checklist of features for sustainably designed community gardens in each of the study sites. In the process of information collection and analysis, the principles and features are revised and refined to take into account the findings from the field.

5.3.1 Principle 1 - Solutions grow from place

This principle advocates local knowledge of the natural environment as a design resource. Norgaard (1987) asserts that knowledge is not separated from living in a specific place over a long period of time. Biological diversity and cultural diversity are therefore deeply linked. Traditional knowledge is therefore seen as being location specific and only arrived at through a unique co-evolution between specific social and ecological systems. McDonagh and Braungart (2002: 32) refer to a 'culture of monoculture' in the existing paradigm of manufacturing and development. Locally adapted traditional knowledge systems help maintain diversity and diverse ecosystems. Vandana Shiva explains, 'diverse ecosystems give rise to diverse life forms, and to diverse cultures' (Shiva, 1993: 65).

Van der Ryn and Cowen (1996: 62) state that needs can be met in the potentialities of the landscape and the skills already present in a community' and 'to the extent that sustainability is imposed by outside forces, it will fail'. For Berry (1987) global problems begin in the realm of culture and character, for which there can be no national or international solutions separate from those that begin with competent, caring, and disciplined people living artfully in particular localities. Biologist Garrett Hardin (1985: 141-163) similarly argues that most 'global problems' are, in fact, aggregations of national or local problems, for which effective solutions can only occur at the same level. However, Massey (2007) argues that rather than simply defending the local, developing local solutions to place is more about throwing up the challenge; what is this place and how has it formed through global encounters?

In order to develop the principle – solutions grow from place; sub principles are developed in order to then identify features of sustainably designed community garden spaces. The sub - principles include (i) Be sensitive to the local/regional ecological context; (ii) Use cooperative and supportive relative location and (iii) Be sensitive to the cultural context.

(i) Be sensitive to the local and regional context

Biodiversity is the harvest of 4 billion years of evolutionary design (Noss and Cooperrider, 1994: 89). It implies a diversity of species, but it also implies a diversity of ecosystems. It can be preserved by protecting representatives of all native ecosystem types in a range of successional states; understanding wide-scale ecological processes and by maintaining diverse viable populations of native species (ibid).

According to the UN Food and Agricultural Organisation (1998) 90% of our food comes from only 20 plants worldwide, and 60% of it from just three: rice, maize and wheat. Three quarters of the cultivated varieties, which have been bred over the past 10,000 years, have been lost during the 20th century. Relying on such a small number of plants makes humans vulnerable to major new crop diseases. The organisation, Plants for a Future have created a database of 6,000 plants of potential use in Britain, and 4,000 of these are edible. However, Fern (2000) points out in his book *Plants for a Future*, fewer than 20 species of plants supply about 90% of all our plant foods. The UK's largest organic gardening organisation, the Henry Doubleday Research Association (HDRA) has set up the Heritage Seed Library because in the UK alone 97% of the vegetable varieties available in 1903 were no longer available just eighty years later.

(ii) Use cooperative and relative location

Relative placement (Mollison, 1991) means placing people and resources in the same space. This reduces the energy it takes to transport goods and services. Windbreaks or shelterbreaks are planted to protect against wind. The strategic placement of windbreaks alters horizontal windspeed, turbulence and vortex airflows and both are amenable to design and management (Forman, 1995; 182). As another example, vegetables that are grown very close to where they are seen will be eaten fresh and hence enhances its nutritional value (Whitefield, 2004). Using shade, sun with drought tolerant and shade loving plants can provide varieties of food at different times of the year. The tastes and health giving properties of herbs are also much greater when fresh than when dried (ibid).

(iii) Be sensitive to the cultural context

Van der Ryn and Cowen (1996: 63) state that 'local knowledge and use of materials provides specific information about the climate, plants, trees, animals, water flows that makes up the texture of a place'. The passing on of local knowledge about building and growing is a prerequisite to sustainable design. Knowledge slowly accumulates season by season, through

active engagement with the land and sustainability is embedded in processes that occur over very long periods of time. These processes are not always visually obvious and manifest themselves in the skills and stories and other cultural heritage of a local area.

5.3.2 Principle 2 – Ecological accounting informs design

Kibert et al. (2002) argue that while we are quite competent in the first law of thermodynamics (the analysis of the quantity of flow and efficiency of energy), the second law which analyses the quality and effectiveness of flow (exergy) eludes us. They state that a massive challenge to design is one that is crucial to our survival – to understand how nature and ecosystems use energy (ibid: 74). Nature's metabolic processes are pollution free. Photosynthesis converts a common waste product of respiration, carbon dioxide (CO_2), into two vital reusable substances, sugar and oxygen. Photosynthesis produces no waste products. It runs at everyday temperatures and pressures and is fuelled by sunlight and water. In a natural ecosystem, nothing is wasted. The output of every plant and animal is the input of another. Ecologically sustainable design aims to imitate this.

An example of this at a regional scale is the bioregion in industry as discussed by Desai (2002) where regional scale technologies can promote (for example) the waste of one industry being the input of another. O'Neill (1993) argues that externalities (e.g. pollution, global warming, habitat destruction, and sickness) create a tension between economic accounting and ecological accounting. There is therefore a discrepancy between ecological accounting and economic accounting, in that ecological accounting takes these externalities into account. Nothing produced or consumed on earth is an externality. In this way embodied energy must be taken into account in design i.e. how much energy is required to extract, process, manufacture, and transport a building material (Van der Ryn and Cowen, 1996).

As scale increases, the sense of interrelatedness and feedback disappears and it becomes easier to separate costs and benefits. Orr (1992) argues that the likelihood of ethical behaviour decreases within distance in time and space between beneficiaries and 'losers'. Larger scale therefore makes it more difficult to assign responsibility.

Sustainable design replaces conventional resource-intensive approaches with information-rich and often low-tech locally adopted solutions. Orr (1992) argues that modern technology may dominate free choice since many use technology out of necessity. However, the goal of a sustainable society based on the model of a natural system is not necessarily antithetical to technology. The question is what kind of technology, at what scale, and for what purposes (ibid). In thinking about issues of this sort, he argues that we lack a philosophy of technology that could help us decide the most important issues on the human agenda. Without such clarity, we are prone to a passive acceptance of whatever technologies are thrust upon us by whomever for whatever purposes (Winner, 1986). The beginnings of this, what Orr (1992: 40) called

'postmodern technology' have been evident in solar technologies, and in the development of regenerative farming practices. Holmgren (2002) argues that the greatest value from solar cells may be their role in forcing us to reassess how precious electricity is during the transition to declining energy availability. Future advance in 'postmodern technology' will combine ecology and technology in subtle and ingenious ways using reused and recycled material (Orr, 1992). Van der Ryn and Cowen (1996: 162) state that by favouring technologies that are not hidden and that do not possess hidden consequences, our imaginations are again enfolded in nature.

In designing for ecological sustainability, one needs to think of sun/shade, water (where does it come from, can it be conserved?); wind earth reuse of materials and energy (making maximum use of the sun). Energy demand is balanced out in a sustainably designed garden by making useful connections between its different parts.

The sub principles of Ecological Accounting Informs Design used in this research includes: i) design in systems of reuse and recycling of energy and waste; (ii) water efficiency (iii) maximise use of space; (iv) plan for energy efficiency and (v) use of low energy and biological solutions.

(i) Design in systems of reuse and recycling of energy and waste

This involves aiming for a balanced waste and energy system. It also takes embodied energy of materials into account. An activity which may be seen to 'design in' cycles of activity may be use of renewable energy (such as solar or wind) or in terms of nutrient cycles – composting. Compost is made up of decomposed plant and animal material such as weeds, vegetable scraps and perhaps animal manure. It is an excellent (and free) soil improver (Pears and Stickland, 2000). When added to the soil, compost feeds the microscopic soil life and as a result, plant foods are made available and the soils health and structure are improved.

(ii) Use water conservation techniques

Holmgren (2002) argues that in affluent countries the reliability and low cost of reticulated urban water supply has led us to take it for granted. The Environment Agency (EA) has examined future water demand and concludes that greater efficiency is essential if a balance is to be obtained between future supply and demand (EA, 2001). A future increase in demand is due to an increase in population, households and predictions of climate change as increases in hot dry conditions will increase future demand (EA, 2004).

(iii) Use appropriate scale

Use of appropriate scale may enhance personal accountability in that individuals can have a manageable space within which to work. Features may include use of a small-scale intensive system and use of multiple function and elements (Mollison, 1991; Holmgren, 2002, Whitefield, 2004). There is space in walls, balconies, flat roofs and even gently sloping roofs to grow food in

cities. A smaller area, which gets all the attention it needs, can produce more than a larger area that does not gain from regular attention. Whitefield (2004) argues that an intensive vegetable bed of 3 by 3 metres could produce a very worthwhile contribution to ones annual fruit and vegetable intake.

(iv) Plan for energy efficiency

After the initial design has been implemented, a plan for how energy will be consumed should be made. Having planned for a balanced energy and waste system of appropriate scale should ensure that much of the work is actually done without extra resource input and 'let things garden themselves' (Mollison, 1998: 15). In this way, site users have a low tech ethos by for example using passive solar gain and insulating buildings with natural materials.

(v) Use of low energy and biological solutions

The use of biological resources means using a plant or an animal to fill a need that might otherwise be used by fossil fuels or mined minerals is a biological resource. In using primarily biological and low-energy environmental resources first, rather than non-renewable resources, we rely less on fossil fuel dependent resources and use few or no toxic substances. It involves taking the behaviour of the plant or animal concerned and arranging for it to take place where it's of benefit to us. An example of this is the beneficial use of trees. A single tree can provide the same cooling effect as 10 room-size air conditioners working 20 hours per day (Tillman, 1994).

Another example may be the use of pest-predator attractant plants for pest control in the garden. In the use of nitrogen fixing green manure, while nitrogen –fixing bacteria perform their work in the soil; we require 300 times standard pressure and temperatures upwards of 800 degrees Fahrenheit to accomplish the same purpose in plant fertiliser (Whitefield, 2004: 87). In terms of design of building materials, much depends on whether the timber is locally grown or imported (Whitefield, 2004).

5.3.3 Principle 3 – Make nature visible

The design of our built environment gives us few clues regarding seasonal change. In this way Van der Ryn and Cowen, (1996) argue that through the daily experience of the designed environment, we learn detachment. There are few designed-in opportunities that encourage us to care for the environment around us. Design should itself therefore become a pattern that connects us to the change and flow of climate, season, sun and shadow, constantly turning our awareness of the natural cycles that support all life (Bateson, 1987). This resonates with E.O Wilson's theory that we have an innate 'biophilic' need for contact with a wide variety of species (Kellert and Wilson, 1993).

Van der Ryn and Cowen (1996: 160) state that de-natured environments ignore our need and our potential for learning. Our environments are the most powerful teachers we have, in a de-natured place; we are likely to develop de-natured imaginations (ibid). The is seen to result in the de-naturing of childhood (Louv, 2006) and childhood experiences in nature (Pyle, 1978) is seen to be due in part to the outlawing of unstructured outdoor nature play, often because of the threat of lawsuits, but also because of a growing obsession with order. Vandana Shiva (1993) argues that as ecosystems lose their diversity, so do our patterns of thought. Contemporary agribusiness and industry therefore produce a kind of 'monoculture of the mind' (ibid: 65). Designing for biodiversity will require us to break free of our monocultures of the mind and see clearly how we are embedded in and interconnected with the living world. She emphasises the importance of translating this awareness into effective design strategies, at scales ranging from the backyard to a city to a continent.

Ecologically sustainable spaces may transform awareness by making nature visible. In spending time in such spaces 'one (increasingly) becomes aware of processes, patterns, and relationships' (Todd and Todd, 1980: 151). By making nature visible, sustainable design provides concrete evidence of the pattern that connects us to the rhythms of life and place.

A sub principle of Make Nature Visible includes (i) Design reflects underlying natural cyclical processes.

(i) Design reflects underlying natural cyclical processes

This involves observing and replicating natural patterns and encouraging a role of learning in this. The use of succession, diversity and use of local varieties within the site naturally produces a seasonal effect in that there is a marked change in vegetation type and pattern. Food that is grown in season requires less energy input and thrives in its local environment. Airfreight uses four times as much energy per tonne-kilometre as road and forty times as much water (Whitelegg, 1997: 43). Seasonal local food is seen as reducing the air miles involved in transporting food from.

5.3.4 Principle 4 – Design with nature

Designing with nature suggests an ongoing partnership with nature, one that benefits both people and ecosystems. The sudden intrusion of new technologies, chemicals, and other massive human impacts disrupts established patterns and introduces novel elements for which nature has no adaptive experience (Van der Ryn and Cowen, 1996). Rates of transformation of finite natural resources from useful to wasted useless forms now far exceed rates at which many can be replaced either by humans or by nature. While nature constantly continues to store energy in plants via photosynthesis, we are using stores at a far greater rate than can be replenished by

either nature or ourselves. In essence, we have not designed and built ecologically sustainable systems.

Sub principles of Design with Nature include (i) Produce a yield; (ii) Enhance successional growth (iii) Use of relative location and linking (iv) Develop reciprocity and (v) Work within the carrying capacity of the site.

(i) Produce a yield

Any output from the sustainably designed sites may be seen as a yield. However, it may be predominantly seen as biomass or energy from plants which can be consumed by humans (Forman, 1986: 71). Growing food in urban areas promotes self-reliance, community, and local economy while reducing many environmentally harmful practices from modern farming practices (Hsin, 1996). The term urban agriculture (UA) has been defined as the production of crops and/or livestock on land which is administratively and legally zoned fro urban uses (Mbiba, 1995) and although dismissed as a fringe activity. UA's potential is beginning to be realised (Redwood, 2009) particulary since the documentation of productive food growing in response to a lack of oil in Cuba in the 1990s[3] (powerofcommunity.org).

At present the world relies on four plants for most of its food: rice, wheat, maize and potatoes. This makes us extremely vulnerable to crop failure if conditions should change, either due to climate change or for any other reason. Mollison states that the yield of a system is theoretically unlimited (Mollison, 1998: 15). According to Whitefield (2000: 24) by accepting more than one output from the land, the yield is doubled. In using polycultures, a number of different types of plant may occupy the ground cover layer (Crawford, 2010). The plants contain annuals aswell as perennials which give the system its long term nature. Many of the plants used are multipurpose. Plants are mixed with few large blocks of areas of single species and each is grown close to others in ways that are mutually beneficial. According to Crawford (2010: 266) the benefits of polycultures include – maximum utilisation of soil space and sunlight and of soil protection and maintenance; increased resilience of the ground cover layer as the cover will be less susceptible to footfall or animal grazing. However he also argues that disadvantages may include reduced efficiency of harvesting and allelopathy (when one plant is detrimental to another).

A diversity of crops may not have maximum yield year on year but it is more likely to be stable from year to year and yield more than a monoculture over the years. Whitefield (2004) states that from an ecological point of view, the great benefit of such a direct food link is the reduction of food miles, the distance the food travels between field and plate.

[3] *How Cuba Survived Peak Oil* is a documentary about societal change in growing food after the loss of half of Cuba's oil imports as a result of the fall of the Soviet Union in 1990.

(ii) Enhance successional growth and ecological integrity

Ecological integrity is about three facets of the self-organisation of ecological systems: current wellbeing; resiliency and capacity to develop, regenerate, and evolve (Kibert et al. 2002). In terms of sustainability it is about the protection and restoration of the earths ecological systems in plans, regulations and designs, with special concern for biological diversity and the natural processes that sustain life (Atkisson, 2011b: 310). Examples of maximising ecological integrity with successional growth may include establishing a forest garden and the timely placement of climax species. In a natural landscape, disturbance may cause the formation of a bare area, and plants and animals then colonise this area (Forman, 1986: 64). A typical natural succession of growth in the temperate Western European climate may broadly follow the sequence: bare ground, annual plants, herbaceous perennials, shrubs, pioneer trees and mature woodland. Over time, species replace one another until the community consists primarily of species which can successfully reproduce where they are, that is, a climax community (Forman, 1986: 64). This directional species replacement process is called succession (ibid). The system changes through the years as the larger but slower growing trees gradually take over the leading productive role form the herbaceous plants, which dominate at first. The conflict between the layers competing for light is minimized with the annual cycles of the different plants and with year-on–year succession.

The forest garden idea has been developed by Robert Hart of Shropshire. Hart describes a forest garden as a tiny imitation of a natural forest designed to achieve the utmost economy of space and labour (Hart, 1996). It can be cultivated at any scale (Crawford, 2010). Like natural woodland it has three layers of vegetation: trees, shrubs and herbaceous plants. It has the layered structure of a natural forest: a canopy of fruit trees, a lower layer of dwarf fruit trees nut bushes, a shrub layer of soft fruit, a layer of perennial herbs and vegetables at ground level, plus root vegetables and climbers. It is a highly productive system. What makes the forest productive and self-reliant is its diversity (Whitefield, 2004). It is not so much the number of species that is important, but the number of useful connections between them. In this way different plants specialize is extracting different materials from the soil. When their leaves fall or the whole plant dies, these minerals become available to neighbouring plants. This happen through the work of fungi and bacteria, which convert dead organic material into a form, which can be absorbed by roots. Meanwhile, the green plants provide the fungi and bacteria with their energy needs. Insects feed off flowers and in return pollinate the flowering plants. The web of useful connections grows richer and richer with increased diversity. All the plants in a forest garden are perennials or self-seeders. It makes the most of the sunlight available to it because the different layers come into leaf at different times of the year: the herb layer first, in the early spring, followed by the shrubs and lastly by the trees. It is productive throughout the growing season at every stage throughout the growing season; there is something at the peak of growth.

(iii) Relative location and linking

The essence of what makes an ecosystem work is the network of beneficial relationships between its components. In order to allow these relationships to happen it's necessary to place things so that the output of one can easily become the input of another. The more links are made, the less the system needs external inputs and the more productive it becomes. The elements are put together in such a way that the relationships happen without too much effort. Therefore if our aim is to create a network of beneficial relationships between the components of our systems, where one put things is very much in essence.

The site design tools of zone, sector and slope (Mollison, 1991) allow us to organise information about the site into useful patterns and provide a starting point for an overall concept plan. The key planning tools of zone, network, sector and elevation can be used together to find the best placement for elements in a design. The zone in which a piece of land falls is a measure of how much human attention it receives. Plants grow better if they get attention everyday as the bed can be weeded and water by passers by. Network analysis looks at the relationships on a site where there is more than one centre of human attention. A sector is an area affected by an influence coming onto the site from outside, such as wind or sunshine. They are based on local observation, skills in reading the landscape and regional data. The bioregion has a generalised sector layout, which is modified by topography, microclimate and land use for each site. Sectoring is to a great extent working with microclimates. A microclimate is the climate of a small area, anything from a neighbourhood to a couple of square meter. Examples of microclimate factors are wind, sunshine, and humidity and to frost risk and many microclimatic factors are influenced by the elevation of the land.

The concept of multi-dimensional design (Mollison, 1991) is based on direct imitation of ecosystems. Most agriculture is virtually two-dimensional, but growing upwards (stacking) introduces the third dimension, the vertical. Succession (see fig 5.1) works with the fourth dimension, time, while maximises the surface area between boundaries between different parts of a system. This 'edge effect' in landscape ecology refers to the high population density and diversity of species on the outer portion or edge of a patch or other spatial element (Forman, 1995: 85). They are often biological cornucopias with high species richness and density of biomass (ibid). In terms of design, edge can also be in the form of curved paths and beds which maximises surface area.

Figure 5.1: Forest garden successional growth on 'the edge'

Source: (permaculture-media-download.blogspot.com)

The most productive part of a natural ecosystem is often on the edge, where one kind of ecosystem meets another, a phenomenon known as the 'edge effect' (Mollison, 1991) e.g. the edge is where woodland shrubs thrive and produce most of the fruit because it enjoys the three dimensions of the woodland and the light enjoyed by the grassland. In nature many of the species from both ecosystems live between two ecosystems. In cultivated systems we can design in edge e.g. by planting in alternate strips, or building in more edge in the form of curved beds and paths. A woodland garden will be most productive if given the maximum edge so that sunlight can penetrate to the lower layers. It can also enhance the microclimate for vegetables and herbs growing in the sheltered area along its edge.

(iv) Develop reciprocity, foster interdependence and connectedness

The use of pesticides, breeding, fertilisation, and planting or cultivation techniques is used to increase yield (Forman, 1986: 71). Organic methods of growing rely on interconnectedness between elements of the site to produce a yield, without having inputs from outside the site. The basic principle of crop rotation is to keep closely related vegetables together and grow them on a different piece of land every year. The crops are moved around in a regular sequence so that they do not return to the same spot for three or four years or longer. This helps to control pests and diseases and weeds; it maintains soil fertility and also helps to improve soil structure without any external inputs (Pears and Stickland, 2000).

Permaculture design considerations are expanded to recognise distant effects of waste on others. Any surplus yield is distributed and resources shared with others. This may involve making connections with other groups and organisations in the locality and sharing resources. By utilizing the yields of each element of the design to meet the needs of other elements, the output form one feature is made the input of the other.

(v) Work within the carrying capacity of the site

This sub principle advocates viewing the site as a self reliant system. One which has an enclosed physical boundary but is open to outside natural, material and human resources. At every level the designer as decision maker should be attempting to maximise the level of autonomy of the system while enhancing its life giving qualities (Barton et al., 1995). Waste and other such potentially pollutant outputs may be reused or disposed of creatively, with no negative effect either on the site or to others. In this way designers 'creatively use and respond to change' (Holmgren, 2002: 10). Furthermore, siite problems are turned into solutions (Mollison, 1988: 15).

5.3.5 Principle 5 – Everyone is a designer

This principle suggests that sustainability is a cultural process rather than an expert one, and that we should all acquire a basic competence in the shaping of our world. The term ecological literacy (Orr, 1992; Stone et al., 2005) and the term sustainability literacy (Stibbe, 2009) all emphasise the role of individuals in having a basic comprehension of ecology, sustainability as well as the wherewithal to find solutions to current sustainability issues. Sub principles of 'Everyone is a Designer' include (i) Encourage active participation and empowerment; ii) Encourage a role of learning.

(i) Encourage active participation and enjoyment

Examples include design days and events and inclusive design features. Van der Ryn and Cowen (1996: 146) state 'We are all designers. We constantly make decisions that shape our own futures and those of others. In the past, local knowledge and materials gave communities everything necessary to design, build, and maintain their places and argue that everyone can participate in design and such participation, with its rich tangle of theoretical knowledge, manual skills, and communication, is at the core of a culture of sustainability.

(ii) Encourage a role of learning

O'Neill (1993: 101) states that 'part of our aesthetic interest in natural beauty is founded on responses to diversity – and part of the problem conservationists often have is that an uneducated eye may fail to see diversity that is present'. He asserts that the principles can be taught, but the practice must be in tune with the unique characteristics of an individual place, and of the people who live there and hence should involve participation in design.

5.3.6 Sustainable design principles and sub principles for community gardens

Through a process of active enquiry, the researcher contacted the Federation of City Farms and Community Gardens (FCFCG) which gave access to more information on the number and location of community garden sites in the UK and Ireland which had been registered with the

organisation. In parallel to this enquiry, the following sustainable design principles and sub principles were being developed (see table 5.2).

Table 5.2 Sustainable design principles and sub principles for community gardens

Principles	Sub principles
1. Solutions grow from place	(i) Be sensitive to the local/regional ecological context -Integrate design with local and regional soils, vegetation, plant types, materials, culture, climate and topography.
	(ii) Use cooperative and supportive relative location -Relative placement: place people and resources in the same space. -Reuse local resources -Maximise use of microclimatic conditions
	(iii) Be sensitive to the cultural context -Respect and nurture traditional knowledge of place and local materials and technologies.
2. Ecological accounting informs design	(i) Design in systems for reuse and recycling of waste and energy -Take embodied energy into account. -Use of renewable sources of energy
	(ii) Use water conservation techniques
	(iii) Use appropriate scale - Maximise use of space - Use multiple functions of features and elements
	(iv) Plan for energy efficiency -Design in passive solar and low tech solutions
	(v) Use of low energy and biological solutions -Use primarily biological and low-energy environmental resources first, rather than non-renewable and fossil fuel dependent resources. -Use few or no toxic substances.

Principles	Sub principles
3. Make nature visible	(i) Design reflects underlying natural cyclical processes -Observe and replicate natural patterns -Seasonal growth
4. Design with nature	(i) Produce a yield - Maximise site outputs
	(ii) Enhance successional growth and ecological integrity -Acceleration of natural succession and evolution of vegetation -Enhance species, genetic and cultural diversity.
	(iii) Relative location and linking -Use multidimensional design -Use zones, networks, sectors and slope. -Make links to other designers and organisations
	(iv) Develop reciprocity and foster interdependence/ interconnectedness and cooperation -Utilise the yields of each element to meet the needs of other elements in the system i.e. the output from one is the input of another. -Expand design considerations to recognize distant effects and global issues. -Distribute excess -Share resources
	(v) Work within the 'carrying capacity' of the site -Turn site problems into solutions; disadvantages into advantages. -Look for useful, sustainable and surplus yields. -Be aware of the natural limitations of the site. -Creatively use and respond to change
5. Everyone is a designer	(i) Encourage active participation and empowerment -Make a commitment to clear discussion and debate about the development of the site. -Everyone is empowered to join in the design process.
	(ii) Encourage a role of learning

5.4 Conclusion

Despite the extent of literature examining how the natural environment and green space in particular can enhance human wellbeing, the essence and extent of the interconnectedness between urban dwellers and the natural environment and how this partnership can be maximised to enhance both human wellbeing and sustainability has not been fully explored. A list of wellbeing capabilities and sustainable design principles and sub principles for community gardens have been produced in this chapter. They comprise a working set of capabilities for individual human wellbeing and a set of principles and sub principles of sustainable design which are used to inform the methods developed in chapter 6. In order to seek out the dimensions of a more 'sustainable wellbeing', enhancing both the health of people and the environment, qualitative methods of interviewing and participant-led video and photography are operationalised in five sustainably designed community garden sites. These tools are used to examine wellbeing impacts of sustainably designed community garden sites.

Chapter 6

Methodology

6 METHODOLOGY

6.1 Introducing the methodology

The aim of this chapter is to explain the methodological approach and methods used in this research. In doing so, it describes how the Capability Approach (CA) to wellbeing may be adopted to examine wellbeing impacts of sustainably designed community garden sites.

The CA is operationalised by using a combination of inductive and deductive methods (site survey and observation, semi-structured interviews and the visual tools of participant-led photography and video) to identify capabilities and functionings of wellbeing in five sustainably designed community gardens. The methodological approach is deductive in that it uses pre-established capabilities and functionings of wellbeing and sustainable design principles and sub principles (as described in chapter 5). The approach is also inductive in that it builds on theories of human wellbeing and sustainable design. It refines the pre-established sets of capabilities of wellbeing and principles of sustainable design as established in chapter 5. In this way, it aims to formulate new design solutions for a more 'sustainable wellbeing'. The conceptual approach to the research is illustrated in figure 6.1.

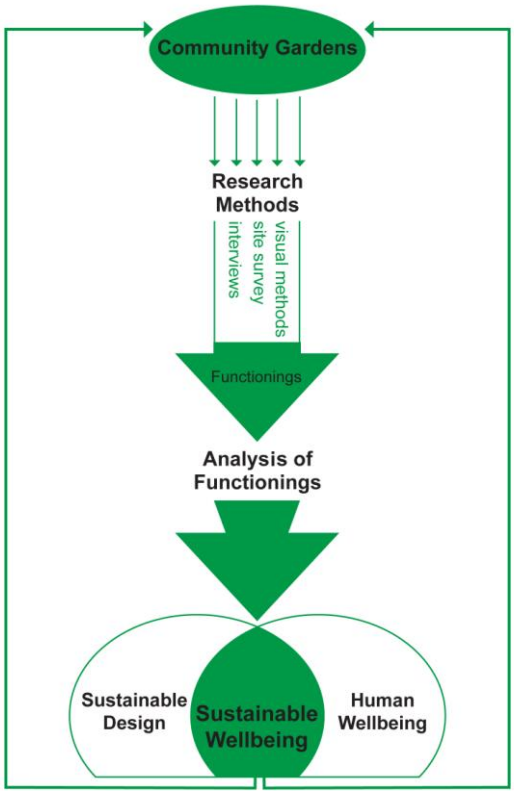


Figure 6.1: Conceptual framework for methodological approach

Section 6.2 of this chapter elaborates on the theoretical underpinnings which inform the methods used to explore wellbeing and sustainable design in this research. Section 6.3 describes the

selection of case studies and develops the research design and reflexive practices and strategies to overcome fieldwork challenges. A fuller explanation of case study selection is detailed in chapter 7. The site survey, semi-structured interviews, and the tools used in participant-led photography and video are used to collect two types of data – information on sustainable design features and processes, and the collection of end user participant views. These are described in section 6.4 and adapted to address the research objectives as described in chapter 1 of this research:

Research Objectives:

1) To establish sustainable design principles and sub principles for community gardens.

Chapter 3 explored the theoretical underpinnings of sustainable design as that of ecological sustainability. In using literature from the field of sustainable design, particularly in terms of the built environment (e.g. permaculture; construction ecology; landscape design; architecture), chapter 5 developed a set of principles and sub principles of 'sustainable design' for use in this research. This set of principles and sub principles is further refined during the course of the field work and analysis, to establish a more complete set of principles, sub principles, and associated features of sustainably designed community gardens.

2) To develop wellbeing capabilities associated with these spaces.

Chapter 2 developed the theoretical underpinning for wellbeing which focuses on the activities people value and have reason to value (functionings) and their ability to achieve this – the Capability Approach. This approach to wellbeing informed chapter 5, which provided a provisional set of wellbeing capabilities and functionings particularly for sustainably designed community gardens. This was based on literature on nature and wellbeing; green space and wellbeing; gardens and wellbeing and sustainable behaviour and wellbeing. This provisional list is further explored during the field work in order to establish a revised set of capabilities and functionings for sustainably designed community gardens.

3) To identify key features of sustainably designed community gardens.

A definition of community gardens as sustainably designed spaces is provided in chapter 4. The principles and sub principles of sustainable design developed in chapter 5 are used to conduct a checklist to further develop the provisional set of sustainable design features for community gardens as provided in chapter 7. This is compiled using a site survey combined with site observation, and an interview with each gardener/coordinator in the field. Chapter 7 provides a description of each case study and their associated sustainable design features.

4) Using community gardens as a locus, to identify any links which may exist between features of sustainable design and human wellbeing, and subsequently to identify the core principles and features that have the most positive impact on different capabilities of human wellbeing;

The semi-structured interview and participant-led video and photography methods are used to seek out the functionings – the beings, doings, and havings that user's value in the sites. Using the functioning as the unit of analysis links between sustainable design features and capabilities of wellbeing are examined. Chapter 8 provides information on those features that most impact on wellbeing. Chapter 9 describes the 'key' capabilities that were most impacted on. These findings, in part, contribute to meeting objective 5 of this research.

5) To establish best practice in sustainable design in terms of maximising wellbeing.

Using the findings from chapter 8 and chapter 9, chapter 10 provides further analysis of the way in which wellbeing is impacted on. It details the essence of how wellbeing is enhanced in the sustainably designed community garden sites under study. The final chapter combines the thesis conclusions to describe how the findings may be applied to other community gardens and other sustainably designed settings. Implications for theory, policy and practice in the fields of sustainability and wellbeing are also discussed.

Following a discussion of the research tools and methods in section 6.4 of this chapter, section 6.5 describes how the research methods are implemented in order to meet the above objectives. Next, the processes of analyses are reviewed. In the penultimate section (section 6.7) the validity of the research methods is discussed. The final section addresses the strengths and weaknesses of the methodology.

6.2 The theoretical approach

For the purpose of this research community gardens are defined as being sustainably designed in that their designs aim to minimise environmentally destructive impacts by integrating with living processes and encourage nature, learning and environmental behaviours in urban settings. Community gardens are one typology of green space as listed in Planning Policy Guidance 17 (PPG17) (ODPM, 2006). Newton (2007: 4) argues that despite the volume of literature on wellbeing and green space, there is criticism that many of the existing studies do not meet the medical professions' requirements for robust clinical and quantitative evidence. However, she also argues that there is a tendency for quantitative researchers to discount a range of in-depth and rich qualitative studies and that such research is important for unpacking and explaining the relationships illustrated through quantitative research methodologies.

This research uses a qualitative approach to explore wellbeing impacts of sustainable design. It takes a values based approach to wellbeing in five sustainably designed community garden sites. This approach to wellbeing – the Capability Approach as introduced in chapter 2 looks to individuals as agents of change in their environment by examining what one values and has reason to value.

In terms of understanding 'value', individual values and resultant behaviour and action is embedded in social and institutional contexts. Comin and Teschl (2005) argue that what constrains people's ability to make changes and evaluate their wellbeing in this way is the process of resignation. Resignation is a feeling of passivity, which leads to the acceptance of the given order. In critical social science, Fay (1987: 31) describes this as 'false consciousness'. According to Fay, critical social science 'demonstrates the ways in which the self-understandings of a group of people are false'. In developing a methodology for evaluating wellbeing where participants may be in a state of passivity and conformity, the critical social science approach of overcoming a 'false consciousness' may be applicable. This is akin to Sen's identification of the process of 'adaptive preference'. Originally introduced by Elster (1983), the issue of adaptive preference formation (APF) was taken up by Sen (1984, 1999) and Nussbaum (2000) in their critique of utilitarianism – whereby the moral worth of an action is determined solely by its utility in providing happiness. Sen's broader informational space of functionings and capabilities for evaluating wellbeing is based on a critique of utilitarianism and its alleged insensitivity to the problem of adaptive preferences.

Using the informational space of capabilities and functionings and the idea of adaptive preference in the context of sustainable behaviour in the built environment examines not only choice and opportunities offered to the individual, but the freedom to make such choices regarding sustainable behaviours in one's everyday life. 'Ordinary' consumption and everyday behaviours may not be oriented particularly towards individual display. Rather it is about convenience, habit, practice and individual responses to social norms and institutional contexts (Granow and Warde, 2001; Shove and Warde, 2002; Shove, 2003) and far from being willing partners in the process of consumerism, individuals may be locked in to a process of unsustainable behaviour over which they have very little control (Sanne, 2002; Jackson, 2005). Dolan et al. (2006) argue that as things stand, it seems that what people want, as expressed through their market behaviour, is not conducive to sustainable development. However, they state that people may actually have 'latent' preferences for sustainability that are not reflected through the market (ibid: 4). A central role of agency in the capability approach sees individuals as active agents rather than service consuming patients of their environment complementing the concept of 'ecological sustainability' wherein that sustainability will rest on foundations that require an active competent citizenry (Orr, 1992: 30).

Critical scientists understand such an active being as intelligent, reflective and wilful (Fay, 1987). This research may therefore be said to have a critical social science character in that by using Sen's agency approach to wellbeing, the underlying dynamics that are affecting people's wellbeing are explored in terms of the use of sustainably designed spaces. It perceives participants as holders of knowledge; and it aims at challenging social realities.

Critical social science can be understood broadly as a 'critical process of inquiry that goes beyond surface illusions to uncover the real structures in the material world in order to help people change conditions and build what they see as a better world for themselves' (Neuman, 2000: 7). The CA is similar to the conventional application of critical social science (Freire, 1970; Fay, 1987) in that it perceives participants as holders of knowledge and agents of change but dissimilar in that its theoretical framework is open and incomplete (Frediani, 2007) and therefore can be adapted to particular research settings.

Sen's writings are not traditionally associated with this stream of social science, as his work bridges mainly the disciplines of philosophy and economics. However, this application of the CA has a sociological character in that it investigates to a certain extent the socially constructed functionings of sustainably designed spaces and the impact these spaces have on capabilities such as expression, purpose and security, including perception of and control of public space. However, it is not one of the aims of this research to enlighten participants with a libratory interpretation of social reality.

Freire (1997: xi) argues that people who are the focus of research have a universal right to participate in the production of knowledge: 'In this process, people rupture their existing attitudes of silence, accommodation and passivity, and gain confidence and abilities to alter unjust conditions and structures'. Literature on participant-led research approaches, sustainability theory and the capability approach all reflect on the process of the production of knowledge. The enlightenment epistemology that defends objectivity and the superiority of technocrats is criticised in all literatures and all relate to people as active agents of change. A variety of participatory tools have been developed to aid outsiders to facilitate this expression. However, it has been argued that 'participation' is sometimes used merely as a tool for achieving pre-set objectives and unrealistically raising expectations of participants, and not as a process to empower groups and individuals to take leadership, envision their futures, and improve their lives (Cooke and Kothari, 2001; Hickey and Mohan, 2004). The participant-led visual methods implemented in this research are used to operationalise the capability approach and have human agency as a core concept. These visual methods aim to change the role of the researcher as an outsider. The researcher as outsider is perceived as a facilitator who encourages and enables local people to express their own reality (Chambers, 1997).

6.3 Research design

The qualitative methods of semi-structured interviews, and visual methods in the form of participant-led photographs and video methods were applied in each study site in order to fulfil the following objectives of the methodology:

1) To use qualitative methods to operationalise the capability approach in five sustainably designed community garden spaces;

2) To capture the underlying functionings associated with these spaces.

The development of generic design principles and sub principles for sustainably designed community gardens was undertaken in parallel with a search for sites which exhibited such design features in the built environment. The selection of sustainably designed sites in the form of community gardens, and the development of sustainable design principles and sub principles therefore evolved inductively. In this way, sustainability theory, subsequent sustainable design principles and sub principles and the choice of sustainably designed community gardens as a locus for the research were based, in part, on observations in the field.

In carrying out the research, the first stage involved selection of study sites. A site survey was developed from theoretical and empirical evidence detailed in chapter 5. The survey was undertaken using both observation and an interview with the site coordinator/gardener. The researcher then immersed herself within each site and the qualitative techniques were adapted to unpack the wellbeing capabilities in each sustainably designed setting; while also tackling the issues of validity such as comparability, reliability, generalisation and causal weighting. An iterative approach i.e. weaving back and forth between data and theory, data collection and analysis (Bryman, 2004) occurred in order to be reflexive in the identification of new sustainable design features and processes, or functionings of wellbeing emerging during data collection and analysis.

6.3.1 Case study selection

Emerging theoretical considerations from reviewing literature on ecological sustainability and sustainable design guided selection of the case study sites. As a result of such 'theoretical sampling' (Bryman, 2004: 102) community gardens were chosen as examples of sustainably designed spaces. According to Smith et al. (1991: 154) the selection of study sites need not rest on how typical the case may be but on its explanatory power. Chapter 4 has outlined the rationale for using sustainably designed community gardens as a locus for this research. Next, case studies were chosen.

In choosing case study sites, it was found that the differences between community gardens with varying types and numbers of sustainable design features were found to be negligible. Choosing sites which were deemed to be more sustainable than others therefore proved unrealistic. Rather than creating a comparison between varying degrees of sustainable design and evaluating wellbeing in a comparative way, the research focuses on a more in-depth analysis of how and why sustainable design may impact on wellbeing. Sustainably designed community garden sites that were at least two years old were selected and access obtained. In this way, the site features and user participation were deemed to be well established.

All of the five sites had sustainable design features; were members of the Federation of City Farms and Community Gardens and all were located in urban residential areas. Although each site is unique in location and form, the identification of identical forms would not have been possible. The number of sites chosen was deemed to be manageable and to fit with the research objectives and qualitative methods outlined. In addition, it ensured that an adequate range of users were available to participate during the fieldwork period, within the time constraints of the research.

When 'casing' possible field sites, the researcher also considered issues of location and access. Each site had a 'gatekeeper' who had formal or informal authority to control access to the site. In this research gatekeeper approval paved the way for willing participants. In seeking out sustainably designed community garden sites, the researcher developed rapports with the site coordinator/gardener(s), adopted a role in each setting and maintained social relations. The researcher explicitly presented herself to others. Being oneself and revealing personal background in growing and environmental education helped develop rapport in the field. Personal subjective experiences although not formally recorded were valuable in themselves and part of the field data in that they helped to interpret field data and interview responses. Subjective insights are admitted as feelings or 'experiential data' (Strauss, 1987: 10-11) were made clear during observation while completing the site survey. The researcher adopted both a stranger's and an insider's point of view and the field research forged a friendly relationship with members in the field.

A profile of each site was prepared in order to establish the particular history and context behind each of the sites. Historical information about the sites, local media information and planning histories were collated. A table was produced detailing background information relevant to each site. This includes location, function, use, adjacent land uses, site ownership, planning history, area (acreage). Site plans and designs were not available for all of the five sites. A site plan for each site was compiled using a combination of aerial photographs, ordnance survey maps and site surveys and sketchings. This information is illustrated in scaled drawings (site plans) for each of the sites which are contained in chapter 7 along with location plans and aerial photographs for each of the five sites.

6.3.2 Preparing for fieldwork

Permission was obtained from each site organiser/coordinator(s) before fieldwork commenced. The question of ethics was an important one in that the research involved working with children and youth participants who are deemed to be a 'vulnerable group'. The researcher therefore required a Criminal Records Bureau (CRB) check before commencing research in the field. In addition, the researcher worked within the limits of the ethical approval from Oxford Brookes University. The researcher had freedom to do as she saw fit within these limitations and responsibility was always assumed. However, it was found that the decision to use visual

methods in the form of participant-led photography and video placed added restrictions on working with youth and child users. Such a use of visual methods with child and youth groups warranted a reflection on the ethical use of visual methods in research.

In terms of the use of participant-led video and photography Banks (2001: 112) suggests that visual research may be inherently collaborative, because making images always entails some sort of negotiated relationship between those making the images and those being pictured. As a strategy for ethical research Banks recommends collaborative research as doing research with your respondents or informants, rather than on them. This means acknowledging one's own skills and understandings, but being open to others skills and understandings, mediating and altering ones own views.

Similarly, Rose (2007) states that reflexivity is a prerequisite for ethical research for researchers using visual methods. This is the careful and consistent awareness of what the researcher is doing, why, and with what possible consequences in terms of power relations between researchers and researched. A reflexive approach recognises the centrality of the subjectivity of the researcher to the production and representation of ethnographic knowledge. The approach goes beyond the researchers concern with the question of 'bias' or how researchers observe the 'reality' of a society they actually 'distort' through their participation in it. Instead, subjectivity is engaged with, as a central aspect of such ethnographic knowledge, interpretation and representation (Pink, 2007).

Reflexivity is a method used to improve the quality and trustworthiness of the research by continually analysing the procedures and application of methods during the fieldwork. According to McGee (2002: 21) 'this seeks to instil in researchers a self-critical monitoring of their application of methods'. Furthermore, reflexivity works as a mechanism to recognise existing gaps between outsiders and those with whom the researcher interacts (McGee, 2002). Instead of trying to reject the idea of bias and objectivity, the critical reflection on the ethical, personal, moral and methodological challenges aims to make the existing gaps explicit and to engage them to minimise their impact, thus enhancing the trustworthiness of the research.

When using photography in research Banks (2001: 131) notes that permission can range from a verbal request before a camera starts to snap to written permission granted after only extensive discussion. In the case of this research, groups of participants were under the age of 18 hence it was necessary for formal permission to be granted from a parent or guardian. This was also specified in the ethics approval granted from Oxford Brookes University. In the pilot stage of this research, the parents or guardians of the children were sent a letter via the garden coordinator (s) or the school's Head Teacher. The letter detailed the project and its aims and what the children would be asked to do. Only two out of twelve responses were received from parents/guardians during this pilot stage of the research. Another obstacle emerged in that it was

brought to the attention of the researcher that a number of the children involved in the sites could be listed in the police register for being of a particularly vulnerable group. A different strategy was therefore undertaken by the researcher. As a proxy, permission was sought only from the site coordinator to work with the children. In doing this, the children were instructed not to take photographs of other children or of themselves so as to avoid identification of children and youths involved. As a result, the photographs taken were only of the physical features and landscape elements of the site. Photographs in which one could identify the faces of children were discarded and not used. This way of proceeding was agreed with the Oxford Brookes Ethics Committee.

The legal position is that the person who took the photo is the person who owns it (Rose, 2007), and they are officially the copyright holders. The youths and children were asked to give permission to the researcher to reproduce their photographs, video voice recordings and video footage in any presentation or publications. Permission was also granted from the site coordinator to undertake the research in this way.

6.3.3 Fieldwork - Immersion

The first stage of fieldwork involved the researcher immersing herself to a certain extent in each of the study sites through techniques of participant observation (Burns, 2000; Neuman, 2000). According to Burns (2000: 406) 'participant observation' serves to elicit from people their definitions of reality and the organising constructs of their world'. However, different researchers apply different levels of participant observation (Denzin and Lincoln, 2000).

In the case of this research the level of interaction progressed from researcher as *non-participant observer* (the researcher is known from the beginning but has limited contact), to *participant observer* (the researcher is overt and is an intimate friend of the site participants) (Junker, 1960). The *observer's* activities as such were made publicly known at the outset, and are openly endorsed. As the fieldwork progressed, the researcher acquired a role of *participant* in the ongoing site work such as weeding and sowing (Moulsecoomb Forest Garden and Wildlife Project); a role in teaching children how to grow and propagate plants (Shanakill Community Garden); cooking and coppicing of willow trees (Eglantine Community Garden), harvesting food (Easton Community Allotment) and joining in event day activities (Scottswood Natural Community Garden). This level of immersion occurred throughout the fieldwork activity period and aimed to tackle three issues identified by Smith et al. (1997) as being essential before beginning praxis:

a. Knowing self - of questioning the researcher's motivations, inner tensions, preconceptions and prejudices. The aim was to start to engage into a process of reflexivity, described as 'a conscious experiencing of the self as both inquirer and respondent, as teacher and learner, as the one coming to know the self within the processes of research itself' (Guba and Lincoln, 2000: 283).

b. Seeking connections - building trust and solidarity. By becoming involved in site activities, the researcher acquired a temporary role in the site thus generating trust (Neuman, 2000: 356).

c. Grounding in context - through people's stories and informal conversations, the researcher aimed at understanding the underlying dynamics that take place in the sites (Smith et al., 1997). This is useful in informing how individuals were to be approached and the style and subtleties of interviewing appropriate to the site or the individual.

6.4 Research tools

After initial immersion in each of the study sites, and establishment of wellbeing capabilities and principles of sustainable design, the following research tools were designed: a site survey (Appendix B); a semi-structured interview schedule to be undertaken with active and passive adult users (Appendix C and D) and a framework for preliminary analysis of participant-led video and photography for youth and child users (Appendix E). These tools were chosen in order to collect two types of data – information on sustainable design features (site survey checklist) and collection of end user participant views (interview schedule and framework for analysis of visual data). In keeping with Sen's capability approach of examining how people value using the study sites, the research tools were used to capture 'functionings' – the activities users valued and had reason to value in using the sites. In this way, impacts of the design features would be clearly identified. In addition, agency and counterfactuals (e.g. what one would like to see done differently) and broader perceptions on their freedom to use the space would also be explored.

6.4.1 Site survey and observation

The principles and sub principles of sustainable design as developed in chapter 5 formed a design checklist specifically associated with sustainably designed community gardens (see Appendix B). These examples of sustainable design features can be divided into those that are tangible and can be physically implemented (e.g. water conservation features) and those that are intangible and implemented as processes over time (e.g. opportunities for user participation).

Observation formed part of the site survey in order to complete the checklist of features in each site. Observation, which is considered as the most 'direct way of obtaining data' (Gillham, 2000: 46) was used to explore and confirm both the tangible and intangible features, and processes of sustainable design detailed in the checklist.

The researcher took the role of *non-participant observer* while carrying out the survey of the physical features of the site. Such a survey is a quick and efficient method of gaining preliminary

knowledge or making a preliminary assessment of state or condition (Walliman, 2005). The researcher then took the role of *participant observer* when looking to the more process oriented and intangible features of the site (e.g. reuse and recycling of materials, multiple functions of site features and levels of participation, use of zoning).

A preliminary, but clear, specification of what should be observed (and a clear explanation as to why it is important) was derived from the literature as explicated in chapter 5. Notes were taken when it was possible during fieldwork, and documented at the end of each working day. They were summarised into the site survey checklist and site plans, and analysed with the data from the interviews and visual methods. This observation was undertaken during five separate visits to each site during the period January 2007 to January 2008. During this time, the researcher attended regular work days and events. The information was recorded on the site design checklist. Confirmation and explication of features and details of more intangible features were sought out by interviewing the site coordinator or site gardener (see Appendix I).

6.4.2 The interview schedule

The semi-structured interview was the main research tool (see Appendix C and D). The semi-structured interview schedule is a technique to undertake open-ended and in-depth interviews, but with a certain set of guidelines and directions addressing the crucial issues of the study (Burns, 2000). In this way it was appropriate in order to achieve defined answers to defined questions, while leaving time for further development of those answers, and including more open-ended questions (Walliman, 2005).

The open-ended and in-depth nature of the semi-structured interview met the need for the requirement to ask the probing question of 'why?' and 'how?' during crucial points within the interview. It also provided room for scoping out the information being gathered on such wellbeing dimensions as spirituality or mental wellbeing where the participant may wish to describe their feelings in detail to the interviewer. In this way a space was created within which users could refer to any sustainable feature of the site perceived to influence wellbeing detailed in the site survey. It also took account of reflections on site experiences and those sustainable features not originally identified in the site survey and hence provided the opportunity to refine the pre-established set of sustainable design principles and wellbeing capabilities.

A concern of the researcher during fieldwork is with the kinds of distinctions people make in what to communicate and with whom to communicate it (Junker, 2004). Information in society is valuated in ways that vary from one situation to another; the field worker therefore develops sensitivity to the many kinds of distinction people make over a range of information from public to private (ibid). With the use of semi-structured interviewing, the interviewer is in a good position to be able to judge the quality of the responses of the subjects, to notice if a question has not been

properly understood, and to reassure and encourage the respondent to be full in his/her answers (Walliman, 2005).

A separate interview schedule was developed for those that use the site on a regular basis (active users) and those that pass through the site regularly en route to another location, live or work adjacent to the site (passive users). The active interview schedule (Appendix C) focused on more involved site activities. The passive schedule (Appendix D) had a number of more specific questions relating to passive activities and functionings such as having a stimulating view/or not as well as counterfactuals and reasons for not being active in the site. For both, the interview schedule was structured in a way that aims to link the features of sustainable design to wellbeing capabilities. This was achieved by focusing on the activities or functioning's (being, doing, having) which people value as a result of interaction with design features of the sustainably designed sites.

In developing the schedule, the provisional list of 10 wellbeing capabilities and 32 functionings established in chapter 5 were used to frame the questions contained within the interview schedule. The user was asked open questions about the activities he/she partakes in – focusing on 'why' the user participates in these activities. This mode of questioning eventually identifies the capability and functionings of wellbeing valued.

The schedule had a deductive element in that it contained a number of pre-coded questions so as to seek out associations between specific sustainable design features within the site, the associated 'functioning' and wellbeing capabilities. A number of precise questions were taken from national health and wellbeing surveys (See Appendix C and D for details of these) and others were derived from previous literature e.g. studies on nature, green space and wellbeing as detailed in Chapter 5.

One of the aims of sustainably designed community gardens is to enhance sustainability literacy (as discussed in section 3.5) and environmental behaviours through learning new skills. Questions relating to environmental behaviour both inside and outside the site assist in seeking out the links between learning within the site and capabilities impacted on. Information regarding environmental behaviour and anxieties about the future of the environment links a particular ecological worldview or mindset, to any wellbeing capability brought about by using the site. Questions on counterfactuals (e.g. active schedule section 2 - Q6 what would you like to see done differently?); agency (e.g. active schedule section 4 - Q35 democratic practice; level of participation) and capability (Q42-44 questions on the general level of health and wellbeing) were included. The final section involves background information such as age and gender. The interview was divided into 5 main sections as detailed below.

Section 1 – Questions on neighbourhood

The aim of section 1 was to locate where the user resided in order to seek out whether they lived within the estate or local community or if they came from elsewhere. They were also asked about their perception of the area, where the community garden was, and whether the site improved their perception of the area in any way. These questions were applied in order to develop conversation with the interviewee in asking about their local area.

Section 2 – Open questions on capabilities and functionings

Section 2 contained questions regarding how the participant used the space and how often. This put the user in context and explored the activities that the participant partook in within the site. The 'why' question looked to the particular 'functionings' of wellbeing and the 'how?' question identified the features and processes of sustainable design - the enabling requirements in terms of capabilities. Some features identified may have already been identified in the site survey. Others, identified as impacting on the wellbeing were noted. However, those new emerging features impacting on wellbeing that were not contained within the survey contributed to developing a more comprehensive set of sustainable design features particularly associated with wellbeing.

Section 3 – Focused questions on functionings

Based on the published peer reviewed literature, a number of links have been made between green space, nature and wellbeing (chapter 5). In order to seek out how these may be particularly impacted on in the study sites, a number of specific questions were formulated regarding site activity and wellbeing. Section 3 of the interview schedule contains questions specifically relating to these functionings and capabilities. These questions prompted the interviewee to think about specific activities that they were involved in such as growing food, meeting new people, being physically active but also some functionings gained from participating in site activities such as losing one's sense of time feeling energised, feeling safe or unsafe. These questions also seek out the more ineffable aspects of wellbeing which are perhaps more difficult to discuss or describe. Again, the emphasis on 'why?' and 'how?' questions facilitated the seeking out of specific functionings and related site features. The impact these leading questions may have on the process of analysis and the research results is made transparent at this stage of the research and taken into account in interpreting findings.

Section 4 – Aspects of agency

Section 4 detailed the agency aspects of the activities partaken in within the site. Such questions covered aspects of perceived levels of participation within the site, participation in debate and decision making about the site, and empowerment of the individual in terms of achievements identified, ownership and expression. Counterfactuals i.e. what one would do differently or change in the site were also taken into account.

Section 5 – Environmental awareness

These questions probe the level of concern that the individual has for the environment and the wellbeing of people, whether they believed that site activities have ameliorated these concerns in any way, and what impact this may have on wellbeing. These questions are abstracted from the DEFRA 2001 Survey of public attitudes towards the environment and quality of life (Latest edition at time of production of interview schedule).

Section 6 – Questions on general level of health and capability

This section contains background questions on general level of health and standard of living, in order to seek out the general wellbeing of the user to use the site. The user was asked whether they felt that the site enhanced this in any way and if so, how.

The final section of the schedule details background information about gender and age. This was to ensure a wide range of interviewees ranging in age and gender.

6.4.3 Participant – led photography and video

As wellbeing changes during the course of one's life (Ryff and Heidrich, 1997; Westerhof et al. 2001; Biggeri et al., 2006) different methods were chosen to seek out the capabilities associated with the users under the age of 19. In order to obtain valid information from this usually difficult to access group, more participatory methods of data collection were developed to seek out the tacit nature of child and youth interactions within the site. This was achieved through the use of participant-led photography and video tools. According to Campbell (2002: 24) visual techniques 'are intended to enable local people to conduct their own analysis, and often to plan and take action through a shift from verbally to visually oriented methods that are not dependent on literacy'. A fuller description of how the research methods were implemented is discussed in section 6.5.

6.5 Implementation of research methods

Once the research tools were designed, the research activities could be undertaken. The fieldwork took place form January 2007 to January 2008. This period of time was necessary in order to include at least one growing season. The duration of the field work however, was longer than expected due to the wet weather conditions during the summer of 2007. The semi structured interview and participant-led photography and video methods (photo elicitation and video walkabout method) were implemented in each study site (see Appendix F and G).

Only three of the sites (Moulsecoomb Wildlife and Forest Garden Project; Scottswood Natural Community Garden; Shanakill and Rahoonane Organic Community Garden) had children and youths participating on a regular basis during the fieldwork period (January 2007 - February 2008). Therefore implementation of visual methods was only undertaken in these three sites.

6.5.1 The semi-structured interview process

A total of 47 (22 active and 25 passive users) individuals were interviewed (see Appendix F). This number was deemed appropriate in order to interview a range of adult age groups for each gender, in each study site. Adult active and passive groups in each case study ranged from 3 to 6 participants. In total 19 male users and 28 female users were interviewed, the average age adult participant being in the 25-34 age group. The information was recorded on the schedule itself and audio recorded digitally.

Face-to-face, on-site semi-structured interviews obtained responses from the active users i.e. those who were actively involved in participating in site activities. The residents living adjacent to the site and those who walk through or around the site act as passive users and are interviewed as such. Theoretical sampling was used in order to obtain information from the sample of the population that knows most about the subject, i.e. those who work actively within the site (active users) and those who live or work adjacent to or pass by the site on a regular basis (the passive users). Purposive sampling was applied in that the researcher selected what she thought was a 'typical' sample, e.g. mix of ages, gender, frequency of use. In seeking out passive users the researcher randomly approached adjacent households and individuals passing by the sites.

The interviews took place within the sites, in the building structures within the site, and outdoors (weather permitting). The exact location of the interview was at the discretion of the interviewee. The interview schedule was pre-tested on two active and two passive users in a pilot study in one site (Moulsecoomb Forest Garden and Wildlife Project). In carrying out pilot interviews with active users, it was found that these participants expressed a wish to carry on working while being interviewed. This mode of interviewing was then offered as an option to interviewees. For passive users, it was found that they were often in a hurry, walking through the site or occupied in their adjacent residential dwellings. The passive schedule therefore focuses on more specific questions about how they use they site. In implementing the passive interview, it was found to be shorter in duration than the active interview.

6.5.2 Photo-elicitation

Photo-elicitation is 'based on the simple idea of inserting a photograph into a research interview' (Harper, 2002: 13). The photo can be taken both by the researcher or the researched, and in the case of this research, taken by the researched. This is termed 'photo novella' (Rose, 2007: 240).

The value of using participant–led photography and photo elicitation as noted by Collier (1967: 5) lies in the way their precision provides data for analysis. Photos do analytical work most helpfully when they are used to evoke something that is itself visual, at least in part (Rose, 2007), whether

that is the aesthetics of a work environment (Warren, 2002) or the texture of a place (Edensor, 2005).

Blinn and Harrist (1991) emphasise two of the reasons why combining photos with interviews offers a particularly insightful research method: first, because it gives detailed information about how informants see their world; and second, because it allows interviewees to reflect on things they do not usually think about. Holliday (2004: 60) states that in photo-elicitation, the images of the research subjects are there to 'talk back' as it were, from their photos.

The photographs are 'supporting' in that they are subordinated to the researcher's interpretations and worked over for what they can offer in the way of evidence to answer a research question (Rose, 2007: 237-239). Collier argues that it is only through interviewing that the information carried out by a photo can be accessed by the researcher (Collier, 1967).

In adapting Blinn and Harrist's guidance on combining photos and interviews (1991:175) three basic steps of photo-elicitation were developed in this research:

1 An initial interview with site users - The researcher introduced herself and the topic of the study to the participant. This 'chat' focused on the questions that the photographs were going to contribute to answering, such as asking the child user how long they have been coming to the site; how often they come; where they live or what school of group they attend.

2 Photo Novella - For those users between the age of 8 and 12, each participant was asked to take pictures using a digital camera of features or aspects of the site they have worked on, found interesting in general, or liked/disliked. In order to reduce researcher bias and interpretation and to assist analysis, participants were then asked to describe the photographs and to give reasons why they had taken them. Both of these methods have been piloted to ensure data would be applicable for analysis in terms of seeking out functionings, features and associated capabilities of wellbeing. Although the child users were asked to focus on particular features of the sites and how they use them, the photos still have agency in terms of exceeding and expanding the research question to produce information of aspects of the site which is not evident from simply observing site activities.

The children were not given any training on how to shoot photos or use lighting, or focus. They were simply asked to stop and click…. However, more 'artistic' or 'extra sensory' photographs or footage type shots were not discouraged but used only in that the researcher could show them to be a reliable source of child functionings and capabilities of wellbeing. Any unexpected and spontaneous happenings, which may have occurred in the site, were also not discouraged.

Rose (2007: 261) asserts that the sample size should not be so large that it overwhelms the resources you have available for analysing it. Blinn and Harrist (1991: 179-180) use Polaroid cameras in their research, and asked each participant to take only 10 photos. In this research, the children were asked to take approximately 12 photographs using a digital camera but this was indicated not to be a strict number. This number was specified as it was deemed to be 'manageable' for the researcher in terms of analysis and also due to the fact that an unrestricted number of photographs could potentially be taken with a digital camera.

3 Photo elicitation in practice -The photographs taken by the children aged 8-12 were used to encourage child interviewees to relay information about site activities that perhaps would not be possible without the photos. The photos and the interview content were then interpreted by the researcher.

In order to find out why the photograph was taken, and obtain a description of the thoughts and feelings evoked by each photograph, the child users were asked to explain why they had taken each of the photographs. On interview, questions were asked such as: What is in it? Why did you take this photograph? Can you describe anything in it that is important to you? In a study by Blinn and Harrist (1991), the photos were developed, and interviewees asked to write something about the photos before they met the researcher again. In using this strategy in the pilot stage of the research, it was found that the children would frequently not attend the site again for perhaps another 3-4 weeks. By this time the child participant had forgotten why they had originally taken the photo. Therefore it was decided that immediately after the photographs were taken by the children, they would be displayed on a laptop computer for the purpose of eliciting comments on the subject of the sustainable design features of the site.

The research is presented such that the 'talk' about the photos between the researcher and the researched takes precedence over the photos themselves. This is a less formal type of photo-elicitation method in that the questions are quite vague so that the young respondents can lead the research process themselves into areas that are important to them. Suki Ali (2004) states that this spontaneity can help to reduce the rigidity of the interviewer/interviewee positions in keeping with feminist principles and consideration for the respondents helps to minimise power relations between researchers and researched.

A minimum of three sets of footage and sets of photographs with associated interviews were carried out within these sites. In total 12 sets of photographs with associated interviews were produced by the child participants.

6.5.3 The video walkabout method

While there is a long tradition in visual anthropology of making films in order to answer research questions, this is a highly specialised and technically demanding method (e.g. Barbash and

Taylor, 1997; Banks, 2001; Pink, 2006). In terms of video, Holliday (2004) argues that the veracity of the visual, demands that due attention be paid to the research participants. Although the video walkabout method was originated by the visual ethnographer Sarah Pink (2007), this research is not an in depth ethnographic study but an application of visual ethnographic methods. In Pink's description of using the 'video walkabout method', the researcher has control of the camera. When piloting this method, it was found that the young participants were keen to use and hold the camera themselves. Many had never used a video camera before, and being in control of the camera seemed to give the young participants encouragement and vivacity in describing how they used the site. Those users between 12 and 19 agreeing to use participant-led video were asked to take the researcher on a tour of the site while holding a video camera. They were asked to describe the features of the site which they have worked on, are interested in, liked or disliked. The young participants had a choice whether to be accompanied or not by the researcher.

The way in which participant-led photograph and video methods were implemented is detailed in Appendix G. In total, 11 sets of footage with associated interviews were produced by the youth participants.

6.6 Analysis

The data obtained from the semi-structured interviews and participant-led video and photography methods were collected and analysed. The data was analysed using coding analysis to establish any relationships which may exist between the various principles, sub principles and features of sustainable design and capabilities and functionings of human wellbeing.

The coding categories pre-set by the researcher in advance of the field work (and explicated in chapter 5) reflect the theoretical framing of the research. Further categories of both sustainable design and capabilities wellbeing arose during data collection and are detailed and analysed, demonstrating the iterative nature of the research. Such a process of emergence i.e. the appearance of common themes and levels of organisation that was not apparent prior to the fieldwork activity formed. These new emerging features of sustainable design and functionings of wellbeing are described in chapter 8 and 9 respectively. During data analysis features of sustainable design are linked to 'functionings' which the users partake in within the site. The various values and valued activities which specifically lead to site functionings and hence enhance a capability of wellbeing are termed valued freedoms. The way in which sustainable design features were pre-coded into valued freedoms, functionings and capabilities of wellbeing and a possible example of this is detailed below in figure 6.2.

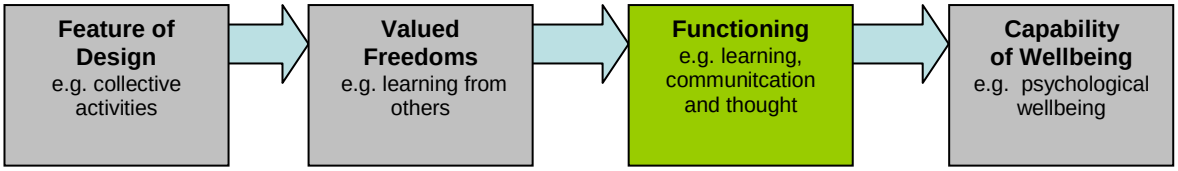


Figure 6.2: Pre-coding categories for interview transcript and video and photo-interview data.

Functionings are the unit of analysis in that they connect the individual to the site features and activities, and to the associated individual capabilities. The method of frequencies is subject to many criticisms (Maynard and Schaeffer, 2002), but can provide insights when there are general agreements. In establishing the frequency of functionings, the number of times a user links a specific sustainable design feature to a capability of wellbeing is counted.

The video footage and photographs with accompanying interviews are analysed with the same analytical framework of functionings and features linked to capabilities (see Appendix E). The extra visual analysis associated with visual methods brings a new aspect to analysing the data obtained for youth and child users and this is detailed in the analysis chapters. The analyses will bring forward those capabilities likely to be affected by sustainably designed space, and show why and how this is so. An example of a coded interview transcript is provided in Appendix E and an example of coded youth video data is provided in Appendix K.

6.6.1 Analysis of interview data

All of the interviews were digitally recorded and transcribed. Conceptualisation of the data into provisional categories was undertaken prior to analysis. This comprises the deductive stage of the analysis examining capabilities, the associated activities undertaken within the site (functionings) and relating these to the associated features of sustainable design. An inductive element to the research was carried out in that the open ended nature of the interview and participant-led video and photography methods brought the emergence of new 'functionings' to light. These functionings brought added features of sustainable design which were used to build on the initial table of sustainable design features and principles developed in chapter 5.

A pre-structured analysis was used in that data collection was streamlined to a certain extent to gather information on functioning activities, features and associated capabilities in each site. To verify the results obtained, observation using the site survey checklist was used to triangulate the results in each case study area. The information was filled in during the interview with each site users and therefore to a certain extent, slotted into the prepared framework of the interview schedule (Appendix C and D). In this way, coding was applied to raw field notes. The qualitative element of analysing the more open ended questions added new categories to the analysis.

Coding analysis was used for the retrieval of text sequences – it involved the process of cutting and pasting sections of text from transcripts coded under the 32 functionings and the 10 capabilities. It is clear that the analytical decision to code using the 10 capabilities in order to seek out aspects of sustainable wellbeing has a defining effect on what is found in the collected data. According to Ezzy (2002), such research has been criticised for manipulating data to fit a certain pre-established theory. In contrast, at the other extreme of coding, grounded theory practitioners developed methodologies to identify themes inductively, after the data is collected (Strauss and Corbin, 1990).

In this research, emerging themes were also developed inductively during data collection. Thus the classification of additional categories starts to take place through the semi-structured nature of the interviews. Therefore there is an iterative process of data collection and analysis, in order to sharpen and make efficient the tools used, while at the same time having consistency in data gathered.

After disaggregating and splitting the data into different categories (principles and features of sustainable design; capabilities and associated functionings), the analysis aimed at clustering data and examining regularities, and identifying variations and singularities (Miles and Huberman, 1994). This requires a method of pulling together the coded information into more compact and meaningful groupings. Pattern coding is used to seek out themes, among the individuals and emerging concepts. A new account is then produced of analysis by principle and feature of sustainable design (Chapter 8) and wellbeing capability (Chapter 9) to inform key aspects of enhancing wellbeing in chapter 10.

6.6.2 Analysis of visual data

In order to move from visual impressions to systematised procedures for handling visual data, fieldwork activities were directed to focus on 'activities', and the features of the site which enable such activities to take place. This led to a structured analysis undertaken on the interview transcripts of video and photographic information. However, unanticipated directions were not excluded in a phase of 'free discovery' and the ideal analysis process allows the data to lead to its own conclusions through a dynamic interplay between open and structured procedures (Collier and Collier, 1986: 277)

When analysing photographs, the following steps were taken:

1) The photograph was viewed repeatedly until its character was clear to the researcher, i.e. the sustainable design feature was identified. The photographs were viewed in chronological order so as to identify any interconnections between features.

2) Each photograph went through an inventory/logging process. Material content and spatial arrangement were viewed in order to be familiar with the content and to identify the location of the data within the sample.
3) A more focused analysis is shaped by analysing the text associated with the interview completed with each child user, the researcher's initial research questions and new propositions discovered during stages 1 and 2 of analysis (above). Elements and features within the photographs, which were not commented on by the participants were not analysed. What can be seen in the visual record (photograph) can then be reinforced by what the participant says.
4) Conclusions are formatted by reviewing all of the photos. The detail observed in stage 3 and 4 then is seen in a larger context.

When analysing video the following steps were taken:

1) Each video clip was viewed and all associated vocal recording was listened to in full until the character of each clip was clear.
2) Using Adobe Satellite Premier Pro software, each clip went through an inventory logging process whereby as the clip was rolling, stills were made at point in the clip where the participant spoke about the site features and associated activities. Each clip was tagged with the vocal recording and transcribed as text to be further analysed.
3) Comparisons can be made between clips; hand movements and the inflection in the sound of voice were observed.
4) Micro Analysis is developed as every frame of film is examined in a particular sequence.
5) Conclusions are formatted by reviewing all of the stills. The detail observed in stage 3 and 4 then is seen in a larger context.

Knowles and Sweetman (2004: 6) emphasise 'the analytical and conceptual possibilities of visual methods in terms of what it is that visual methods are able to achieve rather than in terms of what photographs inherently are'. They also argue that photos can achieve something that methods relying only on speech and writing cannot. Technological developments allow for the digital enhancement of images. And we are now entering the age of post photography (Lister, 1995). Although a digital camera was used by the child users, the digital images were not enhanced in any way in the analysis stage of the research.

All of the images collected that had associated interviews were used in analysis. The images are reduced to a number of component parts - codes, which can be labelled in a way that has some analytical significance. 'Coding' means attaching a set of descriptive labels or categories to the images. Coding for the images was that of the pre-defined codes of the sustainable design principles, sub-principles and features established in chapter 5. Analysis of the coded visual images and text relied on qualitative interpretations of the relations between the categories and

between the categories and the interview codes. The research relied on qualitative interpretations of the relations between the categories. Drawing on Rose (2007), some themes did not appear directly on the list of initial coding categories and others were developed by amalgamating some codes on the basis of the empirical and theoretical literature the study is drawing on.

Although coding may be seen as a reflexive process, Rose (2007: 59) states that the coding categories must be completely unambiguous, they must be so clearly defined that different researchers at different times using the same categories would code the images in exactly the same way. This it is claimed makes the coding process replicable. Lutz and Collins (1993) develop their categories in relation to their theoretical concerns so that their categories are immediately more obviously interpretive. Slater (1998: 236) states that the categories should be apparently objective in a number of ways and therefore only describe what is 'really' there in the text or image. In this way, new categories of sustainable design features contained within the photographs were also taken into account and used in further analysis.

Rose (2007: 71) asserts that something that is left out of the photograph may be extremely significant to its meaning. She also states that coding analysis breaks an image into parts and has no way of handling any interconnections that may exist between its parts, other than by statistical correlation. She states that this is probably not the best way to understand how an image works. She also states that it is very hard to evoke the mood of an image through codes (ibid: 72). The interview that took place with the child participants after the photographs were taken served to evoke such feeling of mood associated with the site feature and activity.

The codes used therefore depend on a theorised connection between the image and the broader context in which its meaning is made. 'Theorised' because making this connection entails drawing on a theoretical and empirical understanding of the images under construction (Krippendorf, 1980: 129). This connection between text, context and code requires careful thought, and it is on the integrity of this link that the codes can be judged valid (ibid).

In order to ensure the categories did not overlap, were exclusive, would produce a breakdown of imagery that would be analytically interesting and coherent and enlightening (Slater, 1998: 236) initial categories were put into use in a trial run on the images. For the development of further codes, the image was analysed in conjunction with the associated interview text. In doing this the researcher returned to the wider theoretical and empirical literature from which the research question has been formulated. Further codes were established from the familiarity the researcher has with a set of images.

6.6.3 Display of results

Matrices and tables are also used in this stage of the analysis to demonstrate the richness of the data, illustrate connections and also display data. Vignettes are used in the analysis of capabilities (Chapter 9). A vignette is a short, contextually rich narrative story this is used to encapsulate a typical event or attitude associated with the site in a direct way. According to Walliman (2005: 314) it results in a vivid, compelling and persuasive interpretation of an issue, an abstraction rather than a representation of the original event. It can be used to formulate core issues and highlight important subjects.

The regularities and variations of the data are selected and summarised in the analytical chapters of the research. According to Dey (1993), the production of the account is the ultimate outcome of the analytical process. The account is in two forms, firstly analysis was undertaken by features and principles of sustainable design (chapter 8) and then the data analysed by key capability of wellbeing (chapter 9) which have emerged form the analysed data. Matrices in chapter 8 illustrate frequencies where the number in each cell refers to one user - one functioning (i.e. one user mentioning one particular functioning of wellbeing). In bringing these analyses together a case for a more sustainable approach to wellbeing will be discussed in chapter 10.

6.7 Tackling the validity of research methods

Qualitative research methods need to pay careful attention to the information gathered due to their open and localised nature (Campbell, 2002). According to Maynard and Schaeffer (2002: 46) 'the small-scale and local nature of the data generated by such analyses raises immediate questions about its applicability for drawing conclusions over a broader area. The four conditions (generalisation, comparability, reliability, and casual weighting) for assessing the validation of research are addressed below (ibid):

Generalisation

According to Maynard and Schaffer (2002) generalisation can take place where there is clear judgement about the typicality of the case studies and population involved. This challenge is addressed in three ways in this research methodology: Firstly the case study sites are within the British Isles - in the Republic of Ireland, Northern Ireland and England. They are all members of the FCFCG and are all are community garden sites that have sustainable design as their guiding focus. Secondly, the sites are all residential areas with four out of the five being designated areas of regeneration or deprivation. The site in Northern Ireland, although not a designated area of regeneration is a site which has been abandoned and seen as a focus of criminal activity in the area. As the sites are community gardens of a particular type – i.e. they are sustainably designed spaces, the research findings can be applied to other such types of community garden.

Comparability

The difficulty of comparability relies on generating domains of the issue studied that can be applied in every community studied. The research outputs can be applied to other community gardens of a particular type – those that are sustainably designed. The set of wellbeing capabilities and functionings, and principles, sub principles and features may be applied to other sustainably designed community gardens. The findings in terms of those principles and features most impacting on wellbeing and the key capabilities and functionings found can also be applied to other such sites. It is envisaged that the methodology developed can be used to evaluate wellbeing in other sustainable designed spaces. This idea is further developed in the concluding chapter.

Reliability

Reliability aims to ensure that the research results are not investigator specific and may be replicable if conducted by others in similar circumstances. The sustainable design checklist (Appendix B); capabilities table (Table 5.1); interview schedule (Appendix C and D); and specific frameworks for data collection and analysis using the capability approach (Appendix E) are structured to allow for replicability but are also open enough to allow for local variation.

Causal weighting

The research did not aim to weight capabilities and functionings of sustainable wellbeing. The perceived importance of functionings (beings, doings, havings that users valued) and associated sustainable design features were analysed according to the frequency of which they were mentioned by site users. Frequencies are utilised in chapter 8 as part of an approach to identifying key capabilities and functionings which impact on wellbeing. To undertake a multidimensional approach to analysing wellbeing as described at the outset, these key functionings are given equal weighting. They are analysed to explore the essence of how wellbeing is enhanced in chapter 10.

6.8 Limitations and Conclusions

The methodology of this research establishes the types of data required and the appropriate methods for gathering such data. In addition it builds on theories, of sustainability and of the approach. Qualitative methods of semi-structured and participant-led video and photography are used to clarify the relationship between sustainability and wellbeing in the context of a particular type of sustainably designed space – that of the community garden.

By applying the Capability Approach through qualitative methods the research may have what can be termed a critical social science character. It unfolds 'valued freedoms', perceiving people

as active agents of change and in this way may challenge social realities. It may tap into what critical social science terms 'a false sense of consciousness' (Fay, 1987: 31). The merging of the capability approach and ecological sustainability reveals the similarities, strengths and challenges of combining these two approaches. The research design has been oriented to address this combination in that by using qualitative methods and visual methods, a more rigorous and in-depth, open-ended approach to experiences of wellbeing may be discovered.

Some practical and conceptual limitations of this research can be underlined at this stage. The set of capabilities, functionings and principles and sub principles are for any sustainably designed community garden but not all types of community garden or all sustainably designed spaces. The methodology described can however be used to explore the wellbeing impacts of other sustainably designed spaces.

In addition, this thesis cannot develop a final overall 'list' of functionings of 'sustainable wellbeing' (as defined in chapter 10) as the sample is not representative enough to generalise findings across all users of sustainably designed spaces. It is therefore not a universal list for 'sustainable wellbeing'. However, it may be used to inform the development of other lists/dimensions of wellbeing in sustainable design.

Such limitations are argued not to have compromised the validity, reliability and innovative features of this research. The data disclosed in part two of the thesis (chapter 7-11) refines objectives 1 and 2 of this thesis in that the end user participants' views are taken into account in revising the sets of principles of sustainable design and of wellbeing capabilities as established in part one. The following chapters also address effectively and thoroughly objectives 3 - 5 of the thesis, which are: 3) To identify key features of sustainably designed community gardens; 4) Using community gardens as a locus, identify any links which may exist between features of sustainable design and human wellbeing, and subsequently identify the core principles and features that have the most positive impact on different capabilities of human wellbeing; 5) To establish best practice in sustainable design in terms of maximising wellbeing.

Chapter 7

Case Studies of Community Gardens as Sustainably Designed Spaces

7 CASE STUDIES OF COMMUNITY GARDENS AS SUSTAINABLY DESIGNED SPACES

7.1 Introduction

For the purpose of this research community gardens are defined as being sustainably designed in that their design minimises environmentally destructive impacts by integrating with living processes and by encouraging nature, learning and environmental behaviours in urban settings. This chapter examines the history and context of five sustainably designed community garden sites in the UK and Ireland while explaining how sustainable design principles and features have manifested themselves in each particular setting. The community garden sites exhibit a number of sustainable design features. These features were identified from both the principles and sub principles of sustainable design as explained in chapter 5 and a survey of each of the five case study sites. The survey was based on both site observation and an interview with the site coordinator/gardener. The site survey is detailed in Appendix B and a summary checklist for all sites is detailed in Appendix H. In doing so, this chapter fulfils objective 3 of this research:

3) To identify key features of sustainably designed community gardens;

7.2 Selection of Case Studies of Community Gardens as Sustainably Designed Spaces

Five community garden sites were chosen as study sites. All were located in residential urban areas. The methods used to search for appropriate community garden sites, were mainly secondary analysis of previous studies on community gardens as detailed in chapters four and five, researching archives of local newspapers, internet searches and informal conversations with people involved in community gardening, organic growing and permaculture activity in the UK and Ireland. The Federation of City Farms and Community Gardens (FCFCG) have a database of community garden sites located in Ireland and the UK. Of the 1782 community gardens registered on the FCFCG database, 582 are actual members and pay membership to the FCFCG (pers. comm. FCFCG January 2011). All of the case study sites chosen are registered on the FCFCG website.

In addition to demonstrating sustainable design features and processes, other factors influencing suitable research sites included richness of data. The five sites chosen had all been established for over two years as sites that present a web of social relations, a variety of activities, and diverse events over time provide richer data (Hammersley and Atkinson, 1983: 42-45; Lofland and Lofland, 1995:16-30). This amount of time also made it possible to examine the effect of at

least one growing season on the site users. The five case studies exhibit sustainable design features and hence varying degrees of sustainable design principles and sub principles as detailed in chapter 5. All of the sites are members of the Federation of City Farms and Community Gardens. They are all in urban residential areas in the UK and Ireland. The sites are located in Ireland and the United Kingdom and are as follows (see fig 7.1 for map of sites)

- Easton Community Allotment, Easton, Bristol, England.
- Eglantine Community Garden, Belfast, Northern Ireland.
- Moulsecoomb Forest Garden and Wildlife Project, Brighton, England.
- Scottswood Natural Community Garden, Newcastle, England.
- Shanakill and Rahoonane Community Organic Garden, Tralee, Co. Kerry, Republic of Ireland.

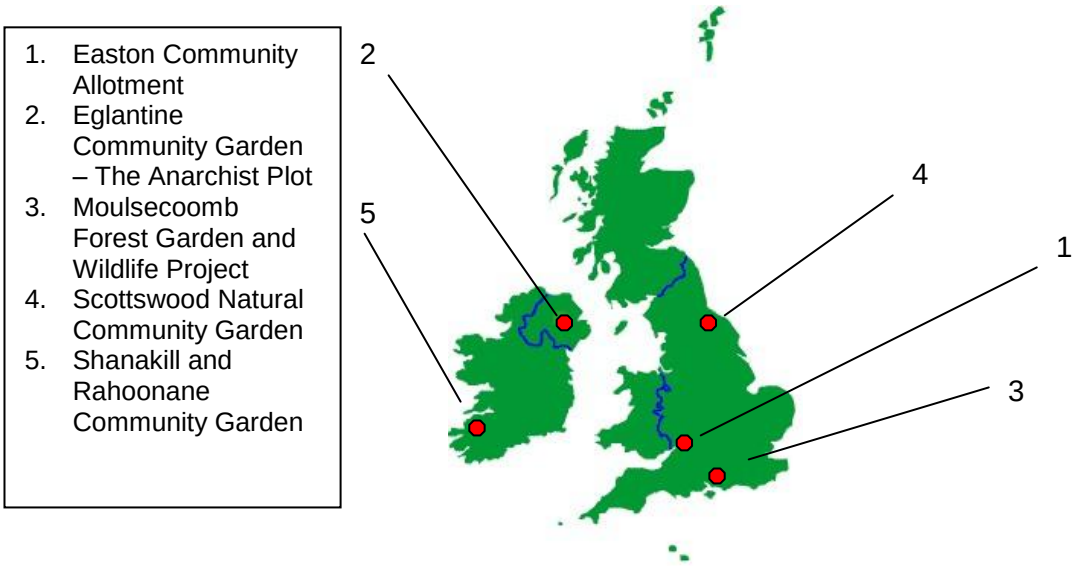


Figure 7.1: Location of case study sites

Each of the sites are described by location; site aims; history and funding sources in Table 7.1 .

Table 7.1 Case study background information

Name of Site	**Shanakill and Rahoonane Community Organic Garden**	**Eglantine Community Garden-'The Anarchist Plot**	**Easton Community Allotment. 'The Garden of Easton'.**	**Moulsecoomb Forest garden and Wildlife project.**	**Scottswood Natural Community Garden (SNCG)**
Location	*Tralee, Co. Kerry*	*Belfast, Northern Ireland*	*Bristol, South West England*	*Brighton, East Sussex, Southern England*	*Newcastle upon Tyne, North East England*
Adjacent land use	*Residential –within council housing estate*	*University Area, Residential and Business*	*Residential and Industrial (furniture factory)*	*Education, Housing, University Buildings, railway*	*College, Residential*
Area	*0.4 acre*	*0.23 acre*	*0.18 acre*	*1.29 acre*	*2.0 acre*
Established	*Spring 2003*	*Spring 2004*	*Winter 2000*	*Autumn 1994*	*Spring 1994*
Ownership	*Council land*	*Landlords of adjacent private residences*	*Council land*	*Council land*	*Institution (College) land*
Paid Staff	*1 (part time)*	*0 (no staff structure)*	*0 (no staff structure)*	*1 (part time)*	*7 (part time)*
Land Use History	*Informal dumping ground for estate*	*Dumping ground* *Previous to this- ornamental garden on the site*	*Allotment site (3 plots).* *Previous to this - site of an abattoir*	*Allotment site (7 plots).* *Has been an allotment site for 20 years*	*College site – formally a playing field.* *Previous to this - site of a former drift mine*
Opening hours	*2 days per week*	*24 hour access - Gardening day once a month*	*1 day per week*	*2 days a week*	*10-4 Mon-Fri* *(users telephone to arrange visit) and events*

Each site is unique in its origin and history. All were conceived in the first instance by individuals or small groups, who gradually built support locally, and worked to attain the right to develop a site and/or a source of funding. This bottom-up approach implies that local participation is inherent to the scheme. While all of the sites under study aim to involve and reinforce the local community, they also do question the relevance of 'community' in its traditional location-based definition and use sustainable design principles to guide participation.

All of the spaces have been designed to include a number of sustainable design features. An investigation of these features was conducted by site observation and an interview with the site gardener/coordinator(s) to complete a site design checklist compiled using the principles, sub principles and features of sustainable design established in chapter 5. Appendix H contains a

checklist of all site features for each case study site. The remainder of this chapter provides details on the background and sustainable design principles and features for each of the five sites. Descriptions include the location of the site in terms of its local, social and environmental context; the aims of the site (based on reports/websites/interview with site coordinator or gardener); the history of the site itself and finally the funding that the site has acquired.

7.3 Site 1 – Easton Community Allotment

7.3.1 Background

Location

Easton Community Allotment is located near Gordon Road on the edge of Easton, Bristol, UK (see Fig. 7.2). Easton is both the name of the Council Ward and inner city area of Bristol UK. The 2001 Census reports that around 35% of the population is of Black or Asian origin. Easton is one of the most deprived areas in the South West of England, with the Lawrence Hill ward in Easton the most deprived ward in the region and one of the most deprived in Britain. This has resulted in the area being granted European Union Objective 2 status and 'New Deal for Communities' status by the UK government, granted to the most underprivileged urban wards. The most deprived area of Easton ward is 'St Marks Road' which is ranked within the most deprived 10% of SOA's[4] nationally in terms of 5 domains, in addition to the overall Index of Multiple Deprivation 4 out of 7 SOA's in Easton are in the worst 10% nationally in terms of Crime. St Mark's Road is ranked the third worst in Bristol for living environment deprivation (IMD, 2007).

Aim

The garden site was developed as part of The Garden of Easton – a community environmental project was associated with Easton Community Centre. Its aim was to improve Easton's local environment through practical action, green courses and volunteering; and to promote sustainability and healthy lifestyles. The project aimed to create a communally maintained organic allotment on the site. It is open to all people who wish to learn about gardening and has plants for sale or swap. Workdays are held every Thursday so as that the allotment is a social space for all people who want to learn how to grow fruit and vegetables.

History

Easton Community Allotment started in the winter of 2000. It began life as a disused and overgrown piece of waste ground which once was the location of an abattoir. This affects the way food is grown in terms of deep planting and digging and a soil test in 2001 showed contamination (pers. comm. Fred Miller, Site Gardener).

[4] The Index of Multiple Deprivation 2007 is the Governments' official measure of deprivation at small area level (Super Output Areas) so as small pockets of deprivation can be targeted.

Located in an inner-city residential area, the site was derelict and had become a popular haunt for fly-tippers. It was an eyesore and a threat to public health. The area was owned by Bristol City Council, which agreed to assign the land to a community allotment. A number of community groups were approached and offered the chance to garden a plot of land. Among those who took up the offer were the local Asian and Pakistani women's group, and Learning Difficulties East, a group of adults with learning difficulties. All groups with allotments met up to weed compost and water the plots on Thursdays. All the crops were produced organically; waste on the site was minimised and recycled or composted where possible (ecojam.org).

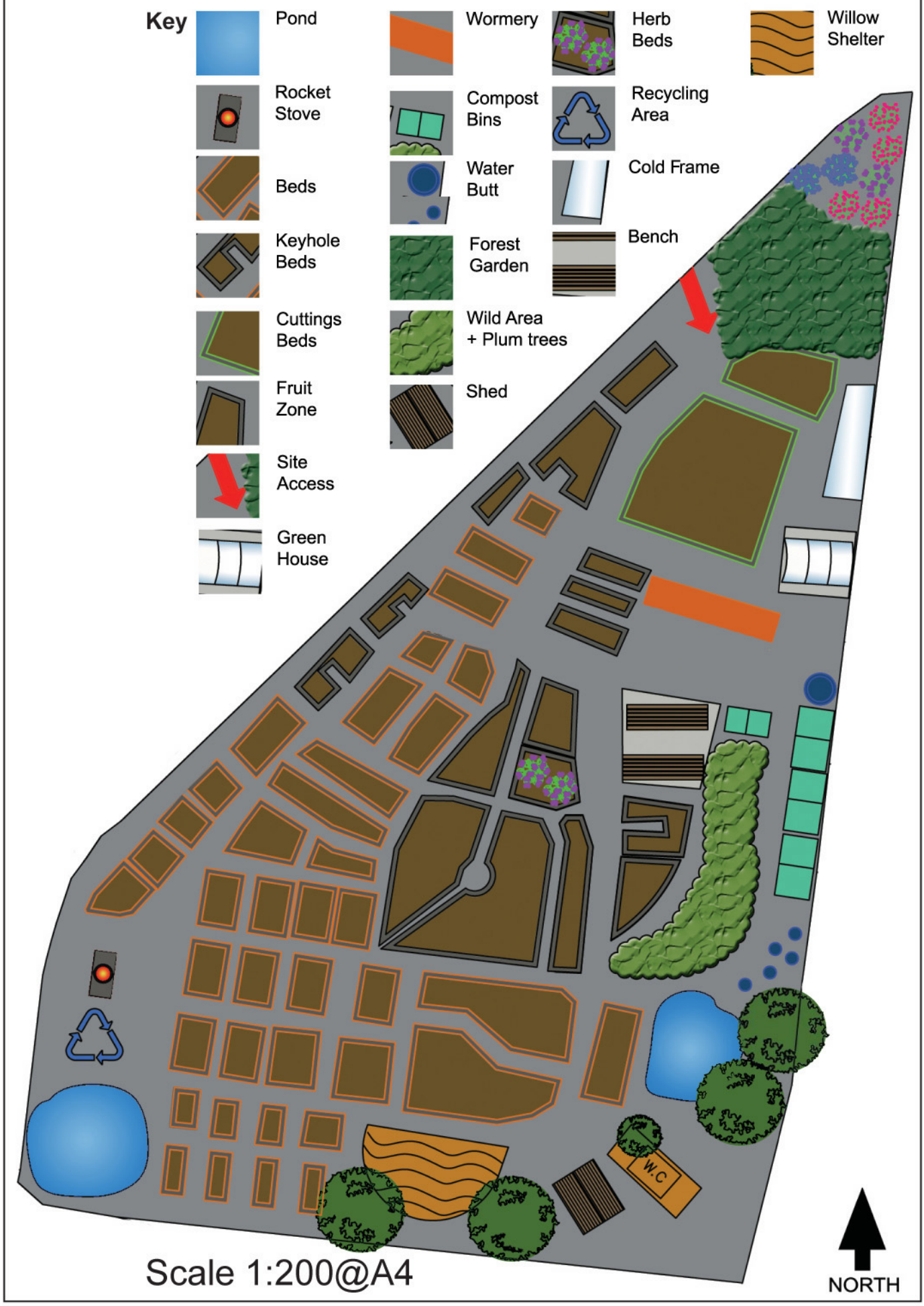
The site is now tended as one large site. With the help of the Bristol Permaculture Group, the Raleigh Team, Wildlife Watch and others, the site has been transformed. A wildlife pond, a forest garden and flower bank was created. A social area was created for eating lunch and holding meetings, and participants built an open fire area for cooking and heating water, a shelter and a compost toilet. The project not only provides training and experience for a range of community groups in the local area, but also introduces people to the benefits of healthy eating and exercise. An open call for support from individuals was called in July 2004 in order to create a vision and plan for the future of the site. Fruit trees were ordered, picked up and planted by Easton residents and planting demonstrations took place as trees were collected. In 2004 the Garden of Easton ran many courses including green woodworking, herbal walks, a herbal practical evening, living willow structures and willow weaving, a permaculture introduction weekend and a permaculture design course.

Funding

Funding from Barclays and SiteSavers was used to clear the site. The Garden of Easton network of community green space activities funding was from the national lottery SEED Programme (New Opportunities Fund) and Neighbourhood Renewal. In 2005, the Easton Community Association (ECA) of which the Garden of Easton was part ceased trading as funding finished at the end of 2004. The Garden of Easton no longer had a home physically or organisationally (permaculture.org.uk). The project then became entirely coordinated by volunteers but the Easton Community Allotment continued to have workdays every Thursday, thanks to the volunteer collective who since then ran the site.

The sustainable design features of Easton Community Allotment are grouped under the five principles of sustainable design as described in chapter 5. Map 7.4 illustrates the layout of the site features.

Fig. 7.4 Easton Community Allotment



7.3.2 Principle 1- Solutions grow from place

The site is sufficiently sheltered and does not require windbreaks to shelter from prevailing winds. There is no water source available on the site and water is harvested in water butts to water plants in the summer months. This can prove difficult during lengthy dry spells. The potential for rainwater harvesting is maximised by collecting rainwater adjacent buildings and the site shelter and compost toilet. There is adequate moisture in the soil but no particular use of planting regimes to maximise moisture content of the soil. Seeds are saved on site and seeds are received from neighbouring allotments, local gardeners and permaculturalists, and obtained free from the Organic Garden Centre. Local varieties of parsnip and cabbage are sown. Local and traditional skills are used in the development of on site buildings and features such as the rocket stove and the compost toilet. Although there has been an emphasis on growing for ethnic groups in the past this is currently not a particular focus of the site. In the past, women's groups gathered where Somali and Asian women brought old containers to recycle and brought food to share and grow food.

There is maximum use of local and on site waste resources. Near the entrance gate of the site there are raised beds made from old railway sleepers. Waste materials are collected from an adjacent furniture factory and wood chips are provided free of charge in the winter from a local tree surgeon. In terms of reuse of waste organic material, there is no mulching around annuals as this is seen to accumulate slugs underneath the mulch. Wood shavings are used successfully for mulching. In principle, the gardeners of the site do not dig deeply into the soil. As part of organic growing methods in order to eliminate bind weed, digging is sometimes required but this does not occur every year as it is desirable for the soil to maintain its natural structure and to avoid digging deeply as bones from the abattoir once located on the site have been found.

Figure 7.5: Reclaimed wood stored and reused as plant supports

Figure 7.6: Polytunnel made from recycled materials

7.3.3 Principle 2 – Ecological accounting informs design

Due to the small size of the site, multiple functions are seen in the use of the shelter as a communal shared space, an educational resource and for collecting rainwater and the use of the pond for pest control and also as an 'edible pond'. Water conservation features include collection of rainwater in barrels and bottles placed close to the plant stem to water more efficiently and directly. Although energy inputs and outputs are not quantified the features and processes within the site aim to reuse on site resources and hence reduce the energy inputs into the site. They have advertised for old mugs, screw-top jars, cutlery and other utensils to be reused on the site e.g. to make chutneys or use old CD's as pest control to scare off pigeons. An energy efficient rocket stove is built to cook the food produced on site using wood collected on and around the site. The site does not particularly suffer from crop pests but the pond and techniques such as taking seeds from slug free environments and sprinkling wood and ash around vulnerable plants assists in slug control. Natural fertiliser in the form of comfrey and nettle liquid fertilisers are produced and used on site.

Figure 7.7: Water collected from roof of compost toilet and stored to function as a hand washing facility (above left)

Figure 7.8: Water collected from neighbouring shed (previous page above right)

Figure 7.9: Fertiliser stored in reused local chocolate factory barrell

Figure 7.10: Rocket stove – fuel efficient wood burning cooker.

7.3.4 Principle 3 – Make nature visible

The herb area is central to the site and has medicinal herbs such as mint (for stomach ailments). Wildlife is encouraged in the garden with features such as nettled areas for butterfly habitats. The site has a small forest garden but due to the small size of the site successional growth is limited.

Figure 7.11: Designated wildlife area

7.3.5 Principle 4 – Design with nature

As the site has no mains water source and no building with a plumbed-in toilet, a compost toilet facility was developed and this design was used as a prototype for compost toilets to be designed in allotment sites in Bristol. This feature is a water saving feature as no water is used in the decomposing of human waste. Water is collected in a water butt outside the site so as users can wash their hands after use and hygiene standards can be maintained.

Although the site is small in scale (0.18 acre) the initial design did not specifically incorporate multidimensional design in the form of stacking, succession or maximising the use of edge. However, there is evidence of stacking of old tyres and use of espaliers in vertical space. Although the garden design was initially inspired by permaculture principles, the site now has 'a more random layout' (pers. comm. Fred Miller, Site Gardener). Successional growth is shown in the forest garden area but the site is not large enough to have a specific woodland area. Patterns of nature can also be seen in the site in the form of curved lines and edges, maximising the use of space in the site. The site has beneficial links with outside organisations. School groups have been involved in the past but not at present. Links to other groups include the local community centre, the FCFCG which is based in Bristol and the Bristol Permaculture group. The site also has open days when exchanges can occur between individuals and groups and plants are swapped and sold.

There is an area to sit and relax in the shelter but also another designated outside 'lounge' area to be as the seasons change. The communal space in the shelter seems to be the space where people gather most often and can be termed the zone 1. Here, people gather to chat, prepare food and eat and share food during breaks. Harvest is also shared at the end of the day. Although food growing is the main activity of the site around which other activities revolve and develop, it is acknowledged that the site does not maximise yield (pers. comm. Fred Miller, Site Gardener). Companion planting, crop rotation and other organic methods such as production of compost are used on site. The composting area includes worm composting.

The site evolves through time and the gardener or caretaker responds creatively to this change. There is no one particular individual that manages or maintains the site – it is a shared task. There are four caretakers who are part of Bristol Permaculture Group and a total of seven on the organising committee. These include a local permaculturalist Mike Feingold, a valued expert who advises on site activities and processes.

Figure 7.12: Wattle and daub natural shelter

Figure 7.13: Compost toilet

7.3.6 Principle 5 – Everyone is a designer

The site is open to anyone who can follow basic safety guidelines, however, for security reasons and at the request of the Council, a high railing was placed around the site. Although work days take place every Thursday and on this day the site is open to the public, users are not obliged to come each week. At other times, access is only to the organising committee. Keys are distributed 'on a need to know basis' (pers. comm. Fred Miller, Site Gardener).

Decisions are made together each Thursday about what to grow and what work needs to be done. A list of jobs is displayed on the tasks board and one can choose a task or 'job' from the list to partake in. Communal tools and gardening equipment is stored on-site and available to all users.

There is a makeshift children's play area where the kids make dens. There has been a children's wildlife group but this has discontinued. The site also on occasion holds night time events and celebrations.

Alongside annual crops and raised beds, there are supplies of perennial edible and useful plants for people to grow at home or in their own allotments so as to make it easier for everyone to grow their own local food. Plants are available each Thursday and at local events where stalls are set up.

Figure 7.14: Communal tools and gardening equipment available on-site

7.4 Site 2 – Eglantine Community Garden –The Anarchist Plot

7.4.1 Background

Location

The Anarchist Plot – Eglantine Community Garden (see Map 7.15 and 7.17) is on the edge of Malone Road in South Belfast (see map). The surrounding homes are large Victorian houses subdivided into separate flats, mostly being rented accommodation. The area is adjacent to the University quarter and hence has a high migrant student population. The Malone Road area is an architectural conservation area (BMAP, 2015). The site itself is zoned as residential. Although the site is not physically bounded by a fence or other structure, it is surrounded by residential and business properties which define the boundary of the site. The land is owned by the landlords of surrounding houses, and once had an ornamental garden, and the site still has Aquilegia, evening primrose and ornamental daisies, but the space was abandoned and used as an informal rubbish dump. It falls between policy areas in terms of management and is not within the remit of any particular officer in Belfast City Council. The Forestry Officer and the Biodiversity Officer have had some input into the development of the garden but no official stance has been taken. The Allotment officer does not particularly see the garden as within the remit of the management of allotment sites in the city (pers. comm. M. Turley, Site Gardener).

Aim

The aim of the space is to create a community space and food growing area in the city (pers. comm. M. Turley, Site Gardener).

History

The Eglantine Community Garden, or the "Anarchist Plot" began life at a visioning day in Belfast for community, peace, social justice and environmental activists in February 2004. A group of people who met at this environmental activism day decided to create a garden, half vegetable beds and half trees and shrubs. A narrative produced by one of the gardeners in the Eglantine Community Garden site is included in Appendix I. In terms of the sustainable design features as set out in the checklist (see Appendix H), the following features are evident in The Anarchist Plot –Eglantine Community Garden. The layout of the site features are detailed in map 7.17.

Funding

The Anarchist Plot currently has no source of external funding and all activities are resourced by volunteers.

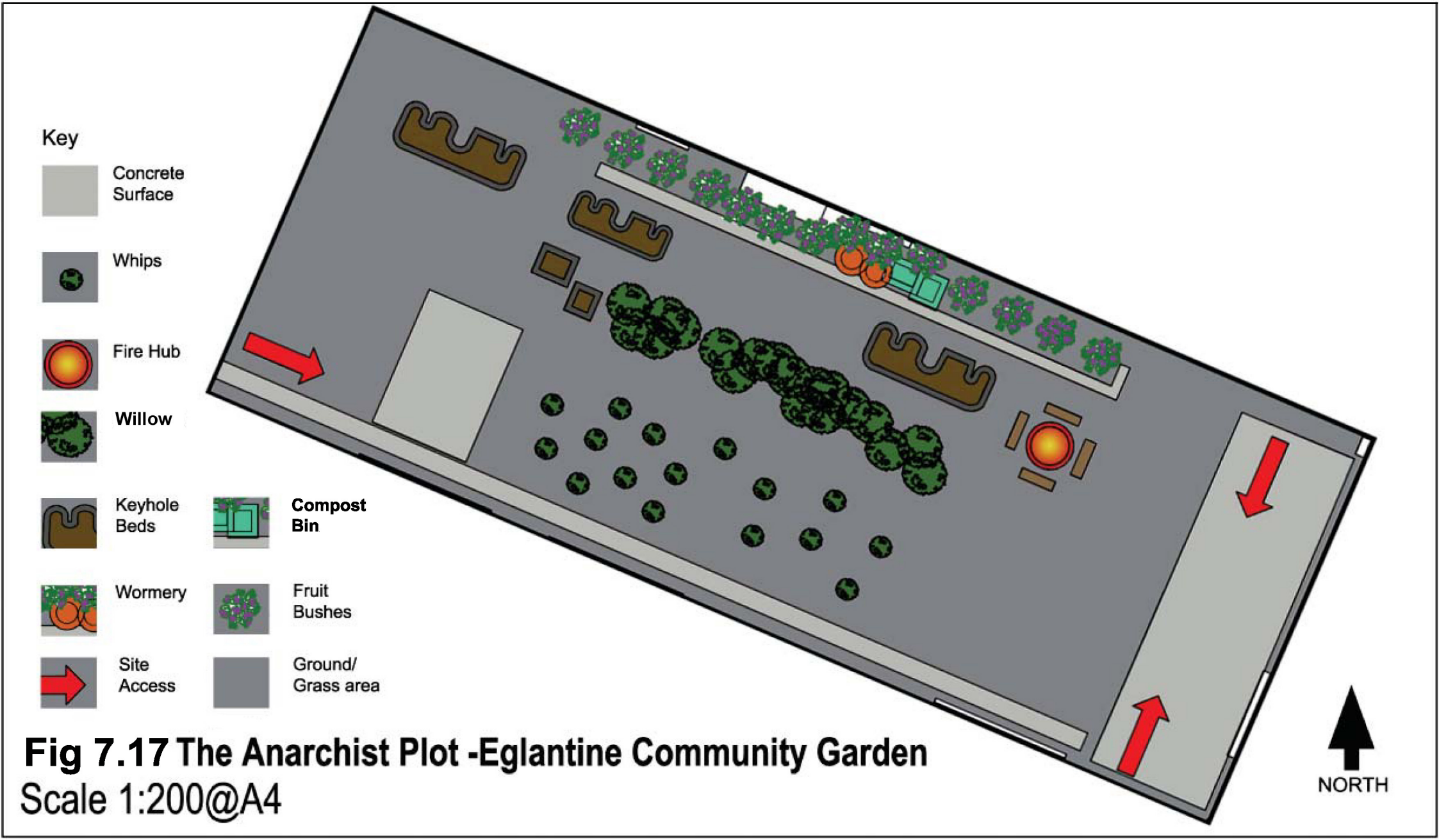


Fig 7.17 The Anarchist Plot -Eglantine Community Garden

Scale 1:200@A4

7.4.2 Principle 1 – Solutions grow from place

Seeds are saved on site but there are no particular local varieties used. Seeds are bought from the Irish Seed Savers Association. There is no mains water but water runs down the site naturally. The ground was scraped to clay and there were pans underneath which either limit or slow the downward movement of water. The soil is suspected to be contaminated and therefore no deep rooted plants are sown. Soil been brought in from outside the site. Seaweed and compost are used to improve this imported soil. Organic material is reused on site by mulching and composting. Tree leaf foliage is collected and used as leaf mould and the compost created from onsite organic waste and also household waste.

The beds and other site structures such as seats are made form reclaimed local materials such as reclaimed wood and bricks from skips. Many of the Victorian houses in the local are being refurbished and there are many 'waste' skips in the area due to refurbishment activity. The houses surrounding the site have neither front nor back garden and neighbours who live in the nearby streets are using the garden as a relaxing place to sit (pers. comm. Miriam Turley, Site Gardener).

7.4.3 Principle 2 – Ecologically accounting informs design

Water butts are used to harvest rainwater to water the sites plants. Composting facilities are for both on site organic waste and also for local residents to dispose of their compost. There is no pond or companion planting used for biological pest control but organic slug control such as broken glass is used. Comfrey and nettles are used on site as natural fertiliser.

Figure 7.18: Compost Area – Leaf mould and household waste compost and worm compost are available at Eglantine Community Allotment

Figure 7.19: Keyhole beds with potatoes growing

7.4.4 Principle 3 – Make nature visible

Medicinal plants and herbs are grown such as lemon balm, lavender, rosemary, oregano, fennel, sage and raspberry leaf. Successional growth is not particularly evident on the site although young trees have been planted on the south side of the site. Half of the garden has been put down to trees. There are willows, cherries, hawthorn, hazel, elder, apple and conifers. There is a habitat pile and ivy berries also encourage wildlife. There are brambles for nesting. The active site users discourage people from 'tidying' the site as this may decrease habitats for insects, e.g. logs for spiders etc. (pers. comm. M. Turley, site gardener).

7.4.5 Principle 4 - Design with nature

In terms of multidimensional design stacking is used in the form of planting of blackberries vertically along the wall but the space is not maximised. Zoning is implemented in that herbs are placed near to the door but sectors and networks are not intentionally designed in. Both perennials, e.g. asparagus and annuals, are grown for food and food is grown from both woody and herbaceous plants. No crop rotation is used. There are no official networks with learning organisations or schools but links have been made to other community gardens such as in Dublin in the South of Ireland and also links have been made with the Transition Towns movement in Belfast. There is one particular gardener who responds creatively to change but a number of others who work in the site and make decisions.

7.4.6 Principle 5 – Everyone is a designer

The site is open at all times and any individual or group is free to use the site at any time. The site has organised events and activities such as work days when anybody can come along and get involved in site activities. The paths are wide enough for wheelchair access and although there is not a specific area for children to play, there is plenty of space for them to play freely. There are communal tools available but there is not open access to them.

7.5 Site 3 – Moulsecoomb Forest Garden and Wildlife Project

7.5.1 Background

Location

Moulsecoomb Forest Garden and Wildlife Project is based at the Moulsecoomb Place allotment site in Brighton (See Fig 7.20 and Figure 7.21). The project is situated on the north east outskirts of the city between four housing estates: the Bates, Hollingdean, Bevendean and Moulsecoomb Estates, all identified as deprived neighbourhoods in the city by Brighton and Hove City Council. This suburb of Brighton and Hove was in the 1920s a network of nurseries and market gardens. The estate of Moulsecoomb was developed in 1924 and the scheme was in the form of a garden city with winding roads, large grass verges, and large gardens. The development was an attempt by the borough to re-house families from slums that existed in inner city Brighton. Moulsecoomb has since experienced problems akin to those in other resort fringes: high unemployment, seasonal labour, run-down facilities and drug and driving related crimes. In Moulsecoomb and Bevenden over one third of the population aged 16-74 has no qualifications (Sussex Council, 2005). This is the highest absolute number of young people not in education employment or training in East Brighton. And the highest absolute number is East Brighton is also high. Attempts have been made to address many of these difficulties in regeneration budgets aimed at alleviating some of the long standing problems in this peripheral estate (mybrightonandhove.org.uk).

Aim

Moulsecoomb Forest Garden and Wildlife Project is a community food growing project. The aims of the project are to (Annual Report, 2007):

- Reduce anti social behaviour by involving excluded pupils in the running of the garden.
- Improve community health by offering free, organic and locally grown fruit and vegetables to low income families and older people.
- Getting children involved in planting, growing and eating healthy food, and respecting nature and the environment.
- Enhance skills and employability by offering practical based training and volunteering opportunities.
- Creating and enhancing wildlife habitats, protecting bio-diversity including old fashioned vegetable varieties.
- Promoting sustainable lifestyles, by encouraging and educating people about composting and the benefits of organic gardening and locally produced food.

Part of the site's ethos is to look to new foods that might be useful in the future as well as protecting plants from the past. The site gardener works part time on the site and teaches gardening and woodland skills to children with learning difficulties and young offenders as part of the Alternative Centre for Education (ACE) Programme which exists to support children with emotional, behavioral and social difficulties. The site takes particular pride in their encouragement of local and old seed varieties.

History

Moulsecoomb Forest Garden and Wildlife Project is based at the Moulsecoomb Place allotment site in Brighton (See Fig 7.20 and Figure 7.21). The project is situated on the north east outskirts of the city between four housing estates: the Bates, Hollingdean, Bevendean and Moulsecoomb Estates, all identified as deprived neighbourhoods in the city by Brighton and Hove City Council.

This suburb of Brighton and Hove was in the 1920s a network of nurseries and market gardens. The estate of Moulsecoomb was developed in 1924 and the scheme was in the form of a garden city with winding roads, large grass verges, and large gardens. The development was an attempt by the borough to re-house families from slums that existed in inner city Brighton. Moulsecoomb has since experienced problems akin to those in other resort fringes: high unemployment, seasonal labour, run-down facilities and drug and driving related crimes. In Moulsecoomb and Bevenden over one third of the population aged 16-74 has no qualifications (Sussex Council, 2005). This is the highest absolute number of young people not in education employment or training in East Brighton. And the highest absolute number is East Brighton is also high. Attempts have been made to address many of these difficulties in regeneration budgets aimed at alleviating some of the long standing problems in this peripheral estate (mybrightonandhove.org.uk).

Funding

At first, volunteers contributed what they could afford. Small grants then became available to enable the site to buy tools, trees, shrubs, herbs and pond lining. The project is now a registered company. It is funded by the National Lottery Awards for All, Infinity Foods and Global Grants (comprised of money from the European Social Fund, Brighton and Hove City Council, Single Regeneration Budget and Neighbourhood Renewal Fund).

Trustees include a Secretary, Chair and Treasurer and a Management Committee of 12 (Annual Report, 2007). In order to escape the grant loop, the site has had to start charging statutory bodies such as schools. The website has been upgraded to include a donations page. They are in the process of becoming a charity and asking supporters to make donations or set up standing orders.

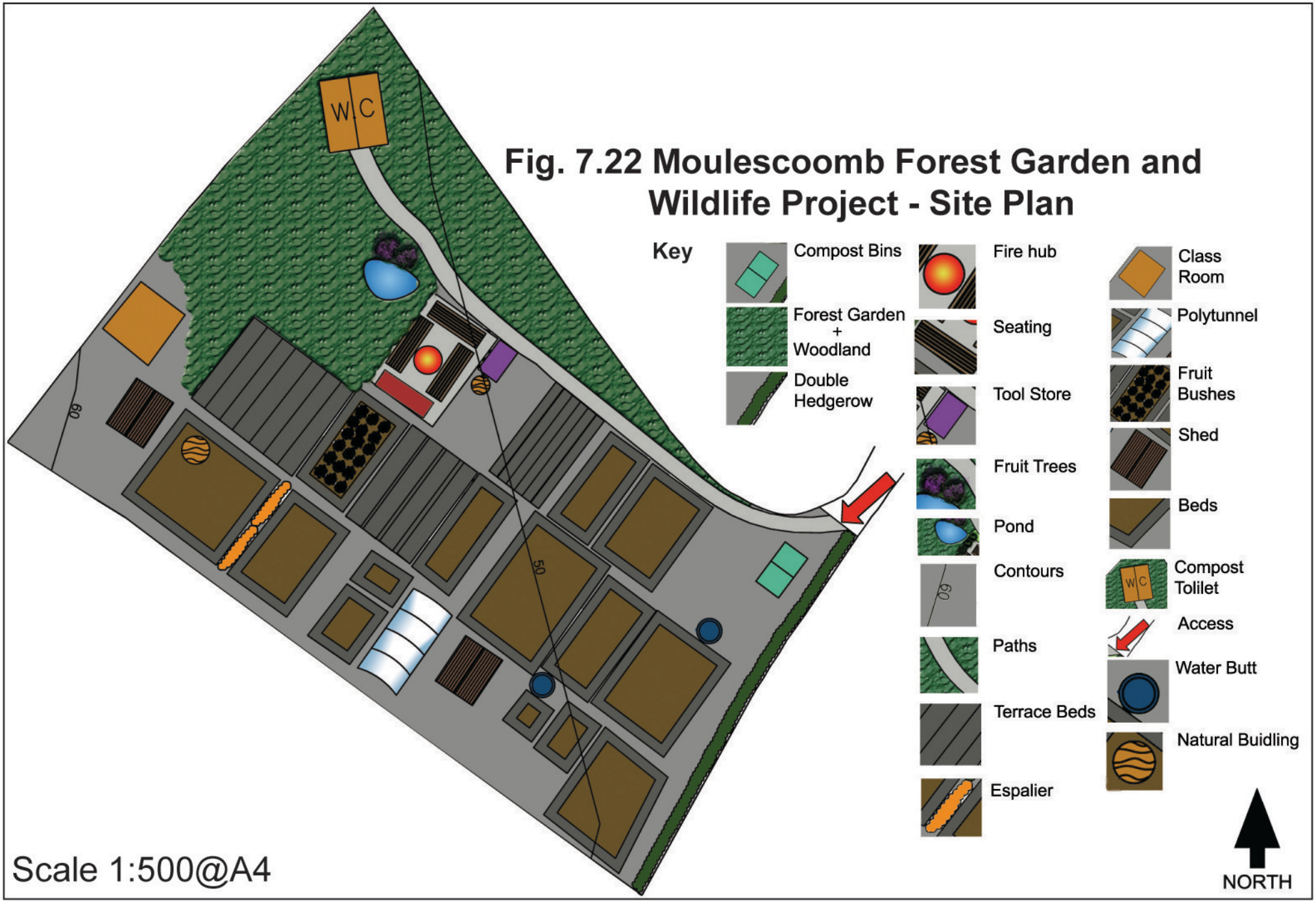


Fig. 7.22 Moulescoomb Forest Garden and Wildlife Project - Site Plan

7.5.2 Principle 1 – Solutions grow from place

The site of the Moulsecoomb forest garden and wildlife project is a sheltered spot and located towards the bottom of a hill. It is terraced on the South East slope. The soil is poor and of shallow chalk. All of the trees and plants in the site are native species. Hazel is placed on the top of the site as a wind break and there is a double hedgerow on the bottom of the site which functions to encourage wildlife and enhance security (pers. comm. Warren Carter, Site Gardener). The site is a member of the heritage seed library and is involved in a community seed swap. Carter states that each year seed companies decide not to register certain seeds as it may be too expensive (seedybusiness.org). They are therefore not put on the National Seed List and are not sold. The HDRA look to plants that have characteristics that might be useful in the future and would be lost were it not for the HDRA. The HDRA then 'lends' seeds to its members and the Moulsecoomb garden is a member of the HDRA and receives such heritage seeds. Seed is also collected on the Moulsecoomb site and users experiments with and find seed varieties that prosper on the site. One of these is the French Climbing Bean 'Cherokee Trail of Tears'. They have also researched and came up with apple varieties once found in East Sussex such as Forge, Lady Sudeley and Knobby Russet.

Waste and resource are reused within the site as far as possible. Leaves are collected and leaf mould is made to enhance crop fertility. The Council also drop off leaves and people drop off compost to the site. There is one part-time employee, and the site relies heavily on its volunteers.

7.5.3 Principle 2 – Ecological accounting informs design

Although there is no official calculation of energy and water inputs and outputs there is a general ethos of reuse and recycling. Wood for the shed was from the wood recycling centre and made out of scrap wood. There is a mix of early and late season planting and although the use of edge is not evident in the physical features of the site, there is perceived to be more variety of plant life on the periphery/edge of the site (pers. comm. Warren Carter, Site Gardener). Water is conserved by mulching plants and using water butts. There is a hose pipe at ground level which drenches the plants once a week.

Many features of the site have multiple functions in order to reduce waste, energy and maximise space. Carter states –‘Before any plant makes its way to our compost bins we try and identify it - amazingly we've found that nearly 95% of plants on site have some use for us - the so-called weed might be left alone because it's the food plant of a butterfly. It might be put in some hot water and drunk as a herbal tea. It might be used as a medicine or stuck in a salad. A lot of our salads contain plants which most people would call "weeds"’ (Carter, 2001: 44).

The double hedge on the south east boundary functions as security and as a wildlife habitat. Nettles and brambles are also used on the outer edges of the site as security but also to increase natural habitats and the nettle is seen as a particularly multi functional plant. Carter states: 'The stinging nettle is probably one of the most useful plants in the UK. It supports a diversity of wildlife, acting as the food plant of the Small Tortoiseshell, Red Admiral, Peacock, Painted Lady and Comma butterflies as well as home to up to 107 different insects including hoverflies, lacewings, parasitic wasps and ladybirds, which all act as natural pest controllers for the organic gardener. Freshly cut nettles, especially the young, soft growth, make an excellent compost activator and cut and left to soak in water for a few weeks can be used as a foliar feed around the garden. It is also one of the first spring greens to appear on the site and up until May - after May there is a chemical reaction that makes the plants bitter – we harvest the fresh tops of the plant and turns it into a delicious soup that contains vitamins A, B and C, serotonin, iron and other minerals (Carter, 2001: 49).

As the soil is poor, composting and manure and mulching with straw and chip is important for improving the condition of the soil. This stops soil erosion on bare soil. To avoid slugs and snails, planting is done indoors first in the tunnel and then planting outdoors. Netting is also used. The ponds are also to attract wildlife to prey on pests.

7.5.4 Principle 3 – Make nature visible

Successional growth is clearly seen both in the forest garden and the woodland area. The site has many pioneering tree species such as ash. Carter states that 'No chemicals or pesticides, a double hedgerow of native trees, a big pond and lots of hidyholes means that the whole site has become a wildlife haven - an important `green lung' for the town, backing off into wood and farmland. There are foxes, moles, voles, frogs, lizards, slow worms, numerous birds, butterflies and insects. We even spotted a stoat once' (Carter, 2001: 48).The forest garden has many medicinal herbs such as lumber balm, borage and marjoram and with this there are organised herb walks. The forest garden has hazel and pioneer ash and is cut twice a year. The site also has habitat piles and brash sticks to stop cats from soiling the site and the sites food plants. There are two baths and a pond to encourage biodiversity.

7.5.5 Principle 4 – Design with nature

The North-East of the site is a forest garden. The forest garden requires minimal work and provides fruit, nuts, salads, herbs and other useful plants and fungi. In the forest garden there are apples, pears, cherries, plums, damsons, mulberries, hazels and walnuts, with fruit bushes in the middle and over 50 different perennial crops making up the bottom layer. There are usual herbs like rosemary, sage and thyme but more unusual plants like daffodil garlic or yellow asphodel.

Companion planting is used and there is a 4-5 year crop rotation and in one record harvest there have been 26 different plants.

The caretaker of the site creatively manages change. Carter in his online publication detaining the history and development of the site states:

> *Nurturing, negative feedback and self-regulation (also) occurs in managing gardens and other green spaces as managed systems. In the early establishment phase, gardens are totally dependent on our care and attention. For example newly planted trees must be protected from browsing animals and may require weed control, water and fertilizer to get started. The designer/manager, who appears to be all-powerful, acts without being able to control or even understand all of the factors that might impact on the garden. If the design is effective, the garden becomes progressively more self-reliant and less dependent on our care, although it may require intervention at times. The garden, as well as becoming more robust will develop a degree of self-regulation and balance. A myriad of circumstances, as well as the inherent potential of the site, will create a garden that is unique and differs from our plans and specific hopes* (mybrightonandhove.org.uk).

Due to soil erosion, the best soil has accumulated at the bottom. Swales have been dug on the east side of the site. The site gardener states that this was useful in the beginning but now there is no time to maintain the swales. There are contoured access tracks and terraces and swales are also used in access. There are no frost pockets. The sun hits the polytunnel early in the morning and the bottom south east of the site gets most sun. There is an area (the zone 1) around the fire pit where one can sit and relax. There is also a space for cooking and groups come and cook food grown and mix with other groups.

The site has a compost toilet. There are structures made of natural materials such as willow and a hazel. However, recycled wood often has nails in it and is difficult to reuse. This is also an important safety point for children using the wood. The site has links to schools and universities, mental health organisations hence wood is brought into the sites for children to work with.

Links have been made with many groups and organisations outside the site and they are part of a network of activities such as the Brighton community composting centre; recycling network and seed saving network organising seed swap events annually. The site has become part of 'Learning Links' a new programme to support insecurely housed people (Annual Report, 2007).

Producing a food yield is one aspect of the site but one which other activities hang on. *Of course we want to grow as much food as possible but we also want it to be a peaceful place to sit and watch the world go by* (Carter, 2001). Although the space does not maximise food production, food production is increasing yearly. And in 2006/7 'Food production once again increased,

thanks in part to the polytunnel, which has prolonged the growing season and made it far easier and more pleasant to pot up, and have somewhere dry to get on with work (or sit on the sofa and drink tea). When we have a surplus our vegetables are handed out around the local estates by our various volunteers' (Annual Report, 2007).

Figure 7.23: Fire hub and cooking area

Figure 7.24: The Compost Toilet

7.5.6 Principle 5 – Everyone is a designer

The site is enclosed with key access for a number of individuals; however, the woodland adjacent to the site is an open space. There are no beds specifically for children as such but there are beds for individuals and groups, including particular groups of children. Communal tools are available on site. Keys are distributed on a need to know basis. Fifteen people have keys and anyone can receive a key if they come frequently to the site.

The future of the site and decisions made are in the hands of the management committee and one of the management committee members is an active site user with speech and mobility problems. Events are open-to-all. The site organiser has been contacting local groups in the

area to encourage them to use the Forest Garden. Sure Start and local youth clubs have taken up this invitation (Annual Report, 2007). The site has regular visits from Moulsecoomb Primary after school club, as well as the 67 Youth Club and the Roasted teenage cookery club during the school summer holidays.

With Brighton and Hove City Councils Global Grants European Social Fund a shed was built with the pupils from the Alternative School for Education (ACE) and young adults from the Brighton and Hove Youth Offending Team. Two sessions were held with the Community Service Team with people helping to put on the roof joists with a number of individuals with learning difficulties from City College took part.

There are now regular sessions two afternoons a week with ACE, and two mornings a week with the Youth Offending Team. Events include pick and cook, picking whatever is ready to eat, and the community chef cooks the food (Annual Report, 2007) as well as working in local schools running environment clubs and helping to improve school grounds.

7.6 Site 4 –Scottswood Natural Community Garden (SNCG)

7.6.1 Background

Location

Scottswood is within the West End of Newcastle, approximately 3 miles form the city centre. The area is largely residential (see map 7.25 and 7.26). There have been clear signs of physical decline and poor services, but the area does benefit from a mix of ethnic minority communities, many of which are well established (West End Regeneration Plan, 2001). In the West End, vehicle crime and burglary are higher than the city's average. People are less healthy than in the rest of the city; the households receiving housing and council benefits are more than 50% above the city average. Unemployment is the highest in the city (newcastleplan.org.uk). The Scottswood and Benswell ward is within the most deprived fifth of areas in England and compared to the local authority area as a whole is within the most deprived third ward in the local authority area.

The site itself is based within a Horticultural College – The John Marley Centre, Newcastle College. Originally called the 'Drift Permaculture Project', due to the fact that it was located on the site of a former drift mine, the Garden was sited on a derelict piece of land, formerly a playing field within the college. It is an established two acre organic garden with a mixture of herbs, vegetables, fruit trees and wildlife gardens, ponds, streams, native woodland, meadows. The garden is open to the public during the week from 10 am to 4pm and regular events such as Nature Club and Harvest Days.

Aim

SNCG aims to promote learning about nature, the environment and sustainable living (SNCG.org.uk). It initially had an emphasis on older people and also incorporating general LA21 principles aims to pass knowledge down to future generations.

The SNCG charity was established to (Annual Report, 2007) to:

- provide and maintain a public garden or gardens for the use and benefit of the inhabitants of Tyne and Wear and others in the interests of social welfare and with the object of improving conditions of life for the said inhabitants;
- to advance knowledge and understanding of the environmental, economic and social dimensions of sustainability.

Three main programmes of work include a ranger service, a healthy eating programme, and a volunteering programme.

History

Scottswood Natural Community Garden (SNCG) was initiated in 1994 by an individual agriculturalist. The garden was founded as a permaculture project – it was designed to use natural ecology to create a productive and self fertile garden that would be capable of supporting a wide range of insects, animals and plants. The garden started as an entirely volunteer-run project with one individual managing a rolling programme of funding bids to develop the site. The garden ran various free training events including Permaculture Garden Design courses and city gardening courses. During 1999, the Garden's Nature Club started involving over 52 children aged between 8 to 12 years old and a vegetable growing project was initiated. These activities are now both core parts of the garden's work.

In 2000 a new project coordinator led new projects to increase the garden's users to include disabled people, those from ethnic minorities and single parents. During this time, links with Newcastle College, with whom the Garden shares the John Marley site, improved and several horticulture and design courses where run. In 2001 community events began to be held at the garden. In 2006/7 the garden won the Green Pennant (part of the national Green Flag award), a national award that recognises high quality green spaces in England and Wales that are managed by voluntary and community groups.

Funding

SNCG is an educational charity, the gardens demonstrating space for food and wildlife gardening. It is a registered charity with a board of seven trustees. The charity is dependent on grant funding for most of its income. In 2007 there were two full time 'senior' staff members and

five part time staff. The charity is managed by a management committee which consists of the Trustees and is attended by the Project Manager and Administrator; meetings are held bi-monthly and attended by active users. The Project Manager sends a bi-monthly report of activities to the management committee. Decisions and actions are recommended and taken at this meeting (Annual Report, 2007).

In 1996, the Scottswood Waterways Project was set up to recycle grey water on the site. This was funded by NWET and the Civic Trust, and in 1998 help was received from British Trust for Conservation Volunteers and CEED. The pump that enables water to flow around the garden has been repaired with funding from Eaga, a local company.

In 2000 the garden was awarded a grant of £125,000 from the National Lottery to fund the project for 4 years, paying for a coordinator and an administrator. This development heralded a new era for the garden as it formally registered as a charity. In 2002 funding was received from the Children's Fund to run regular activities for children, particularly to run the increasingly popular Nature Club at weekends. Also during this year a trainee gardener was taken on with help from the Wise Group; an Intermediate Labour Market. In 2006/2007 funders included the Northern Rock grant together with the Tudor Trust and The Henry Smith Charity. The ranger service was funded by the Newcastle Children's Fund plus The Henry Smith Charity. A volunteer programme is also funded by the Included Communities Fund. Grants have also been received from the Co-op and the Ward Committee for events and equipment. The garden is facing a challenge to its future and is struggling to find the funds to continue. A petition has been made to the local authority requesting that they support them with short-term financial aid. With a new business plan, workers were doing everything in their power to ensure that the activities that were run in the site continued (sncg.org.uk).

The layout of site features is illustrated in Map 7.27

Fig. 7.27 Scottswood Natural Community Garden - Site Plan

7.6.2 Principle 1 – Solutions grow from place

In 1996, the Scottswood Waterways Project was started on the site. This project used 'grey' water from the John Marley Centre roof and car park and recycled it using a 'reed bed' filtration system and was further extended in 1998 and 1999, to create two further ponds and a stream system. The larger of these two ponds, a 'water meadow' has become a vital education resource for the garden.

Native hedges have been put in as wind breaks. Although heritage is not particularly used, seeds are collected each year but there are no seed swaps on site. Traditional skills such as hedge lying have been used. Local artists participate in willow weaving workshops and artwork. Asian ladies have come to the site and have a small plot to grow mustards. First Step, a local project, working with women from the black and minority ethnic community, developed parts of the garden to produce herbs such as fenugreek, mustard and garlic.

Waste materials are composted on site. Leaves are collected to make leaf mould and habitat piles are created from fallen woody materials. There are facilities for informal and formal volunteering in the garden. The site provides training, and no previous experience is required. With the help of the Co-op dry stone walls were formed and a local food expert built a wood fired oven in the garden.

Figure 7.28: Reuse of old tyres to create a play area

7.6.3 Principle 2 – Ecological accounting informs design

Water butts are used to collect rain run-off. There is a solar fountain and an ironwork fountain depicting a bud about to open; the fountain powered by solar cells was named the Green Crown. Natural fertilisers have been tried in the past but are not in use or made on site. Multiple functions are present in that trees are used for shelter and as a windbreak and also to produce

food; food is also produced by vegetables and bushes and adjacent buildings to the site provide shelter and windbreak.

7.6.4 Principle 3 – Make nature visible

There are habitat piles in the woodland. The large set of ponds enhances biological pest control as well as enhancing biodiversity. Slug control includes use of beer traps, upturned grapefruits, eggshells and also simply picking off the slugs. A no-dig method is used. Wildlife is a major part of the site particularly in terms of being an educational resource. The bugs hotel, made up of reclaimed bricks and reused wood, attracts insects to the area.

A Nature Club for students between the ages of 8 and 13 runs every Saturday. Activities include pond dipping, mini beast hunting, wildlife gardening, cooking, picnicking, making bird feeders, games and a number of nature based arts and crafts.

The site has all three species of UK newt: great crested, palmate and smooth. The site also host many species of dragonfly and butterfly including the broad bodied chaser. A sensory garden was also created with raised beds designed in the naturalistic Mandala design. A willow nursery was planted to provide shoots for repairs, and donated hazel, buddleias and medlar trees were bedded in 2000. In 2001 planting on the top meadow included plants such as common bird's foot trefoil to attract butterflies. Sensory plants include lambs ear but there is no particular herb garden.

The large pond – the water meadow supports a wide range of aquatic animal, insect and plant life, including, newts (great crested), dragonfly, water boatmen, water snails and frogs. Plants include yellow flag irises, lesser spearwort, snake's head fritillary and water forget me nots. The meadows have over 120 wildflower species.

Figure 7.29: Woodland area

7.6.5 Principle 4 – Design with nature

A forest garden and woodland area ensures plant succession with features windbreaks, nitrogen fixing shrubs, berried shrubs, nitrogen fixing cover and shade tolerant plants. The slope does not seem to affect planting.

Food is also produced in the 9 raised beds. There are two beds for each crop. Clover is planted to fix nitrogen. The site is completely organic, with no pesticides used. There is a five year crop rotation on site. Companion planting using cabbage and nestercians are used and wood chip is used for mulch.

There is an oven area which is the main outdoor space for eating and cooking and acts as the zone 1. There is also an indoors space for activities and community gatherings when the weather is unsuitable to be outdoors. There are safety issues regarding a fire pit but the stove provides a warm hearth and is used as an outdoor oven made with lime and bricks. There is a part-time gardener who creatively responds to change.

Early developments included extensive planting of fruit trees and bushes (including apple and pear trees, Worcester berries, red and white currents, blackberries, gooseberries and Tay berries).

Living willow planting is used in structures and willow was also used to create a boundary around the garden – this planting material being tough enough to withstand wear, with the ability to 'self repair'.

Links have been made with a host of outside organisations (see report). Further links were made with local groups such as the Cornerstone Project, the Community Food Initiative and an International Activity Day was held with the support of ESOL.

7.6.6 Principle 5 – Everyone is a designer

Only staff members participate in site design but active users can join in bi-monthly meetings. The garden's activities include educational workshops for schools, volunteering opportunities for adults, a weekly youth club and regular community open days. The garden hosts a variety of workshops including green woodworking, willow weaving, composting, grafting and mulching. NVQ courses in organic growing are run on the site.

Public events are frequently held on site and advertised in the SNCG newsletter. School groups and local community group use the site. The group run a Nature Club for local children and school groups, wildlife groups and out of school clubs visit regularly.

There are different-sized raised beds for children and there is a specific area for children at the entrance to the site which is confined and particularly used by toddlers and very small children. Paths are wheelchair friendly. Communal tools are available and stored in a shed on site but this is locked and under supervision. Keys for the site itself are distributed on a need-to-know basis and volunteers can have keys.

7.7 Site 5 – Shanakill and Rahoonane Community Garden

7.7.1 Background

Location

Shanakill is located in Tralee, Co. Kerry, in the South West coast of Ireland. Tralee Town is the largest town in County Kerry and is the County administrative, retail and services centre. The Tralee Town Development Plan (2004) which has been formulated in the context of the National Development Plan (NDP) 2000-2006 and the National Spatial Strategy (NSS) stated that the Shanakill/Rahoonane areas have been designated under the National Development Plan RAPID programme. The Council has prepared a ten year plan focusing on upgrading older Council estates in terms of educational and environmental improvements. The plan states that a lack of appropriate community facilities has been detrimental to the social development of housing estates and the establishment of sustainable communities. Figure 7.30 and 7.31 show the location of Shanakill in relation to the surrounding area.

Aim

Shanakill and Rahoonane Organic Community Garden was set up to be an organic garden for the local community.

History

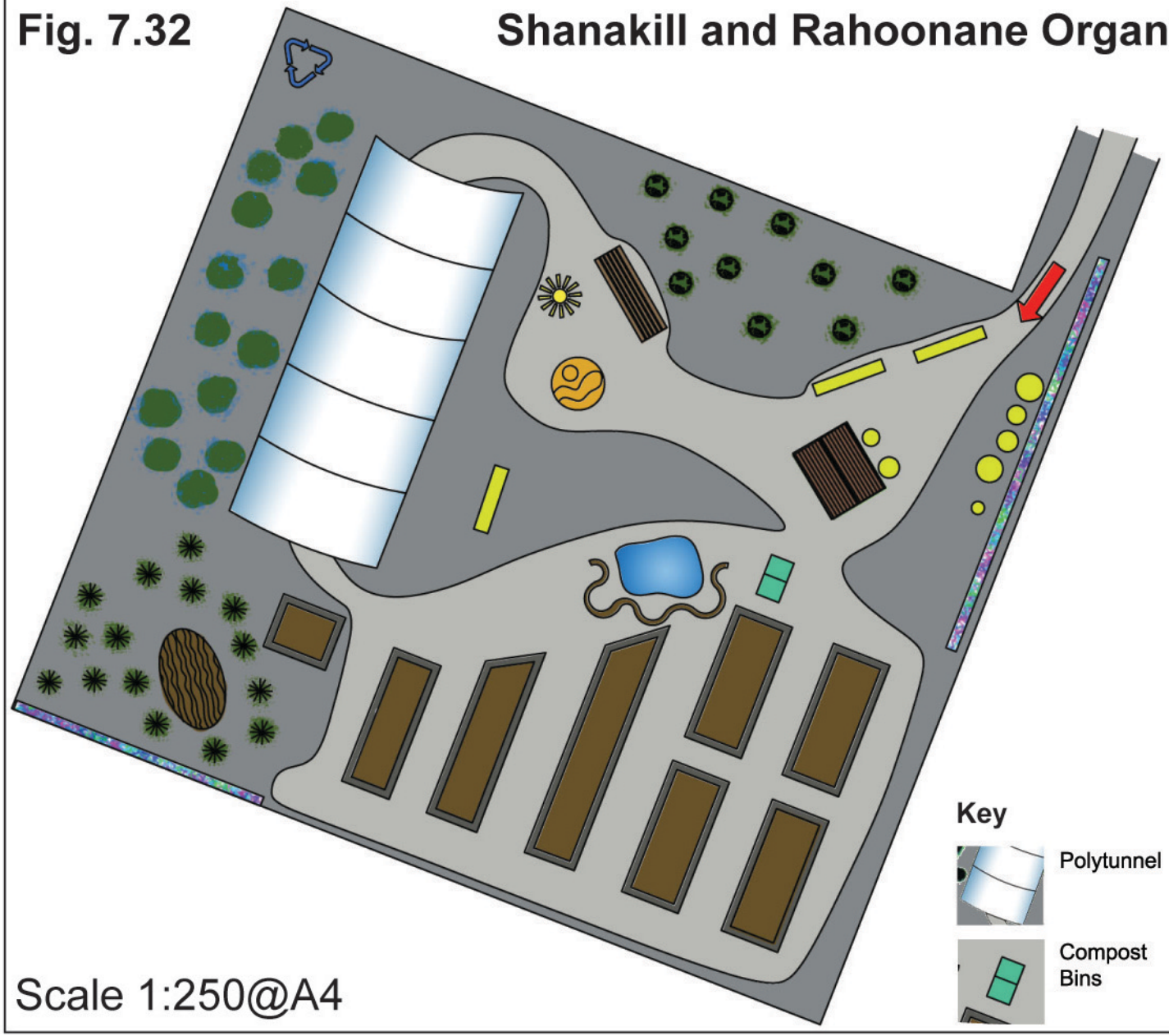
The garden was opened in February 2003 by the local residents who saw the potential of waste ground in the Shanakill estate with the help of Kerry Earth Education group, a local environmental collective (26th Sept 2006, *Kerryman*). It is used to provide formal and informal training in organic growing and environmental sustainability. It is used for workshops, school tours and for the children in the after schools club. There is a wide variety of vegetables and fruit, including tomatoes, cucumbers, apricots and grapes which are grown in a polytunnel. The garden also contains a native woodland area, an established pond and a wildlife area.

Funding

As Tralee is a RAPID area, the Shanakill/Rahoonane Organic Community Garden has received funding form the HSE. The RAPID programme operates under the auspices of the Director of Community and Enterprise, Kerry County Council. The Community and Enterprise Department continues to support the RAPID Programme with the provision of administration support, office accommodation, and assistance to the RAPID Co-ordinator and associated costs in the application of the programme to Shanakill family resource centre. Map 7.32 illustrates the layout of the features in the Shanakill and Rahoonane Organic Community Garden.

Fig. 7.32

Shanakill and Rahoonane Organic Community Garden



Key

- Polytunnel
- Compost Bins
- Pond
- Recyling Area
- Access
- Shed
- Raised Beds
- Ferns
- Living Willow Structure
- Solar Water Feature
- Whips
- Fruit Trees
- Recycled Art Work
- Planting Boxes
- Grassed Area
- Hard Surface
- Art wall
- Living Willow Feature

NORTH

Scale 1:250@A4

7.7.2 Principle 1 – Solutions grow from place

All of the plants in the site are native. There is a native woodland area, native hedgerows and wildflowers. Native vegetable varieties are also used to enhance biodiversity. There is Japanese onion that flowers in winter. Shelter from the wind is particularly an issue on the site as it is surrounded by concrete walls. However, there is a hawthorn hedge and there is willow surrounding the pond. The site gardener has contacted the heritage council and the Irish Seed Savers Association on which local seed varieties to use. Local varieties of apple trees, potatoes, sprouts and kale are used. Water comes from a tap of mains water supply provided by the Council. Water is also collected from the guttering of neighbouring sheds.

There are shade tolerant ferns at the corner of the willow dome. Seaweed, chicken manure, cardboard and straw are used as mulch and natural fertiliser on the site as these are available in the local area. Year on year crop rotation is used. Grass cuttings from residential gardens in the estate and from the open public green spaces are composted in the site. Tree foliage is also used as mulch. The soil is 'no-dig'. It is forked over but a no-dig method is used to maintain soil structure.

In making art, recycled materials are used. The site organiser states that this is 'as much for economic reasons' (pers. comm. Rachel Budd, Site Gardener). An example of using local waste materials for art is the use of old bicycles for an art project. When the site coordinator requested any old bicycles for the local estate, she received 30 when in fact only two were required.

The tool shed was donated – it was second hand. Wood for carpentry is obtained from the industrial estate across the road. Local artists have been involved in organising art classes and photography lessons for adults. Although ethnic food is not a particular focus of the site, there have been Irish traveller groups and people from Kuwait using the site.

7.7.3 Principle 2 – Ecological accounting informs design

Companion planting is used and there are water conservation days where users learn about water saving techniques. The pond has multiple functions in that it is also a learning feature for children. Water butts collect rainwater to water plants. There is a wormery and compost facilities. Solar energy is used to heat water in the solar water heater made of an old recycled water tank, painted black facing the sun and insulated in a wooden box (Fig.7.33) with a perspex south facing front. There is no electricity on site but on occasion they plug into a neighbour's house. The water inputs are metered. Materials used for art work with the children are made out of recycled materials from outside the site. Biological and low energy solutions are used for natural fertiliser in the form of comfrey, produced and used on site. Nettle and seaweed are also used.

Figure 7.33: Solar water heater

7.7.4 Principle 3 – Make nature visible

There are 'wild areas' with bees and bugs nests habitat piles and a 'stumpery' to attract insects. The frogs in the pond are a form of biological pest control. There is a native woodland area with fruit trees. There is a sensory bed in front of the willow structure. Medicinal plants and herbs include evening primrose, primula, calendula, camomile, chickweed. A herbalist comes to the site and makes tinctures.

7.7.5 Principle 4 – Design with nature

Clover and green manure is used to fix nitrogen. For slug control, Fe (Iron) and Ph (Phosphorous) slug pellets have been recommended by the Soil Association as they do not absorb nitrogen as they break down and therefore can be placed on directly on the bed.

Systems links and networks are not intentionally 'designed in'. There are specific zones in the site for growing vegetables, a fruit area and zone for relaxation. The polytunnnel is a mixed use space for growing and teaching and socialising and acts as the zone 1 in the site where site users get together to drink tea and eat food, and this is also where most of the on-site teaching takes place, particularly if it is wet outdoors. The polytunnel has been located facing the length to the south to maximise solar gain. The site tends to flood so raised beds are used to grow food. Curved edges are used in beds in the polytunnel. The gardener states that "this is not intentionally so, it seems to make common sense" (pers. comm. Warren Carter).

Space efficiency is an issue and one that the gardener is mindful of when planning activities and designing the site. Although a small site (0.4 acre), multidimensional design is not intentionally designed in but there are espaliers and tyres used to grow vertically.

Organic structures which act as a wind breaks around the pond and also as a play structures are living willow structures. There is a tree nursery where small oaks are grown and donated to other projects. Site users take trips to local woodlands and collect oak seeds to take back to the site. However, as the site tends to flood so there is no room to plant the saplings on site. There is a mix of early and late season planting and perennials such as artichokes, asparagus, rhubarb and perennial leeks are grown for food to be available all year round.

Links to other organisation include the HSE (Health and Social Enterprise), local schools, local community groups, St John of Gods (adults with special needs), Seed Savers, and Kerry Earth Education Programme. Links with funding bodies, partnerships; councils are also maintained.

There is a gardener working part time who creatively responds to change and this role also changes as funding streams change, i.e. during field work it was found that the focus of the site was changing from food growing and education to healthy eating for older people due to a change in funding body.

Figure 7.34: Use of edge in design of raised beds to maximise growing space

7.7.6 Principle 5 – Everyone is a designer

There are no design days as such in that users do not actively plan the site. There are opportunities to attend workshops on how to design your own garden at home.

Courses in the garden include: laying a patio; basket making; introduction to the organic garden; designing the organic garden using organic principles. A course entitled 'The complete organic garden kitchen' includes, garden planning, rotation and ground preparation; sowing, pricking out and planting; composting and green manures; growing under cover; growing container food; pest, disease and weed control; medicinal herbs; growing fruit for the home; harvesting and storing, propagation from cuttings; seed saving and winter crops. Fifteen participants completed FETAC (Further Education and Training Awards Council) Level 3 training on Organic Gardening in 2006. There has also been coppicing and willow weaving activities and basic carpentry to participate in.

Individuals may partake in particular designs and are given ownership of that design feature, such as a propagator made by an individual user.

There are different beds for children and wheelchair users and the site is wheelchair friendly. The children planted the sensory herb bed and there is art on the walls (fig 7.35) made by the children. There is also a willow dome structure particularly for children but the site gardener prefers for all users to work together. The site is open to all individuals but it has gated access and in this way outside opening hours, the site can only be accessed by the organising committee. Communal tools (fig. 7.36) are available but the shed is locked and under supervision when the site is open. Keys for the site are distributed on a need-to-know basis. There is also a key in the Shanakill Resource Centre which is located in the estate.

Figure 7.35: Art work – murals made from recycled crockery

Figure 7.36: Shed with communal tools

7.8 Conclusion

Each site has its own particular evolution and context but all have in common an ethos of ecological sustainability and are designed using sustainable design principles and features. The features of sustainable design identified in this chapter are used to inform the analysis of the impact of sustainable design features on human wellbeing in chapters 8 and 9. Chapter 8

examines the features of all of the sites combined in order to seek out those features of sustainable design that have particular impacts on capabilities of wellbeing. Chapter 9 examines the capabilities that are most impacted on by such sustainably designed spaces and explores capabilities and functionings that users value in using the sustainably designed spaces.

Chapter 8

Analysis by principle and feature of sustainable design

8 ANALYSIS BY PRINCIPLE AND FEATURE OF SUSTAINABLE DESIGN

8.1 Introduction

This chapter reports the findings on the impact of principles and features of sustainably designed community garden sites on human wellbeing of adult, youth and child users. The findings have produced empirical evidence from the results of the site survey (chapter 7) and analysis of semi structured interviews, and participant-led photographs and video methods as set out in chapter 6. Using this empirical evidence, this chapter provides information to refine, confirm and call into question both the sustainable design principles and sub principles developed in chapter 5, and the features of sustainable design identified in chapter 7, to produce a more complete table of sustainable design features for community gardens for use in this research (see tables 8.1-8.5). Matrices (Tables 8.6-8.10) illustrate those principles of sustainable design which impact on particular capabilities for the different user groups. Functionings (beings, doings, havings) that individuals value and have reason to value are the unit of analysis and link sustainable design features and capabilities of wellbeing. The matrices represent frequencies of functionings linking features of sustainable design and associated capabilities. The chapter is divided into analysis of adult, youth and child users groups. It will conclude by drawing together the conclusions from each principle for each user group summarising those features that were found to have the most impact on both single and multiple capabilities. This chapter therefore aims to fulfil objective 4 of this thesis.

4) Using community gardens as a locus, to identify any links which may exist between features of sustainable design and human wellbeing, and subsequently to identify the core principles and features that have the most positive impact on different capabilities of human wellbeing.

In summary, 47 interviews were undertaken with adult active and passive users in the five sites. Youth (n=11) and child users (n=12) from three of the sites (Moulsecoomb; Shanakill and Scottswood) participated in producing visual images and associated interviews. Details of gender, age and location of interviews is provided in Appendix F for adult users and Appendix G for youth and child users and summarised below. Table 8.1 summarises the number of male/females participants for each study site. Figures 8.1 and 8.2 illustrate the diversity of location and adult age groups who participated in the study respectively.

Site	User Group			Gender Adult		Gender Youth		Gender Child	
	A	Y	C	M	F	M	F	M	F
Eglantine	11			45%	55%	na	na	na	na
Easton	10			40%	60%	na	na	na	na
Shanakill	11	7	6	30%	70%	57%	43%	50%	50%
Scottswood	7	2	3	75%	25%	50%	50%	32%	67%
Moulsecoomb	8	2	3	13%	87%	50%	50%	67%	33%
Total	47	11	12	40% M	60% F	54% M	45% F	50% M	50% F

Table 8.1 **Summary of sites and gender of participants for each user group (above).**

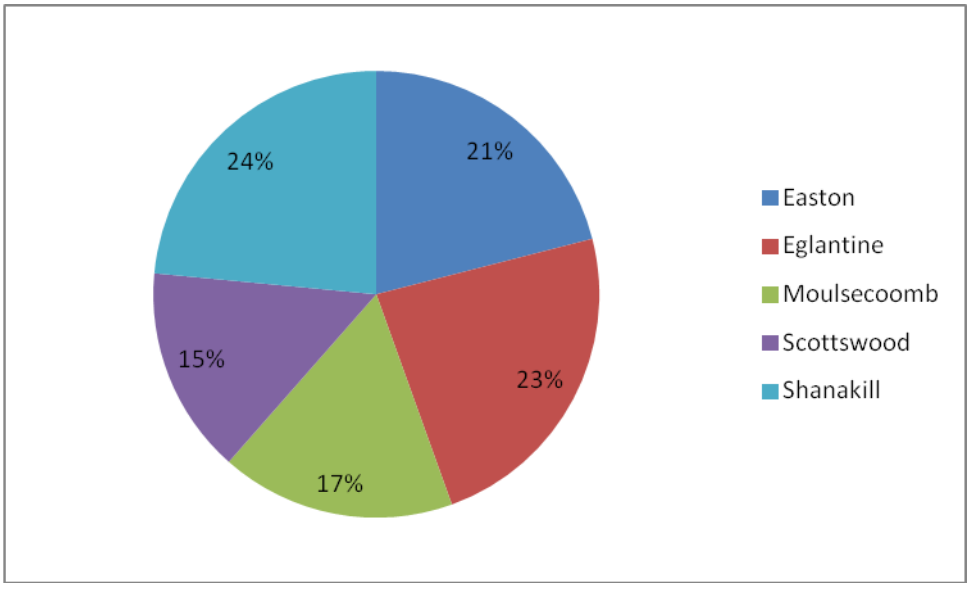


Figure 8.1: **Percentage of total number of adults interviewed according to site.**

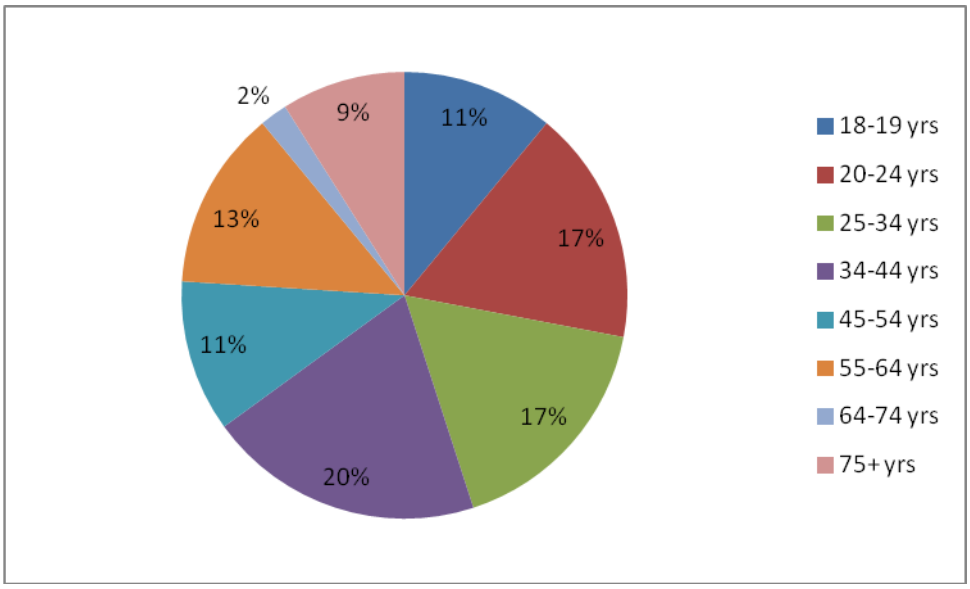


Figure 8.2: **Illustration of percentage in each age cohort for all adult participants.**

As discussd in chapter 6 (methodology) the unit of analysis is the functioning – the beings, doing, having that site users value and have reason to value in using the sites. An example of the way in which the interview transcripts were coded is provided in fig. 6.2. The frequency of functionings is counted and in this way the number of times a user links a particular sustainable design feature to a capability of wellbeing is taken into account. It was found that some features had more impact than others. A median of frequencies was taken in order to establish a cut-off-point to identify those 'key' features which had most impact on wellbeing for each user group, detailed in appendix J and the resultant key features are summarised in tables 8.3, 8.9 and 8.10.

8.2 Sustainable design and adult wellbeing

For adult users, the principle that had the most overall impact on wellbeing was Principle 4 - design with nature. This principle contained the sub principles - produce a yield; enhance successional growth and ecological integrity; use of relative location and linking; develop reciprocity and interconnections; and work within the carrying capacity of the site. This is graphically illustrated in a matrix (Table 8.6) where the darker cells of the matrix illustrate a greater number of functionings found, which linked design features to capabilities of wellbeing. For adult users, the features which were seen to have the most functionings of wellbeing are - edible plants (Principle 4(i) produce a yield); collective activities (Principle 4(iv) develop reciprocity and foster interdependence); holding site events (Principle 5(i) encourage active participation and empowerment); wildlife gardening (Principle 3 (i) design reflects underlying natural cyclical processes); a focus on community (Principle 1(ii) use cooperative and supportive relative location); set tasks (Principle 5(i) encourage active participation and empowerment; use of zoning, network and sectoring (Principle 4(iii) relative location and linking) (see Appendix J for details of frequencies). Table 8.2 details those features which were found to have most impact on wellbeing for the adult group.

Table 8.2 Sustainable design features which were found to have most impact on adult wellbeing

Principle	Sub Principle	Sustainable Design Feature
Solutions grow from place	Use cooperative and supportive relative location.	-Relative placement –putting food and groups of people in the same space (urban location) -Volunteer activity -Focus on community
Ecological accounting informs design	Design in systems for reuse and recycling of waste and energy	-Composting -Ethos of reuse/recycle
	Appropriate use of scale	-Small scale intensive system
	Plan for energy efficiency.	-Use of low tech activities + solutions
Make	Design reflects underlying	-Successional growth

nature visible	natural cyclical processes.	-Wildlife gardening (including pond)
Design with Nature	Produce a yield	-Edible plants –capacity to grow food
	Relative Location and Linking	-Zone, network, sector and slope arrangement of all the elements of the design
	Develop reciprocity and Foster interdependence/ interconnectedness and cooperation	-Organic methods (e.g. rotations, biological pest control) -Collective activities -Diversity of activities
	Work within the 'carrying capacity' of the site	-A gardener – to stay in touch with the needs of the system allowing it to self-regulate -Non-rigid design
Everyone is a designer	Encourage active participation and empowerment	-Design days and events -Open door policy -Set tasks -Choice of activities
	Encourage a role of on site learning	-Adaptive learning

The associations between sustainable design features and individual adult wellbeing are described below under each principle and sub principle of sustainable design in the following sections. Counterfactuals were taken into account in so far as they affected those features identified by adult users as impacting on their individual wellbeing.

8.2.1 Principle1 - Solutions grow from place

Having established sub principles and features of sustainable design (established in chapter 5), new additional features have emerged for principle 1 (Table 8.1). New features of principle 1 - include wild food, volunteer activity, a focus on community and having a reclaimed informal space and a focus on soils. The feature 'relative placement' of putting food and people in the same space is divided into two elements – the sites urban location, and the informal nature of the spaces.

Having a community focus was found to have the most overall impact on wellbeing. In Eglantine the reclaimed informal nature of the space had the most impact on wellbeing and in Scottswood volunteering opportunities and reuse of local and on site waste materials had the greatest impact on wellbeing. In Shanakill, Easton and Moulsecoomb, having a community focus was seen to have the greatest impact on wellbeing. The features which were found to impact on any capability of wellbeing are detailed in table 8.3.

Table 8.3 Principle 1 – Features found to impact on capabilities of wellbeing

Principles	Sub principles	Features	Adults	Youths	Children
1. Solutions grow from place	(i) Be sensitive to the local/regional ecological context	-Native/naturalized plants	×		
		- Saving seed and use of local seed varieties	×		
		-Gain information on local soil*	×		×
	(ii) Use cooperative and supportive relative location.	-Shallow rooted and deep rooted plants	×		
		-Natural windbreaks	×		
		-Drought tolerant, shade tolerant and sun-loving plants	×		
		-Relative placement – putting food and groups of people in the same space	×		
		-Integration with local runoff water source	×	×	
		-Re-use of local and on site waste materials	×	×	×
		-Wild food*	×		
		-Volunteer activity*	×		
		-Focus on community*	×	×	×
		-Reclaimed/Informal site*	×		
	(iii) Be sensitive to the cultural context	-Use of local materials and knowledge and skills	×		
		-Ethnic food			
		-Local art work*			×

× features that were found to impact on wellbeing

*** new emerging features of sustainable design**

The impact of different sub principles and features on both single and multiple capabilities is detailed in the following sections.

Be sensitive to the local and regional ecological context

In terms of sub principle (i) saving seed and using local seed varieties was found to have the most impact on different capabilities. Gaining information on local soil was found to be a new emerging feature impacting on wellbeing.

Saving seed and using local seed varieties

The use of local seed varieties, seed swapping and seed saving emerged as having multiple impacts on capabilities of ecological wellbeing. Having different colours shapes and varieties of food was found to bring multiple stimuli. Having different flavours due to the planting of different varieties of apple enhanced gustatory stimulation. Saving seed and swapping seeds and using local rare seed varieties made users more mindful of the diversity of flora in the locality and stimulated the mind to think differently about plant diversity and the multitude of plants available. An active user in Easton stated: *I have been doing growing for 25 years. I grew up in the countryside but here you are always learning. There are interesting and unusual local kinds of vegetables here like Lundy Island cabbage. It's an island in the Severn* (En5). Learning to save seed and then actually seeing these seeds grow into food plants enhances learning, communication and thought and psychological wellbeing. Gaining and developing such practical skills and knowledge also had a role in continuous learning and bringing sense of purpose. Gaining knowledge and planting local and old varieties also brought cultural knowledge to the site and the users of the area enhancing participation in cultural activities, and social wellbeing. Eating locally and having a variety of shapes and colours, was seen as important to users and brought a sense of purpose.

Focus on soil

A focus on soil fertility in cultivating crops and gaining information of local soil in this way enhanced psychological wellbeing in learning about the soil cycle and solving problems of fertility. Noticing changes in the soil throughout the growing season brought a sense of longevity and time passing, enhancing stimulation. The improvement in soil condition for growing and gardening enabled users to grow food in different soil conditions. Having this opportunity was seen to be important and brought sense of purpose.

Use cooperative and supportive relative location

A new emerging feature of using wild food that has grown on the site was found to improve knowledge of plants and the local area which also enhanced learning communication and thought. Appropriate placement of **natural windbreaks** to shelter the site in Shanakill was found to enhance learning in observing wind direction on a site and how this can be applied to ones own home garden. The features of the sub principle that had the most impact on different capabilities and described below were reuse of local and on site waste materials and relative placement (putting food and people in the same space) along with new emerging features of

having a focus on community and opportunities for voluntary activity and having an informal reclaimed an urban space.

Relative placement – putting food and people in the same space

This feature is divided into the urban location of the sites and the informal nature of the establishment of the sites and their activities. The urban/peri urban location of the community garden sites demonstrated relative placement in placing food and food growing activity and people in the same location. This was found to bring close access to food. Eating food locally was seen as an important activity, enhancing purpose.

The location in particular of the Moulsecoomb site on a height looking down on a valley in a peri urban area enhanced audio and visual stimulation. Having such a green space in the city is was seen as somewhere for people to go, to be active and - *have a breathing space* (Eg4) which was seen to stimulate the mind and also enhanced bodily health. The provision of such a resource made residents feel that the area was cared for, enhancing security. A passive user in Shanakill believed the site was effective because – *it is only one door down'* (PSh6).

Although some users felt they were away from the city and not in an urban environment which brought an opportunity for short term recovery and sensory stimulation and enhanced spiritual wellbeing from being in contact with – *the wonders of nature* (Eg4). Other users felt they were still in an urban location. The juxtaposition of the sites within the built up urban environment illuminated the contrast between the green and grey spaces of the built environment and brought and user's value in: *knowing that we can coexist with nature* (Mb1) by having both natural and human made noises together. The daily activity of offices adjacent to the Eglantine site brought a sense of diurnal change for the users and a sense of longevity and time passing, enhancing stimulation. Also in the Eglantine site, being enclosed by surrounding buildings was found to bring a sense of seclusion and privacy and a feeling of safety and security. Such a sense of enclosure gives a sense of ownership and expression. In the Shanakill site, a user stated that the location of the site in the estate meant for one user that - *everything fits together* (Sh5) and the user could easily move around the estate and the gardens site making it accessible and enhancing active participation and social wellbeing.

In terms of getting local people to participate in site activities, passive views in Scottswood had conflicting values. One passive user stated: *I don' use the site as much as I would like, as I don't live locally*, another stated that the site was *too convenient, too close by* (PSd 2). This may reflect Kaplan's' (1989) idea of being away from ones normal routine achieves mental restoration. In terms of getting local people to participate in site activities passive views in Scottswood were also seen as conflicting. One passive user stated: *I don't use the site as much as I would like, as I don't live locally*, another stated that the site was *too convenient, too close by*. This may reflect Kaplans' (1989) idea of being away from ones normal routine achieves mental restoration.

Reuse of local and on site waste materials

Maximising use of site and local waste resources urged users to think about turning problems of waste into solutions. Being creative in solving problems within the site brought learning, communication and thought which enhanced psychological wellbeing. It encouraged a new way of thinking enhancing stimulation, and a feeling of control with enhanced security. The way in which such activities are designed-in to site activities enabled users to understand the process of working within a cyclical design process. Examples of such activities included composting, mulching, coppicing wood for posts and reusing wood from the site.

Users were encouraged to think in cycles leading to changing everyday behaviours by applying and adapting what they had learned. This was enabled by seeing function in the design of such features, and learning by doing. An active user in Eglantine states: *It's great that we don't have to throw our vegetable scraps in the bin. The garden has made me compost more* (Eg3). The skill of composting and thinking about how nutrients can be recycled in this way is therefore applied elsewhere e.g. in the home enhancing application of learning, communication and thought and enhancing psychological wellbeing. The activity of local residents of taking out the compost and the feeling of satisfaction in turning compost was found to bring a feeling of relaxation and enhanced mental restoration.

Seeing waste as a resource and reusing waste materials in site features and processes was seen to be an important feature of the site enhancing a sense of purpose for users in reducing their carbon foot print and making a difference to the environment. One active user stated: *It's important to eat locally. The carbon footprint is important. It's good that food can be just grown down the road* (Mb2). There was a feeling of purpose particularly in learning to compost in all sites e.g. in reusing wood and cardboard from adjacent industry in the Easton site or reusing bricks from skips in the Eglantine site. In reusing wood from the site or local area, one can produce ones own design, and express ones own creativity. However, issues emerged in the reuse of some materials:

The recycled mats on site are something I think about. I have different views on these things. Using something, it doesn't really matter what it is so long as you are re-using it. E.g. paint reused. They wanted various signs showing people where things were. They wanted them painted. We had been given pot ends of paint. Therefore in people's mind this was reusing paint that would have otherwise have been put in a landfill or poured down drain which would have been toxic or something. So they said this is good we can reuse this and it was raining and we were doing it in the shelter and the fumes were making a few people feel ill. Personally I think there comes a point where you don't reuse because the things may not be good things to use

e.g. the paint. You need to find another way. I wish they had not been created but they have been created and the answer is not to just keep reusing them' (En3).

Informal site and setting

All of the sites under study were informal sites in that they were not established by either public or private enterprises. They were grass roots in nature and truly evolving from place. The Anarchist Plot in Eglantine is the most evident of this, the site being claimed by local individuals and transformed from being a waste dump, with many incidents of crime, to a social space described as one user as *an outdoor living room* (Eg4). Active users in Eglantine also feared that the site may be contaminated as there had been a history of dumping in the site. The sites in Scottswood and Easton were established by local permaculture activists and the Shanakill site by a grass roots environmental organisation (Kerry Earth Activists). Reclaiming a public urban space, having such an alternative space, *a free space…. where one does not consume* (Eg4) brought a sense of ownership which enhanced expression and capacity to shape ones life and a sense of purpose. Users felt they had a special space to go and a sense of local pride and of both individual and community ownership. There was a feeling of empowerment and that the local area was being cared for enhancing security, social wellbeing and political expression because the space was created and rehabilitated by a collective group of interested individuals. However, in Eglantine there was a fear amongst active users that the site may be taken away due to lack of fixed tenure or funding. Passive users were inhibited from using what was seen as a messy disorderly site: *There is graffiti and rubbish, the greenery is nice but not well maintained* (PEg5). Passive users would use the site if it looked more formal with fewer weeds and if it was less overgrown. One user stated that she did not feel close to nature when viewing or passing through the site as she perceived the site to be neglected.

Volunteer activity

In the Moulsecoomb and Scottswood sites volunteering was seen as a formalised activity. There were many volunteer students from the local University of Brighton and in the Scottswood site many volunteers came from a local NVQ horticulture course, and worked with children's groups. Engagement with local children and youth provided volunteers with cultural knowledge of the area bringing capabilities of social wellbeing and active engagement in youth activity which enhanced enjoyment of the site.

Volunteer activities included teaching, organising session structures enhancing learning, communication and thought and psychological wellbeing. Volunteers had a real sense that site activities were important in having a local active green space and also in improving the wider global environment. Passing on information to others particularly children was seen as important and showed pleasure in care and fulfilling purpose. Volunteering in itself brought focus and direction enhancing purpose and was seen as a way of getting back into social and working life. One active user stated: *I have been out of work for quite a while so I have more time. To come*

here, for me, was beneficial, to get back on that ladder. There are so many things you can do here (Sc5). One individual had suffered a breakdown and was using his time in the site to ease his way back into social life and long term recovery. He has since had any new ideas for future projects.

Focus on community

A new emerging feature of using local resources has an emphasis on community. Caring for the community; having a focal point for the community harnesses a feeling the local area is cared for and a community focus makes people feel safer with a sense of both individual and collective purpose. Feeling that the site is different and special brings a sense of community and a shared sense of ownership enhancing expression. Helping others in site activities and encouraging people to use the space is seen as being important in creating community.

Learning about community culture and society was found to bring new ways of thinking, enhancing stimulation. Learning about ones locality and relationality encouraged learning, communication and thought enhancing psychological wellbeing. Participation in social life by networking and learning form others and having a space to do this helped establish social networks and friendships and enhanced social wellbeing.

Be sensitive to the cultural context

Use of local and traditional skills materials and knowledge brought opportunities to be creative and use of imagination enhancing expression. In particular, using traditional skills such as coppicing enhanced learning.

Principle 1 - Conclusion

A sense of purpose and stimulation are the capabilities most identified with the first principle of ecological design - solutions grow from place. Volunteering further enhances a sense of purpose and social wellbeing with such activity also enhancing long term recovery and mental restoration. The urban location of the sites was found to enhance sensory stimulation and physical health. Users have a feeling that the space can be rehabilitated, and one felt had control over resources in influencing such a local space. Users felt they could influence their environment by reusing and recycling on site and local 'waste' material. Such activity also enhanced learning, communication and thought and also stimulated the mind to think differently in that users not only found solutions to tasks but turn on-site problems into solutions.

8.2.2 Principle 2 - Ecological accounting informs design

Being involved in composting activities, an ethos of reusing and recycling, having a small scale intensive site, and being involved in low tech activities and solutions were found to have the most overall impact on wellbeing. In Shanakill and Eglantine composting activity was the feature seen as bearing most functionings of wellbeing. In Moulsecoomb and Easton a low tech ethos was seen to most enhance wellbeing and in Scottswood building natural structures had the greatest overall affect on wellbeing.

The sub principles found to have the most impact on multiple different capabilities for adult users were i) design in systems of reuse and recycling of waste and energy iv) plan for energy efficiency and iii) use appropriate scale. Neither use of legumes in fixing nitrogen and natural building materials, nor passive solar design were perceived by users as features of sustainable design that influence user wellbeing.

The way in which sub principles and features impact on any capability of wellbeing is detailed below in table 8.4.

Table 8.4 Principle 2 – Features found to impact on capabilities of wellbeing

Principle	Sub principles	Features	Adults	Youths	Children
2. Ecological accounting informs design	**(i) Design in systems for reuse and recycling of waste and energy**	**-Composting**	×	×	×
		-Reclaiming materials	×		
		-Solar lighting, wind, small-scale hydro, biomass		×	×
		-Ethos of reuse/recycle*	×		
	(ii) Water conservation and rain water harvesting	**-Water butts**	×	×	
		-Water saving techniques in growing		×	
	(iii) Appropriate use of scale	**-Small scale intensive system (appropriate scale)**	×	×	×
		-Use of multiple functions of features and elements	×	×	×
	(iv) Plan for energy efficiency.	**-Passive solar design**		×	×
		-Use of low tech	×	×	×

		solutions			
	(v) Use of low energy and biological solutions	**-Biological pest control, e.g. ladybirds**	**×**	×	**×**
		-Legumes (fix nitrogen).			
		-Companion planting.	**×**		
		-Natural fertilisers	**×**		
		-Use of natural building materials			**×**

× features that were found to impact on wellbeing

*** new emerging features of sustainable design**

The way in which sub principles and features impacted on both single and multiple capabilities is detailed below.

Design in systems for reuse and recycling of waste and energy

New feature of principle 2 which emerged as influencing capabilities was - having an ethos of reusing and recycling and designing in waste and energy systems. As quantitative ecological accounting of waste, water and energy was not found to be undertaken in any of the sites, having such an ethos aimed to instil ecological and systems thinking in site users. The feature of renewable energy sources was not seen to impact on capabilities of wellbeing.

Ethos of reuse/recycle

A sense there is a clear site ethos of reusing and recycling within the site was found to bring a philosophical and moral underpinning which went beyond the site simply being a place to grow food in a community setting. This ethos bore a number of functionings and resultant capabilities. Having an ethos of reusing and recycling gave users a goal, bringing clarity of purpose. Reusing and recycling activity was found to be a reason to use the site, bringing a sense of purpose, expression and social wellbeing. Having what one active user perceived as an alternative to consumerism brought choice of expression and security. Users felt more forward looking and optimistic about the future which enhances personal growth, enhancing psychological wellbeing. Recycling everything and being continually involved in environmental behaviours brought a sense of purpose. There is also a shared goal of working for a healthier environment while also working for ones own individual health. Emphasis was found to be not only on oneself but on others.

All of the sites were found to be open to flows of energy and materials but had enclosed physical boundaries. In this way the sites were conceptualised by site organisers and gardeners as being open systems within enclosed boundaries. New learning from experiencing and identifying cycles by actively participating in reuse and recycling activities such as composting and mulching

brought stimulation of mind, new ideas and ways of thinking. It involved a continuous role of learning and personal growth which enhanced psychological wellbeing.

In seeing the site as a system one learned about designing-in energy and waste flows and thinking systematically and systemically enhancing both learning communication and thought and also stimulation of the mind to think differently. One user in Scottswood stated that specifically learning about permaculture design systems stimulated in him a new way of thinking about resources. Developing awareness and new methods of resource efficiency was found to bring a sense of vitality, of feeling excited and stimulated. Learning about such a design system was then adapted to everyday life and thinking, and enabled one to feel more in control of resources: *If you can get the ground into a position where it is actually growing well…you can make your own compost as well with the stuff around the garden that you've got* (Sh3).

Composting

Learning about composting in particular involved the user in thinking about reusing and recycling organic nutrients. Such cyclical thinking brought a continuous role of learning and a sense of purpose. Understanding recycling/reusing organic waste in composting activity enabled users to be more mindful in looking to the consequences of their actions a result of seeing the cyclical nutrient process behave as a system in itself. Watching composting and participating in daily and weekly composting activities brought a sense of longevity and time passing enhancing stimulation, learning a new skill, and having a sense of achievement in doing so. However passive users in the Eglantine, Easton and Scottswood sites stated that the sites had rats as a result of composting activity and this inhibited them from using the site.

Use appropriate scale

A small scale intensive system

The effects of having a small scale enclosed site in an urban area were divided into those associated with having a contained green space in the city and those to do with the space efficiency of the site and the repercussions for understanding the activities which occur within the site. A user stated: *The site is all encompassing. There is so much concentrated on just one little site and using lots of different skills, creating things from recycling…..Because it is enclosed people can concentrate on giving it the care it needs in terms of raising the beds and weeding it in the confined space* (En4).

Capabilities relating to having a green space included those relating to mental restoration and short term recovery – having space and fresh air, feeling you are away from the city, being in a therapeutic environment, having a retreat, getting away from the city and *feeling Zen* (En1). Long term aspects of mental restoration included co-existing with nature and having an opportunity to interact with nature.

It was found that users lost their sense of time and were inspired by using the site bringing vitality and enhancing stimulation. Having a haven to relax also brought a sense of safety, enhancing security. The feeling of ownership in having such a local green space gave a sense that the area was cared for and demonstrated control of resources, also enhancing security. The contained nature of the site emphasised for the users the contrast with the surrounding built up environment and in this way local residents felt different/special enhancing belonging and social wellbeing.

The space efficiency of the site particularly in Eglantine meant that one - *can know the site and love the site* (Eg3). The small scale enabled a diverse and functional space in which activities brought a sense of purpose and learning, communication and thought, enhancing psychological wellbeing. The spaces were also seen to be large enough to be a place to think and relax in and be creative in enhancing expression.

It was found that waste and energy inputs and outputs could be easily traced in these contained sites. This was seen to bring understanding of the energy and waste flows in the site and how this relates to site design: *It's nice that this site does not really have any waste products. Nothing goes out of the site. So we are not dumping anything on anyone else. We bring a lot in and reuse. And also we try and bring in as little as possible. We reuse compost and water. It's nice that it is as contained as we can make it* (En3).

There was a sense of ownership and care of the local environment, enhancing expression. In Moulsecoomb and Eglantine, the sites were seen to be small enough for one to be aware of other users. There was a feeling of safety and freedom to use the local environment when there were other users around.

Plan for energy efficiency

The feature that had the most impact on different capabilities is that of low tech activities and low tech solutions.

Low tech activities and solutions

Using low tech activities and solutions encouraged people to use their hands and be physically active on the land. In Shanakill, everything was done by hand: *Everything that is in here we built, the pond, everything is done by hand, weaving willow, growing, timing* (Sh4).

Being physically active and being involved in manual labour in this way enhanced physical activity and physical health: *It's also really good just doing physical activity. Being in a city you often don't do enough physical activity. Doing garden work and moving things about is a nice thing to do* (Eg4). Hand harvesting and weeding in silence was seen to particularly bring

relaxation enhancing mental restoration. Physically working with the soil and having hands in the earth also brought opportunities to relax. One active user stated: *I always have my hands in the earth. I need to do that. When you look after plants and vegetables it is very pleasant* (En1). The repetitive activity of weeding brings a meditative experience - *a feeling of balance* (En1) enhancing spiritual wellbeing.

In participating in low tech activities users were physically active which involved a feeling of increased energy and vitality. Not relying on modern technology and having a variety of tasks as opposed to simply having to mow a lawn for instance (Sd5) brought variety of activities enhancing stimulation. Gaining experience in practical activities such as making craft items, painting, and making wooden bean poles in Scottswood brought active participation and enjoyment. In Shanakill, learning new low tech skills such as setting seeds, weeding, separating plants, and using and building the propagator enhanced learning, communication and thought and psychological wellbeing. Thinking about how to solve problems on the site in a low tech fashion without simply bringing in high energy machinery (Sc1) brought an opportunity to be creative enhancing expression, personal growth and psychological wellbeing.

Use of low energy and biological solutions

It was found that learning about companion planting and how to naturally fertilise to improve yield using seaweed, chicken manure and straw enhanced learning, communication and thought enhancing psychological wellbeing and stimulation of mind to think differently about low tech solutions to site requirements.

Principle 2 - Conclusion

A contained balanced energy and waste, low technology system were those features of principle 2 - ecological accounting informs design that were found to have most influence on user wellbeing. Stimulation, psychological wellbeing and purpose were the capabilities identified as having most impact on sub principles and features of this principle. The sites implicit focus and ethos of reusing and recycling enhanced personal growth and psychological wellbeing. This focus brought a sense of care that something was important. This was most influential in enhancing a sense of purpose. Stimulation of mind occurred in learning about a design system which aims to reuse and recycles waste and energy (e.g. permaculture). Participating in activities such as composting not only made the user more mindful of ones actions, such ‘low tech’ activities enhanced vitality in learning, further stimulating the user but also enabled the user to pace oneself in the site, enhancing relaxation and physical health. Space efficiency in the enclosed sites affected both on site activities and successional growth and planting, heightening the sensory experience of nature in the site and perceived bodily health and mental relaxation. Learning in a contained space where users could see the consequences of their actions

enhanced psychological wellbeing and stimulated the mind to think cyclically. The enclosed nature of the sites, a design system that reused and recycled waste and energy and and ethos also enhanced security in that users had a feeling of safety, control of and choice of how to use local resources.

8.2.3 Principle 3 - Make nature visible

Principle 3 – make nature visible contains the single sub principle (i) design reflects underlying natural cyclical processes. Nature celebrations and rituals are a new feature of this sub principle. In all sites, the features of wildlife gardening and successional growth had the most overall impact on wellbeing. The way in which each sub principle impacted on any capability of wellbeing is detailed in table 8.5.

Table 8.5 Principle 3 – Features found to impact on capabilities of wellbeing

Principle	Sub principles	Features	Adults	Youths	Children
3. Make nature visible	**(i) Design reflects underlying natural cyclical processes.**	**-Successional growth**	×	×	×
		-Seasonal growth	×	×	×
		-'Wild soil' (not affected by human activity).	×		
		-Sensory plants	×		
		-Woodland and timely placement of climax species	×	×	×
		-Medicinal plants	×		×
		-Wildlife gardening	×	×	×
		-Nature celebrations and rituals*	×	×	×

× features that were found to impact on wellbeing

*** new emerging features of sustainable design**

The way in which each sub principle and feature affects single and multiple capabilities is detailed as follows.

Design reflects underlying natural cyclical processes

The features of this sub principle that had most impact on different capabilities are wildlife gardening and use of plant succession and are detailed below. It was found that the use of **wild soil** facilitates activities of identifying soil cycles and learning about maximising beneficial relationships between plants and the soil, stimulating the mind and enhancing psychological wellbeing. The texture and smell of **sensory plants**, touching plants, smelling and feeling the texture of salad leaves and edible herbs enhances tactile and olfactory stimulation. There is a sense of civic pride in having such an aesthetically pleasing environment enhancing a sense of security users felt within the community. Use of **medicinal herbs** in the site enhanced bodily health and encouraged users to involve all of the senses enhancing sensory stimulation.

The nw emerging feature of the **celebration of nature rituals** e.g. wassailing rituals (to promote a good harvest), Halloween (Samhain), equinox and Summer and Winter solstice encouraged night time use of the sites which brought enjoyment. Participation in such activities brought learning about culture and history and enabled the user to learn and think in new ways about nature, its celebration and the impact it has on the growing cycle. **Seasonal growth** encouraged users to notice change in what they grow by having different food each week. This brought diversity of experience to the users and stimulation of the mind. Users learned about different types and varieties of food that can be grown seasonally which enhanced learning. Growing food seasonally brought the functionings of having variety and being less detached from ones food source. This is seen as enhancing control of ones resources and sense of security.

Wildlife gardening

Wildlife gardening brought an aesthetically stimulating local environment and a feeling that the space was special. This enhanced a sense of expression, of belonging and social wellbeing. Users believed that having natural habitats and encouraging wildlife and diversity was important bringing a sense of purpose. Having a variety of fauna, watching things grow, hearing birds sing and seeing wildlife enhanced variety and visual and audio stimulation. Users experienced abundance and a feeling of peace. Spiritual wellbeing was enhanced by feeling that one had company in nature, seeing God in nature and having a sense of wonder and awe in nature. The cycles of nature evident in having a wildlife garden were found *to: nourish the soul and the spirit ….. opening up of the wonders of nature* (Eg4).

Active users were amazed at how the space looked. They loved the site and appreciated the functionality of design features. A wildlife garden brought learning, communication and thought enhancing psychological wellbeing by seeing functionality in design which also enhanced visual stimulation. Ponds were understood by users to encourage wildlife as well as being used as a feature for organic pest control. They were found to be a source of pleasure and enjoyment for the site users. Pond dipping was an activity that was shared and enjoyed with friends. Being

near to the pond was an opportunity for users to interact with nature and an opportunity to relax, and lose their sense of time, enhancing mental restoration.

Successional growth

Plant succession occurs naturally in an ecosystem. The mimicking of such a system in a community garden setting brought visual variety and the perception of abundant biomass. An active user in Eglantine stated: *In the winter the site can be ugly and really flat and then whenever Summer comes the biomass really leaps up and year on year the visible biomass above ground has been gigantic. It's like a jungle and it all happened really fast it was incredible. I t made me so proud. All that would not be there if it had not been for us* (Eg3).

Being in a space with abundant successional growth was found to be visually stimulating. Such a - *lush space* (Sh1) with *abundant biomass* (Eg3) brought a sense of spiritual realisation for some users. Successional and seasonal growth over time brought a sense of longevity and time passing and a feeling of pleasure, stimulation and a feeling that the local area was cared for, enhancing security. Such opportunities to interact with nature enhanced mood and mental restoration. This interaction was found to be inspiring and provided a setting in which users could be creative, stimulating the mind. Users felt close to nature by experiencing natural smells and natural noises enhancing olfactory and audio stimulation. Succession also brought variety in *seeing different colours of green and doing a task on site and being in nature* (Eg3). Such a variety of experiences enhanced stimulation. Users in Shanakill and Easton felt they 'have company in nature' and this enhanced interaction with nature and the capability of mental restoration. However, a passive user in Easton stated: *the site is messy, leaves from the trees fall into my garden* (PEn3). In Moulsecoomb a number of passive users felt that the woodland which is an open space adjacent to the site (but part of the site) was seen as: *unsafe, ugly, too steep and open* (PMb2).

Principle 3 - Conclusion

Wildlife gardening and especially on-site ponds were found to be most influential in enhancing user wellbeing in the site. Stimulation was the capability of wellbeing most influenced by this principle. All sites encouraged successional and seasonal growth over time and space enhancing sensory stimulation and a sense of longevity and time passing. Seasonal growth also enhanced learning and psychological wellbeing. Wildlife gardening and use of sensory plants and medicinal herbs enhanced sensory stimulation. Working with wild soil and sensory plants brought pride of place enhancing security and social wellbeing.

8.2.4 Principle 4 - Design with nature

This principle was found to have the greatest overall number of functionings linking features of sustainable design to wellbeing for adult users. All of the sub principles of principle 4 - Design with Nature had an impact on different capabilities of wellbeing. New features found included diversity of activities and a non-rigid design. The use of a compost toilet was the only feature not recognised by the adult users as bearing functionings of wellbeing. However this features was only available in two of the case study site Easton Community allotment and Moulsecoomb Forest Garden and Wildlife Project.

Producing a yield, being involved in collective activities and having a social hub in the site – a zone 1 were found to have the most functionings of wellbeing. The sub principle (iv) develop reciprocity and foster interdependence, interconnectedness and cooperation has the most overall impact on wellbeing. However, producing a yield had the most functionings of wellbeing in all of the case study sites but one – Moulsecoomb Forest Garden and Wildlife project. In this site, having a social hub – a zone 1 and collective activities had the most functionings of wellbeing.

The features of principle 4 that were found to impact on any capability of wellbeing are detailed in table 8.4 below.

Table 8.6 Principle 4 – Features found to impact on capabilities of wellbeing

Principle	Sub principle	Feature	Adults	Youths	Children
Design with Nature	**(i) Produce a yield**	**- Gardening edible plants – capacity to grow food**	**×**	**×**	**×**
		-Grow perennials	**×**		
		-Grow food from annuals and perennial plants	**×**		
		-Mix of early and late season planting	**×**		
		-Produce food from different sources, annuals, perennial plants, trees, and herbaceous plants.	**×**	**×**	**×**
		-Polycultures	**×**		
		-Food growing from both herbaceous and woody plants.	**×**		**×**
	(ii) Enhance successional growth and ecological integrity	**-Pioneering plants**			
		-Timely placement of climax species i.e. trees and woodland	**×**	**×**	**×**
		-Forest garden	**×**	×	**×**
	(iii) Relative	**-Multidimensional**	**×**		

	Location and Linking	**design (stacking succession, edge)**			
		-Zone, network, sector and slope arrangement of all the elements of the design	×	×	×
		-Development of networks and links to other organisations	×		×
	(iv) Develop reciprocity and Foster interdependence/ interconnectedness and cooperation	**-Natural building**	×	×	×
		-Organic methods (rotations, biological pest control …)	×	×	×
		-Collective activities	×	×	×
		-Diversity of activities*	×		
	(v) Work within the 'carrying capacity' of the site	**-A gardener – to stay in touch with the needs of the system allowing it to self-regulate**	×		
		-Compost toilet		×	×
		-Non-rigid design*	×		

× features that were found to impact on wellbeing

*** new emerging features of sustainable design**

The impact sub principles and features had on functionings on single and multiple capabilities of wellbeing are detailed below.

Produce a yield

The feature of this sub principle that had the most impact on different capabilities is gardening edible plants. Growing many crops in **polycultures** and from many different sources rather than having just one singe crop brought a variety of colour and shapes and types of food. It also improved knowledge of plants enhancing learning, communication and thought.

Gardening edible plants – capacity to grow food

Producing a food yield was seen as the focus of each of the sites although none of the sites aimed for maximum yield/productivity. The activity of gardening, of planting seeds and watching things grow not only brought enjoyment but also short term recovery and a feeling of peace,

relaxation and of being soothed, enhancing mental restoration. Hearing seeds pop brought olfactory stimulation. Chatting with others whilst preparing the ground or weeding enhanced opportunities for social interaction.

Being active with such a variety of activities enhanced stimulation. Seeing things grow and gaining practical gardening skills also brought learning, communication and thought enhancing psychological wellbeing. Users felt challenged to work within a growing process with evolving timescales stimulating a sense of longevity and forward thinking.

Learning about food, and growing food, and accessing environmental skills to grow food were seen to be important to users and brought a sense of purpose. Producing outputs, not just food but also arts and crafts enhanced opportunities to be creative and a sense of achievement which enhanced self efficacy and psychological wellbeing.

Producing food crops as a yield was found to save money and enabled users to manage their own resources and be more aware of what they were eating. This brought a sense of security. Growing ones own food also enhanced the capacity users felt they had to shape their lives, enhancing expression. Growing food on site also was found to give the perception of a clean and a healthy environment a feeling of being physically active and increased vitality and stimulation. Taking home food to eat brought gustatory stimulation.

Growing food as annual, perennial crops, nuts and fruit from trees and fruit from bushes provided a greater variety of food types enhancing stimulation. Grazing on fruit, vegetables and berries enhanced gustatory stimulation, a perception of a clean and healthy environment and of being healthy. In Eglantine and Scottswood the activity of working with one other person in harvesting were opportunities to relax enhancing mental restoration. A user in Scottswood stated: *I am relaxed when I am …doing a shared task with someone else, being busy and sociable at same time* (Sc3).

Enhance successional growth and ecological integrity

The timely placement of climax species and establishment of a **forest garden** brought a sense of longevity and time passing enhancing stimulation. The diversity of experiences that came with tree growth such as being in the shade and being in the forest, and going for walks brought a sense of visual stimulation and of relaxation.

Relative location and linking

The features of multidimensional design; the use of zone, network, sector and slope; and development of networks and links to other organisation all had impacts on multiple capabilities.

Being inspired by nature in the site and noticing nature with the seasons was found to be impacted on by **multidimensional design**, particularly the use of horizontal space. Use of stacking and succession made a biodiverse *lush space* (Sh1), a space in which people felt connected with nature enhancing spiritual wellbeing. Individuals were inspired by nature and had a sense of longevity and time passing in noticing change in the site because: *it is a small space with a lot growing inside* (PEg5). **Networks and development of links to other groups and organisations** was found to be important to the evolution and long term survival of site activities in all of the sites. Working with different groups brought new learning in gaining insight into how other groups worked. Meeting new people established social networks and friendships. Adults found working with children and young people enhanced vitality, opportunities to be creative and the participation in social life and social activities. This enhanced social wellbeing and a sense of fun and enjoyment. The mixing of mental health groups with children from the ACE group was particularly noticeable in Moulsecoomb Forest Garden and Wildlife Project, where on work days; these groups used the site simultaneously. The mental health visitors to the sites had opportunities for long term recovery and back to work volunteering schemes. However, in Scottswood it was found that another local group had started a new community garden and this was seen by some users of the SNCG as reflecting a lack of communication between user groups in the local area.

Zone, sector, network, slope

Users felt that learning about aspect and shading improved observation skills and made users more aware of their surroundings enhancing learning, communication and thought and stimulated the mind to think differently. In terms of zoning activity, zone 1 had most impact on wellbeing of active site users. Social wellbeing was the capability most enhanced by having a zone 1 in each site. A zone 1 was in the form of a fire pit (Moulsecoomb and Eglantine), an inside/outside space such as a polytunnel (Shanakill), a shelter made of natural materials (Easton), an oven/cooking area (Scottswood). Having such a hub to gather, chat, share food, make tea and cook food brought a community atmosphere and provided opportunities for communal activities and participation in social activities. Functionings of social wellbeing included being by the fire, being incorporated into discussions, drinking tea. Eating what one has grown on the site enhanced sharing of food, opinions and ideas. Relaxing by the fire in a friendly atmosphere enabled users to meet people that had similar interests but also people users would not normally meet.

Develop reciprocity and foster interdependence

Features of this sub principle which were found to have the most impact on different capabilities included organic growing methods; use of organic building structures; building with natural materials and collective activities. New emerging features included having a diversity of activities.

Use of organic methods

Organic methods were seen to contribute to healthy eating in the non use of pesticides. Being physically active in growing organically was perceived to enhance physical health. The activities of weeding and composting and noticing change in pond life brought a sense of longevity and time passing in noticing cyclical change. Organic growing made users more mindful of resources while also learning new skills for example in learning about crop rotation users noticed seasonal change and identified cycles of nature. As the site and situation always changes, in applying what one has learned elsewhere users learned to understand not only organic skills but also organic process such as nutrient and waste and energy cycles enhancing psychological wellbeing. However in the Moulsecoomb site, one active user contracted ecoli blood poisoning from the use of unrotted manure used as a vegetable fertiliser, a condition which greatly affected her physical health. However, the active user continues to use the site and eat food from the site which still used rotted manure to enhance crop growing nutrients. McDonagh and Braungart (2002: 42) emphasise that 'substances created by nature can be extremely toxic', and that the use of new technologies combined with traditional methods is more appropriate for future ecological design. In terms of growing food organically education about nature's processes and how these can be dealt with most effectively is necessary to ensure toxic outputs are deal t with appropriately.

Use of natural building and structures

The fast growing nature of willow enhanced visual stimulation. The participation in planting willow enhanced learning communication and thought. Willow weaving brought the opportunity to relax enhancing mental restoration. The activities of pruning and weaving willow were seen as - *a useful activity* (Sd1) in which users had a goal/aim to achieve. For some users, the form of a willow dome made them feel sheltered and secure. Coppicing willow in a group brought active participation in social and cultural activities and social wellbeing.

Diversity of activities

Users were actively busy in participating in a variety of dynamic, various and stimulating activities. Such diversity made the space interesting for users enhancing a continuous role of learning and sense of purpose. Multiple functions of activity such as weeding and chatting and also experiencing nature had multiple activities and functionings enhancing stimulation. Being

busy with a variety of tasks made users feel uplifted, losing their sense of time which was found to enhance mood and mental restoration.

Collective activities/group work

People felt useful working in the site but particularly more confident working as part of a group. Having a shared task, feeling useful and achieving the aim of a particular task, brought a sense of purpose. Mixing with and being around people for an active user in Scottswood - *takes my mind off troubles* (Sd4) and enhanced mood.

It was found that sharing tasks enabled users to meet like minded people but also people they would not normally meet. An active user in Scottswood sates that since using the site: *I am wiser about nature and I am also wiser about people* (Sc5) from working with others and being part of a team. Gardening skills and social skills were practiced simultaneously enhancing social wellbeing. Individuals made friends while working in a group, tasks are shared and enjoyed together and people supported one another enhancing reciprocation and social wellbeing. Some groups had patches for growing vegetables together (e.g. Moulsecomb). Individuals felt more dynamic when working with others learning and interacting, learning and sharing ideas, helping each other out and achieving aims collectively. This enhanced a sense of shared purpose building community, and enhancing social wellbeing.

Learning form each other enhanced learning, communication and thought and having a variety of things to do such as chat and garden while being in nature brought a variety of experiences with a shared aim. Working together also brought an increase in energy and vitality and also an increased feeling of safety and enhanced security. Individuals felt relaxed being around other relaxed people and felt more positive about the future. Being involved in communal activities also made users aware of other people.

Work within the carrying capacity of the site

Having a gardener/caretaker to respond to change and a new emerging feature of having a non-rigid design are the features of this sub principle which have impacted on multiple capabilities.

A gardener/caretaker to respond to change

In each site there is a gardener present that was a source of learning and who could creatively respond to change. Although users were free to use the site unsupervised, one active user in Easton stated-*I need to be supervised, to learn* (En2). The site gardener/s must manage an ever fluctuating network of flows of energy and material. This flexibility is a consequence of multiple feedback loops that keep site activities in a state of dynamic balance and ensure that the site survives. Such a person can be formally employed as is the case in the Moulsecoomb, Scottswood and Shanakill sites. The gardener can also be a volunteer, who comes along when

they can as is the case in Easton and Eglantine. Eglantine has many such individuals who respond to change in different ways by planning rotations, or organising on site activities, linking with external groups and organising volunteers. The gardener may in fact have a particularly special relationship with the site, knowing its history, its past flux and have a holistic knowledge of how the site works. The gardener in the Eglantine Anarchist plot stated that - *knowing and loving the space* (Eg3) has come for being actively involved since its inception. This site gardener imparts his or her knowledge to the other users of the site and an exchange of ideas takes place. Such exchange helps deal with flux and on site problems in a shared manner. This interaction was found to encourage learning between individuals, enhancing psychological wellbeing and reciprocation and the social skills of listening to and working with others, enhancing social wellbeing.

Having a non-rigid design

Site activities evolve with time. Sustainable design is a process in which design is always adapting and changing to suit a given circumstance of resource availability and climate. Evolving with an ecologically sustainable community garden site was found to involve a continuous role of learning for users. The user learns to - *let what happens happen* (Eg2) and activities and behaviour adapt to fit the new design and vice versa and in this way it was found that users learned to cope with change enhancing personal resilience and psychological wellbeing. This means that new situations are matched with new ideas and new opportunities to be creative. Users felt that the changing nature of the site made it different to a more formal manicured setting and gave a feeling that the site was special enhancing a sense of belonging and social wellbeing. Such change brought a sense of longevity and time passing enhancing stimulation.

Principle 4 - Conclusion

Principle 4 – Design with nature functionings most impacted on the capabilities of stimulation, social wellbeing, mental health and psychological wellbeing. The diversity of activities around producing a diverse organic yield and the exchange of energy and materials resulted in a constant flux of the natural and human activities in the site. This, in turn, enhanced stimulation which was found to be the capability of wellbeing most influenced by this principle. Participating in planting and maintenance of annual plants, use of organic methods and the ever evolving non-rigid design of the site enhanced forward thinking and the ability to cope with change. Growing ones own food brought a feeling of control and security in that users felt secure in knowing what they were eating. This influenced user perception of enhanced health in eating organic food which they grew themselves. Use of zoning, networks, sectors and learning about growing food was found to stimulate the mind to think differently about location and site observation. The resultant timely placement and design of forest gardens and timely placement of trees and woodland enhanced sensory stimulation bringing a diversity of sensory experiences. Producing a yield collectively, exchanging ideas, meeting other groups and the provision of a zone 1 enhanced both social wellbeing and enjoyment. Relaxation at breaks also enhanced social

wellbeing. Having communal goals brought a sense of self–efficacy, learning and a sense of purpose. In terms of mental restoration working collectively also brought short term recovery in affecting mood positively and long term recovery in the case of long term active users.

8.2.5 Principle 5 - Everyone is a designer

This principle includes the sub principles of i) encourage active participation and enjoyment and ii) encourage a role of learning. New features include i) set tasks, having a choice of activities and different levels of activities (sub principle i) and teaching of practical skills and adaptive learning (sub principle ii).

The features that had the most functionings of wellbeing were having events, set tasks such as maintenance activities, a choice of tasks and having an open door policy where the site is accessible to all. In Moulsecoomb, Scottswood and Easton, site events have the greatest number of functionings of wellbeing. In Shanakill, learning and particularly learning to apply skills outside the site such as in the home environment was found to have the most functionings of wellbeing. The way in which sub principles and features impact on any capability of wellbeing is detailed below.

Table 8.7 Principle 5 – Features which impact on capabilities of wellbeing

Principle	Sub principle	Feature	Adults	Youths	Children
Everyone is a designer	**(i) Encourage active participation and empowerment**	**-Design days and events**	×	×	
		-Communal use of tools			×
		-Inclusive design	×	×	
		-Open door policy	×	×	
		-Inclusive decision making	×	×	
		-Set tasks*	×	×	×
		-Choice of activities*	×		
		-Different levels of activities*	×		
		-Participation in on-site art work		×	×
	(ii) Encourage a role of on site learning	**-Workshops and courses**	×	×	×
		-Teaching of practical skills*	×	×	
		- Encourage role of adaptive learning	×	×	

× features that were found to impact on wellbeing

*** new emerging features of sustainable design**

The way in which different sub principles and features impact on single and multiple capabilities is detailed below.

Encourage active participation and enjoyment

Design days and events

The features found to influence multiple capabilities include design days and events, inclusive design and an open door policy. New emerging features identified by adult site users as influencing wellbeing included diverse levels of activities, inclusive decision making and features relating to types of tasks and activities. These included user choice of activity and having a number of set tasks for users to participate in.

Active participation in design days had a theme of celebration and having fun and enjoyment. The sites all had special events where visitors came for a day or a half day and participated in organised tasks and festivities. Such events were seen as important for attracting individuals and groups to the site. Events may be targeted to particular groups e.g. children's Nature Club in Scottswood or mixed groups as in Moulsecoomb where children and mental health visitors came to the site on particular days or joined the same events. They provide a space for mental health visitors to go. This facility was seen as being important enhancing a sense of purpose for site volunteers. Such design days particularly encouraged group work and other collective activities. Being around people; meeting new people; meeting people you would not normally meet; meeting like minded people and working together with a shared sense of achievement was found to enhance social wellbeing. People worked together, networking and exchanging ideas, sharing food at breaks between work and actively created links and networks of activity enhancing reciprocity and social wellbeing.

The Nature Club in Scottswood provided a particular focus for volunteer workers to work with children. The club brought a sense of purpose, learning and a feeling that the children are special, enhancing a sense of belonging. Here, the role of learning in the site is based on fun and enjoyment. Kid's events brought an opportunity for adult volunteers to be creative and use imagination, enhancing expression. They participated in building and growing food such as in Moulsecoomb or in nature activities such as in Scottswood or simply building huts and playing in them in Easton. Volunteers who specifically work with children felt energised and were physically active bringing a sense of vitality and stimulation. The volunteers were also challenged to organise activities and be creative in preparing session structures. For parents of children, they were pleased that the children had somewhere to go and they felt secure in knowing where their children were.

It was found that site events brought enhanced collective energy and celebration. Participants in such events used their imagination and were creative in participating in arts and crafts and creative tasks enhancing expression. Ideas were shared and multiplied enhancing learning, communication and thought and stimulating mind. Being in a learning environment and working to ones full potential brought a feeling of having and achieving aims and a sense of purpose. Individuals brought along family members and friends. Such active participation brought a sense of community.

In Eglantine, having work days opened up skills to all and removed the barrier between seeing and doing for new users. Users felt they had an influence on the local area and this enhanced the capacity to shape ones life and a sense of purpose, and the opportunity for users to express ones opinion in their local environment. However a number of active users would prefer if events started later in the day and a lack of indoor space in the site was found to be a barrier to active participation when the weather conditions were unfavourable.

Inclusive decision making

Inclusive decision making was not a consistent process within the sites. Everyday decisions are made on an ad hoc basis, depending on what users are present on a particular day. For long term decisions about the site, funding sources and planning for future events, Scottswood Community Garden and Wildlife Project has a steering group and more rigid structure for decision making. In contrast Easton Community Garden is essentially run as an unofficial collective with no hierarchical structure. In Moulsecoomb, users interviewed felt they had a say and could express ideas freely, enhancing political expression. In Scottswood, one individual stated that a sense of achievement was gained in seeing ones decisions/opinions materialised and affirmed which enhanced a sense of purpose. In Eglantine, a number of active users felt politically active in making decisions about the local area. However it was found that passive users did not feel they could influence their local area and a number felt they had not been considered in the design or maintenance of the site. A number of the passive users in Eglantine thought that there was no activity in the space and that the space: *is of no benefit to the area* (PEg6). Another stated: *I did think at first that people grew drugs there, but not I don't think they* do (PEg5).

Inclusive design

A number of passive users were either physically unable to use the sites due to mobility problems or other physical ailments or the sites were not seen to be inclusive and welcoming to all. In addition some passive users were just not interested in growing food but were glad that other individuals were using the spaces. The informal nature and design of community garden sites may mean that raised beds and entrances are not up to specification in terms of disabled access.

However, the site in Scottswood is both child and wheelchair friendly. Users found the step slope of the Moulsecoomb site hindered wheelchair access. Likewise raised beds in the Shanakill site were found to be too close together in parts making it difficult for wheelchair access. In Scottswood there is a specific area for young children (under 5) to play. Having a child friendly site with children's activities was seen as being an important aspect of all sites in particular the Scottswood and Shanakill sites which have a large proportion of child users. Having such spaces for children to go, was seen to bring an opportunity for short term recovery for parents and guardians. However, a passive user in the Shanakill site explained how she felt the site is more for local kids rather than adult users. Both active and passive users of the Eglantine site would like to see a communal bbq space and a grassed section, in this way it was believed more users form adjacent houses would use the site. Passive users would also like to see a seat and some paths to walk and a water fountain –hence a more formal design. Active users stated that it was difficult to engage local community in design in the Eglantine site as in a transient student populated area. In Moulsecoomb, barriers to participation included perceptions that the ground is unstable and slippy and the slope of the sites means that the paths are steep. Some passive users stated that the site looked overgrown and neglected and not well cared for. Others thought that the site was for the exclusive use of mums with children or young people.

Open door policy – access to all

All sites have open access in that any individual can use the site during site opening hours. However, Eglantine was found to be the only site without an enclosed boundary which can be locked to prevent people using the site out of hours. In Easton having an enclosed site which is looked after brings a feeling of safety in knowing that the local environment is being cared for, enhancing security. In Eglantine, being with others in the site was also found to make users feel safer. For parents and guardians in Scottswood, feeling that the children are in a safe place and knowing where they are brought a feeling of security. The setting of the garden in a family residential estate affords this. The restricted opening hours of the Scottswood site was seen for some to be a barrier to further participation for some active user. Issues of time and logistics for those users not living locally and the fact that only a small number of active users possess a key inhibited fuller use of the site. Financial and work related issues prohibit users from using the site more often during the day.

The collective management of the site in Easton meant that the maintenance and opening of the site each week and organisation of events is shared. Having restricted access brought the opportunity to interact with others on particular days. One can bring family and friends along. This enhances a sense of belonging and social wellbeing, ownership and expression. A number of active users in Easton saw access as a barrier to further participation as the site is only open one day a week. In Moulsecoomb users realised that if more people had keys to the site then

food may be stolen. Passive users in Easton felt that they had not been informed about site activities and did not know what actually took place in the site.

In Moulsecoomb, people came to know the site and returned weekly, monthly or even after not having attended for more than a year. In this way regular visitors could identify cycles of human activity in the comings and goings of different individuals. Individuals had an opportunity to relax and work alone if they wished to do so. The site is large enough to facilitate this. The Scottswood site is large enough so that one can relax on ones own if they wish. Being with other people can be seen as both positive and negative as one may wish to work or be alone. Such freedom to choose demonstrated a sense a freedom to use the local environment as one chooses.

The Eglantine site is open to the public 24 hours. One user living adjacent to the site stated that it is a *public living room* (Eg4). Another came along as and when he wished to read, wander, hang out, smoke, drink beer. Being free to use the space at any time brought spontaneity and a feeling of political expression to use such a public open space in this way and also to reclaim this space by physically working in the site. A number of active users noted that open access meant that there is dog faeces and rubbish because residents of adjacent houses throw rubbish into the site and set it alight. Active users believed this affected enjoyment of the sites natural features.

Choice of activities

Having a task board or a list of tasks that need to be done on a particular day provided a degree of structure to a days activities. Individuals chose the type of task that they had particular interest in. They chose a level of physical exertion for that particular day and in this way matched their tasks to their bodily limits for that day.

Users chose to work alone or with others. Individual patches brought a sense of ownership in doing ones own design, enhancing expression. Some users preferred to be given a task to do. When users felt they ware competent at a particular task they moved to something new or advanced. An example of this was picking salad leaves for the lunch in Easton Community Allotment where users harvested a salad to eat for lunch, identifying what was edible/not. He/she accompanied others until they could competently identify the different leaves and flavours. This was seen as a more difficult task for novice site users.

Being engrossed in a particular task such as weeding or harvesting, made one lose ones sense of time. This brought short term recovery and enhanced mood. However it was found that individuals also enjoyed escaping routine and not having a rigid structure to tasks was seen as an opportunity for short term recovery and a break from a usual work routine. Having a sense of

achievement in completing a task brought a sense of self efficacy and cognitive functioning enhancing psychological wellbeing. Users felt useful and self esteem was enhanced. It was found that individual users were put to a task but brought their own reasoning and problem solving to complete the task.

Tasks often involved maintaining the site. This involves sharing a task and a sense of shared ownership and care of the site and local environment. Maintenance tasks often required repetitive tasks such as pruning of weeding. Such tasks are seen as being useful whilst bringing an opportunity to relax. Weeding is seen by one participant as being a meditative activity.

Set tasks

Having a list of set tasks was found to bring structure to - *get on with things* (Sd5) and the work that needs to be done. The way the tasks were delegated and the importance placed on choice of level and type of activities was seen to facilitate users in understanding their bodily limits. This enhanced both physical health and mental restoration as one did not become strained or tired. In terms of relaxation, not having a rigid time schedule when using the site made users more relaxed and this enabled short term recovery. Users had a choice to either work alone or with others. Working alone also brought an opportunity to relax. Users also found their own jobs to be done. This was seen as an opportunity to express ones own opinion in the site. Again, choosing activities that suited ones own energy levels brings physical and mental restoration benefits in not being over exerted and relaxed and one feel a healthy tiredness.

Little's (1993) work on personal projects looks to extended sets of personally meaningful action in a particular place or context. Little has demonstrated that human wellbeing is enhanced to the extent that individuals are pursuing projects that are meaningful, manageable and embedded in a sense of community and the local environment affords people such pursuits. Set tasks may be seen to equate with such personal projects. Individuals who came to the sites on a regular basis were seen as either formal volunteers (as in Scottswood and Moulsecoomb), informal volunteers (Shanakill) or as individuals with an interest in the site (Eglantine and Easton). Routine maintenance of the site meant individuals got to know the space and saw a difference or improvement over time. This was seen to bring a sense of ownership and purpose. It was seen as an effective way to create community with the garden as a locus for this.

Diverse levels of activities

In addition to having a diversity of tasks (Principle 4), having different types and levels of tasks was also enhanced wellbeing. Pacing oneself and realising ones energy limits in doing what one feels one can on a particular day was found to enhance physical health. Having a choice of activities generated capacity to shape ones life and explore ones bodily limits. This was

particularly found to be the case in terms of the capability of older users: *I feel physically active, within limitations. As you get older, you can't do as much as when you were younger. I try not to get tired, sometimes I do… it depends* (Sd4). In Easton if a user it was found that if a user was feeling particularly energetic on a particular day, they participated in digging for instance, but if a user felt low in energy they harvested, weeded or made tea.

Encourage a role of learning

Features influencing different capabilities included having courses and workshops. A particular aspect of this was found to be the teaching of practical skills that can be adapted outside the site, particularly in the home.

There was a sense that the site was valuable as a shared space. They were seen as accessible particularly in terms of accessing and being involved in **practical skills** such as composting in that one can see and understand how it is done: *Seeing the space and the composting can make it more accessible. A lot of the time there is a barrier between seeing something and getting involved* (Eg 3). Gaining practical skills such as organic growing, composting, rainwater harvesting, planting willow, orchard growing and learning was found to have a continuous role of learning enhancing psychological wellbeing in applying these skills elsewhere in different contexts and settings.

Workshops and courses

Events may be a course on permacultue or growing organic vegetables. In this way, users gained skills and knowledge to be more self-reliant bringing control of resources enhancing a sense of security. A role of learning on site included learning new skills; learning from and about others; learning about food. The emphasis on skills training and how these are taught through the design of the site enhanced cognitive functionings such as problem solving and resourcefulness. The sites show functionality in design and users were provided with information and practical advice in an informal education setting. Courses and workshop were found to enhance learning communication and thought.

Adaptive learning

It was found that learning about systems and cyclical thinking within the site and learning particular skills enabled one to apply what one has learned to one home and even in everyday life. An active user in Shanakill stated: *I recycle everything now* (Sh3).

Being active and energised within the sites was found to bring a new energy and vitality in which ideas are gained. This energy is moved out of the site to the home and other environments. The garden and the activities within it were identified as incentives for adapting skills learned elsewhere. Being successful in growing plants in the garden gave users confidence to grow plants in ones home. Users pass on skills, stories and care to family and friends. Active users

took plants, seeds and seedlings home which were seen to encourage healthy eating outside the site.

Learning about food growing and being resourceful at home and in everyday life enabled users to be more in control of their resources and this enhanced a feeling of security. Learning about cyclical systems thinking within a contained site was found to be associated with having a healthy environment –things make sense (Eg4) and everything fits together (Sh5). Learning abut aspect, shading, context and relationality gave users observation skills to use in the home and elsewhere. The site and its activities were seen to remove the barrier between seeing and doing and hence gave one the confidence and capacity to use the skills gained elsewhere.

Principle 5 - Conclusion

Purpose, expression and mental restoration were the capabilities most influenced by principle 5 – everyone is a designer. Participating in events and having the opportunity to participate in decisions, and choosing the task one partakes in on a particular day brought confidence to the user, enhancing psychological wellbeing. Putting ones own creativity to a task and believing one can influence ones locality by being involved in site activities enhanced expression. The sites are open to all during the day and individual users felt they had the opportunity to use the sites alone if they wished. However, organised events bring fun and enjoyment and an enhanced sense of safety and security. This brought opportunities to relax and enhanced mental stimulation. Including children in site activities brought short term recovery for parents. Being busy with a variety of tasks and also concentrating on one particular task enhanced short term recovery and mental restoration. In being given a choice, users matched their energy level to a task enhancing both mental restoration and bodily health. Users were stimulated in choosing any number of tasks and kept busy, enhancing vitality. Although a role of learning was found to have greatest impact on the wellbeing of adult users. The most significant aspect identified being transferring practical and observational skills to ones own home which enhanced not only learning communication ad though but also stimulation of mind new ideas and ways of thinking. Events provide the opportunities for social interaction, meeting both like minded people and those one would not normally interact with. The site was seen to bring a shared purpose and sense of belonging and community, enhancing social wellbeing.

8.2.6 Passive and active adult users

Tables 8.7-8.8 illustrate the impact of sustainable design principles on different capabilities of wellbeing for active and passive users. Principle 4, design with nature had the greatest number of functionings for both passive and active user groups. Passive ‘activities’ included walking passed or having a view of the site and a number of passive users used the sites occasionally (once or twice before) or had a family member who have used the site. Passive users valued having a well maintained site where the successional growth and pioneering plants brought aesthetic

stimulation in what is perceived to be a 'green' environment, benefiting the local community and local people. This brought a sense that something is important and enhancing purpose. In contrast, active users valued the benefits of learning about food growing systems, being involved actively in producing a yield, collective activities, having a social hub and meeting others.

The wildlife and successional growth of the site gave the perception of a 'green' and healthy environment, such site features being relatively more important to passive than users. For a number of passive users, the wildlife e.g. ponds (principle 3 – make nature visible) that the site brought to the local area enhanced the wildlife of their own gardens, especially if living adjacent to the site. Those passive users in the Scottswood site, who had visited the sites on one or two occasions, received surplus vegetables and fruit. This enhanced contact with nature brought enhanced aesthetic stimulation and a sense of longevity and time passing in noticing the passing of the harvest season.

Active users valued features of principle 5 (everyone is a designer) such as being actively involved in design days, having set tasks and a choice of tasks, both passive and active groups valued an open door policy and inclusive design for all age groups where parents or grandparents can come along with children if they wish. In this way, passive users in all sites valued such use of the space to the local area. This was particularly the case in the Scottswood, Moulsecoomb and Shanakill sites where the provision of the space was identified by passive users as being of benefit to local children in that it provides a safe space for children to play. Parents were particularly happy for their children to use the sites, enhancing a feeling of safety and freedom to use the local environment, enhancing security.

The community focus of the sites (principle 1 – solution grow from place) was seen to be important for both active and passive groups. For passive users, having a local community centre (Shanakill) and schools involved in the sites (Moulsecoomb) strongly enhanced a feeling of purpose, security and social integration for passive users. There was a feeling that such features of the site were important, brought a greater sense of community and brought a feeling of safety and freedom to use the local environment.

8.2.7 Conclusion – Adult users

The sites provided the adult users with both a dynamic and active learning space which particularly enhanced stimulation, purpose and psychological wellbeing. It also provided a relaxing space to be either alone or with other people, enhancing both social wellbeing and mental restoration. The location of the site in an urban, community setting and the informal nature of site activities in reclaiming such spaces brought a sense of purpose and expression. Although users felt proud of the achievement of transforming a local unused site into a productive active space, active users also appreciated having an on site gardener to teach and respond to change

in the site. Having a site gardener(s)/coordinator(s) and volunteers to maintain the site and assist in youth and children's activities also meant that the site was perceived by a number of passive users to be organised, productive and of benefit to the local area, in providing a safe space for local youths and children.

For active users' individual agency, opportunity of choice was evident in principle 5 – everyone is a designer where having a choice of activity and learning experience to match ones particular mood and energy level brought both expression and purpose. At the same time having a set task was seen to benefit both learning and psychological wellbeing, relaxation and mental restoration as users became engrossed in site activities.

In the reuse of local and on site materials, active users learned to turn local problems such as waste into solutions. This enhanced learning and psychological wellbeing, and stimulation of mind in showing users a different way to think about local resources. Although energy and waste flows were not measured or monitored in the site, the low tech, and design systems of reusing and recycling was made evident by having a contained site with an enclosed boundary. The enclosed nature of the boundary combined with space efficiency features such as succession; stacking and seasonal growth enhanced sensory experiences in nature and a sense of longevity and time passing. Passive users also valued the resulting 'green' environment which was seen to enhance sensory stimulation and perceived to be of benefit to the local area in enhancing wildlife.

Table 8.8 **Matrix of frequencies (no. of functionings) of impact of principles of sustainable design on capabilities of adult wellbeing**

	Enjoyment	Express-ion	Mental restoration	Physical health	Purpose	Psychol-ogical wellbeing	Social wellbeing	Stimulat-ion	Security	Spiritual wellbeing	Tot al
Solutions grow from space	5	9	6	3	25	17	11	24	9	2	111
Ecological accounting informs design	2	7	12	3	18	19	4	16	6	2	89
Make nature visible	4	1	3	3	5	2	1	32	3	3	57
Design with nature	12	9	21	9	16	24	27	44	7	1	170
Everyone is a designer	8	24	23	5	22	12	13	8	10	0	125
Total	31	50	65	23	86	74	56	124	35	8	

Table 8.9 Matrix of frequencies (no. of functionings) of impact of principles of sustainable design on capabilities of active users.

A	Enj.	Exp.	Ment.	Phys.	Purp.	Psy.	Soc.	Stim.	Sec.	Spirit.	Total
PR1	5	9	6	3	25	17	9	22	4	2	102
PR2	2	7	12	3	18	19	3	11	4	2	81
PR3	3	1	1	1	2	2	1	27	0	2	40
PR4	10	9	19	7	11	23	25	37	1	1	143
PR5	6	24	22	4	20	12	9	6	3	0	106
Total	26	50	60	18	76	73	47	103	12	7	

Table 8.10 Matrix of frequencies (no. of functionings) of impact of principles of sustainable design on capabilities of passive users.

P	Enj.	Exp.	Ment.	Phys.	Purp.	Psy.	Soc.	Stim.	Sec.	Spirit	Total
PR1	0	0	0	0	0	0	2	2	5	0	9
PR2	0	0	0	0	0	0	1	5	2	0	8
PR3	1	0	2	2	3	0	0	5	3	1	17
PR4	2	0	2	2	5	1	2	7	6	0	27
PR5	2	0	1	1	2	0	4	2	7	0	19
Total	5	0	5	5	10	1	9	21	23	1	

8.3 Video Analysis

The features of sustainable design which were found to have the most functionings of wellbeing were gardening edible plants (Pr 4(i) - produce a yield), reuse of local and on-site waste materials (Pr 1(ii) use cooperative and supportive relative location) and wildlife gardening (Pr 3(i) - design reflects underlying natural cyclical processes) in the form of ponds, and use of natural building and structures (Pr (iv) develop reciprocity and foster interdependence). Ponds also have multiple functions (Pr 2(iii) – use appropriate scale) in that they are used in all of the 3 sites for relaxing, recreation and learning about wildlife.

In Moulsecoomb, producing edible plants had the most functionings of wellbeing. In Shanakill growing flowers (Pr4(i) - produce a yield) had the most functioning on wellbeing and in Scottswood, making art from recycled materials had the most functioinings of wellbeing. The way in which each sub principle and feature impacted on different capabilities is detailed below. An example of how the visual data was analysed by one youth user is detailed in Appendix K. The features which were found to have most impact on the wellbeing of youth users are detailed below.

Table 8.11 Table of key features most impacting on youth wellbeing

Principle	Sub Principle	Sustainable Design Feature
Solutions grow from place	Use cooperative and supportive relative location.	Re-use oof local and on-site waste materials
Make nature visible	Design reflects underlying natural cyclical processes.	Wildlife gardening (including pond)
Design with Nature	Produce a yield	Edible plants
	Develop reciprocity and Foster interdependence/ interconnectedness and cooperation	Natural building and structures

8.3.1 Principle 1 – Solutions grow from place

The features contained within sub principle i) be sensitive to the local/regional ecological context were not identified by the youth users as impacting on capabilities. The features - integration of water source, reuse of local and on site waste resources, and a focus on community were identified as enhancing capabilities in ii) use of cooperative and supportive relative location. A new emerging feature, local art work is the only feature of iii) being sensitive to the cultural context that is perceived to impact on the wellbeing of the young users.

Use cooperative and supportive relative location

In Moulsecoomb a young user explained about ways of watering such a large site making use of the natural slope of the site. This may enhance cognitive thinking abut the network of water needed to nourish the site and impact on psychological wellbeing. The **focus on community** demonstrated partnership and network activity which enhanced social wellbeing. *The best thing for me about being here is being involved and being part of something that is for the whole community. It's A bit of everything, a combination of things. All the people that I have met are really friendly* (SD 2 P 13).

Reusing local and on site materials

The young users were found to participate in art and crafts using local and on site materials. This includes making murals with broken tiles and the giant Spider as shown made from recycled materials (P4Sh1.4). One young user making mosaics with old crockery and tiles brings a sense of pleasure and enjoyment to the site user.

Shv4.1 *We had tiles and we smashed them with a hammer and we had cement and we cemented the wall. We draw pictures on the walls.*

Shv4.1 *We did this last year. It's made of bottles. We all put them together with bars. It looks like a spider. We enjoyed doing this.*

Such activity in reusing local materials demonstrates partnership working enhancing social wellbeing and enjoyment. Old clothes are used to make scarecrows. The scarecrow is crafted in group activity and they have fun in doing so enhancing enjoyment. It also is a collective activity in which is used as pest control and also reuses materials. A bird feeder is made of an old milk carton. Reuse of local and on site materials was found to enhance visual stimulation.

SDV 13.41 *Here is more recycling –this is a milk carton used as a bird feeder. It's pretty good.*

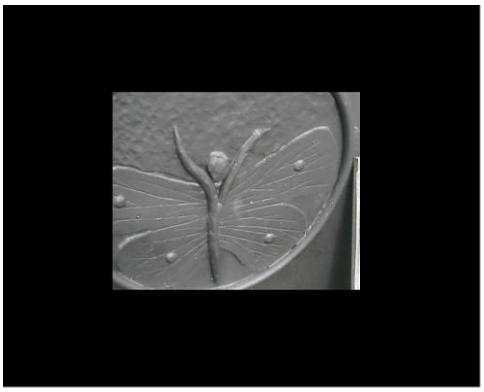
Sdv13.2 *I like all of the colours, I mean, this is just an old tyre, but I like the way everything is recycled and re-used here.*

Be sensitive to the cultural context

Local Art work

Diversity was found in the detail found in local art work which was found to be inspired by **local knowledge** of place.

SdV 13.48 *Saint Bee –this has a connection to the region. I think this is really beautiful. Such art work is in keeping with the natural theme of the site and brings visual stimulation.*



SdV 13.32 *Even the motif of the garden is really nice. It's a person, a butterfly, a flower –nice.*

Principle 1 - Conclusion

Enjoyment is the capability identified to be most affected by features of the first principle of sustainable design – Solutions grow from place. Enjoyment is particularly impacted on by the activities of reusing local and on site materials and particularly making art out of old materials. This feature was found to have multiple impacts on capabilities. The youths can be both creative

and destructive enhancing freedom of expression. In making such creative features youths have an aim and purpose and work together enhancing social wellbeing.

8.3.2 Principle 2 –Ecological accounting informs design

Two features of i) design in systems for reuse and recycling of waste and energy were identified as affecting the wellbeing of youth users. Both sub principles of (iv) plan for energy efficiency were found to impact on wellbeing. No new features of principle 2 were identified by youth users as impacting on capabilities of wellbeing.

Design in systems for reuse and recycling of waste and energy

Composting was seen as a 'useful' activity enhancing a sense of purpose. Composting was also viewed as a collective activity. The young users built the composter together, enhancing social wellbeing.

Mb V1.7 *This is the compost heap. Me and quite a few other kids make it.*

Water conservation and rain water harvesting

The supply of water from a mains tap in conjunction with water butts and a network of hoses make use of the sites natural slope irrigates the Moulsecoomb site. This diversity of water sources aid in **water conservation** and enhance learning and psychological wellbeing. In explaining the system, one young user stated: *This is the water tank. It's partly to attract wildlife and also it's for the hoses and for the water supply to the tap that's up there and the tap that's over there (the young user point camera to two spots in the garden)It's got something underneath the goes though underground* (MB 1P11).

Use appropriate scale

Multiple functions

Nettles are used on site for liquid fertiliser and natural habitats and also to eat and were found to enhance bodily health: *These are nettles here as well that you can use for nettle soup and stuff. It's really good for you* (SdP2). The pond is for pest control but also as a space to sit. Such short term relaxation was found to enhance mental restoration.

MbV 11.49 *Here sitting by the pond is relaxing*

Plan for energy efficiency

Use of passive solar design

This young user understood the technology of the solar water heater. Such cognitive functioning of cyclical activity may enhance psychological wellbeing (Sh7.9 and Sh7.11).

ShV 7.9

ShV 7.11

ShV 7.10

This is the solar water heater –it gets warm. The sun reflects off it. The sun heats up the tank and the water gets warm **(ShV7.10).**

Use of low tech solutions

Having low tech technology such as the hand soil rotator enabled learning, communication and thought and psychological wellbeing. One young user explained how the soil rotator worked.

Sh V 8.11 *If you have a shovel you put piles and piles of muck on the flowers. You put the muck in there (soil rotator) with a shovel and you turn it and it keeps spinning and all the muck falls out and you put it on the flowers and all the big stones and stuff stays in the turner*

Principle 2 -Conclusion

Psychological wellbeing was the capability most enhanced by the features of principle 2 – ecological accounting informs design. Water saving techniques, passive solar and low tech activities enhanced learning and cognitive functioning. Multiple functions of features (e.g. ponds) were found to enhance both physical health and mental restoration.

8.3.3 Principle 3 –Make nature visible

In sub principle i) design reflects underlying natural cyclical processes, the features successional growth, seasonal growth, wildlife gardening and nature celebrations and rituals, all impact on capabilities of wellbeing. With nature celebrations and rituals being a new features identified by youths as enhancing wellbeing. However, wildlife gadening was the feature that was found to most impact on youth wellbeing.

Design reflects underlying natural cyclical processes

The **successional growth** and chang in **seasonal growth** throughout the year was found to bring a sense of pleasure and enjoyment as well as a sense of longevity and time passing and stimulation. One young user stated: *This is a really nice time to visit. Every time is a nice time to visit. There are different things going on*. *It will be really nice to see how the space changes during the year* (P13 SD 2). Blossoms in spring brought brightly coloured flowers bring visual stimulation.

SdV 13.55 *This blossom tree is really nice*

Sh VP9 *We planted the flowers, I love them because they are beautiful.*

The **woodland** area brought opportunities for exploration and discovery. A young user stated; *There is a nice walk through here. You can wander around and find new things even though it's a small space.* (P13 SD2).

Wildlife gardening

Wildlife was found to be an important aspect, particularly for users of the Scottswood Natural Community Garden site. 'Butterfly bushes' are planted to encourage biodiversity. Being in wildlife brought a sense of longevity and time passing enhancing stimulation.

Sd V 12.1*They have all been cut back for new growth. It's going to shoot some new leaves. It will have a nice purple flower. I work on this.*

The wooded area has abundant wildlife which enhanced biodiversity with habitat piles to encourage insects and animals. Here the idea of growing cycles, change and disappearance to encourage new growth is demonstrated in pruning activity. Sacrificing current growth for a healthier plant encouraged learning and forward thinking enhancing psychological wellbeing.

The presence of insects and amphibians such as frogs is perceived to be a healthy environment. Habitat piles and the change of tadpoles to frogs brought with it a form of pest control. A young user stated: *These are the tadpoles. There was a frog there before. It's good to have frogs* (P12 SD1).

Sd V 12.15 Habitat Pile

The pond was found to be used as a location for insect and amphibian activity. It held a variety of fauna enhancing biodiversity. There are benches by the pond where users sat and relaxed enhancing mental restoration.

Sh V8.1 *There are tadpoles in there and a few frogs. They are good. They make the garden look nicer.*

There is a network of three ponds in the site which were found to act as places of rich biodiversity and also as places of fun, exploration and enjoyment.

SdV13.14 *This is the pond we were looking for newts the last time I was here. I just managed to catch one last time. The kids really like the pond to go pond dipping. They take samples out and put back in but it's just nice to look at all of the variety. You would not think about how much stuff is in there.*

Principle 3 -Conclusion

Stimulation was the capability of wellbeing found to be most affected by the features of principle 3 –make nature visible. Seasonal and successional growth enhances visual stimulation and a sense of longevity and time passing. Wildlife and seasonal growth affected a greater diversity of capabilities. Taking pleasure in wildlife was found to enhance exploration in discovery and expression.

8.3.4 Principle 4 –Design with nature

The features most impacting on youth wellbeing were edible plants (Pr4(i) produce a yield and (iv) natural building and structures. No new features of principle 4 –Design with nature were identified by the youth users.

Produce a yield

Edible crops

The site provided a growing space for young users that would otherwise not be available to them. Young users travelled to the site on a weekly basis. One young user in Moulsecoomb stated: *I get here on the bus. It's a bit more expensive than the metro, but worth it. There is a wood/park in Jesmond Dean that I go to that is really nice and open to the public but there is nothing like this that would be growing* (Sd2P13). Producing a yield on site was found to encourage healthy eating.

SD V 12.3 *This is the salad that we have planted before….. I'm good at eating salad.*

A young user in Scottswood filmed squash plants at various stages of growth. Some were not ripe and others were overly ripe. Courgette plants were seen to be *really tasty and sweet* enhancing gustatory stimulation. Herbs e.g. basil enhanced olfactory stimulation. The young users harvested food crops and ate the food. One users states –*We eat the beans most weeks, I personally prefer them raw.* A young user is challenged when seedlings 'don't take' at first and this enhanced cognitive functioning and psychological wellbeing. Producing a food yield on site and eating the edible plants also means that youths learned what was edible on site and what is not. This enhanced both gustatory stimulation and learning enhancing psychological wellbeing.

Sh V 7.4 *You can eat beetroot.*

ShV 7.3 *You can eat spinach..*

ShV8. 4 *Here we have garlic. It's not grown yet though*

The young users understood when crops were not ready to be harvested and that they must wait until the time is right facilitating forward thinking bringing a sense of longevity and time passing in the growing cycles, enhancing stimulation.

Planting food can be a collective activity. It brought a sense of ownership and expression. Producing food to eat brought gustatory stimulation. The young users took food home linking site activity to home. *You can eat this and bring it home. We wait until they are fully grown and then you can take them home if you want* (ShV11). *The fruit is over there and carrots and veg and cabbage. I eat it when it's grown properly and take it home. My Mom cooks it and eats it* ShV3.8. A diversity of plants is grown on the site, with **multiple yields** from multiple types of plants and varieties. Users begin to know different varieties enhancing learning and psychological wellbeing.

Mb V 11.30 *I think these are Italian long tomatoes. They usually don't tend to go red. They stay this yellow colour. You can eat them raw*.

Relative location and linking

There is a hub of activity around the fire area. This acts as a **zone 1**. One young participant stated: *This is like the centre of everything*. This area enabled participation in social life and social activities and enhanced social wellbeing.

Mb V11.42 Fire Hub - *This is like the centre of everything*

Develop reciprocity and foster interdependence

It was found that there was a sense that organic growing was an important aspect of the site. – *i am particularly interested in the organic side. It's an important part of the work here, keeping it organic and being involved with permaculture* (SD 2P 13).

Natural building

Various natural materials were used in building structures in the site. Pine and Hazel were used in a wattle and daub structure in the Moulsecomb site. The young users had a sense of ownership in working on the building and one stated: *I've been working on this actually….that bit there –that's my work of art* (Mb V 11.16). The young users were found to be creatively involved in learning about natural building enhancing psychological wellbeing. Making the hut was seen to be a physical activity enhancing physical health.

Mb V11.12 *Here is what we use the pine for.*

Mb V 11.13 *We also use hazel because it Is bendy.*

Mb V 11.15 *It's going to be quite good. It's going to have that (and she pats it) which is mud, wallpaper paste, water and it makes a good inside thermal thing for the hut so that it does not get too cold and so the water does not come in.*

Mb V 11.16 *I've been working on this actually. That bit there (see previous slide as camera points in opposite direction). This is my work of art (she exclaims). Making the hut is my favourite thing because it is physical and you have to put a lot of thought into it as well.*

A willow dragon structure which is pruned by active users in the Scottswood site and is a space of fun as one can move through it. It is also a space for relaxation and shelter. Bringing a sense of longevity and time passing with its fast growth.

Sd V13.17 *This is the willow arc I was trying to keep in shape. I was here the end of February and it didn't have leaves. I did a bit of pruning. And tucked it in. You just bend the shoots when they are really small and they just grow. It's amazing the flexibility of it. It was nice the end of summer but I think in summer it will be great.* (Following fedge with camera).

The willow structure therefore brings a sense of pleasure and enjoyment as well as opportunities for exploration and discovery and expression as well as a sense of longevity and time passing enabling one to also look forward.

The site has a summer meadow and a spring meadow. The Summer meadow produces a wheat yield. The wheat is then used to bake bread in the outdoor oven and then is eaten by the active users of the site.

Collective activity

Collective activity and group work was facilitated by a gardeners and adult volunteers who can teach skills and be creative in enabling change. A builder came to the site to work with the kids to build a classroom. Such collective active participation by the young users showed partnership

working. A young user stated: *This is a tree house that Russell helped us to make* (Mb2 P1). Composting is also a collective activity.

MbV1.1*This is the tree house that Russell helped us to make*

Collective activity demonstrated a sense of achievement and self efficacy enhancing psychological wellbeing.

ShV 1.8 *We made the pond. We did it with shovels. It took us four days.*

Work within the carrying capacity of the site.

Using the **compost toilet** was found to enhance the functionings of being both resourceful and mindful enhancing care for the environment, expression and purpose.

MbV 11.43 *The legendary toilet*

MbV 11.44 *So here's the toilet.*

MbV 11.48 *That's for 'the other business'. It's not wasting any water and it's completely natural and we're not flushing everything back out in to the sea and destroying that part of the world.*

Principle 4 – Conclusion

Stimulation is the capability most influenced by the sub principle - Design with nature. This is mainly due to the production of yield and the visual and gustatory stimulation arising form this. Although bodily health is recognised by the youth users as benefiting from growing food, stimulation including gustatory stimulation rather than health is the capability of wellbeing associated with producing food on site. Growing edible crops and natural building are the impact most on capabilities. Growing edible crops enhances learning and a sense of self efficacy and psychological wellbeing. One can grow on ones own, enhancing self expression, with ones own plot, or with others enhancing social wellbeing. Building with willow and learning pruning and weaving skills enhances a sense of longevity and time passing and learning enhancing psychological wellbeing.

8.3.5 Principle 5 – Everyone is a Designer

Under this principle the features - set tasks (Pr5(i) encourage active participation and empowerment) and workshops and courses (Pr5(ii) encourage a role of on-site learning) impacted most on wellbeing. Set tasks are identified as a new feature of sustainable design. In addition, other new features – the teaching of practical skills, adaptive learning, inclusive decision making and participation in on-site art work, were found to impact on youth user wellbeing.

Encourage active participation and empowerment

Set tasks

There are individual growing plots in Moulsecoomb and Shanakill.

MbV11.19 *Here's our pumpkin patches.*

ShV1.3 *This is my plot. There is Spinach, Pumpkin and Lettuce.*

Individual tasks brought a sense of ownership and expression. Tasks set for the young individuals included weeding, pruning, planting. This gives a sense of ownership and achievement encouraging a sense of purpose enhancing cognitive function and psychological wellbeing.

Sd V12.6 *I pruned this tree.*

Inclusive design

It was found that there was a sense that it is important that wheelchair users can use the site showing emphasis on 'others' enhancing purpose and expression.

Encourage a role of on site learning

Workshops and courses

A role of learning was found to be central to all of the sites and the Shanakill and Scottswood offered formal courses in growing. The Scottswood site is located within a college where people can take an NVQ in horticulture. In Moulsecoomb, the young users from the Alternative Centre for Education (ACE) programme come to work on the site. One young user stated: *I love coming here because it's better than being stuck in a classroom filled with kids constantly annoying each other.* The site provides an alternative and a greater choice of education….. *I come Tuesday and Friday and stay all day. It's just so nice to be working outside –even in the winter* (MbP11). Being outside and having a choice was seen to enhance capacity to shape ones life and expression.

Principle 5 – Conclusion

Expression of choice in having an alternative learning space and a sense of ownership were most affected by the principle - Everyone is a Designer. There was also a sense of expression and purpose in thinking of others and ones community. Learning enhanced psychological wellbeing and learning to be self sufficient enhancing a feeling of security. Collective activities enhance social wellbeing.

8.3.6 Conclusion - Youth users

The way in which each capability was impacted on by different principle of sustainable design for youth users is graphically illustrated in a matrix (Table 8.7) where the darker cells of the matrix illustrate a greater number of functionings found which linked design features to capabilities of wellbeing. Stimulation and expression, psychological wellbeing and enjoyment were the capabilities which were found to most impact on youth users in ecological spaces. Having fun in reusing and recycling materials, visual stimulation and exploration and discovery in nature were more prevalent in the younger youth users (age 13-15) whereas those aged between 14-19 focused more on learning new skills, adapting these skills and valuing being part of something. Young users took particular care in understanding site processes and features such as water saving, solar energy and building with natural materials. They were found to value having such a choice of green space, and alternative learning space. This is particularly the case for the young ACE users in Moulsecoomb.

Table 8.12 Matrix of frequencies (no. of functionings) of impact of principles of sustainable design on capabilities of youth wellbeing

	Enjoyment	Express-ion	Mental Health	Physical Health	Purpose	Psycholog-ical wellbeing	Social Wellbeing	Stimulat-ion	Security	Spiritual Wellbeing	Total
Solutions grow from space	7	3	0	0	3	2	2	1	0	0	18
Ecological accounting informs Design	0	3	2	2	0	5	0	2	0	0	14
Make nature visible	4	2	1	0	1	1	0	7	0	0	16
Design with nature	2	5	1	1	4	8	8	13	1	0	43
Everyone is a designer	1	7	0	0	2	1	2	0	1	0	13
Total	14	20	4	3	10	17	12	23	2	0	

8.4 Analysis of children's photography

Three of the case study sites namely – Scottswood Natural Community Garden, Shanakill and Rahoonane Community Garden, and Moulsecoomb Forest Garden and Wildlife project had children as active members. Although children and youths came occasionally to Easton Community Allotment and Eglantine Community Garden, they did not come on a regular basis and are not included in the study of child and adult users.

The features that had the most impact on child users were edible plants and growing flowers (Principle 4(i) produce a yield) and use of art from reusing and recycling materials (Principle 1ii). All of the sites were found to have Principle 4(i) produce a yield as the sub principle with the most functionings of wellbeing in particular gardening activity (Moulsecoomb) and planting both edible (marigolds and nasturtiums) and non edible flowers e.g. sunflowers (Shanakill and Scottswood) sites. A summary of the key features which impacted on child wellbeing is detailed in table 8.13.

Table 8.13 Table of key features that impacting on child wellbeing

Principle	Sub Principle	Sustainable Design Feature
Solutions grow from place	Use cooperative and supportive relative location.	Re-use of local and on-site waste materials
Ecological accounting informs design	Use of low energy and biological solutions	Biological pest control
Make nature visible	Design reflects underlying natural cyclical processes.	Wildlife gardening
Design with Nature	Produce a yield	Edible plants
		Multiple yields
	Relative location and linking	Zone, network, sector and slope
	Develop reciprocity and foster interdependence	Natural buildings and structures
		Organic methods
		Collective activities
Everyone is a designer	Encourage active participation and empowerment	Set tasks
	Encourage a role of on site learning	Workshops and courses

The way in which each sub principle and features impacted on different capabilities is detailed in the sections below.

8.4.1 Principle 1 – Solutions grow from place

Features of principle 1 identified by the child users as most impacting on their wellbeing were reuse of local and on site waste resource and having a focus on community. It was found that a focus on community was a new features identified by the child users as impacting on multiple capabilities in the three site in that there is a feeling that the sites are cared for as a **community space** and this may provides a loal recreational space to enjoy. However, it was the feature of reusing local and on-site waste materials which most impacted on the wellbeing of child users.

Use cooperative and supportive relative location

Re-use of on site waste and local materials

The children had fun and enjoyment from creating something from that which would otherwise be waste such as climbing on tyres (Sh P5) or creating art from old tiles and crockery. This brought a sense of wonder for the child and a sense of achievement. One child 'loves' the spider made from recycled materials (ShP1.1).

	
Sh P5 –Tyres –*These are for climbing and it's fun'.*	Sh P1.1 *Spider made from a discarded washing machine and old plastic bottles.*

In Shanakill art activity in making murals was found to be challenging and enhanced psychological wellbeing it is *hard but good* (ShP4.9). In Scottswood the children made paint out of flowers on the site as they use the flowers as dye (SDP1.13). Such success in a task brought a sense of achievement and psychological wellbeing.

ShP8. Wall murals –*It is made of plaster and tiles. It is good, it is fun.*	SDP1.13 Yellow and orange flowers – *We make paint out of these flowers. The yellow works brilliantly.*

Principle 1 - Conclusion

Stimulation was found to be capability of wellbeing with most functionings of wellbeing for features of principle 1. The establishment of the sustainably designed space in a community setting provided space for the children to use and enjoy. The reuse of local materials to make artwork has multiple capabilities, providing a stimulating local environment near where the children live, with visually pleasing features made from recycled materials. Such activity also enhanced learning in psychological wellbeing and care enhancing purpose security, pride and a sense of community.

8.4.2 Principle 2 – Ecological accounting informs design

Under the sub principle i) design in systems for reuse and recycling of waste and energy, composting and use of renewable energy were identified by the child users as impacting on their wellbeing. Sub principle ii) water conservation had no feature found to affect child wellbeing. All of the features of sub principle iii) appropriate use of scale and iv) Plan for energy efficiency was identified as affecting capabilities in some way. The feature –the use of natural building materials and biological pest control (in particular ponds) were identified under the sub principle v) use of low energy and biological solutions. It was the feture - biological pest control that most impacted on child wellbeing.

Design in systems for reuse and recycling of waste and energy

The children 'love' **composting**. They *love throwing stuff in, watching it disintegrate* (MbP1.2). It is seen as an important activity.

	
Mb P2.1 Compost Bins -*I help putting*	Mb P1.2 *This is where we throw*

things in, I put in eggshells and weeds. Putting compost on, makes food smell and taste nicer. It has had something to help it grow. Compost helps plants to grow strong and have better fruit. It is nice and organic. It helps the earth and it is not polluting.	*rubbish in and it disintegrates within a few weeks. We watch it disintegrate it is cool and all of us love throwing stuff in it.*

Use appropriate scale

Maximise use of space

The contained, small scale intensive nature of the site meant that the children see it as an adventurous diverse space. The sites were found to be spaces of discovery bringing a sense of ownership (ShP3.1).

	
ShP 3. 1 Wall of site - I discovered this garden. I saw Ian (tutor) in here and I came in. This is why I have taken a picture of the wall.	Sh P2 – Orange Flowers –*I chose these because they are colourful and because they are mostly the only flowers around here. Other flowers planted in the estate have been destroyed by people.*

Care is seen in site maintenance witin such a contained space. Watering by hand is seen as an important activity for site users. Growing food organically and eating it on site and caring for the plants. The contained nature of the site also brings a sense of safety in that the young users recognise that plants have a greater chance to thrive as they are free from local vandalism.

	P1.5 Raspberries –*They are fruit and they are delicious. Raspberries are better in nature club because they are juicy and delicious and nobody can get at them.*

Multiple functions

Many features of the sites were found to have multiple functions that impact on wellbeing. Marigolds can be eaten and are also pleasing for children to look at enhancing visual stimulation. A scarecrow was made of old and recycled materials were fun to make as part of group activity and are also used as a form of pest control. The pond had multiple functions as an educational tool, an area of relaxation and enjoyment and as a source of pest control in encouraging frogs. The pond was seen as a space to relax and be visually stimulated. In the Moulsecoomb site, a bath acts a pond and encouraged wildlife enhancing pest control in the site. It is seen as important to the child user enhancing a sense of care for 'others' and purpose (Mb P2.5).

	Mb P2.5 Bath pond - *This is nice. It is for frogs and frog spawn and tadpoles, and newts eat them. Kids dip in the pond and look at all of the things growing there. It is a great place for them to live. The bath gives insects and animals a home, while not damaging anything. You just leave it there and let it grow. It is not damaging or polluting or anything and it looks nice.*

Plan for energy efficiency

Passive solar

In the Shanakill site, the hot water tank is made form an old domestic hot water immersion cylinder. It has been painted black by the children. It is enclosed in an insulated case with a perspex front. It faces south and the sun heats the water which is then used to wash ones hands after working on the site. Being engaged in the technology enhanced learning and psychological wellbeing (ShP3.3) of the child user.

	Sh P3.3 Solar Water Heater - *Me and Rachel (tutor) and the lads painted it….it brings water with the sun*.

Low tech solutions

Low technology organic methods mean that the children are physically working in the site weeding, harvesting, watering, liquid feeding. Such active participation was found to be enjoyable for child users.

Principle 2 - Conclusion

Stimulation and purpose are the capabilities most impacted on by the features of Principle 2 – Ecological Accounting Informs Design. The small scale enclosed nature of the site created a sensory stimulating local environment. Caring for the site and site features enhanced purpose and the space is safeguarded form local vandalism by its enclosed boundary. The multiple functions of site features e.g. pond and edible flowers had multiple impacts on wellbeing. Hands on low technology activities enhanced both learning and enjoyment.

8.4.3 Principle 3 – Make nature visible

Out of the features under the sub principle i) design reflects underlying natural and cyclical processes, a number were identified by the child users as impacting on their wellbeing namely wildlife gardening and nature celebrations and rituals. The latter being a new feature emerging form the analysis as impacting on capabilities.

Design reflects underlying natural cyclical processes

The **woodland** in the Scottswood site brought a sense of both sensory stimulation and relaxation enhancing mental restoration.

	Sd P1.22 Woodland -*The woodland is (seen as) a nice place to be.*

Wildlife garden

Pond features brought abundance in all of the three sites. There are: *lots of' frogs and tadpoles in the pond* (ShP1.5) stimulating interest in the child. They had fun in catching the frogs and were aware of nature; *there are tadpoles …this is good because the tadpoles grow into frogs* (Sh P1.5) and they take the tadpoles home. Children anthropomorphised the frogs and other animals and enjoyed giving them human attributes e.g. *frogs are funny, they jump around* (Sh P2.5). There is diversity in the flowers and plants grown in the site. This brought aesthetic simulation. Some plants brought tactile stimulation e.g. lambs ear: *This feels really nice…we lay it out so as the creature can come and lie on it* (SdP1).

There is a sense of care shown when frogs are returned from the estate having 'escaped' from the pond giving the perception that such local fauna does not survive outside the site. Other methods of pest control include a scarecrow which 'is fun' and seen by a child as having an important function in scaring away the birds form the plants.

	
Sh P4.10. Pond – There are lots of tadpoles and frogs in here. They are good. I like them. They are nice. You don't see frogs outside of the garden	Sh P3.2 Pond – *I like looking in here. There are leaches in it. I like sitting by the pond and just chilling.*

	
Sd P1.27 Pond - We like to play stone games in the pond. In winter we can skate in this pond when it is frozen. The pond was wrecked by some kids once.	Sh P1.5 Pond – *I took this photo because there are loads of frogs. I thought that I might catch one. There are loads of tadpoles. This is good because they grow into frogs. I take them home and put them in the pond at home.*

Experiencing flowers and butterflies brought a feeling of abundance in biodiversity and enhanced stimulation. There was a wooden seat by the solar fountain with an overhanging apple tree. One child user stated: *birds come and nibble out of my hand* (SdP2). The also brought an interest and the young users recognised that bees and other insects were important to the site enhancing purpose. A hide to watch animals and a 'Bugs hotel' (SDP1.23) which attracts insects. Such features were established to attract fauna to the site and also brought a sense of care and purpose to the children's activities.

	
Sd P 2.4 Butterfly garden – *most butterflies come here. There are loads of nice flowers. They are nice and colourful.*	Sd P1.23 Bug's hotel - *This is where we catch creatures. We are still finishing the bugs hotel.*

	Sd P1.24 Willow Sculpture – *this is a good place to hide out and watch animals up close. We had a hedgehog here.*

Principle 3 - Conclusion

Stimulation is the capability of wellbeing most affected by the features contained within the principle - Make nature visible. This is due to the wildlife gardening and the abundance brought by biological pest control features such as ponds and the 'bugs hotel' in Scottswood. A role of learning about such wildlife activities, enhancing how nature is experienced by the child users enhanced care and a sense of purpose and enjoyment in experiencing nature in the site. The child users enjoyed nature together in groups, enhancing social wellbeing.

8.4.4 Principle 4 – Design with nature

The sub principle (i) produce a yield, had features- edible plants and the production of food from varied sources which impacted on multiple capabilities of child wellbeing in the sites. Having a forest garden and a woodland were features of sub principle ii) enhance successional growth and ecological integrity which was found to impact on child wellbeing in the sites. Zones, network, sectors and the development of links to other organisations are the features of iii) relative location which affect wellbeing found to impact on child wellbeing. Sub principle iv) –Develop reciprocity and foster interdependence/interconnectedness and cooperation had three features namely natural building, organic methods and collective activities which impacted on child wellbeing. The only feature of the sub principle v) working within the carrying capacity of the site - compost toilet is perceived to impact on wellbeing. No new features of sustainable design of principle 4 were found to impact on child wellbeing. Those features of principle 4 which most impacted on wellbeing are: edible plants; multiple yields; zone arrangements; organic methods; natural building and collective activities.

Produce a yield

Edible plants

Cycles of growing and harvesting were evident on the site. Food such as radishes and cucumber were found to be visually pleasing and tomatoes apples and blackberries were eaten by the

children. Growing both vegetables and also flowers, watering and looking after the plants were seen as an important aspect of the site, enhancing care and purpose. They had fun in planting, feeling the soil and seeing things grow. Having success in seeing plants grow brought a sense of achievement enhancing psychological wellbeing.

The children were shown which plants were edible and in this way enhanced learning about both growing and health. Food growing is seen as an important activity for the children and gives a sense of purpose. Food is eaten on site and the child explores different tastes in tasting sorrel.

	
Sd P1.10 Sorrell –*This tastes sour, it tastes a bit like apples at first though.*	MP2.2 - Broad beans – They *taste lovely and sweet when they are freshly picked and you can hear them crack. They are nice and sweet straight away. They are very satisfying. I watch them grow and it is really nice. It is a lovely sound. I help to plant and produce them.*

The children looked forward to new growth engaging in a sense of forward thinking: *there will be berries on it soon* (Sd P1.11). 'They *are ready yet but when they are you can eat them* (MbP2). *These are planted for the winter* (plants in pots) (SdP1). The polytunnel is used as a space for growing food and encourages growth of seedling plants. The children work hard there and are challenged. Having a goal and aim in this way enhances purpose. Taking food home links the site to the home (meso) environment and enhances social integration and holistic child development (Bronfrenbrenner, 1979).

Multiple yields are produced from both **woody and herbaceous plants** in the form of berries, apples, vegetables, nuts. One child stated she enjoys seeing the apples grow.

	Mb P3.1 Inside Polytunnel -*Here we do pumpkin planting, sorrell, we hang garlic and sometimes we sit inside when it is raining. I work hard.*

	
MbP3 Broccoli – *Broccoli is lovely. I like to see the kids come up and taste the veg. It is nice and sweet. It is sweet and raw before it flowers….. I have been here from the start and each time I come it gets bigger. Then it gets a big juicy stem. Old and young people can come and taste it.*	Mb P2.4 Raspberry Bushes – *It's nice to eat these early to late summer and in autumn. You can just walk passed and pick them and eat them. ….it's nice to see things grow.*

	
Sd P1.3. Plants in bed –*These will grow big. It's good to grow tomatoes and look after them because you can*	Sd P1.11Tree –*there will be berries on this soon.*

then eat them. There are frogs there and they will eat bugs.	

	
Sd P1.17 Fennel –*this goes with salads*.	Sd P1.25 Nut tree –*they are not ready yet but when they are you can eat the nuts when they come out.*

	
Sh P4.11 Planting in Polytunnel -*You can eat the orange flowers. They are nice and tasty. You can always bring flowers home and plant them at home*.	Sh P4.13 Planting in polytunnel - *Everyone planted the tomatoes and strawberries. You can eat them. They are tasty and you can take them home. You can come back and see the plants get bigger. My favourite thing to do is plant. I learn how to do it here and then plant more at home.*

Enhance successional growth and ecological integrity

Forest garden

Successional growth brought visual stimulation to the children. This successional growth of the forest garden enhanced longevity and time passing: *In winter there is no fruit, in early summer there are bulbs…I like it here because something is always sprouting* (Sh4).

Develop reciprocity and foster interconnectedness and cooperation

Collective activity

It was found that working together making something brought enjoyment to the children and gave a sense of achievement and purpose. This partnership is demonstrated in the spider art feature made from recycled materials: *This shows teamwork. I helped to make it. We won a competition and we were happy when we won* (Sh4.6).

Collective activities such as making the spider and the scarecrow and painting together enhanced creativity and expression. Being involved in making something or knowing that your friends have been involved in making something brought a sense of pride. There was also a sense of pride in the group work completed by other children which enhances a sense of togetherness in the community and social integration.

Natural building and structures

Children in all sites were active in willow growing and sculpting as collective activities. There was challenge in seeing such a task to completion, enhancing cognitive functioning and psychological wellbeing (Sd P2.2). The willow structure in the site was fun to make and also fun to play in for the children. The willow structure has seats inside which acted as a cool shaded space in summer for when it gets hot, enhancing physical comfort and bodily health. A classroom of wood was being built on the Moulsecoomb site with the participation of the older children (year 8's). This is seen as impressive by the younger children.

	
Sd P2.2 Willow arch –*this is the dragon (and he runs through it). I helped to make it and it was hard to do.*	P1.4 Willow Sculpture –*The maze is fun. It is fun to play in and there are loads of branches –tricky stuff –there are traps you fall over and it's nice and soft and sandy.*

Zone, network, sector arrangements

Having a zone 1 enhanced social wellbeing as well as physical and mental restoration in eating food and relaxing in the focal point. In Moulsecoomb, the zone 1 focal point was the fire pit where individual children made tea and site around with friends (MbP1.4 and MbP3.5 below). This

social hub –zone one may shift depending on weather and time of year. In Scottswood it may be beside the oven or solar fountain during summer which is at the centre of the site with has radial patches cantering from it (SdP1.14). In Shanakill, when it rains, the zone 1 is the polytunnel (ShP2.8 below) and when the weather is hot the willow structure acts as a cool space for children to sit, eat food and chat. When talking about the willow sculpture in Shanakill one child user states: Willow sculpture –*everybody loves it. We always go in there. Its fun when we come here to organised events in this space* (ShP 2.4). Another states: *This is a nice area, it's nice and cool here* (ShP5.2)

	
Mb P1.4 -Fire –*This is where we make tea*	Mb P3.5 Fire –*We make tea on the fire, and it's good to sit around with my friends.*

	
Sd P1.14 *Sometimes we all sit around and eat here. I like it because it makes it all happy and everything is good.*	Sh P2.8 *This picture is good because my friends are in it. The polytunnel is good because you get to draw inside.*

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Working within the carrying capacity of the site

Compost toilet

The compost toilet stimulated children in the Moulsecoomb site to think differently about waste, stimulating the mind to think differently. There is also a sense of wonder and pride in having

something different on site, enhancing social wellbeing, a sense of shared pride and belonging (Mb P2.6).

	Mb P2.6 Compost Toilet – *This is strange and unordinary for what you would usually find in an allotment. It is good because we use manure in it and waste from the compost bins. If people want to have a look, we can tell them how interesting and nice and strange it is. It is strange because you wouldn't think of having a compost loo, but a plumbed toilet. It is weird and interesting for visitors to see. I give tours.*

Principle 4 - Conclusion

Stimulation, purpose, social wellbeing and enjoyment are the capabilities which were found to be most affected by principle 4 - Design with nature. Stimulation was the capability which was most impacted on. Edible plants enhanced visual stimulation and a sense of longevity and time passing. The activities of composting and using a compost toilet stimulated the children to think differently about waste while being involved in an activity that they enjoyed. Looking after annual edible plants brought purpose in care and in having a goal. Such activities were done collectively enhancing social wellbeing and a shared sense of purpose and enjoyment. In Moulsecoomb having such a feature as a compost toilet brought a feeling that the space was special, enhancing a sense of belonging and social wellbeing. Having a zone 1, also enhanced social wellbeing as well as physical and mental restoration in eating food and relaxing in the focal point. The children enjoyed playing in the space, enhancing enjoyment and a feeling of achievement in completing tasks which may enhance psychological wellbeing.

8.4.5 Principle 5 – Everyone is a designer

Set tasks, workshops and courses, participation in on-site art work and communal use of tools are the features that were found to impact on wellbeing. Having set tasks and participation in on-site art work were identified as new features of sustainable design impacting on wellbeing.

Encourage active participation and empowerment

Participation in on-site art work

The children painted on the walls and had an active part in how the site looks. They found this visually stimulating and had a sense of ownership in that their own designs were on the walls of the site and there is a sense of achievement in creative input, enhancing expression.

	Sh P4.9. Mural - *Wall mural fish and my friend's fish- making the fish was difficult but it was fun.*

There are **communal tools** available for use which brought a sense of ownership as well as enabling site activities. (Sh P3.7 and Mb P1.5).

	
Sh P 3.7 Shed - There are lots of stuff in it like paint and tools. I like to dig.	Mb P1.5 Communal tools - *These are tools I use for my vegetable patch.*

Set tasks

Bringing a set task to completion was found to enhance cognitive functioning and self efficacy e.g. *I planted them…it looks good* (MbP3.3). In addition having ones own patch brought a sense of ownership and expression (Mb P1.1). Users were satisfied when a task was finished. Some of the child active users had the task of giving tours of the site to visitors showing a sense of ownership and belonging enhancing expression and social wellbeing and also learning communication and thought.

	
Mb P1.1 Individual patches - *This is my patch. I grow things here. I grow food, vegetables. I like it because it's just mine.*	Mb P3.3 Berry bushes – *I helped plant these berries. I planted them because I wanted to and I think it looks good.*

The child users also recognize the achievements of other individuals and groups and admired their work. This showed that they are aware of other youths and also adult users who work in the site. (Sh 3.4 and Mb P3.6).

	
Sh3.4 *I was there when PJ made the plant stand* (propagator).	Mb P 3.6 *This is good. It was built by the Year 8's. They built it from scratch. They put lots of hard work and effort in. It's good to hang out and chill there.*

Encourage a role of learning

Workshops and courses

In Scotswood the outdoor oven is used to cook food which may be grown on site and was found to be a focal point for education about healthy eating (Sd P1.28 and Sd P3.11).

	
Sd P1.28 Oven –*We make our own food here and sometimes I take it home.*	Sd P3.11 *Oven - We help to cook and we eat outside here. There is smoke and fire.*

The purpose of the nature club in Scottswood is learning and enhancing psychological wellbeing. There is a sense of exploration and fun as part of the sessions. There is a clear sense of discovery and wonder in nature as the children take photographs of the site and the insects, such as looking under rocks for slugs (SdP2.6). There is a focus on soil health and insect life in Nature Club. The user photographs work trails and woodlice under rocks. This brings a sense of discovery and wonder and awe. A sense of care and purpose was found in the anthropomorphisation of fauna e.g. perception of snails hiding and frogs escaping.

	SDP2.6 –Nature Club

Principle 5 – Conclusion

A role of learning during site events enhanced stimulation as child users participated in events in the site, learning about wildlife and also in making art in the site. Such learning was seen to be a collective activity enhancing social wellbeing. Learning in the site also enhanced a sense of care and purpose and further freedom of discovery and exploration of the site, enhancing expression. Expression is further enhanced by individual tasks and plots. Set tasks also encouraged social wellbeing by interacting with other children and focused learning enhancing psychological wellbeing.

8.4.6 Conclusion - Child users

The way in which each capability was impacted on by different principle of sustainable design for child users is graphically illustrated in a matrix (Table 8.8) where the darker cells of the matrix illustrate a greater number of functionings found which linked design features to capabilities of wellbeing. The capabilities identified by child users as being influenced by ecological are stimulation, social wellbeing, purpose and enjoyment. The children watched flowers and trees grow through the seasons, and enjoyed the diversity of colour and types. They learned to plant flowers and vegetables and took this skill to their homes enhancing learning and psychological wellbeing. The ethos of each site involved processes of reusing and recycling waste and energy and such features provided a sense of interest and fun for the young users with feelings of empowerment and ownership being evident, enhancing expression. The children felt a sense of achievement and satisfaction of completing a task enhancing cognitive skills and psychological wellbeing.

Interaction with nature mainly occurs by ponds, seating areas, where it is possible to sit and watch wildlife, watching habitat structures, habitat piles, and hides. Food is eaten and enjoyed on site and often eaten collectively where the children sit with friends by the fire, by an outdoor oven or another designated communal hub. Along with natural buildings and structures and natural water features these are also seen as areas of relaxation.

The child users indicated that activities within the site fostered a sense of care, care for the efforts of other users, care for the site and a sense of loving the sites features and its abundance. In this way these sites may be seen as transformative spaces in which children can experience processes that help to develop both sustainability and wellbeing.

Table 8.14 Matrix of frequencies (no. of functionings) of impact of principles of sustainable design on capabilities of child wellbeing

	Enjoyment	Express-ion	Mental Health	Physical Health	Purpose	Psycholog-ical Wellbeing	Social Wellbeing	Stimulat-ion	Security	Spiritual Wellbeing	Total
Solutions grow from space	3	1	0	0	0	1	1	7	2	0	15
Ecological accounting informs design	4	0	1	1	5	0	1	7	1	0	20
Make nature visible	2	0	1	0	9	1	1	18	2	0	34
Design with nature	9	4	4	4	12	7	18	24	0	0	82
Everyone is a designer	3	2		0	2	2	3	5	0	0	17
Total	21	7	6	5	28	11	24	61	5	0	

8.5 Conclusion

This chapter aimed to describe those features of sustainable design that had the most impact on the wellbeing of three user groups' adults, youth (age 13-19) and child users (5-12 years). By examining the functionings (beings, doings, havings) of individual site users, the sub principles and emergent features of sustainable design were found to impact on multiple capabilities. Principle 4 - Design with Nature was found to have most impact for all user groups with functionings relating to producing a food yield having most impact.

It was found that active adult users particularly valued diversity of choice and freedom to choose between site activities. They enjoyed a dynamic active learning space. Learning and adapting new skills and volunteering in the site enhanced self esteem, particularly those out of full time employment. Passive users valued the aesthetically stimulating 'green' space that the site provides. This user group also realised the benefit of the space to the local area - the safety and security the spaces provide local youths and children. Youth users valued learning building and growing skills and having an alternative learning space. They recognised that they were part of something which was important to them and to the community. The child users were stimulated and loved reusing and recycling on site and local waste materials and were particularly stimulated by being in nature and learning about nature in the sites. They valued being with other children and were found to exhibit a sense of care for plants, animals and others in the site and outside the site in participating in 'non-polluting' activities.

This chapter has shown that sustainable design features of the community garden sites under study impact on multiple capabilities of wellbeing. However, as illustrated in the matrices contained in this chapter, there are a number of 'key' capabilities which are most impacted on by using the sustainably designed sites. Chapter 9 further explores the capabilities and associated functionings which are most impacted on for each user group.

Chapter 9

Key Capabilities of Sustainably Designed Community Gardens

9 KEY CAPABILITIES OF SUSTAINABLY DESIGNED COMMUNITY GARDENS

9.1 Introduction

As a result of the empirical research undertaken in chapter 8, a new set of capabilities and functionings of wellbeing relating to ecologically sustainable community gardens is produced for site users. This chapter further examines those capabilities of wellbeing that were most impacted on by the sustainably designed sites under study. In order to achieve this, an ordinal list of capabilities is produced for each user group. Next, the chapter then focuses on those key capabilities which were found to have higher frequencies of functionings and hence most impacted, for each user group. Those capabilities that were seen to be not so important (i.e. had relatively lower frequency of functionings) are also discussed.

9.2 Key capabilities enhanced by sustainably designed community gardens

In drawing on the empirical evidence produced in chapter 8, a new set of capabilities and associated functionings of wellbeing for sustainably designed community garden sites is provided in Appendix L. Building on the set of capabilities and functionings developed in chapter 5, this new set of capabilities draws on the empirical evidence provided in chapter 8 and contains all of the functionings that site user's valued and had reason to value.

In addition to those functionings pre-established in chapter 5, a number of new functionings of wellbeing emerged from the analysis. New emerging functionings include being active; experiencing pleasure (Enjoyment); having a sense that something is important, capacity to shape ones life, having a continuous role of learning; caring for others and the environment (Purpose); having opportunities to interact with nature (Mental Restoration); having variety (Stimulation), developing reciprocity (Social Wellbeing); interacting with nature (Spiritual Wellbeing); and political expression (Expression) which involved feelings that one is active and an agent of change in everyday life.

However, as illustrated in tables 8.6-8.10, there are a number of capabilities that were most impacted on by using the sites. An ordinal list of capabilities for each user group is illustrated in table 9.1. Reading across the matrix, the darker colours represent those capabilities which had the greatest number of functionings linking sustainable design features to capabilities of wellbeing. Stimulation (stim.) was the capability which was found to have most impact for all user groups. Both adult and child users had purpose (purp.) as one of the key capabilities in enhancing wellbeing. For youth users, expression (exp.) featured strongly. For both adult and

youth user groups, psychological wellbeing (psych.) featured as a key capability. Social wellbeing (soc.) had relatively more functionings for child users than the other two user groups. Young children enjoyed meeting, playing and having fun with other children in the sites. Both children and youth users had a greater number of functionings of enjoyment (enj.) than adult users, with adult users valuing the more mentally restorative (ment.) aspects of site activities.

User Group	**Capabilities of Wellbeing**									
Adult	Stim.	Purp.	Psych.	Ment.	Soc.	Exp.	Sec.	Enj.	Phys.	Spirit.
Youth	Stim.	Exp.	Psych.	Enj.	Soc.	Purp.	Ment.	Phys.	Sec.	Spirit.
Child	Stim.	Purp.	Soc.	Enj.	Psych.	Exp.	Ment.	Phys.	Sec.	Spirit.

Table 9.1 Ordinal list of capabilities impacted on by sustainable design features of community garden sites.

Physical health (phys.) was not found to be greatly impacted on for any of the user groups, ranking in the bottom three in the ordinal list. The functionings of physical health (physical activity, healthy eating; bodily health and perception of a clean and healthy environment) were valued by a number of adult users. It was the functionings associated with security (e.g. control of resources and a safe environment) and mental restoration (e.g. short term recovery in site activities and surroundings) relating to food growing and related activities, bore a greater number of functionings for adult users. The capability spiritual wellbeing was at the bottom of the ordinal list for all user groups, with neither youth nor child user groups stating that they value functionings pertaining to this capability.

Sections 9.3-9.5 below discuss first of all the three capabilities most impacted on (Stimulation, Purpose and Psychological wellbeing in the case of adult groups). A median was taken in order to establish a cut-off point for 'key functionings' which most impacted on wellbeing. Only the key functionings of the remaining seven capabilities are described. The original sets of functionings as established for each capability in table 5.1 are refined, affirmed or called into question. Counterfactuals are taken into account in so far as they impact on key capabilities and functionings of wellbeing.

9.3 Key capabilities and functionings of adult wellbeing

Adult Users	Stim.	Purp.	Psych.	Ment.	Soc.	Exp.	Sec.	Enj.	Phy.	Spirit.

For adult users, the three capabilities most impacted on by sustainable design features are stimulation, purpose and psychological wellbeing. Out of the remaining seven capabilities of wellbeing a number of particular 'key' functionings were found to be impacted on. These include short term recovery (mental restoration); participating in social life and social activities (social wellbeing); having opportunities for political expression (expression); a sense of ownership

(expression); control of resources (security) and being active (enjoyment). A list of those functioings most impacted on are detailed below in table 9.2 below.

Table 9.2 Functionings most impacted on by using the sustainabley designed sites for adult users.

Capabilities	Functionings
Stimulation	Stimulating the mind – new ideas and ways of thinking
	Having a sense of longevity and time passing
	Sensory stimulation
	Feeling of vitality
Purpose	Having an aim
	Having a sense that something is important
Psychological wellbeing	Learning, communication and thought
	Gaining cognitive skills
Mental restoration	Having opportunities for short term recovery
Social wellbeing	Participation in social life and cultural activities
Expression	Feeling a sense of ownership
	Having opportunities for political expression (choice and opportunity)
Security	Feeling of safety and freedom to use the local environment
	Having control of resources
Enjoyment	Being active

9.3.1 Stimulation and sustainability

All of the five pre-established functionings of the capability of stimulation were affirmed by the site users as impacting on wellbeing. However, in refining the set, 'having multiple stimuli' was revised to 'having variety' in using the sustainably designed sites. The functionings of stimulation that were most impacted on were sensory stimulation and stimulation of mind. Having a sense of longevity and time passing, variety and vitality were also impacted on by using the site. Both active and passive users valued the site as being a natural 'green' space with trees and wildlife enhancing visual stimulation for both passive and active users.

Sensory stimulation

Sensory stimulation included tactile, visual, gustatory, audio and olfactory stimulation. Users ate food within the site, grazing when passing by, and ate meals together in the site from food produced there and bringing food home, enhancing gustatory stimulation. An active user in Eglantine stated: *I eat some of the food - berries, peas, potatoes, nasturtiums, herbs that I have helped to plant* (Eg4). Auditory, olfactory and tactile stimulation were enhanced by touching, smelling and feeling plants. In Easton, this is most evident in preparing salad for lunch from a variety of salad and herb leaves. Olfactory senses were stimulated in growing and using herbs. *I*

think they are really valuable things (herbs), their smells and using all the senses. They have a lot of potential (Sc3).

Users who experienced the site visually range from: those working within the site; those living adjacent to the site and have a view of the site from their windows; those walking through the site on a regular basis; those who park their cars at the site and work in an adjacent office building and those living adjacent to the site but do not have a window view of the site. Aspects of aesthetic stimulation identified by the users included appreciation of the view, wildness and 'naturalness' of the site, the greenness of the vegetation and plant succession. In terms of passive values, the aesthetic stimulation of the site varied. There is a feeling that the space *looks nice* and that the active user *do a great job* (PSc1). In Moulsecoomb the woodland site behind the garden is seen by a passive users as *ugly and very steep and very open* (PMb2). In Eglantine, one passive user stated that when giving an opinion about the aesthetic benefits of the site i*t depends if you know what you are looking at* (Eg4). Therefore this implies that having a level of understanding or any knowledge of the site may affect how one sees it aesthetically.

A distinction of aesthetic stimulation was found between those looking onto the site and those being actively involved in the site. Value was placed on seeing functionality in design, but also simultaneously seeing wildlife, living things, plants and also having a food and herb garden. The shelter made of natural materials was seen to be visually stimulating. The materials used e.g. for mulching such as cardboard, plastic, carpet and the use of nettles for habitats were seen to add enhanced visual stimulation for the active users but for passive users the site sometimes looked untidy. An active user in Shanakill stated: *I think the site is visually pleasing. If you are trying to be organic, tidy does not quite go along with it* (Sh1).

The point was made by a passive user that the Eglantine site looks comparatively better than what it did before the site was worked on as a community garden but admits that it does look disorganised. It was realised that the site looks different to other public green spaces. One active participant stated: *Compared to what it would look like if we did not do anything – the site is absolutely visually pleasing. Compared to the botanic gardens – a different issue* (Eg4). An active user in Moulsecoomb stated: *I think the site looks well, especially the fact that it is not too well maintained; it's a bit wild and a bit natural* (Mb2).

Users were amazed in having a stimulating local space that is visually stimulating; loving how the space looks with its wildlife and successional growth, and feeling that it is special. One very active user in Eglantine showed a feeling of love in caring for something and having a sense of ownership and familiarity. Users admit subjectivity of aesthetic stimulation and that other users may not find the site aesthetically pleasing: *I love it – I love the way it looks because I know it. None of it is strange to me* (Eg3). Sensory stimulation came from having variety, having another experience and abundant changing vegetation. An active user in Scottswood stated: *It's one of*

the few places which have a lot of variety, seasons, and the way things change; it's just a fine mix… It's just another experience (Sc2).

Stimulating the mind

It was found that user's minds were stimulated by working within an ever evolving site design process which was hinged on food growing and associated activities. An active Eglantine user stated: *The site has changed me as a person. I have learned new information about plants but even more so, it has challenged my way of thinking. The problem is the solution. The first initial design did not help much as it was imposing rather than looking at the process…..If you impose a rigid plan - it fails, but if you work within a process it changes and evolves* (Eg2).

Learning about the site as a whole system has enabled the users to think cyclically and be more mindful about the use of site resources. An active user in Eglantine stated: *You have to be careful... The garden is a manifestation of organic mindful life, being mindful of the energy you are using, of the resources is actually possible so it's almost like a statement…the garden is a reminder that that it is really worth it and keep on track (*in terms of environmental behaviours) (Eg4).

Learning permaculture on site enabled one to learn about an approach to design. An active user in Scottswood stated: *This is the thing that excites me most about permaculture…. the idea that there feasibly could be a system where there is no waste and everything could be reusing* (Sc3). Such a shift in thinking about reusing materials can be identified by the users in the site and applied elsewhere: *I had a vegetable wrack and I didn't want it anymore ….I lined it with black liner and put holes in it and it's a 3 tier vegetable wrack, filled it with soil and compost and left it and now I've started to use it for strawberries. So instead of throwing it away, I've used it as a strawberry bed. My way of thinking has changed. I am more innovative in that let's not throw this away, what can I use it for now* (Sh3). The user also stated, *the garden has taught me about these things, recycling etc. I now recycle everything* (Sh3).

Having a sense of longevity and time passing

It was found that change in site was seen diurnally, weekly, seasonally and annually. Producing food organically using crop rotation, seasonal varieties and polycultures brought vitality in noticing change. Daily activity is noticed in the office activity adjacent to the Eglantine site. The weekly change in annual crops, the different people who attend the site each week. An active user in Shanakill stated: *I very much feel close to nature here and it is different every single week when I come here (Sh1).* There is change in seasons and the change in the physical feature inside the site such as bed rotations, turning compost and change in the pond life. Noticing cycles and change in the site include noticing soil cycles, plating and harvesting, noticing biomass

change, changes in levels of human activity and of bird activity. Plant structures change with the growing season. One passive user stated: *I notice the space changing during the course of the year, the flowers change and the pond changes* (PSh6). There is also a change in active user activity in that: *There are regulars here but different people come and go* (En2). The unrestricted growth over time resulted in a sense of amazement. One participant recognised the solstice as a mark in time: *It's very overgrown at the moment because basically it's been raining since solstice practically non-stop…. it's amazing the way it has grown up* (Eg1).

Having variety

An active user in Shanakill stated: *The combination and variety of plants grown makes for an abundant and "lush" environment…There are brambles, fruit areas and wildlife areas which bring variety and make the site look wild* (Sh1). The site offers variety in terms of biodiversity, a variety of activities and experiences; a variety of outputs and offers multiple stimuli. One passive user sees the wildlife in his own garden as being due to its location beside the Scottswood community garden site: *We have newts, frogs, bats, and foxes in our garden. There are 6 types of dragonfly. Many of these are because we are beside the garden site. We get grey crested newts in our garden that come from the site. We also get hover moths. I hunt and fish but I would not harm the newts* (PSc3).

There is also variety in experiences and activities. Multiple stimuli involved having different types of activities; meeting different types of people and having different colours, shapes and varieties of food grown in the site. There was a diversity of activities and experiences within the site engaging with people mentally, physically and socially. *There are different people here every week, different food and different atmosphere* (En5). Doing a variety of tasks included those that are physically laborious such as digging and chopping wood and tasks that require knowledge e.g. harvesting wild food. The use of annuals local and seasonal varieties and the growing of a polyculture crop meant that there was also different food each week.

The different types and shapes of food are due to growing polycultures and local varieties and rotating crops. Gustatory stimulation was enhanced by the variety of apples grown which are normally not available in the shops. Food was not the only output yield found in the sites. Herbs, food, crafts, art, preserves, plants to sell, are also produced. Due to the use of polycultures, a diversity of food was found to be grown and the excess distributed: *We produce courgettes, potatoes, a grapevine in the corner, basil, lettuce, aubergine, and rhubarb, a mixture, and beetroot. If there is quite a bit of food and its harvested then we take it home. If anyone wants to take a little bit we have to take a bit home with us. You only take a little bit so as everybody has a chance of having something ...I think neighbours have veg too* (Sh3).

Having multiple stimuli means that there were many things going on at any one time in the site. For one user, this could be weeding, and experiencing nature and also chatting with a co-worker.

Being busy and sociable at the same time and being both indoor and out of doors brings a variety of experiences and encounters. An active user in Moulsecoomb stated: *It is important for me to have lots of different types of activity in life, mind and physical activity and also meeting people* (Mb3).

Having a variety of experiences included noticing polycultures rather than just having one crop. Having a wildlife garden, growing food and successional growth brought an experience of a diversity of flora ad fauna and a feeling of being close to nature. Users work inside or outside, in the woodland or exposed to the elements. Collective activities in the Moulsecoomb site involved merging groups of youths, students and people with mental disabilities bring variety to site tasks. Such variety also brings vitality and a feeling of increased energy.

Having a feeling of vitality

Feeling energised involved being spontaneous and dynamic. Users are energised and excited about learning about a design system which reuses and recycles waste and energy. There was a feeling of being dynamic from bring active and busy in the site. More social activities such as preparing food and sharing food and chatting harnessed group energy. It was found that users gained incentive from learning and using the sites: *Sometimes I am tired when I go home from here, but it does give me more incentive to do more at home even if I am tired* (Sh1). Another stated: *You have energy afterwards and you know at the end of the day that you have learned something and you can tell someone else if they ask. You can actually show someone else if they want to do a bit of gardening (passing on energy and skill)* (Sh2).

One user felt energetic in been busy in a variety of activities –*Make the fire; make tea; weed; harvest beans; harvest garlic; dig and plant potatoes; pick and prepare salad for lunch* (En1). The Eglantine site is open 24 hours users were more spontaneous in site activities. Activities often occurred at any time, even when events have not been formally organized. One user stated: *Sometimes activities are just spontaneous. Sometimes we just go out and clean the whole garden* (Eg4). Set tasks provided a particular goal during a working day brought the energy and vitality of a job well done. Seeing the outcomes of ones action and seeing things grow resulted in a feeling of motivation. Users feel energised from being in the sunshine and working with children is particularly dynamic and enhanced vitality.

A choice of activities meant that users matched their physical ability at any one time or day to a particular task. One shared a task and chose the type of task in which to partake in. Users can therefore be spontaneous and can access the site and start working at any time and also use the site to relax or take friends along. When users left the site there experience a 'relaxed tiredness': *I feel very much revitalised and energised and comfortably relaxed when I leave* (Eg1).

9.3.2 Purpose and sustainability

The capability of purpose contains four new functionings namely - having a sense that something is important; having the capacity to shape ones life; having a continuous role of learning, and caring for others and the environment. The functioning 'achieving potential' was not affirmed as impacting on wellbeing but is integrated into the functioning 'capacity to shape ones life'. Both active and passive users viewed the site as being important for the local community in terms of wildlife, trees and supervised activities for local children and youths to be involved in. Having a sense that something is important and having an aim, were the two functionings which were most impacted on.

Having an aim

Having an aim was enabled by the activities of reusing and recycling, food growing and being involved in environmental behaviours; caring for the local environment and community; having a sense of achievement, and having a role/focus in site maintenance and volunteering. The principle of reduce and reuse and hence using waste and energy cycles in the site was evident in composting and using reclaimed wood to build structures (e.g. compost bins and raised beds) within the site.

All of the sites were found to offer direction to site users and users valued having a focus in food growing activity. None of the sites aimed to maximize food yield, but did offer multiple benefits and capabilities of wellbeing with a food yield being one output. Food growing is therefore not the sole focus of a sustainably designed community garden site. However having set task evolving around food growing and a tasks board such as in Easton means that one is clear about tasks to be done on a particular day.

It was found that there was great emphasis on caring in terms of maintenance activities and ensuring that the community get involved and also that the community gets enjoyment out of the site and impacting on the local environment. Caring for 'others' is akin to the Permaculture concept of 'people care' (Mollison, 1990: ix). An active user in Shanakill stated: *I do these things (environmental activities) both for my own health and for the health of the environment* (Sh3).

In Eglantine, care for the site and a sense of ownership was evident in the active users attempt to clean up a waste spot but also the people who came and drink there at night who: *After a while they started leaving them (their cans and bottles) in little piles* (Eg3). Such signs of positive feedback bring a sense of achievement. An active user in Scottswood stated: *I have seen people come here and I've seen a big change in them. They have a smile on their face and that's good* (Sc5). In addition, having events and attracting more people to the site bringing a sense of achievement. Growing flowers and food, has an aim in the successful take of the plant. In terms of having a sense of achievement, one user stated that the activities of weeding,

composting, building and growing vegetables on site brought a sense of purpose*: I enjoy gardening. It's just so peaceful and you can see things grow. You feel like you have achieved something as well* (Sc1).

There was focus on specific projects the sites may have organised such as Nature Club in Scottswood where children come on a weekly basis to learn and be involved in learning about nature in the site. In this way adult volunteers could focus on a certain aspect of the site such as in this case working with children in nature activities – *Nature club is my main focus in the site* (Sc3). The sites also contributed to a long term focus for site volunteers. *When I finished Uni, I didn't have much direction. It (the garden) helped me a lot in this sense, to find direction* (Sc3). Maintaining the site brought a feeling that users had a role in the site. Tasks such as checking the bird feeder, checking the levels of the pond and checking for vandalism was seen top be part of ongoing maintenance on the site. These set tasks brought enjoyment as well as a sense of purpose and responsibility in feeling that one has a role. Volunteer opportunities and working with community groups and children in the site enabled one to feel of use, building confidence and enhancing self esteem. In Scottswood, one user stated*: I feel like I have been useful though. Some of the skills that I have developed are my ability to give something to a situation. I contribute something* (Sc3).

Having a sense that something is important

Minimising resource use, provision of wildlife and green space locally, food production were seen as important aspects of the sites. An active user in Eglantine stated: *The compost and rainwater harvesting for the beds is important. We also recycle things from skips. If there is wood or stones or things going to be thrown away for example bricks, they will be used for the beds. These are important features of the garden* (Eg4).

Users felt that the sites were of benefit in terms of being part of wildlife corridors in their urban areas. The active use of local people in these sites is also seen as important. One passive user stated – *It is important to have green corridors in the city. There are badgers and foxes. I believe that it is important to keep wildlife. We need insects and flowers for pollination* (PEn1). An active user stated*: It's important to encourage people to use green space in imaginative and different ways* (Sc3).

The emphasis on food generally was found to provide a learning space about where food comes from, to learn about the benefits of local food and local varieties and to learn of food miles. A passive user in Easton stated that the site has been put to good use as a food growing space: *Here there are not so many houses now with big enough gardens to grow food. It's important to eat locally. The carbon footprint is important. It's good that food can be just grown down the road* (Mb2).

The sites not only act as community space but as a learning space, a natural green space and a cultivable space, linking learning and health in a community setting. There are no other sites around that could be used in this way by the community especially in terms of the children activities that take place in Moulsecoomb. Active users valued having a multi use community space, and in particular that is inclusive of all members of the community. An active user from Moulsecoomb stated: *I think for the children it makes it special because there are not many spaces for them to go and I found a lot last year that even in the holidays the children would come and do work which I found quite surprising. During the holidays they can come here and I think they feel safe here and do projects and they built their own den and a hammock…They learn how to interact with the environment and to eat healthily* (Mb2).

Having the capacity to shape ones life

This functioning included the choices the site offers the users, and learning and being active in the site. Users living adjacent to the site often work there sporadically at any time. Maintaining the site and being involved in key daily and weekly tasks such as watering was found to bring a sense of ownership. The site offers an opportunity to have the capacity to shape one's environment and empower the individual through active participation to feel they can make a difference in their everyday life and environment. One user stated: *Coming to a space like this is good to know it is possible, you are empowered. It is good to know that you can do this, plant on waste ground* (Eg1).

Having a choice of activities was seen to give users greater autonomy than simply being delegated a task. Users chose to work alone, with another, in a group, and decide on what kind of activity they would like to participate in. In addition, the sites provided a valued alternative to formal parks and the opportunity for users to garden when they did not have a suitable private space to do so.

The site is seen as an environmental benefit as a tool for learning and feeling excited about self-sustaining systems. This is particularly evident in using the compost toilet. *The compost toilet and composting are important aspects of the site because it means that it is self-sustaining in a way (Mb2).* An active user in Easton states: *I would like to learn to build a compost toilet because it is very important. We learn about compost, a wormery. For me this is the future and …….I would like to put food compost on my garden* (En1).

Communal activities such as the communal lunch which was held in the shelter or around a communal seating area meant that users got to chat to like minded people and in doing so felt more positive about the future. Another states: *I do hope that my life will be affected by peak oil*

or climate change, because it is (life!) dreadful now! My actions can help this. I feel better coming here; meet like-minded positive people (En5).

Having a continuous role of learning

Learning was seen as a continuous process in the site for active users. This was particularly the case for formal volunteer workers. An active user in Easton stated: *It is a beginning when you come here, when you want to learn gardening and learn organic gardening. This is the beginning if you want to improve your behaviour about the planet* (En1). It was found that having an expert or site gardener to be on hand to answer queries and teach means that one is constantly learning when in the site, learning about the names of plants such as in Moulsecoomb and new skills such as learning how to make a wormery in Easton. An active user in Scottswood stated that: I am still learning here about environmental behaviours (Sc5). In Eglantine, one user stated: *I learn new things all of the time…the names of plants, how important they are in the cycle of growing and nutrition, using comfrey and seaweed on the beds to make them more fertile* (Eg4).

Finding solutions to on site problems using a minimum of resources meant that users are always looking to solutions in resources within the site and the surrounding area. Active users were constantly solving new problems and learning new things.

Caring for others and the environment

Although a functioning valued more by youth and particularly child users, for adult users, the freedom to care for others ones environment enhanced purpose in feeling one is nurturing life, using the garden as a tool for recovery to help others. An active user in Easton stated: *I do these things because it's nice to nurture isn't it –nice to nurture life* (En5). Having a green space that one can actively be involved in was seen as an important freedom for local residents: *It's important to encourage people to use green space in imaginative and different ways* (Sc3).

An active user in Scottswood stated: *It's good that all sorts of people come here and use the garden as a tool for themselves…All the various other people that come through the door that need help, you can give them help, you can actually give it to them by using the garden and just talking to them as well which is really good* (Sc5).

9.3.3 Psychological wellbeing and sustainability

No new functionings of psychological wellbeing emerged as impacting on wellbeing.

The capability psychological wellbeing was found to be enhanced by the functionings learning, communication and thought which in turn enhance cognitive skills and personal growth.

Learning, communication and thought

Users valued gaining new skills. Practical skills were particularly enhanced by experiential learning. These skills can then be successfully applied to other environments. New skills learned included observation skills, growing skills, composting, and water efficiency and subsequently learning how to think in cycles. Skills that are learned in the site and ideas gained from the reuse and recycling of waste material enabled users to apply such skills outside the site and pass on these skills to others. New skills included growing, learning about soils, liquid feeding, setting seeds in the ground, weeding, separating plants, using a propagator, learning how to water efficiently, composting, use of organic methods of mulching with straw, manure, seaweed, chicken manure; companion planting; saving seed.

In learning about observation skills in particular, one active user stated: *Before I came here I thought about observation skills a bit, but being here and being involved in getting muddy and using the land – I thought about it a lot more because you are much more aware of e.g. shading (trees and parsnips example)* (Mb1). Users always had something new to learn and learning changed through the seasons: *One of the jobs is to pick a salad for lunch. I have no idea what you can eat or what you can't eat around here. I would not know what to pick. They go around and I watch. That sort of knowledge you can't just learn once because as the seasons change different plants emerge* (En3).

The functioning learning, communication and thought involved experiential learning – learning by doing (Orr, 1992). There is a sense that the space is an assessable shared space for accessing skills such as composting in that one can see and understand how activities are undertaken. It was found that if a user planted a crop that does not grow successfully; they learn from this what to do differently*. I got some tomato plants and they did not do very well last year, so I know this year I should feed tomato plants – feed them more* (Eg1). Harvesting wild food with another engaged users in a learning process. The task of making a salad lunch with another enabled one to identify different salad leaves and herbs to eat that day with lunch. In using the site a user in Scottswood users has: learned about nature; learned about people (Sc5). Users learn from each other and from the site gardener. Groups and individuals mix together and the on-site gardener is available to give advice and guide participants on tasks that need attended to. The role of learning between individuals in the site on an informal level is identified as something that is important for site users. The role of communication, learning and thought in learning how to grow plants is seen in: *If you put a stick of willow in the ground, it just grows. I now have knowledge of plants I never knew, like I know there is calendula at the bottom of the garden. I was really impressed by the knowledge that people have* (Eg1).

The sites were found to be both conceptual and physical spaces for learning. Users work within the design process and the sites boundaries, being mindful of its cycles of activity within the site. A user from Easton stated: *It's nice that this site does not really have any waste products. Nothing goes out of the site. So we are not dumping anything on anyone else. We bring a lot in and reuse. And also we try and bring in as little as possible. We reuse compost and water. It's nice that it is as contained as we can make it* (En3).

In learning about and understanding the importance of soil in growing food plants, users applied this to another area. *I have clay soil. My ph is high so what I do now is put more compost and manure in it to build it up, to raise the beds to make sure that it's not wet clay soil. This is better for my growing. I put a windbreak round it because we live in the mountains and we get a lot of wind, which kills the plants…. It (wind) stunts the growth. I have learned about all of these things here* (Sh3).

In learning about food, user became more aware of where food comes from and food miles: In terms of learning about food growing, one passive user stated: *I go to the site about twice a year. I pick apples and take them home. The site has made me think about food* (PSc1). A Moulsecoomb passive user stated: *I have learned how to cultivate and grow food. We can get so detached from food – it just grows in a plastic bag and you bring it home from Sainsbury's. This way you learn about seasonality, which I did not really think about before* (Mb1). It was found that in using the site users were more aware about recycling activities: *I think about waste all of the time. Now I compost grass cuttings etc when it used to go to the landfill. I've done this since I've been coming to the garden* (Sh3).

Active participation within the site has led to increased activism outside the site: *I have been involved in campaigning to stop university building near the railway site on the bank that had badgers. This would have attracted the site in terms of wildlife* (Mb1). Site observation is an important skill of sustainable design and hence is an aspect of learning about the site and its design and applying this skill elsewhere. Learning in the site, making decisions and being involved in both physical and social activities were found to build integrity of links and networks in the site gaining momentum as the site continuously evolves.

The contained and compact nature of sites means that it is viewed as a system. Reusing/recycling resources in a contained space visibly demonstrates that one is *not dumping on anyone else* (En3). Looking for solutions to problems using on site resources means that one evolves with the site. Recurrent activities such as water saving of plants; water harvesting system, composting builds up integrity and user learning capacity within the system as the site aims to be contained in terms of energy and waste. Workshops such as a wildflower workshops

and building paths workshop in Eglantine and courses in organic growing in Scottswood and Shanakill enhanced learning in the site.

Gaining cognitive skills

It was found that cognitive skills were enhanced by learning and being active in the site. Users learned to turn on-site problems into solutions and this in turn enhanced self-efficacy. Growing food and then taking this food home enhances a sense of achievement. Achieving set tasks enabled one to complete a task and move onto the next task. Organising a site event also brings a sense of achievement. There is a feeling of satisfaction in applying what one has learned successfully elsewhere. *Myself and my younger sister grew herbs for the first time, we actually just put them on the window and we were looking at them saying "they won't grow" (and they did)…!* (Sh2).

There is a challenge in volunteers working with children and organising activities for children's events. It was found that the ethos of reuse and recycling meant that one is challenged in their thinking in turning problem into solutions. One user was particularly involved in being active and learning from/within the site and stated: *When you are doing a task you think about it and you think about it, you say according to everything I have read, it would be a good thing to mulch this blackcurrant bush. Or turning the compost is the same. Or whether something should be a compost bin or a worm bin, I thought about it and thought about it*… (Eg3).

The ethos of reuse and recycling which is ingrained into the site enabled one to think in cycles turning problems into solutions. An active user in Eglantine stated: *The site has changed me as a person. I have learned new information about plants but even more so, it has challenged my way of thinking. The problem is the solution* (Eg2).

Experiencing personal growth

Feeling confident in the site involves feeling of use. Users noticed improvement of learning since being in the site, increasing self confidence. A user in Scottswood stated: *I am being more aware of things that grow, grow wild or have planted things that spread easily, things that are hardy. My knowledge has improved so much, like if I compare when I first came here I barely could recognise mint* (Sc3).

Another stated: *I like it because being here you don't feel like you are a waste of space. It's like you've got a job, you know? It builds up your self-esteem and you build your confidence up as well, which is another positive thing* (Sc5).

Being practical and learning from others about reusing and recycling, learning about a designing systems that reuse and recycle waste and energy, learning about nature, other organisations and

food was found to stimulate the mind to think systemically. For young adult users, learning practical skills was seen to be a welcome contrast to more academic learning: *I get to practice practical things. I have never done this kind of thing before. I have read the theory but not practiced it (Sc2).* Another stated: *My degree was very non-practical. I did feel the need to have some practical skills…. I have definitely learned also, not just gardening skills but social skills as well* (Sc3).

9.3.4 Mental restoration and sustainability

The original functioning 'having opportunities to relax' as established in table 5.1 was found to have a large impact on short term recovery. A new emerging functioning of mental restoration was 'having opportunities to interact with nature'. The garden was used as a long term tool for recovery for a number of users. It was seen as a therapeutic environment where users could meet like minded people. However, it was found that short term recovery was the functioning of mental restoration most enhanced by using the site.

Having opportunities for short term recovery

Opportunities for short term recovery involved opportunities for relaxation, having the choice to be alone or with others and feeling satisfied with tasks completed. The space itself was seen as relaxing, and particular activities enhanced relaxation such as picking strawberries, thinning seedlings, eating food you have harvested on site or just sitting by the fore alone or with others.
The contained nature of the site with its surrounding buildings meant that one user felt the site: is a wee haven (Eg1). Relaxation also resulted from being in the sun and going for walks in the forest, drinking tea with others. The site provided an anecdote to the pressure and stress of work or daily life *It is so relaxing….I might not have realised how stressed I am when I come and then the nature and the peace relaxes me* (Eg1). Another stated: *At work it feels more like that I have to perform. It's like when you are doing something productive but you are not worried about what standard you have to live up to* (Eg3).

Active users also used the site during less busy periods and take along friends to use the space for their own enjoyment and relaxation. A sense of relaxation also resulted from interacting with others. This included working actively by exchanging ideas and talking or passively by working alongside another individual (e.g. picking blackberries with another person or observing others).
Active users in Eglantine and Moulsecoomb stated how being in the site alone or working alone was a source of relaxation: *This is a relaxing environment. I feel particularly relaxed on a Sunday when I am here alone (Mb1). Another stated: It's nice to get space sometimes and work alone (Mb2).*

Users gained satisfaction in completing certain tasks such as planting and turning compost. Tasks found to be relaxing and at the same time satisfying included emptying the compost bin, turning the compost, picking blackberries with another person, and picking beans. Not having a rigid structure of activity meant that sessions often evolved organically. Users matched physical energy to a task: *You pace yourself, as you want. It's very relaxed like that* (Sc3). The site presented low-level activities for users who did not wish to participate in strenuous digging or building activities. These less strenuous activities included for example lighting the fire, making tea. In choosing an activity that matched users level of energy or mood on a particular day, then one could then really focus on a task and lose ones sense of time. This was seen as a positive experience.

In using ones hands to harvest and weed, a user: 'does not have to think' and repetitive tasks were seen as meditative. Being practical in site activities was seen to be in contrast to a sedentary office environment and lifestyle. Physically working with the soil and having hands in the earth brought a feeling of relaxation: *I always have my hands in the earth –I need to do that* (En1). *Another stated: The more the task involves working with the soil, the more relaxing it is. Some tasks require tools and equipment; others are down on your hands and knees pulling out weeds. I feel more relaxed with these kinds of jobs* (En3). Stopping for breaks in work activity enabled people to chat and eat together and drink tea. Having been physically active participating in on site tasks, users rested during breaks. Being by the fire during breaks was seen to be particularly relaxing. In being active in tasks such as pruning and weaving willow, users felt relaxed but also felt they had done something useful. One active user stated: *I am very relaxed here, wonderfully soothing. It's fantastic - no pressure. I am particularly relaxed if I feel I am doing something useful and feeling valuable* (Sc1).

Being in a green space was seen as being a relaxing break form from the city. The space was seen to be less polluting than the surrounding area. The valued freedom of having green surroundings included being in the forest; going for walks and being in the sun. An active user in Easton stated: *It is relaxed because the surroundings are green. I go to the countryside quite a lot but not as often as I would like. I feel calmer when I leave* (En2). In Eglantine in spite of the site being surrounded by residential and office buildings and busy roads on all sides, it still provided a space for relaxation. One user stated: *You are aware of the buildings, you can hear the traffic from here, you are very well aware of it, but it is like a wee haven (Eg1).* An active user in Shanakill stated: *Yes it is a relaxing space*. When the sun is shining, or when you are in the tunnel and it's raining and it's warmer than it is outside. I feel like you are visiting the country for a few hours (Sh1). Another stated: *I feel relaxed here. You still feel like you are in the city, due to noise, the area. There are a lot of houses…. But it is like a little bit of the countryside* (Sh2).

It was found that being involved in collective activities meant that users experienced enhanced mood from being around people. The contained nature of the site meant that the sites were seen

as places where one went to feel better or enhance mood in being somewhere to retreat to: *Coming here is pleasant and you leave stress behind, it affects mood* (En4). One user stated that this was due to the vegetation and social interaction, that: *being here affects mood because of the feeling of peace, the greenery and people help too* (Eg1). Short term recovery involved losing ones sense of time; escaping routine and 'turning off' This was enabled by having no time schedule if one so wished: *Most of the time I do tend to lose my sense of time. I don't like having my phone on me when I am up here or my watch* (Mb1).

A number of families in the surrounding area of the Shanakill and Scottswood sites in particular did not use the site themselves but their children attended organised events in the site. Such a passive adult user in Shanakill stated: *My child goes once a week but I would like if it was more often* (PSh3).

9.3.5 Social wellbeing and sustainability

The functionings of social wellbeing include participation in social life and social activities; establishment of friendships and social networks; developing reciprocity and having a sense of community. Developing reciprocity emerged as a new functioning which was impacted on by the sustainably designed sites. Originally set up as two separate functionings participating in social life, and participation in cultural activities were found to be interlinked as one functioning of social wellbeing and was the functioning of social wellbeing most impacted on by the sustainably designed sites.

Participating in social life and cultural activities

If was found that there was self satisfaction in working with others. Working together involved creating new ideas together and being part of a team and having a shared aim. Users learned about different groups of people and mix with people they would not otherwise have an opportunity to meet but have a shared interest in the site. An element of positivity and enthusiasm was found in working together: *The most important thing that draws me to the site is people being enthusiastic about the space and that is just contagious and you end up doing things for it and with it and using it* (Eg4).This shows a level of interaction between users, and between users and the site, which builds up a level of integrity beyond which energy is harnessed and the site becomes a community space.

An active user stated: *I've learned to work with large groups of different people. I've talked to non-punks, people I would not normally socialise with* (Eg5). Users felt enthusiastic with a shared goal of producing food. In Moulsecoomb, some groups have their own projects and

vegetable patches and this means that ideas are created together. Group activities include coppicing and clearing woods of rubbish.

The Scottswood and Shanakill sites had formal volunteer opportunities with users as a result of links to organisation and institutions such as the mental health charity Mind and Universities and Colleges. An active user in Scottswood stated: *To come here, for me, was beneficial, to get back on the ladder. There are so many things you can do* (Sc5).

Projects run between Brighton University and the site form a positive relationship between both local and visiting students integrating with local children and the community. One international student stated: *I have learned about plants that grow in England. I've learned about the lifestyles of the kids that come here. This has been indirectly useful as it has provided me with cultural knowledge. These kids get into trouble in school and come here* (Mb3).

Celebrating and sharing food and meals together with food grown in the site was found to be a vital aspect of social integration in the site. Food is harvested to eat and wood is collected from the site to cook the food. In Eglantine having communal meals and a fire hub enabled users to eat together, prepare food together and take their family along.

In Scottswood, events often centred on the pizza oven and rituals such as Wassailing. Equinox and Solstice events were celebrated in Easton. In Eglantine more informal celebration occurs in the site: *Sometimes we just go if it's somebody's birthday and we just sit on a rug and hang out* (Eg4).

9.3.6 Expression and sustainability

The functionings of expression were found to include opportunities to be creative and using imagination, having a sense of ownership in reclaiming urban space, and political expression. Political expression was found to be a new emerging functioning. The functioning 'capacity to shape ones life' which was part of the original set of functionings was not affirmed (however this functioning was found to impact on the capability of purpose as explained above). The functionings which were most impacted on by using the sites were, having opportunities for political expression, and a sense of ownership.

Having opportunities for political expression

When working in the site, users had a choice of what activities they wished to partake in, or whether to work alone or with another. In addition, it was seen as a space for people to express their values in terms of ideas and actions not otherwise possible in other urban spaces. One user stated: *For many things we don't have a choice really because there are laws or regulations*

or other people's interests that seem to be more important. Then your own interests are completely ignored, especially in terms of public spaces in Belfast, it is completely commercialised. Yes, there are parks but it is very clearly defined what you are allowed to do. They close at night; there is security and a lot of restrictions. Apart from community halls, there are no other spaces where I feel that you can just do what you want and create a community (Eg4).

One active user in Easton equated using the site as reflecting 'a good life' and stated: *The focus of the government is* about jobs and aspirations. It should be about life and how to live a good life and not about money (En5). Active users in the Eglantine site were frustrated with local politics: *oftentimes your interests are ignored and you don't have a choice* (Eg4).

User felt they could express ideas while attending meetings where users felt they had a say and felt they were involved in decision making. In terms of participating in decisions in the built environment in the city an active user in Moulsecoomb stated: *In terms of what's being built in Brighton, I don't know whether there is a lot of say and there is a lot of competition between private enterprise and the public and what they want e.g. the football site. Since I have been coming here, I feel like I have had more of a say in the environment in Brighton, definitely* (Mb2).

The physical impact of the activities in the site, how a group changed how the space looked and the impact of decisions made on the evolution of the site affirmed ones ideas and interests about not only the local environment but also larger global issues such as climate change and peak oil. Expressing oneself and the feeling users were influencing their environment or community was felt to be an important aspect of the site for the users. This was found to be in the form of physical activity or social activity depending on the reasons for using the site. One active user stated: *Psychologically it's so nice to have the garden in the back yard – just to know there is not just concrete…The garden is a manifestation of organic mindful life, being mindful of the energy you are using, of the resources is actually possible so it's almost like a statement* (Eg4). Another stated: *Being here has helped me influence my environment and be actively involved….it did give me a boost, to be a bit more active and be more in the community garden and also to be active outside of the site as well* (Mb1). However, passive users in all sites felt that they were unable to influence their local environment. In Easton one active user stated: *People don't get involved because they don't have faith in the local authority. People have been let down so much. Easton is a dumping ground for the local authority* (PEn1).

In Eglantine passive users were found to be inhibited from using the site because they did not feel they could influence their environment in any way or they felt they had not been included in decision making about the sites. A passive user in Eglantine stated: *it is not our property to use* (PEg1). While an active user stated: People will look to the government to fix their problems rather than trying to fix them themselves (PEg2). However, an active user in Easton stated that

he used the site because: *our society has been taken over and we have very little power to do anything* (En3).

Having a sense of ownership

The informality of the site, a communal, reclaimed space contributed to a feeling of having created something different and special. This is particularly the case in Eglantine, where active users could use the space at any time: *I bring out the compost twice a week or so. Sometimes on a really sunny day would go out and read a book or hang out. Once a month we would have a community garden day* (Eg4).

With a sense of ownership in reclaiming a space came a sense of pride in caring for the site*. ..It's like a jungle and it all happened really fast it was incredible, it made me so proud. All that would not be there if it had not been for us* (Eg3). Feelings of ownership were also linked to feelings of empowerment about reclaiming a space. *Coming to a space like this is good to know it is possible, you are empowered. It's good to know you can do this –plant on waste ground* (Eg1).

Active users strived for community and therefore used the site as an expression of this. One participant stated: *In my personal life there is a lot of desire to build community especially in urban spaces, and in Belfast at least it is not a very easy thing to do because there is not really any particular place to go where you don't have to consume... …..It's (the site) more like a public living room even though it only takes place every couple of weeks, it's more permanent than political* groups that are there for one event (Eg4).

9.3.7 Security and sustainability

The functionings of security impacted on by the sustainably designed sites included feeling of safety and freedom to use the local environment, having control of resources and a feeling the local area is cared for in having. The functioning which was most impacted on by the sustainable design features was having control of resources. This functioning is a refinement of the idea of control in terms of There was also a sense of pride in feeling of safety and freedom to use the local environment for the community and particularly the children of the community. Adult users valued having a safe 'green' space for children to go. Although each functioning of security was refined during the analysis, no new functioning of security emerged.

Having control of resources

Having access to a green space and wildlife and somewhere to go that is free of charge was seen as a valued freedom. In the Easton site one passive user stated: I have brought my children

to the site because it is free (of charge). Kid's activities are very costly and my kids complain that there is not enough to do (PEn4).

It was found that being close to a food source and having a space that is free to access and also a place where one does not have to 'consume' is a valued freedom. One user stated that In Belfast there is not really any particular place to go where you don't have to consume, so you can't really just go and hang out somewhere and have a cup of tea in a public space and mingle with people and think about things to do together (Eg4). The fact that Eglantine in particular is not a 'formal' public space and one is actually 'free' to use it as one wishes, also brought a sense of freedom. An active user in Eglantine continued: *It's a free space in that you can actually go and do what you want more or less. You can light a fire, sit down, have a drink, and have a bath if you feel like it!* (Eg4).

It was found that a sustainably designed community garden has a role in learning about being self-reliant in food and learning skills such as composting and rainwater harvesting and organic food growing which one may use in their private home in order to be more self-sufficient.

Reusing and recycling of waste resources and being mindful in this process was found to be a valuable freedom in controlling ones resources. There was recognition that there is financial and resource benefits form spending time in the site in terms of both provision of vegetables and fruit and in terms of learning to be self-reliant. An active user in Moulsecoomb stated: *It's important to know where the food has come from. There is definitely a financial benefit I could learn to be self-sufficient if I really wanted to be. To look after yourself you don't have to depend on outside* (Mb1).

In producing food organically it was found that users believed that one knows what one is eating. Organic food growing emphasises reusing and recycling e.g. mulching, composting and reusing waste, enhancing ones feeling of control of resources. An active user in Shanakill stated: *I did not want to buy loads of pesticides... It's healthier and if you don't need to spend the money I think you should see how to do it another way… you can make your own compost with the stuff around the garden that you've got (Sh3). Another stated: I wanted really to learn how to grow things and with all the compost you can buy now with the additives in them, you don't know what's in them and you don't know what you are eating in the end (Sh4).*

There was a feeling that the site is beneficial to the community in that it provided a green space for local residents and valued as part of a wider network of green spaces promoting wildlife in the city. There was also a belief amongst passive users that in urban areas, green spaces were not a priority in terms of land use but rather viewed an in fill development. For example a passive user in Easton stated: *The space does benefit the local area because otherwise there would be a factory there. There are already many warehouses in the area at present* (PEn5).

Feeling of safety and freedom to use the local environment

In Moulsecoomb and Shanakill, it was found that the enclosed nature of the site made one more aware of who is in the site and any perceived risks or dangers. Users go to the sites alone for regular maintenance such as watering plants during the growing season (March-September). Enhanced safety was perceived when there are others in the site especially at night time. The sites are used at night for organised events. The Eglantine site was used by active regular and non-regular users at night for drinking and lighting small fires. It was found that the site was used as a 24 hour access route for walkers between Malone Road, Malone Avenue and Eglantine Avenue. After dark the site and walking route are not illuminated and this has an impact on use and feeling of safety for passive users. Another active site user living adjacent to the site stated: *I usually try to avoid the space at night because crimes have taken place. There has been a murder, it has been a few years ago, but it lingers in my memory. There has been a rape as well* (Eg4).

A passive user in Eglantine stated: *It is not safe. The willow is over 6 feet tall; there could be anything in there*. Another states: *It feels unsafe as there is no lighting*. Passive users in Moulsecoomb also felt that lighting would improve a sense of safety as more people would use the site if it was lit and she would use the site more often if more people were around.

Users in Moulsecoomb and Easton and Scottswood state that there is a contrast between how safe one feels in the site compared to the surrounding adjacent areas. One active user in Moulsecoomb stated: *It's not a rough area but it's where the kids come and hang out after school, and we've had a couple of burnt out cars. Once you are within the fences you feel safe* (Mb2).

The site was seen as a safe place away from local vandalism. A passive user in the Scottswood stated: *It's not safe around here. There is a murder or a stabbing every other week. There is vandalism. Two members of staff have been assaulted. Cars have been burnt out but I feel ok there at lunchtime because young people can come and make friends there* (in the site) (PSc4). Local active users were not keen top use the site at night as they feel unsafe doing so. Non local active users in Scottswood who travel to the site by public transport are hindered from using the site at night due to safety fears of using public transport in the area at night time. Having restricted access and closing the site gates at night was therefore seen to enhance safety and security in the Scottswood site.

In Easton, a passive user felt unsafe in the area and feels disempowered to participate in local politics and stated: *we just make our own place, our own home secure* (PEn1). *Another passive user stated that the trees in the site enhance a feeling of safety 'when there are less trees, there is more need for security* (PSc3).

Active user's valued having the choice to be alone in the Moulsecoomb, Shanakill and Eglantine sites if one chooses. Being alone in the site was seen as relaxing in that users can potter about and water plants and participate in regular maintenance. An active user in Eglantine stated: *I come during the day and after dark sometimes. It is secluded because of the buildings, and not open. It is more private. Not a huge amount of people know about it* (Eg5).

Holding events and including all local people including young people was perceived to enhance security. *There was some vandalism at the start but that has settled… The young kids are part of it now in that they come in organised youth groups* (Sh 4). Both passive and active users valued sites which had children's activities and events provided a safe, regularly supervised space which is free of cost and part of the community.

9.3.8 Enjoyment and sustainability

Two new emerging functionings of enjoyment are being active, and experiencing pleasure. Being active was the functioning of enjoyment which was most valued by users – particularly adult users. Active users enjoyed being busy in gardening, volunteering, learning tasks and being and participating in site events. Youth and child users had fun in being both creative and resourceful in reusing materials that would otherwise be discarded. Active adult users particularly lost their sense of time when being alone in the site while reading or lying in the sun. This was particularly the case in the Eglantine site where users were free to be in the site at any time. Active users also 'enjoyed the here and now' while sharing tasks with others.

Being active

Physical activities partaken in 'doing gardening' and 'learning gardening' included piling manure, liquid feeding, sowing and planting, mulching, composting, weeding, harvesting. Different types and levels of physical activity and knowledge were required to complete a task and one even enjoys the menial tasks (En3).

Volunteers participated in the ongoing tasks and maintenance of the garden and in helping with children and youth activity. One volunteer stated – *I enjoy gardening. I pot plants; join in building, composting and weeding. I check the bird feeder; check the levels of the ponds and check for vandalism* (Sc1).

Users gained experience in practical activities in making crafts, painting, cutting grass, making wooden bean poles. Growing plants successfully brought a feeling of achievement. Learning new skills was found to be both challenging and enjoyable. One user stated: *I have done some willow weaving, I quite enjoy that. Its hard work but I quite enjoy it* (Sc4).

Regular users knew what tasks needed to be completed each week: *When I arrive, I do the fire; I do a lot of things that I would like to do, as there is a lot of work to do* (En1). Being busy was enabled by having a diversity of tasks and choosing which task to partake in. One could then enjoy being alone or working in a group if one wishes.

Participation in planning events for the public was seen as a source of enjoyment. It brought a feeling of having a personal role in bringing the site to the public: *I really like it when we have public open days, meeting the public, selling plants and things, and planning for those kinds of events* (Sc1).

In Shanakill active participation involved having parties and having somewhere for the kids to go: *My kids use it. They use it whenever it is open. I go now and then for parties. It is a great experience* (Sh5). Nature was celebrated in the sites at Equinox and Solstice. In Scottswood rituals such as Wassailing were celebrated.

Physical health and **spiritual wellbeing** were found to have the least number of functionings of wellbeing for adult users. Although the health related aspects of urban agriculture's role in local food and organic food production has been purported (Garnett, 1996; Grant, 2003), physical health and the functioning of healthy eating was not seen to feature strongly for adult users. However, active adults did value growing organic food as they could then be aware of what they were eating. The more physical aspects of being physically active and having a healthy body feature more strongly. Adult users valued having choice of a variety of activities and learning to pace themselves when engaging in site activities. Although not seen as a 'key' capability and having the least number of functionings, adults valued having such a green space in an urban area which 'nourished the soul and the spirit' (Eg1). There was a sense of wonder and awe in nature and in growing activity. The space provided a serene space and activities such as weeding provided a repetitive and meditative practice.

9.4 Capabilities and Functionings of Youth Wellbeing

Youth Users	Stim	Exp	Psych	Enj	Soc	Purp	Ment	Phys	Sec	Spirit

Youth users (between age 13 and 19) in Moulsecoomb, Shanakill and Scottswood visited the sites on a weekly basis. Details of all of the functionings of welllbeing impacted on are detailed in Appendix L. The functionings most impacted on for youth users are detailed below in table 9.3.

Table 9.3 Functioings of wellbeing most impacted on for youth users.

Capabilities	Functionings
Stimulation	Having a sense of longevity and time passing
	Sensory stimulation
Purpose	Having an aim
Psychological wellbeing	Learning, communication and thought
	Gaining cognitive skills
Social wellbeing	Participation in social life and cultural activities
Expression	Feeling a sense of ownership
	Having opportunities for political expression (choice and opportunity)
Enjoyment	Experiencing pleasure

The functionings of stimulation found to be most influential in youth wellbeing were experiencing sensory stimulation; a sense of longevity and time passing. Having a sense of longevity and time passing was most influenced by learning about and maintaining plants, and noticing change in pond life through the year. Sensory stimulation can be broken down into tactile; visual; gustatory; audio and olfactory stimulation. Having diversity in pond life and also plant types, site activities, recycled site materials to reuse were found to bring multiple stimuli to the youth user.

Functionings of expression included having a sense of ownership, and political expression. A sense of ownership was found in planting, building and participating in artwork in the sites. Set maintenance tasks enabled ownership and a sense of care of youth users. Tasks may be of individual e.g. individual beds in Moulsecoomb or of a collective nature e.g. building ponds or other structures together. There was a sense of ownership in displaying art work made of recycled materials in the site in Shanakill. This was particularly the case for the Alternative Centre for Education (ACE) students in Moulsecoomb. Opportunities to be creative involved working with arts and crafts in Moulsecoomb and Scottswood but also opportunities to be both creative and destructive were valued in both sites in the form of building temporary structures in Moulsecoomb and then destroying them and smashing old materials to create art form recycled materials in Shanakill. Engaging in these activities also enabled pleasure and enjoyment and also expression. The capability of expression involved the eudemonic and long term elements of having a sense of ownership and the capacity to shape ones life. These functionings particularly involved the valued freedoms of choice and opportunity. This resulted in eudemonic elements of care for ones environment. Hedonic elements involved opportunities of exploration and discovery and to be both creative and destructive in building natural structures and creating art.

Key functionings of psychological wellbeing for youth users included learning communication and thought and cognitive skills of being resourceful; being challenged and enhancing self esteem. Learning involved mainly learning about and gaining skills of growing plants and building low tech structures with natural materials. This is enabled by having a variety of indoor and outdoor

growing spaces. Cognitive functionings of psychological wellbeing include being resourceful and being challenged. Values in being resourceful included using solar water heating, building with natural materials and use of multiple functions such as the pond (e.g. for leisure and pest control). Building with natural materials also enabled users to feel challenged. The functioning of self esteem was enabled by completing building tasks and also in participating in off site competitions such as the Shanakill art work made from recycled materials.

The key functionings of social wellbeing was participating in social life and cultural activities. The community location and collective activities and celebrating nature rituals and having the space to do so enabled this. The capability of enjoyment involved the short term affective hedonic values in experiencing pleasure.

The key functionings of purpose were having an aim and a sense that the site and site activities are important. These included opportunities to interact with nature and wildlife that the site provided and the freedom to be actively involved in a local green space, particularly for children and disabled groups. Activities seen as important were composting, organic methods and the compost toilet is seen as an important example of how the site does not pollute other environments. The functioning of having capacity to shape ones life included having a choice of green space and learning environment - of learning in an outdoor space.

Mental restoration, physical health and spiritual wellbeing had no key functionings of wellbeing with spiritual wellbeing having no functionings of wellbeing for any youth users. However, mental restoration included the functioning of having opportunities to relax. This was enabled by having benches by the pond or a fire hub. Mental restoration involved the inner affective elements of having the opportunities to relax enabled by site structures, having benches to sit by the pond, willow huts and natural structures. Functionings of physical health included eating healthily and physical health was enabled by learning to be resourceful in the site. Functionings of security included having control of resources which included learning skills to be self reliant particularly in growing food.

9.5 Capabilities and Functionings of Child Wellbeing

Child Users	Stim.	Purp.	Soc.	Enj.	Psych.	Exp.	Ment. Rest.	Phys. health	Sec.	Spirit.

Child users aged between 8 and 12 years in Moulsecoomb, Scottswood and Shanakill usually visited the sites on a weekly basis. The photographs and discussions showed that overwhelmingly the most valued activities are those related to stimulating environment which enabled them to take part in activities with other children and give them a goal or sense of purpose while at the same time being fun. The children showed pride in their achievements, the achievements of others, and of their space. They had a sense of the importance of reusing and

recycling; using features such as composting waste and an on-site compost toilet in the Moulsecoomb site. Details of all of the functionings of welllbeing impacted on are detailed in Appendix L. The key functionings that that were most impacted on are summarised in table 9.4 below.

Table 9.4 Functioings of wellbeing most impacted on for child users.

Capabilities	Functionings
Stimulation	Stimulating the mind – new ideas and ways of thinking
	Having a sense of longevity and time passing
	Sensory stimulation
	Having variety
Purpose	Having a sense that something is important
Psychological wellbeing	Gaining cognitive skills
Social wellbeing	Participation in social life and cultural activities
	Establishment of friendships and social networks
	Having a sense of community
Enjoyment	Having fun

Stimulation was enabled by having physical contact with plants and eating the plants. Waiting for the plants to grow enhanced a sense of longevity and time passing. The capability of purpose included having a feeling of achievement and a sense that something is important. A feeling of achievement also came from participating in shared tasks. The feeling that something is important was enabled by reusing and recycling, particularly in composting activities, and using the compost toilet and use of natural pest control such as the pond features. Many children felt features of the site such as natural habitats, solar energy, the compost toilet and reusing and recycling to be important and enhance eudemonic element of wellbeing for the child users.

Social wellbeing bore the key functioning of participation in social life and cultural activities. Children valued making items from recycled materials; eating together and sitting by the fire. The site provided the valued freedom of having a space to relax particularly by the pond and it also acted as a 'zone 1' communal hub, enhancing relaxation and mental restoration.

Functionings of enjoyment included being in contact with a diversity of plant, flowers, trees and vegetables, and having fun in site activities. These included creating site features such as scarecrows and murals from recycled material, building with natural materials and taking part in these activities with friends. For children enjoyment involves short term affective or hedonic functionings and valued freedoms.

For the functionings of psychological wellbeing, being challenged and learning and adapting new skills were enabled by older children (10-12) working hard in building structures and taking home yield in the form of flowers and vegetables. This involves mostly shorter term cognitive elements and experiences.

The capability of expression bore the functioning of a feeling of ownership, caring for and loving the site, and having opportunities for exploration and discovery. A feeling of ownership was enabled by having ones own growing plot. Caring for and loving the site included the valued freedoms of a diverse site with activities such as making arts and crafts from recycled materials. The Scottswood site in particular has a focus on interacting with bugs and creatures and this is the functioning of exploration and discovery. Flowers growing on the site brought a sense of security in Shanakill as a child user takes a photograph of marigolds in a raised bed in the site stating: *I chose these because they are colourful and because they are mostly the only flowers around here. Other flowers planted in the estate have been destroyed by people* (ShP2).

The capabilities of mental restoration, expression, physical health and spiritual wellbeing had no key functionings of wellbeing for the child users. As was the case with youth users; the capability of spiritual wellbeing was not impacted on in any way. The capability of expression did involve opportunities for experiencing ownership and opportunities for emotional expression for the children. The children felt healthy from eating vegetables and taking fruit and vegetables home. They valued seeing flowers grow. In having a contained site, children felt care involving outer elements of living in a good environment – enhancing a sense of security.

9.6 Wellbeing components of user capabilities and functionings

As discussed in chapter 2, the definition of wellbeing used in this research had inner and outer, hedonic and eudemonic, short and longer term components. The 'inner' (e.g. coping and enjoying life) and 'outer' (e.g. living in a good environment or being of worth to the world) life chances and life results (Veenhoven, 1998: 334), and hedonic and eudemonic components of wellbeing can be used in evaluating reflections the different site user groups had on their own wellbeing. For adult users the functionings of short term restoration and sensory stimulation both show shorter term affective elements of subjective wellbeing. Adult users valued relaxing 'in the here and now' but also have a sense of longevity and time passing with the site activities and the seasons – enhancing stimulation. Longer term eudemonic elements were also shown in having a sense that the site and site activities are important, having an aim and a sense of community. Learning involved both short term cognitive but also longer term impacts on stimulation of mind and being mindful in ones everyday life.

Youth users mentioned more eudemonic elements of wellbeing than child users. Youths also valued more eudemonic elements of being part of something for the wider community. They valued the opportunities and freedoms the sites offered with expression being one of the most valued capabilities of wellbeing. The functionings such as having a sense that something is important and the resulting impact on a feeling of purpose have more eudemonic components. Having a sense of longevity and time passing showed long term satisfaction, and both inner - coping and outer - living in a good environment. Values associated with a sense of ownership demonstrate eudemonic elements. Children made shorter term evaluations of their own wellbeing

focusing on having fun and enjoyment, but also care whilst in the site, anthropomorphizing animal activity, and thinking about friends.

Inner and outer components of wellbeing lead to both life chances and life results. Sustainably designed community garden sites contain activities which impact on but also bridge these different components of wellbeing, combining inner and outer, and hedonic and eudemonic evaluations. In examining both the singular and multiple impacts on wellbeing of the sustainably designed sites, chapter 10 examines all of the key site functionings. A concept of interbeings is developed to further explore the interface between inner and outer, hedonic and eudemonic evaluations of wellbeing associated with site activities. This balance between the self and the other, the inner and the outer and the way in which wellbeing is enhanced in the sustainably designed sites is discussed.

Chapter 10

Enhancing Wellbeing in Sustainably Designed Community Gardens

10 ENHANCING WELLBEING IN SUSTAINABLY DESIGNED COMMUNITY GARDENS

10.1 Introduction

As has been explained in chapter 8 and 9, sustainably designed community garden sites impact on singular and multiple capabilities and components of wellbeing. The unit of analysis has been the 'functioning' – the beings, doings, havings that people value and have reason to value in using the site. Functionings link sustainable design features to capabilities of wellbeing and therefore contain both sustainability and wellbeing components. In order to further examine how wellbeing impacts may be enhanced in sustainably designed sites, key site functionings termed 'interbeings' are divided into their various sub-functionings termed 'valued freedoms'. This set of valued freedoms is used to provide an insight into the core aspects of site activity which were found to impact on the wellbeing of site users (see Fig. 10.1).

10.2 Key functionings in enhancing wellbeing

Chapter 8 identified sustainable design features that impacted on singular and multiple capabilities of wellbeing. A number of these features were found to have most impact on wellbeing and can be termed key features. These key features have, in turn, a number of associated key functionings. Chapter 9 identified those particular capabilities most impacted on and these capabilities also have a number of identifiable key functionings. In this chapter, these two sets of functionings are combined to create a comprehensive and multidimensional set of 'key functionings' for sustainably designed community gardens. In order to distinguish these key site functionings from the original set of functionings drawn from literature and established to undertake the analysis, they are termed *interbeings*. **They are a set of beings, doings and havings that users value and have reason to value in using the sustainably designed sites.**

In order to firmly establish which functionings to examine, a median of the range of frequencies of both site features (Chapter 8) and of capabilities (Chapter 9) was taken for each user group (adult/youth/child) and used as the cut-off point in identifying 'key functionings' for each group (see Appendices J and L). The equal weighting given to each feature and capability (despite the range in frequencies) ensures a multidimensional approach to examining the enhancement of wellbeing whilst taking into account a range of sustainably designed features and processes. Each key feature was subdivided into its associated key functionings (Set A). This set was then combined with the key functionings identified in Chapter 9 (Set B). In combining these two sets of key functionings it was found that in fact, all of the capabilities and functionings of community gardens were included as key functionings (either from Set A or Set B) and can therefore be termed interbeings (see appendices J + L). In order to examine the range of wellbeing impacts, each interbeing was given equal weighting and segregated into the specific *'valued freedoms'* which the sites were found to provide (see Appendix M). The equal weighting given to each

interbeing also enables the list of interbeings to be developed by other users in the evaluation of wellbeing in other community gardens, or other sustainably designed settings.

The concept of freedom is one which is integral to the capability approach for evaluating wellbeing in that functionings are dependent on the freedom to enjoy valuable activities and states. These valued freedoms have been extracted and collated from the user coded interviews and provide further reasoning behind user's values in being involved in the site. In examining the valued freedoms (Appendix M), themes of choice, opportunity and learning in an ever changing and non-rigid design setting emerge. It was found that they collectively point to two different overall aspects of site activity – *agency and dynamic balance* – which are seen to be integral to the enhancement of wellbeing in the sustainably designed sites.

The terms are in keeping with the theoretical grounding of the research in ecological sustainability and the capability approach to wellbeing. As one of the key concepts of the capability approach to wellbeing, agency was integral to defining wellbeing and the formation of capabilities from the outset (Sen, 1999; Nussbaum, 2002). Likewise, dynamic balance is a principle of ecology (e.g. Capra, 2003) and was one of the concepts used in defining sustainability and as a consequence sustainably designed community gardens. In the context of this research, agency can be redefined as having choice and opportunity in learning and pursuing and realising goals that one values. The flux of dynamic balance was found to be enabled by continuous learning and design in a non-rigid and ever changing system, resulting in somewhat uncertain site processes and outcomes.

In analysing the key functionings and associated valued freedoms it was found that it is not the features and functionings themselves that contribute to the enhancement of wellbeing. The core of wellbeing enhancement in this sustainably designed context is the way in which these key functionings contribute to the interconnected aspects of agency and dynamic balance. The relationship between the terms site functionings, interbeings, valued freedoms, agency and dynamic balance is illustrated in Fig 10.1.

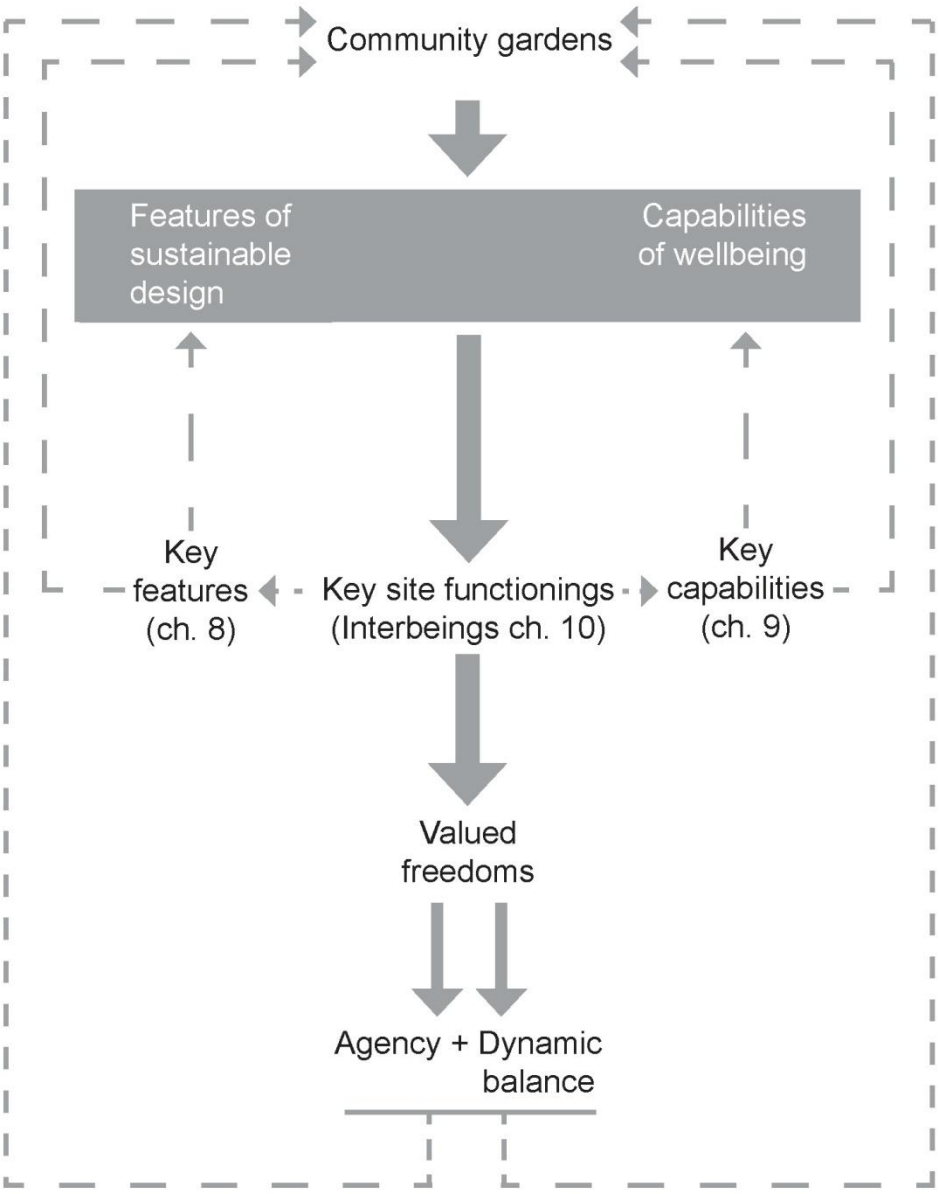


Figure 10.1: Development of concepts and core aspects in enhancing wellbeing in sustainably designed community gardens.

10.3 Interbeings, valued freedoms and the capability approach

As discussed in Chapter 2, people attach different meanings, values and derive different benefits from their environment. The capability approach (CA) used in this research uses a value based conception of wellbeing. The approach takes into account the freedom that people have to achieve the beings, doings and havings that they value. The approach looks to individuals as

agents of change in enhancing their own wellbeing. It focuses particularly on the individual ability people have to achieve the things they value.

This focus on the individual has been recognised and explored by a number of authors (e.g. Alkire, 2008, Robeyns, 2008). Robeyns (2008: 30) argues that the capability approach adopts what is called 'ethical individualism' in that individuals are the ultimate units of moral concern in evaluating wellbeing. In this way, the concerns of the group are not celebrated without taking into account individual agency and 'unfreedoms'. However, Robeyns asserts that the CA does not suffer 'ontological individualism', i.e. society is nothing more that the sum of individuals and their properties, nor does it advocate 'methodological individualism', that all social phenomena can be explained by individuals and their properties (ibid).

Alkire (2008: 8) states that in addition to individual action, the process of improving wellbeing often requires the sustained collective action of people. She argues that at an individual level people usually consult, discuss, and negotiate their goals with others, so their very own goals are socially influenced. As wellbeing goals may be both individually and socially influenced in this way, so too are the values and reasoning behind why individuals use sustainably designed community garden sites. Although subjective individual wellbeing has been examined in this research, it was found that the site functionings (termed interbeings) bridge inner and outer, individual and collective components of wellbeing.

For Robeyns (2003) the conversion factors converting individual opportunities into achievements are also influenced by one's environment. The interbeings developed are a comprehensive set of resources, activities and values enabled by the sustainable design in a particular type of local environment – community gardens. Interbeings contain and merge a sustainable design and a wellbeing component, and reflect how wellbeing may be enhanced in such sustainably designed sites.

In the same way that the CA broadens the informational space to evaluate wellbeing, the sustainable design of community gardens provides an opportunity for individual values relating to sustainability to be developed, affirmed, encouraged and realised. Using the CA in this context further develops the theory and language of Sen and his contemporaries within the discipline of sustainability. In this context the CA examines not merely the existence of sustainable resources for individuals but what such resources enable people to do or be. In applying the CA to this type of sustainably designed local environment – community gardens, in addition to agency, a particular aspect of design – dynamic balance was found to be integral to the enhancement of user wellbeing. Along with dynamic balance, a focus on agency, choice and opportunity provided by sustainably design features and processes emerged as core aspects of interbeings in enhancing user wellbeing. The way in which the terms interlink in the context of the capability

approach is illustrated in fig. 10.2. This diagram adapts the general conceptualisation of the capability space as illustrated in fig 2.1 to take into account the research findings.

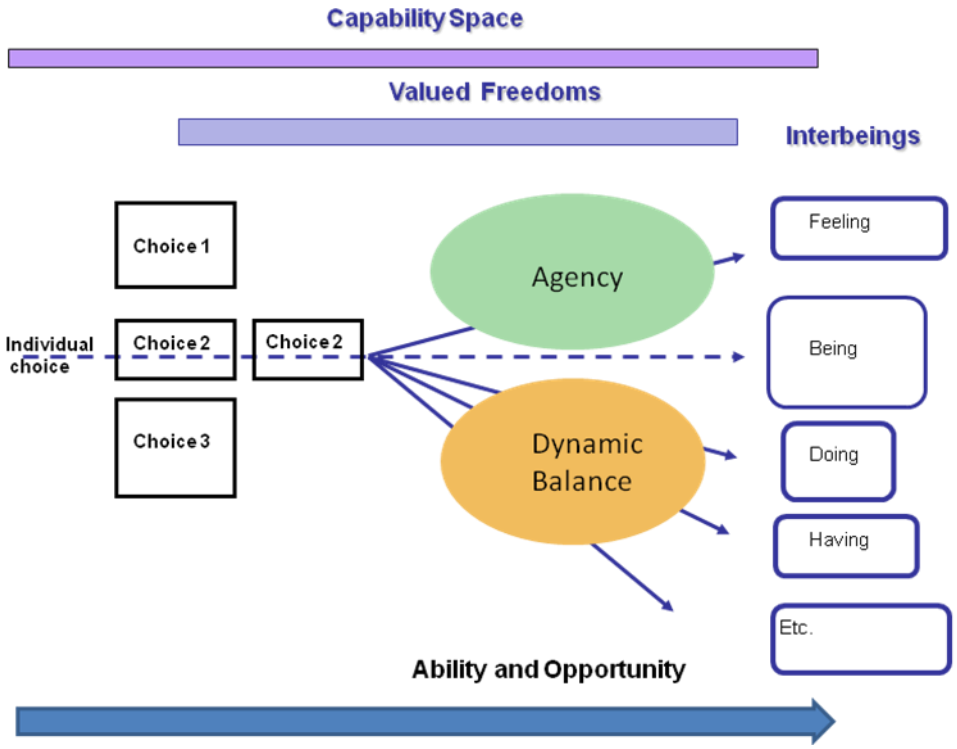


Fig 10.2: Specific conceptualisation of the capability space in sustainably designed community gardens.

10.3.1 Interbeings

An interbeing is a new concept developed in the context of the capability approach in a sustainable design context. As explained in section 10.2 above, **they are defined as a set of beings, doings and havings that users value and have reason to value in using the sustainably designed sites.** They link site features and processes to dimensions of human wellbeing, and in this way contain both a sustainability and a wellbeing component. Associated valued freedoms further explicate and unpack the reasoning and values behind each interbeing and how the values are enabled by site features and processes.

A number of interbeings are seen to transcend inner and outer, hedonic and eudemonic components of wellbeing. Adult users' senses are stimulated by the abundance of nature in the sites. This sense of love and amazement of the site was found to bring the individual closer to nature and to feel that one is part of the development of the site. In being involved with sustainable design features and processes active users engage with the evolution of the site, its changing vegetation, design and community. The site itself evolves and gains integrity over time

and users learn with the site, with other active site users and site coordinator(s). In this way ecological sustainability is enhanced.

This feeling of understanding nature's processes and how the user can learn to design with these processes is not one of domination, which is one of the nine ways in which humans view nature (Kellert and Wilson, 1990), but of interrelatedness (Bateson, 1972), and is the practice of ecological literacy (Orr, 1992) and sustainability literacy (Stibbe, 2009) as described in Chapter 3 – understanding the principles and organisation of complex, adaptive systems and applying this understanding to build a sustainable society. Although evident in all active adult users, such learning and interpretation of the sites was not found in either youth or child users. It is found to have a spiritual element for a number of adult users in that although the user understands the adaptive, complex ecological processes of the site and its limits, they are also in awe of the abundance of nature. Some users equate this with the transpersonal or transcendental and feeling of a greater power in nature.

It was found that users have opportunities to relax and lose their sense of time in experiencing 'flow' of thought (Csikszentmihalyi, 1990) in doing a task and co-existing with nature and in this way being mentally restored. It is this interaction with nature in combination with learning and being an active part of systems, features and ecological processes in the site that facilitates the user to apply 'adaptive learning', taking what they have learned in the site to their home or other environment. This is achieved by stimulating the mind in learning about how systems work and in turn the user is mindful about how the site works and how this can be applied to other settings.

Interbeings are evident in the way the site facilitated the capability of expression: to express oneself, expressing ideas, in influencing the environment positively and caring for others. In caring for 'others' – the local environment and people – users have a sense of achievement and purpose. They feel safe in having the opportunity to attend local events. Interbeings are also prevalent in the capabilities of enjoyment and social wellbeing. They include valued freedoms of enjoying watch things grow, of being active in sharing a task with another, volunteering, and celebrating events with others. The valued freedoms of social wellbeing were identified as interbeings in harnessing collective energies to work hard together towards a collective goal. In doing so site activities build community as people make friends and exchange ideas while participating in a shared task or goal. In this way interbeings transcend individual and more collective components of wellbeing.

For youth users, interbeings are in the form of having a feeling that the local and global environment was being cared for in reusing and recycling materials. Youth users admired the art work of other young users and other youth groups in the site. They valued the social interaction of working with others and feeling part of something. For child users, interbeings are prevalent in how the children valued being with other children and being stimulated by nature. Growing edible

plants and flowers were found to bridge enjoyment, fun and care for others and the local environment.

Such interbeings resonate with Gregory Bateson's view that we are not outside the ecology for which we plan, but are always and inevitably a part of it (Bateson, 1979). It also resonates with the idea of human ecology purported by Marten (2001) as a systems perspective in which human society and the environment functions as a self organising ever changing, adaptive system. Interbeings transcend both inter and intrapersonal elements and inner and outer elements of wellbeing. The concept also resonates with Nakamura and Csikszentmihalyi's (2003: 84) argument that a person's goals (the self) influence transactions with the environment (the other); but it is only through transactions with the environment that 'a self' will be realized, and Goodin (1992) argues that the continuity and context in which humans understand their individual plans and projects is linked to larger natural environmental processes.

The way in which interbeings transcend different components of wellbeing is explored by unpacking each interbeing into their various valued freedoms. It was found that the balance between the self and the other, the inner and the outer, is enabled by two core aspects of site activity and development – agency and dynamic balance. It is the combination of these two aspects of the key site functionings (interbeings) that were found to be integral to the enhancement of wellbeing in the sustainably designed sites. These two aspects are not mutually exclusive in that they can each be associated with the same interbeings and valued freedoms. However, each of the two aspects was found to be particularly associated with certain interbeings and associated valued freedoms.

Agency

In Chapter 2, agency was defined as the ability to act and bring about change (Sen, 1999) and to pursue and realise goals that he/she values (Nussbaum, 2002). In developing a list of wellbeing capabilities in Chapter 5, agency formed part of the development of each of the ten wellbeing capabilities. Agency has previously been identified as a benefit of using community garden sites in the UK (Holland, 2004) and Western Australia (Stocker and Barnett, 1988). The way in which agency was associated with site interbeings for each user group demonstrates that both individual and collective agency are key components in enhancing wellbeing particularly for adult and youth groups.

Having opportunity

For adult users, valued freedoms demonstrated agency in having opportunities to enjoy actively using their local green space. The wellbeing capabilities of expression, mental restoration, security and purpose had particular impacts on agency in generating opportunities to be creative, use imagination and express ideas in influencing and caring for one's environment.

The sites offered opportunities for mental restoration through places to relax in green surroundings. The sites also offered safe and secure environments for children to play. They are an opportunity for the user to be away from the city if this is what one values, where nature is offered as a tool for recovery. The user has the freedom to choose particular tasks and has the option of avoiding group activity if he/she wishes. In this way active users may discover their own bodily limits. Eating and learning about food, organic growing and herbs was also found to provide users with tools to enhance their own bodily health.

Agency is seen in the wellbeing capability of purpose in having a goal and ability to change one's life and environment if one wishes. Users had an aim and a sense of achievement in reusing and recycling, and caring for others and the local and global environment. Opportunities to realise goals that the user values is seen in the functionings of 'having a sense that something is important' such as being resourceful, having green and natural habitats, learning to grow food and having a community space. The functionings related to having the capacity to shape one's life and continually learn, facilitate the ability to act and bring about change in the life of the active user. Positive feedback in the form of finding solutions to on-site problems and success in growing, and achievement of both formal and informal learning, enhance self esteem as well as purpose – enhancing psychological wellbeing.

Young people's valued freedoms had agency as a dominant element with expression, psychological wellbeing and purpose most enhancing agency. The young users also had a great sense of care and felt that some activities in the site were particularly important. In this way, they can pursue goals they value and have reason to value. These include interacting with nature and wildlife, being actively involved in local green spaces, composting and learning about organic food and using the compost toilet so as not to pollute other environments with site waste. Opportunities to participate in site activities and having set tasks to do enhanced a feeling of ownership and care. The youth users feel ownership in displaying their art and building physical structures in a community space. For child users, agency was most evident in having one's own plot to grow, having space to display art work, making art and crafts with recycled materials, interacting with nature, and having a space to relax and 'chill'. Others valued having opportunities to play in challenging willow structures and having flowers that were often not found in their residential environment.

The role of learning

Learning was found to be an important aspect of having both the ability to act and bring about change in one's life and local environment and also in pursuing the goals that the user values. The sites were found to provide a learning environment close to where people live. Experiential learning (enabling a more direct participatory learning experience through the active engagement of the learner) (Orr, 1992) meant that the user was 'learning by doing', a form of learning which is

not often a part of formal education. In participating in practical activities and processes within the site users learned practical skills in 'making connections' and finding solutions in site observation and organic growing and building with waste materials. Such skills were applied successfully outside the site boosting confidence and self esteem in rising to a challenge. Shared learning in the exchange of stories, plants and sometimes materials between site users created a support network, a collective agency. The capability of social wellbeing is also seen in the opportunity to harness collective energies and to build community, producing the feeling of being included and having shared goals.

The ability to bring about change and to pursue the things that he/she values was found to impact on the capability of security. All of the valued freedoms of security had agency influences in feeling safe and having the freedom to use the environment and feeling the local area is cared for. Passive users valued having such a local green space and a space for local youth and children to be. The capability of security is linked to expression in having control over local resources – valuing having a free space where one does not have to spend money and consume, and where one has the opportunity to learn about growing food and being self reliant in food production.

Some users valued learning to be self reliant and learning to adapt skills to one's home environment. However, users also valued collective activity in the site, and in particular the exchange of plants and ideas about growing, building and design. For child users, being involved in practical learning, activities and having set tasks and seeing them to completion enhanced self efficacy and self esteem.

Having choice

For active adult users, discrepancies and contradictions in choices and valued freedoms were evident in the research findings. It was found that users wanted to choose different functionings depending on their basic capabilities such as health and energy levels and how they feel at a particular time of day. A summary of choices and valued freedoms identified in site activities are listed below:

- Having the choice to be slow in one's task but also be busy and active.
- Having the choice to be alone but also to be with other people.
- Meeting like minded people but also being with people you would not normally meet.
- Having the choice of a variety of tasks stimulates the users but having the choice to work on a particular single task matches one's physical capability on a particular day.

The youth users felt that they had a choice of what to do in the site, to be able to learn somewhere outside of the classroom and have the freedom to be creative but also destructive in weeding and pruning plants, e.g. in destroying old crockery to make art, and in building and then

taking apart temporary structures. In this way the dynamic nature of the site stimulated the young user while in turn integrating them into site processes. The sites also offered opportunities to relax and disengage from dynamic site activities.

10.3.2 Dynamic Balance

As discussed in Chapter 3, *The Limits to Growth* sought out planetary conditions that were sustainable – i.e. able to continue indefinitely (Meadows et al., 1974). Sustainability in the model purported in *The Limits to Growth* is in systems language equivalent to 'dynamic balance'. In their model, sustainability was achieved when growth stopped but development continued. The ecological economist Herman Daly once called this condition a 'steady state', but Atkisson (2011a) argues that there is nothing necessarily steady about it. He asserts that the more important word is 'dynamic', i.e. change continues to happen – radical change, in the direction of radical improvement (ibid: 126).

In *Beyond the Limits*, the sequel to *The Limits to Growth*, a sustainable society is described as one that can persist over generations (Meadows et al. 1992). However, Atkisson (2011a: 129) argues that no society persists forever, just as not even the healthiest person can live forever – sustainability is therefore an ideal, like health, or even freedom or justice. The goal therefore, Atkisson states, is 'to be as sustainable as possible' (ibid).

The sustainably designed community garden sites evolve with people, seasons and the change of infrastructure and site structures. The non-rigid and contained features of the sites enable the site to mature and develop more complex structures and processes with greater diversity, more cycling of resources and more complex levels of user activity. In this way, an ecologically sustainable community garden may therefore be seen as a flexible, ever fluctuating network, or a complex adaptive system as defined by Kibert et al. (2002).

This flux involves changing dynamics between people as they come and go and as the seasons change. Flexibility is a consequence of multiple feedback loops that keep the system in a state of dynamic balance. Having something to resolve on each site, such as what to do with waste resources, or experiencing the failure of one crop due to soil or exposure to elements, indicates the need for change and evolution. Such feedback is essential for the site to evolve and thrive and gain integrity as a system. This learning was found to enhance both psychological wellbeing and stimulated the mind to think differently. Team coordinators manage and facilitate change in each of the sites. Decisions are made and there are successes and failures as a result of positive and negative feedback. In this way the sites adapt and have their own learning capability. In having mixed groups, a variety of activities and rich ever changing vegetation, the sites were found to be dynamic and vitality and stimulation enhanced.

There is diversity in crops grown, people and activities. There is always a constant flow of energies into and out of the site. This ensures that no one person becomes exhausted or if a particular crop fails that there will be other crops to harvest and that there is a range of activities to keep users interested. If there is a deviation in the site such as crop failure or an absence of site participation, then a change is needed perhaps in a different form from before, so the site will survive. From analysis of the users' valued freedoms, dynamic balance is most evident in the following ways: designing in systems of reuse and recycling of waste and energy; having a non-rigid design; successional and seasonal growth; creativity and disappearance and a role of learning. These are discussed in turn below.

Design in systems for the reuse and recycling of waste and energy

The enclosed nature of the sites makes the processes of having dynamic balance, links and diversity easier to observe. The ethos of reusing and recycling in the site ensures the dynamic balance of feedback loops. The flux in ecological cycles is a result of reusing local and on site materials which drives the activities in the site. Each site is anchored in place with a restricted amount of resources meaning that waste resources in the site are maximised. Activities in the site therefore gain momentum and integrity in that links and partnerships are forged to maximise user participation, while maintaining the dynamic balance of both a rich ecosystem and balanced but fluctuating systems for the reuse and recycling of waste and energy.

Having a low tech, balanced system means that the sites rely on continuously forging links between the active users and the different parts of the site and the different features of the site. In this way the user is continually learning and there is vitality in having an ever changing environment which was found to enhance stimulation and the energy to continue working in the site. There are multiple feedback loops and the system is in a state of dynamic balance to maintain a balanced system. Having such a balanced system is not a final goal but is a process, a state of dynamic flux. One solves problems in the site as one is restricted in using a certain amount of resources and in this way cognitive functioning is enhanced.

Having a non-rigid design and management

Having a non-rigid design facilitates the emergence of somewhat uncertain site processes and outcomes. In this way the sites reflect nature's processes of non-equilibrium self-organising dissipative structures where specific processes which emerge are uncertain (Kibert et al., 2002). Having set maintenance tasks, such as weeding, turning compost, mulching, and preparing the ground, keeps the system in a state of dynamic balance. However, there is a non-rigid structure to tasks given, in order to ensure that the tasks and maintenance are completed and the users can match a task to their particular mood or energy level. The non-rigid and flexible design of the site gives a relaxed feeling as the site evolves organically. Users begin to understand the processes of nature and of working within a sustainable design process where one is challenged to work within a set of design limits which are set by nature.

During times of adaptation and flux, ideas emerge and this brings the opportunity to be creative. Continuously working with the site as it evolves was found to bring new challenges. User's problem-solve and are resourceful, which was found to enhance cognitive function and psychological wellbeing. Having such an ever changing site brought a sense of evolving timescales and a sense of longevity and time passing and stimulation.

The non-rigid design meant that the site never looked the same at any one garden day from week to week particularly during the growing season. A non-rigid design process meant that users noticed change and this also brought a sense of longevity and time passing. The systems constantly changed as energy is passed through zones and sectors and upward through stacking and successional growth. Users were inspired by the abundance of nature which brought an opportunity to use one's imagination.

Successional growth

Users experienced diversity and were found to be stimulated by the changing site activities and changing seasons, but also felt a sense of control and purpose in having ownership in regular maintenance and particular site tasks. In the same way the seasons brought a sense of stability, longevity and time passing, but also dynamic flux in new life. Noticing change included noticing abundant growth, seasonal and diurnal change. The sites had evolved and changed with time in order to maintain itself and its integrity as an ecologically sustainable space. The designs evolved during this time and the condition of the soil changed. The sites also changed in terms of the people who use them and the amount of times they return over different periods, take a break and perhaps return the next year. Users maintained the sites on a regular basis, which meant that they get to know the space, got involved and met the community. Being involved on a regular basis over time meant that user noticed a difference and this brought a sense of longevity and time passing enhancing stimulation.

Multiple feedback loops in the form of predator/prey relationship keep the pests away from the growing food and hence the site in a state of productivity. Not only does wildlife gardening in the site have a function in this way but it was also perceived to be a stimulating and also a relaxing environment to be in. The garden then was found to give users more energy to work and return to the site with ideas and inspiration.

Dynamic balance of growing and user activity was achieved in the sites through wildlife gardening. This dynamism is due to the rich biodiversity. This is enabled by features in the sites such as ponds, spring and summer meadows, woodland and successional growth. It is a stimulating environment for working and meeting people and learning, but also enjoyable and was found to bring relaxation. For children dynamic balance and enclosed nature of sites was

found to bring a sense of wonder and awe in nature. Biological pest controls maintains dynamic balance in controlling pests and growing food.

The forest garden is a self sustaining growing system. The successional growth of the site enhanced longevity and time passing and sensory stimulation. Child activities included maintaining the site, such as coppicing in the forest garden and in the woodlands. Children in particular noticed change within ponds and gain multiple benefits from learning from and being stimulated by ever changing pond activities. Nature's dynamic balance is used as a model to work within environmental limits and in this way is used as a gauge of the sustainability of on-site activities.

Creativity and disappearance

There is a sense that the plants need to be taken care of and a sense of ownership and responsibility. This brings a sense of purpose. The young users of the sites participate in art and crafts using local and on-site materials. This included making murals with broken tiles and taking apart recycled items to make art. Smashing tiles is seen to be a destructive activity but emerged as a creative activity in the murals created. The concept of disappearance is also seen in the building of temporary natural structures and then the destruction of these structures directly after – emphasising the process of building and construction rather than the end product.

A role of learning

The informal and dynamic participatory nature of the space meant that one is constantly learning new things in the site. This enhanced stimulation of the mind. Users learned new skills and apply this learning elsewhere. The site user then returned to the site, exchanging new ideas and experiences. Due to physical activity and learning, a feeling of vitality ensued which enhanced energy and an incentive to work outside the site in using skills and creativity. The sites were found to be ever changing and therefore needed to be cared for and maintained on a regular basis. This created a perception of the environment as being cared for and enhanced a sense of security in one's local area.

Interbeings, agency and dynamic balance

Learning was found to be an integral part of both agency and dynamic balance. This indicates a role of the sustainably designed community garden sites in sustainability literacy – what Stibbe (2009: 10) refers to as the skills, attributes, competencies, dispositions and values that are necessary for surviving and thriving in the declining conditions of the world in ways which slow down that decline as far as possible.

As detailed in Chapter 2, in his structuration theory, Giddens (1984) rejects the dualism of structure and agency and stresses instead their interconnectivity. Structured forms are not developed independent of agency and he states that 'structure is not external to

individuals…structure is not to be equated with constraint but is always both constraining and enabling' (ibid: 25). Giddens also refers to the reflexive monitoring of daily activity and feedback which creates conditions for further acts (ibid: 21).

Interbeings also reject this dualism of structure and agency in that they comprise of interconnected notions of agency and dynamic balance. However, this empirical research only examines a particular type of environment and judgements about application of findings to users' day to day activities outside the sustainably designed sites cannot be made.

Agency and dynamic balance were found to be the result of both sustainable design features and processes including management processes. The design features and associated functionings may not in themselves enhance wellbeing but it is how they contribute to agency and dynamic balance that is important in enhancing wellbeing. In this way, particular design features could be implemented in a site with different management processes, and different results could emerge in terms of wellbeing.

10.4 Conclusion

The loci for this research – community gardens – contain sustainable design features and associated interbeings which transcend both inner and outer, hedonic, short term, affective wellbeing, longer term and eudemonic components. These interbeings may be applied and operationalised in the evaluation of wellbeing in other community garden sites or other sustainable design settings. Turning life chances – individual opportunity – into action links individual and collective agency, and fills a value-action gap. It is the combination of both agency and the dynamic balance aspects of sustainable features and processes that enhance human wellbeing in community garden sites.

Chapter 11

Conclusions

11 CONCLUSIONS

11.1 Review of research

This research investigated wellbeing impacts of sustainably designed community gardens using a capability approach (CA). In doing so it examined wellbeing impacts of sustainable design features and processes in five community garden sites in the UK and Ireland. Based on the empirical findings from these five study sites, the thesis argues that whilst certain features of sustainable design enhance wellbeing, other features have less bearing. In the same way, certain capabilities of wellbeing are more affected than others. The ways in which these wellbeing impacts are achieved are the main outcomes of this research. These outcomes have been outlined in Chapters 7 to 10 using a combination of theoretical understandings and an innovative methodological approach to operationalise the CA in a sustainably designed setting. In this way, the findings are indicative and provide evidence for the process undertaken and the results formulated which, in turn, refine the theories and research tools and methods developed.

In investigating wellbeing impacts of sustainably design community garden sites using a capability approach, five research objectives were purported. A number of steps were taken to address each objective and these are detailed below. The objectives remained largely unchanged but were refined during the research process. A distinction can be made between two sets of data. The first being the establishment of principles, sub principles and features of sustainable design and capabilities and functionings of wellbeing developed in part one of the thesis (chapter 1-6) and secondly, the end user participant views as developed in part two of the thesis (chapter 7-10).

Objective 1) To establish sustainable design principles and sub principles for community gardens.

Chapter 3 provided a discussion of sustainable design in the context of ecological sustainability. This discussion was undertaken in order to trace the practical realisations of this particular approach to design. A description of the theoretical and philosophical origins of ecological sustainability contributed to forming a definition of community gardens as sustainably designed spaces in Chapter 4. Chapter 5 provided further theoretical and empirical evidence for the establishment of principles and sub principles of sustainable design for community gardens. These principles and sub principles were refined, affirmed and called into question in taking account of the responses of the end user during the analysis stage of the research. A final set of principles and sub principles of sustainable design which include the end user participants views were produced in chapter 8 (see Appendix J).

Objective 2) To develop wellbeing capabilities associated with these spaces.

Chapter 2 provided a discussion of the basic conceptions of wellbeing, introducing the CA as the value based conception of wellbeing to be used in this research. The language of the CA was explained. These terms were used to provide a set of capabilities and functionings of wellbeing to be developed in Chapter 5. These capabilities were used to inform the research methods in Chapter 6 providing a methodological framework for evaluating wellbeing in community gardens. The capability approach was operationalised by using the qualitative methods of semi structured interviews, and participant-led photography and video. The provisional set of capabilities and functionings of wellbeing established in chapter 5 was refined during fieldwork to include the end user participants' views. This refined set of wellbeing capabilities for sustainably designed community gardens is detailed in Appendix L.

Objective 3) To identify key features of sustainably designed community gardens.

Chapter 7 provided information on the five case study sites. A site survey (Appendix B) was undertaken in each site using observation, secondary data and an interview with each site organiser/gardener. The site survey was built on to create a more refined set of features of sustainable design for community gardens. This information was used as a basis for understanding site processes and features for undertaking the interviews and participant-led visual methods in the field. The resulting survey checklist (Appendix H) also served to revise the set of sustainable design principles and sub principles as developed in chapter 5. These were further refined in the analysis stage of the research taking into account the views of the end user participants. A final set of features of sustainable design was produced (see Appendix J).

Objective 4) Using community gardens as a locus, to identify any links which may exist between features of sustainable design and human wellbeing, and subsequently to identify the core principles and features that have the most positive impact on different capabilities of human wellbeing;

The results of the fieldwork were in the form of five site survey checklists, 47 interview transcripts, 12 sets of photographs and 11 sets of video footage. The information provided was coded for functionings and resulting impacts on each capability. A qualitative description of those features of sustainable design which impacted on single and multiple capabilities was provided in Chapter 8. Principle 4 – Design with nature was found to have the most impact on wellbeing for all user groups. Specifically, it was found that producing a yield in the form of growing edible plants, impacted most on the wellbeing of all user groups. Although the nutritional health related aspects of food growing in urban areas has been purported (Garnett, 1996; Grant, 2003), physical health and the functioning of healthy eating was not seen to feature strongly for adult users. However, active adults did value producing a food yield, particularly growing organic food as they then felt

that they could be aware of what they were eating. Adult users also valued being involved in collective activities and being part of reusing and recycling activities in a community site. Both youth and child groups valued activities relating to the reuse of local and on-site waste materials and the activities surrounding wildlife gardening such as pond life. This findings affirm Pollan's assertion that the current concept of 'health' in relation to food is too narrow and a much more broad definition of health is required in terms of eating – one which links culture, politics, and environment (Pollan, 2008).

Objective 5) To identify best practice in sustainable design in terms of enhancing wellbeing.

Chapter 9 explained how the key capabilities of wellbeing were impacted on. The two capabilities most impacted on for all user groups were stimulation and purpose. Key functionings derived from Chapters 8 and 9, termed 'interbeings', were found to have a number of groupings of associated valued freedoms. The diversity of valued freedoms was distilled into two aspects – agency and dynamic balance, which emerged as the essence of enhancing wellbeing in the sustainably designed sites. Viewing sustainable design and resultant valued activities as an integral part of enhancing human capabilities, calls for greater consideration of how the capability approach can be used in the evaluation of wellbeing in different types of sustainably designed spaces.

The purpose of the remainder of this concluding chapter is threefold. The findings presented in Chapters 7 to 10 included a set of sustainable design principles and features; a set of wellbeing capabilities and functionings for sustainably designed community gardens and a description of the way in which wellbeing is enhanced in the sustainably designed sites. In section 11.2 these innovative and new findings are discussed for their benefit to research and practice. Next, these findings are synthesised to shed light on the literature review chapters and the theoretical underpinnings of the research. The research limitations are then explicated and the way in which the research may continue onwards in future projects is suggested.

11.2 Implications of findings

Results from this study provide practical design solutions and best practice regarding the wellbeing impacts of community gardens of a particular type – those that are sustainably designed. This research of wellbeing impacts of sustainably designed spaces provides findings to revise each of the five principles of sustainable design. The first principle – solutions grow from place (Principle 1) emphasises the importance of locality and relationality specific to a particular place. Although each of the sites had place-specific solutions in terms of soil, waste and energy resources, and people, networks and partnerships, they do have similar patterns of activity, associated functionings and impacts on wellbeing.

Rather than quantifying energy and waste inputs and outputs (Principle 2 – Ecological accounting informs design), an ethos of reuse and recycle is enabled by thinking systemically. It is this way of thinking that urges people to apply what they have learned to other spaces outside of the site such as the home environment.

The sites contained both natural and designed-in sustainable processes. Users learn from and experience nature's processes first hand. Making nature visible (Principle 3) in the sites, although seen to have relatively more functionings for youth and child wellbeing, provided both a relaxing and naturally stimulating environment for all groups of users to learn skills and have direct experience of working with nature's processes. Site outcomes and results were yielded by undertaking collective activities (Principle 4 – Design with nature). The emphasis on collective activities and exchanging ideas, tasks and learning together, and the interbeings that arise from this, may go some way towards working against a risk society in which individuals are not responsible for taking collective action in the environment (Beck, 1992). Instead, interbeings may go some way towards generating what Massey (2007) describes as a local relational agency which is rooted in recognisable interdependence.

Principle 5 (Everyone is a designer) emphasises active participation, empowerment and a role of learning in design. The central role of agency in sustainable wellbeing calls for greater emphasis on learning, opportunities and the ability to choose.

This research first examined these principles and associated sub principles in context in each of the five case study sites. Focus was then shifted from each site context to an analysis of sustainable design features and capabilities of wellbeing in all of the sites combined. Features of sustainable design and capabilities of wellbeing for such spaces were developed and used to analyse the wellbeing impact of such sustainably designed spaces. In order to draw conclusions from analytical research, emphasis was placed on the key features and capabilities and resultant functionings of wellbeing impacted on.

Findings indicate that, based on the empirical evidence from five study sites, whilst certain features of sustainable design appear to enhance human wellbeing (e.g. producing a yield and collective activities) others seem to have less impact (e.g. use of passive solar energy, water saving techniques, inclusive design and decision making). In the same way, some capabilities of wellbeing were found to be more influenced (e.g. stimulation, purpose) than others (e.g. health and spiritual wellbeing). In carrying out the research, a number of outputs and processes have been developed:

- A table of sustainable design principles, sub principles and features for community gardens.

This table (Appendix J) provides practical sustainable design features and processes which impact on wellbeing. Such information is of use to community garden designers, educators and

user participants. The distinction between the three user groups (adult, youth and child users) is of use to those who may wish to focus community garden activities to a particular age group such as youth/child users.

- A table of wellbeing capabilities and functionings for sustainably designed community gardens.

This table (Appendix L) may be of use to individuals involved in institutions or community groups who specifically wish to enhance wellbeing in the establishment of a community garden. The way in which each capability has been explicated means that the garden coordinator(s) can aim to focus on or enhance a particular dimension of wellbeing such as security or psychological wellbeing.

- A methodological framework to reflect on and evaluate wellbeing in a sustainably designed context.

This approach merging the CA to wellbeing with sustainable design may be of use to other research aiming to reflect on or evaluate wellbeing in a particular sustainable design setting (see summary Fig. 6.1).

- A set of key features of sustainably designed community gardens which were found to most impact on wellbeing.

This set of key features provides information to designers and coordinators of sustainably designed community gardens on ways to maximise wellbeing in the sites (Appendix J).

- A set of wellbeing capabilities and functionings which were found to be most influenced.

This set of key capabilities and functionings provides information to the designers and coordinators of sustainably designed community gardens on ways to maximise wellbeing in the sites (Appendix L).

- The essence of enhancing wellbeing in this sustainably designed context.

The emergence of two interconnected notions of agency and dynamic balance (Fig. 10.1) provide insight into the essence of the enhancement of wellbeing in sustainably designed community garden sites. The list of sustainable functionings – 'interbeings' as described in Chapter 10 – may be used as a starting point to evaluate wellbeing in other sustainably designed spaces.

In addition to the processes and outputs described above, a number of general policy recommendations can be advised. Chapter one placed community gardens in the context of UK green space planning policy. It is one typology of green space listed in PPG 17(ODPM, 2006). This research shows that sustainably designed community gardens are multifunctional (food growing, learning, community spaces) with multiple impacts on wellbeing. Planning regulation needs to recognise the impacts of sustainably designed community gardens not just as beneficial green spaces (PPG 17) but also on other planning guidance and policy statements in delivering sustainability and wellbeing such as delivering sustainable development (PPS1); planning and climate change (supplement PPS1); planning for a natural and healthy environment (draft PPS). Zoning and policy recommendations need to be further refined to take account of the multiple impacts of such sustainably designed spaces in urban areas. As producing a food yield was

found to have most impact on all user groups, the inclusion of community gardens in a planning zone designated and designed in an integrated way for food growing activity is a recommendation of this research.

The research has shown the emergence of two interconnected notions of agency and dynamic balance in providing insight into the essence of the enhancement of wellbeing in sustainably designed community garden sites. Such an ever changing, non rigid and user led approach perhaps does not bode well with the current political and planning boundaries and zoning tools which are rigid and disaggregated with public and private agencies making disparate decisions according to their own remits rather than that of local communities (Barton, 2000). With a focus on agency and demonstrating the transformational capacities of flux and change, sustainably designed community gardens may therefore play a role in the implementation of the governments new Localism Bill (HL Bill 71-1). This Bill promises to shift the balance of power from central government back into the hands of individuals, communities and local councils with packages including community empowerment; a radical re-boot of the planning system including neighbourhood planning; and decentralisation and strengthening of local democracy.

The implications of the research findings for the theoretical development of sustainability and of the Capability Approach are discussed below.

11.3 Sustainable wellbeing – a capability approach

Using the Capability Approach to research wellbeing impacts of sustainably designed community gardens' has provided an opportunity for individual human values relating to sustainability to be developed, affirmed, encouraged and realised. However, Sen's CA has been criticised for being too individualistic as a framework for evaluating human wellbeing. Although this research focuses on individual subjective wellbeing, collective capabilities such as social wellbeing have been taken into account in so far as they were found to impact on individual wellbeing. In addition, the locus of the research – the community garden – is, as the name indicates, a shared communal space encouraging social interaction and collective learning, purposefully forging links between individuals and between individuals and the environment.

This research contributes to the development of the capability approach in that it has demonstrated how the sustainable design of the sites merge individual, collective and environmental capabilities in a particular setting. The contained nature of community garden sites provide both a physical and conceptual manifestation of the collective capability space in which activities are undertaken and decisions made to enhance both sustainability and human wellbeing.

The research demonstrates how the environment in itself has capability. Holland (2008) has advocated the recognition of the environment as capability, in placing a specific value on environmental assets and evaluating environmental policy in the context of wellbeing. However, Holland's approach still focuses on the environment as apart from and not an integral part of human capability and wellbeing. In order to enhance both sustainability and wellbeing, this research demonstrates the need for methods to evaluate the inclusion of the environment as an integral part of all human capabilities. This calls for further research on how the capability approach and sustainable functionings - 'interbeings' can be used in the evaluation of wellbeing in different types of sustainably designed spaces.

This research provides a set of interbeings which unite and enhance both sustainability and human wellbeing and are particular to a sustainably designed community gardens. However, a focus on the way in which interbeings contribute to agency and dynamic balance rather than on the set of interbeings themselves is the essence of enhancing wellbeing in the sustainably designed setting.

11.4 Sustainable design – a capability approach

Based on the CA, a framework has been devised to evaluate principles of sustainable design that support wellbeing. In doing so, the thesis began by first investigating individual human wellbeing and the wellbeing impacts of sustainably designed community garden spaces. Although an initial focus was on interpersonal wellbeing, the findings showed that the sustainable functionings 'interbeings' (which merge inter- and intrapersonal functionings) should be the starting point for reflecting on wellbeing in a sustainably designed setting. Such interbeings have agency at their core and enable the individual to cope with a fluctuating ever changing dynamic environment, one which develops partnerships with non human and human aspects of nature. In this way the sustainably designed spaces may facilitate what Orr (1992) refers to as an active competent citizenry in encouraging ecological sustainability. Furthermore, as this research has shown in enhancing sustainability and wellbeing, feedback in the form of success and failure of site outcomes and outputs was found to maintain dynamic balance between each site and its users. Such dynamic balance is facilitated by a non-rigid design and a site manager who creatively responds to change. Both agency and dynamic balance combined were therefore found to be the essence of enhancing wellbeing in the sustainably designed setting.

Forman (2008: 60) has described sustainability concepts as focusing on the long term, over decades or generations, but with usual planning and design horizons often only lasting a few years or a couple of decades in contrast. Furthermore, it has been suggested that the psychological differences in using different environments depend upon people's varying attitudes and lifestyle which change over time, and individual capabilities cannot be related simply to the biological and physical environment (Howarth, 1976). In the context of this research, in as far as

each capability of wellbeing has human agency at its core, it also has the environment. Both elements should be taken into account when reflecting on wellbeing in a sustainable design setting. The points of interface between inter- and intrapersonal functionings of human wellbeing are managed by exchanges between individuals, and between individuals and the enabling environment. It is a continuous and ever changing process of dynamic balance in undertaking momentary tasks over time.

11.5 Limitations of the research

The findings presented in this research are indicative in they that provide empirical evidence as a result of the research processes which, in turn, expand on and refine the theories and methods outlined in the thesis. Research based on a small sample from five study sites may be criticised on the grounds of the limits to which one can generalise from a small sample to large populations. In this way, the findings are not sufficient to provide universal rules or statement of fact for sustainable design and wellbeing. Such generalisations may be made possible by the application of larger scale, more quantitative methods and analysis. In this way, as a result of the use of in-depth qualitative methods applied in this research, the research findings cannot be generalised and applied to all community gardens, but can be applied to community gardens of a particular type – those that are sustainably designed.

However, Mitchell (1983: 188) argues that such criticism arises from a misconception of the basis upon which the analyst may justifiably extrapolate from such a small sample to the social process in general. Mitchell says, the 'validity of the extrapolation depends not on the typicality or representativeness of the case but upon the cogency of the theoretical reasoning' (ibid: 207). Therefore, it is possible that the results of this smaller case sample may be generalised based on logical inference to theory (Mitchell, 1983; Yin, 1989: 21). In using such a qualitative approach, a depth of understanding of wellbeing in this particular context is provided. Furthermore, the innovative conceptual use of the CA and the notion of 'interbeings' may be applied to other sustainably designed sites, and used by other researchers in the fields of sustainability and wellbeing. In addition, the methodological approach to operationalising the capability approach and examining wellbeing may be adapted to other sustainably designed spaces.

Additional limitations are evident in that the coding system used was not tested for inter-rater reliability and therefore, perhaps, subject to the researcher's bias. The use of an independent coder to rate an identical set of primary data would have removed such potential subjectivity. Furthermore, constraints of a restricted time period with limited access to sites and resources placed further limitations on the research. For instance, all of the sites were in urban residential areas, were registered with the Federation of City Farms and Community Gardens and were sustainably designed. In this way the researcher endeavoured to keep external factors constant in the choice of study sites. However, each site was unique in its location, development and form and the identification of identical contexts and forms would not have been possible. A larger

sample of sites would have required more time and resources than were available. In addition, the particular personality of the site coordinator(s) was not taken into account, hence subtleties of individual character and resultant tacit impacts on site development and resultant impacts on wellbeing were not integrated into the research methodology or findings. However, recommendations for the way in which the gardener/coordinator should manage the site such as having a non-rigid design, and creatively managing change, were found to be key features in enhancing wellbeing.

The compact size and contained nature of the sustainably designed community garden sites has meant that the findings are associated with a particular contained space. However, the focus on individual agency assumes that we are all potentially coordinators and stewards of the environment and that an optimum size of space in which to conduct oneself in a sustainable manner is not definitive. Furthermore, although individual capability was not the focus of this research, to manage a particular space in a sustainable way and to know the optimum size of that space requires that we know an individuals capacity to learn, level of health, skill, depth of motivation, energy level, age, type of land and so forth. Appropriate scale (and management of that space) is not an absolute but a continuum (Orr, 1992) bounded by the limits of nature and those of the physical body and mind. The application of these findings to other sustainably designed spaces and settings of differing scales is therefore a question for future research.

11.6 Future research

Focusing on the whole

The beings, doings, havings, that individuals value and had reason to value (functionings) were the unit of evaluation in the examination of wellbeing impacts of the features of the five sustainably designed community garden spaces combined. However, in taking a particular ecologically sustainable approach, each site is seen as an integrated whole, rather than being reduced to its individual features because its individual features may not possess the systematic properties of the whole garden site. It is envisaged that further research calls for the use of more in-depth qualitative and participatory methods which may provide a more systematic approach to reflect on and evaluate wellbeing in sustainably designed community gardens.

Application of more reflexive ethnographic methods of observation and visual ethnography in each case study site would provide a more contextual model of renewal, change, and transformation within each site context. In this way ecological networks, flux and levels of change and interaction could be observed and contextualised, providing a richer value laden account of the sensibilities surrounding both wellbeing and ecological sustainability. In addition, a longitudinal study would provide information on change and transformation in sustainability and wellbeing. The transformative potential of such sustainably designed sites may provide an opportunity for behaviour change outside the site and therefore may provide an antidote to

adaptive preference formation and being 'locked in' to unsustainable everyday behaviours. Such an examination of the transfer of thinking, skills and behaviour to ones everyday behaviour is the subject for potential future research.

Focusing on other spaces

As mentioned in chapter 10, the concept of 'interbeings' affirms Giddens' account and criticism of the dualism of 'structure' and 'agency' in that interbeings comprise of the interconnected notions of both agency and dynamic balance of site structures. The empirical research produced in this thesis examines a particular type of environment – sustainably designed community gardens. Judgements about application of findings to users' other day-to-day spaces and associated activities (and related 'structures') outside the sustainably designed sites and to 'non-sustainably designed spaces' cannot be made, and is a topic for future research.

Transferring the methodological approach to other sustainably designed spaces raises issues of scale, management and longevity. Community gardens are dependent on scarce sources of funding and are seen as temporary works, have predominantly outdoor features, are 'small scale' (all under a maximum of two acres), and all have physical boundaries. Further research is needed into the use of this values based approach to more fragmented urban green space. This work would compliment research being undertaken on green infrastructure and Continuous Productive Urban Landscapes (CPULs) (Viljoen, 2006).

Focusing on the capability set

A focus on parts rather than the whole is also seen in the examination of functionings rather than an individual's capability set i.e. the set of functionings one chooses from. Sen (1992) argues that evaluation of wellbeing should be measured within the capability space (see fig 2.1) and not functionings, thus evaluation should focus on ability and opportunities and counterfactuals rather than achievements. In this research, although opportunities and counterfactuals were taken into account within each capability examined, the focus was on the functioning as a unit of measurement and analysis. A focus on functionings was deemed to be more appropriate in examining the interaction between site users and this particular environment. The identification of valued freedoms provided an opportunity for a finer grained analysis into the essence of how wellbeing may be enhanced.

A focus on opportunity as suggested by Sen, would mean that a capability set and a particular capability space would be developed for each individual user. Decisions and trade-offs would then be made explicit within this capability space (see Fig.2.1). This calls for a more quantitative evaluation of individual capability and how everyday decisions are made. Such research would be particularly valuable in environmental behaviour research in examining the way in which trade-offs and decisions are made in relation to both wellbeing and the environment.

Such an evaluation of the capability set for each individual also provides for the integration of more economic aspect of financial wellbeing. As noted in the introduction of this thesis, the UK government are currently paving the way for a national wellbeing index. This has shown a wish to understand how wellbeing can be enhanced in tandem with economic growth (number10.gov.uk). Sustainability authors (Daly, 1990; Atkisson, 2011a,b) argue however, that sustainability cannot occur in conjunction with continuous economic growth, a more qualitative change in the integrity of 'development' is asserted. Since not all natural environment benefits can be expressed in monetary terms (Newton, 2007) economic/monetary dimensions of wellbeing or sustainability were not taken into account in this research. The placing of economic value on the environment, including green spaces, has recently been undertaken in the UK in order to ensure their equal footing with the market price of goods which currently dominate decision making in the built and natural environment (DEFRA, 2011). The integration of economic wellbeing within the trade-off of values and capabilities in how individuals make decisions in a particular sustainably designed setting is a topic for future research.

Focusing on sustainability literacy

The role of learning and hence sustainability literacy was seen to be integral to the process of enhancing wellbeing in sustainable design. Sustainability literacy (Stibbe, 2009) is not currently part of the process of design and development of spaces in the built environment, nor is it seen as a significant part of education for urban designers, and landscape architects, and planners and architects in education in the built environment. Learning was found to be integral to both agency and dynamic balance components of interbeings. Sustainability literacy may therefore be seen to be as significant as sustainable design in impacting on wellbeing in the sites under study. It is this knowing and understanding of the ways in which sustainable ecological systems and communities function that may lead to change and transformation. The way in which sustainability literacy can be creatively integrated into the design of other spaces is the subject for further research.

11.7 Conclusion

Environmental conditions underlie all human capabilities. In developing capabilities in this community garden setting, individual capabilities are expanded to take into account other site users, other humans, and environmental resources. In this way site users are seen to be part of, rather than apart from the sustainably designed site and site activities. Just as human capabilities concern the overall human potential to achieve valuable activities and states of being; environmental capabilities concern the capability of natural systems to maintain their own self-generating conditions which, in turn, impact on human capabilities. By thus re-conceiving capability in an ecologically sustainable context, we can consistently and systematically explore human-environment relations.

References

REFERENCES

Alkire, S. (2002) 'Dimensions of Human Development', *World Development,* Vol.30(2) pp.181-205.

Alkire, S. (2003) *Valuing Freedoms: Sen's capability approach and poverty reduction*, Oxford: Oxford University Press.

Alkire, S. (2007) *Choosing Dimensions: The capability approach and multidimensional poverty*, Chronic Poverty Research Centre, Working Paper 88.

Alkire, S. (2008) *The Capability Approach to the Quality of Life*, Working paper prepared for the working group 'Quality of Life', October 2008.

Anand, S. & Sen, A. (2000) 'Human development and economic sustainability', *World Development,* Vol.28 pp.2029-2049.

Anderson, A. N. (1996) *Ecologies of the Heart: Emotion, belief and the environment*, New York: Oxford University Press.

Anderson, B. (2006) [rev ed.] *Imagined Communities: Reflections on the origin and spread of nationalism*, New York: Verso.

Argyle, M. (1997) 'Is happiness a cause of health?', *Psychology & Health,* Vol.12(6) pp. 769-781.

Armstrong, D. (2000) 'A survey of community gardens in upstate New York: Implications for health promotion and community development', *Health & Place*, Vol.6 pp.319-327.

Atkisson, A. (2011a) [1999] *Believing Cassandra: How to be an optimist in a pessimist's world*, London: Earthscan.

Atkisson, A. (2011b) [2009] *The Sustainability Transformation: How to accelerate positive change in challenging times*, London: Earthscan.

Aveneri, S. (1970) *The Social and Political Thought of Karl Marx*, Cambridge: Cambridge University Press.

Ayres, R., Simpson, D., & Toman, M. (2005) *Scarcity and Growth Revisited – Natural resources and the environment in the new millennium*, Washington USA: Resources for the Future.

Ball, M. & Smith, G. (1992) *Analysing Visual Data*, London: Sage.

Banks M. (2001) *Visual Methods in Social Research*, London: Sage.

Barbash, I. & Taylor, L. (1997) *Cross-Cultural Filmmaking: A handbook for making documentary and ethnographic films and video*, Berkeley: California University Press.

Barber, A. (2007) *Building Health: Creating and enhancing places for healthy, active lives,* Heart Foundation.

Barton, H, Grant, M. & Guise, R. (2003) *Shaping Neighbourhoods: A guide for health, sustainability and vitality*, London: Routledge.

Barton, H. (ed.) (2000) *Sustainable Communities: The potential for eco-neighbourhoods*, London: Earthscan.

Barton, H., Davies, G. & Guise, R. (1995) *Sustainable Settlements: A guide for planners, designers and developers*, University of the West of England and Local Government Management Board, Luton.

Basiago, A. (2006) 'Methods of defining 'sustainability'', *Sustainable Development*, Vol.3(3) pp.109-119.

Bateson, G. (1975) *Steps to an Ecology of Mind*, New York: Ballantine.

Bateson, G. (1979) *Mind and Nature: A necessary unity*, Hampton: Hampton Press.

Beatley, I. (1994) *Ethical Land Use: Principles of policy and planning*, London: Baltimore, John Hopkins University Press.

Beatley, T. (2000) *Green Urbanism*, Washington DC: Island Press.

Beck, U. (1992) *Risk Society: Towards a new modernity*, New Delhi: Sage.

Belfast Metropolitan Area Plan (2015) The Planning Service Northern Ireland (www.planningni.gov.uk)

Benedict, M. & McMahon E. (2006) *Green infrastructure: Linking landscapes and communities*, Washington DC: Island Press.

Benson, J. (2004) 'Tilting at Windmills? The Attitude-Behaviour Gap in Renewable Energy Conflicts', *ESRC Award Summaries*, University of Newcastle.

Bentley, I., Alcock, A., Murrain, P., McGlynn, S. & Smith, G. (1985) *Responsive Environments: A manual for designers*, London: Architectural Press.

Benyus, J. (2002) *Biomimicry: Innovation inspired by nature*, New York: Harper Perennial.

Berger, G. (1996) 'Psychological benefits of an active lifestyle: What we know and what we need to know', *Quest,* Vol.48 pp. 330-53.

Berry, W. (1987) *Home Economics*, San Francisco: North Point Press.

van Bertalanffy, L. (2008) [1969] *General Systems Theory*, New York: Brazillier.

Biggeri, M, Libanora, R. Mariani, S. & Menchini L. (2006) 'Children Conceptualizing the Capabilities: Results of a Survey Conducted during the First Children's World Congress on Child Labour', *Journal of Human Development*, Vol.7(1) pp.59-83.

Bird, W. (2004) *Natural Fit: Can green space and biodiversity increase levels of physical activity?,* Sandy: Royal Society for the Protection of Birds.

Bird, W. (2007) *Natural Thinking: Investigating the links between the natural environment, biodiversity and mental health*, Sandy: Royal Society for the Protection of Birds.

Birkeland, Y. (2002) *Design for Sustainability: A sourcebook of integrated eco-logical solutions*, London and Virginia: Earthscan.

Bixler, R. & Floyd, M. (1997) 'Nature is scary, disgusting and uncomfortable', *Environment and Behaviour*, Vol.29(4) pp.443-467.

Bixler, R., Floyd, M. & Hammitt, W. (2002) 'Environmental Socialization: Quantitative tests of the childhood play hypothesis', *Environment and Behaviour*, Vol. 34(6) pp.759-818.

Blinn, L. & Harrist, A. (1991) 'Combining native instant photography and photo-elicitation', *Visual Anthropology*, Vol.4 pp.175-92.

Blowers, A. (2000) 'Planning for a new millennium - Challenges for planning of sustainable development', *Town and Country Planning*, Vol.69(6) pp.192-4.

Bohm, D. (1991) *Changing Consciousness*, San Francisco: Harper Collins.

Bowling, A. (2001) [2nd Edition] *Measuring Disease,* Oxford: Oxford University Press.

Bradley, R. & Childs, B. (2006) *Growing in the Greenhouse: Protecting the climate by putting development first*, Sustainable Development Organisation.

Brady, K., Myrick, H. & McElroy, S. (1998) 'The relationship between substance abuse disorders, impulse control disorders and pathological aggression', *American Journal of Addiction*, Vol.7 pp.221-230.

Bramewell, A. (1989) *Ecology in the Twentieth Century: A history*, New Haven: Yale University Press.

Breheny, M. (ed.) (1992) *Sustainable Development and Urban Form*, London: Pion.

Breslav, M. (1991) 'The Common Ground of Green Words: One authors search for a definition of community greening', *Community Greening Review,* Vol.1(4)pp 4-9.

Brook, I. (1998) 'Goethean science as a way to read landscape', *Landscape Research*, Vol.23 (91) pp.51-69.

Brown, C. & Grant, M. (2007) 'Natural medicine for planners', *Town and Country Planning*, Vol. 76 (2) pp.67-68.

Brown, K. & Kasser, T. (2005) 'Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle', *Social Indicators Research,* Vol.74 pp.349-368.

Bryman, A. (2004) [2nd edition] *Social Research Methods*, Oxford: Oxford University Press.

Buonfino, A. & Hilder, P. (2006) *Neighbouring in Contemporary Britain: A think-piece for the Joseph Rowntree Foundation Neighbourhood Committee*, York: Joseph Rowntree Foundation.

Burns, G. (1998) *Nature Guided Therapy: Brief integrative strategies for health and wellbeing*, London: Taylor and Francis.

Burns, G. (2000) 'When watching a sunset can help a relationship dawn anew: Nature-guided therapy for couples and families', *Australian NZJ. Fam. Therapy*, Vol. 2(4) pp.184-190.

Burns, G. (2006) 'Naturally happy, naturally healthy: the role of the natural environment in wellbeing' In F. Huppert, B. Keverne & N. Baylis, *The Science of Wellbeing*, Oxford: Oxford University Press, pp. 405-431.

Burns, R. (2000) *Introduction to Research Methods*, London: Sage.

Burton, E., Mitchell, L. & Raman, S. (2004) *Neighbourhoods for Life: Designing dementia friendly outdoor environments*. Oxford: OISD.

Butland, B., Jebb, S., Kopelman, P., McPherson, K., Thomas, S., Mardell, J. & Parry, V. (2007) *Foresight Tackling Obesities: Future Choices Project Report*, London: Government Office for Science.

CabeSpace (2004) *The Value of Public Space: How high quality parks and pubic spaces create economic, social and environmental value*, Commission for Architecture and the Built Environment, March, 2004.

Cabinet Office (2008) *Food Matters –Towards a Strategy for the 21st Century*, Cabinet Office, July, 2008.

Campbell, A. (1976) 'Subjective measures of well-being', *American Psychologist*, Vol.31(2) pp.117-124.

Campbell, C. (2002) 'The Assessment of and Importance of Oil Depletion', *Energy Exploration and Exploitation*, Vol.20(6) pp.407-435.

Campbell, D. (2002) Atrocity, memory, photography: Imaging the concentration camps of Bosnia - The case of ITN versus living Marxism, Part 1, *Journal of Human Rights,* Vol.1(1) pp.1-33.

Capra, F. (1997) *The Web of Life: A new synthesis of mind and matter,* London: Harper Collins.

Capra, F. (2003) *The Hidden Connections*, London: Harper Collins.

Carr, S. & Lane, A. (1993) *Practical Conservation: Urban habitats*, The Open University in association with English Nature.

Carter, W. (2001) *In the Potting Shed* (www.mybrightonandhove.org.uk).

CEC (1990) *Green Paper on the Human Environment*, Commission of the European Communities, Brussels.

Chambers, R. (1997) *Who's Reality Counts?: Putting the first last*. London: Intermediate Technology.

Checkland, P. (1981) *Systems Thinking, Systems Practice*, Chichester: John Wiley & Sons.

Chiappero Martinetti, E. (2000) 'A Multidimensional Assessment of Well-Being Based on Sen's Functioning Approach', *Rivista Internazionale di Scienze Sociali*, Vol.108 pp.207-39.

Cimprich, B. (1993) 'Development of an intervention to restore attention in cancer patients', *Cancer Nursing*, Vol.16(2) pp.83-92.

Cimprich, B. (2003) 'An environmental intervention to restore attention in women with newly diagnosed breast cancer', *Cancer Nursing*, Vol.26 pp.284-292.

Clark, D.A. (2002) *Visions of Development: A study of human values*, Cheltenham: Edward Elgar.

Cloke, P., Philo, C. & Sadler, D. (1991) *Approaching Human Geography: An introduction to contemporary theoretical debates*, London: Paul Chapman Publishing Ltd.

Clavin, A.A. (2009) 'Community Gardening: Skills for building community and working within environmental limits' In: A. Stibbe (2009) *Sustainability Literacy*, Totnes: Green Books.

Clavin, A.A. (2011) 'Briefing: How and why children use ecological space', *Institution of Civil Engineers (ICE): Urban Design and Planning*, Vol.164(DP1), March 2011.

Coccaro, E., Bergeman, C., Kavoussi, R. & Serocynski, A. (1997) 'Heritability of aggression and irritability: a twin study of Buss-Durkee aggression scales in adult male subjects', *Biological Psychiatry,* Vol.41 pp.273-284.

Cohen, S., Doyle, W., Skone, D., Rabin, B. & Gwaltney, J. (1997) 'Social ties and susceptibility to the common cold', *Journal of American Medical Association*, Vol. 277 pp.1940-1944.

Cohen, S., Tyrrell, D. & Smith, A. (1991) 'Psychological stress and susceptibility to the common cold', *New England Journal of Medicine*, Vol.325 pp.606-612.

Colenutt, B. (1997) 'Can town planning be for people rather than property' In: A. Blowers & B. Evans*, Town Planning into the 21t Century*, London: Routledge.

Collier, J. & Collier, M. (1986) *Visual Anthropology: Photography as a research method,* Albuquerque: University of New Mexico Press.

Collier, J. (1967) *Visual Anthropology: Photography as a research method*, New York: Holt, Rinehart and Winston.

Collier, M. (2001) 'Approaches to analysis in visual anthropology' In: T. van Leeuwen & C. Jewitt (Eds.) *Handbook of Visual Analysis*, London: Sage, pp. 35-60.

Comin, F. (2001) *Operationalising Sen's Capability Approach*, Paper prepared for Conference Justice and Poverty: Examining Sen's Capability Approach, Cambridge, 5-7 June 2004.

Comin, F. & Teschl, M. (2005) 'Adaptive preferences and capabilities: Some preliminary conceptual explorations', *Review of Social Economy*, Vol. 63(2) pp.229-247.

Communities and Local Government (2008) *The English Index of Multiple Deprivation 2007*, London: Communities and Local Government.

Connelly, S. (2007) *Mapping sustainable development as a contested concept*, Local Environment, Vol.12(3) pp.259-278.

Cooke, B. & Kothari, U. (2001) 'The Case for Participation as Tyranny' In: B. Coke & U. Kothari (eds.) *Participation: The New Tyranny*? London: Zed Books.

Counsell, D. (1999) 'Sustainable Development and Structure Plans in England and Wales: Operationalising the themes and principles', *Journal of Environmental Planning and Management*, Vol.42 pp.45-61.

Countryside Commission (1993) *Action for London's Trees: Investing in a leafy capital,* Countryside Agency (Natural England).

Crawford, M. (2010) *Creating a Forest Garden: Working with nature to grow edible crops*, Totnes: Green Books.

Csikszentmihalyi, M. (1990) *Flow: The psychology of optimal experience*, New York: Harper and Row.

Cummins, R. (1996) 'Domains of life satisfaction: An attempt to order chaos', *Social Indicators Research*, Vol.38(3) pp.303-328.

Cummins, R., Eckersley, R., Pallant, J., Vugt, J. van & Misajon, R. A. (2003) 'Developing a National Index of Subjective Well-being: The Australian Unity Well-being Index', *Social Indicators Research*, Vol. 64 (2) pp.159-190.

Daly, H. & Cobb, J. (1990) *For the Common Good*, Boston: Bacon Press.

Daly, H. (1988) *Sustainable Development: From concept and theory towards operational principles*, Paper presented in Milan, Italy, March, 1988.

Danner, D., Snowdon, D. & Friesen, W. (2001) 'Positives emotions in early life and longevity: findings from the nun study', *Journal of Personality and Social Psychology,* Vol.80 pp.804-813.

Davies, S., Leach, M. & David, R. (1991) *Food Security and the Environment: Conflict or complimentarity*, Sussex Institute of Development Studies.

Deci, E. L., & Ryan, R. M. (1985) *Intrinsic Motivation and Self-determination in Human Behavior*, New York: Plenum.

Deci, E. L., & Ryan, R. M. (2000) 'The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior', *Psychological Inquiry,* Vol.11 pp.227-268.

DEFRA (2011) *UK National Ecosystem Assessment: Understanding nature's value to society* (synthesis of key findings), London, HMSO.

DeKay, M. (1997) 'The implications of community gardening for land use and density', *Journal of Architectural and Planning Research*, Vol.14(2) pp126-149.

Denzin, N. & Lincoln, Y. (eds.) (2000) *Handbook of Qualitative Research,* London: Sage Publications.

Department of the Environment (1993) *Trees in Towns, a Survey of Trees in 66 Towns and Villages in England,* DoE.

Department of the Environment (1996) *Greening the City: A Guide to Good Practice*, GFA Consulting & Tibbalds Monro report for the HMSO.

Department of the Environment, Transport and the Regions (1999) *Planning Policy Guidance Note 12: Development Plans*, TSO, London.

Department of Health (2004) *At Least Five a Week: Evidence on the impact of physical activity and its relationship to health*, A Report form the Chief Medical Officer.

Derbyshire, A.K. (2011) 'Sustainable Urban habitats: Design intentions to practical implementation', *Institution of Civil Engineers (ICE): Urban Design and Planning*, Vol.164(1) pp.19-28.

Desai, P. & Riddlestone, S. (1992) 'Bioregional Solutions – For living on one planet', *Schumacher Briefing No. 8.*, Totnes: Green Books.

Devall, B. & Sessions, G. (1985) *Deep Ecology: Living as if nature mattered*, Salt Lake City: Gibbs M. Smith Inc.

Dewberry, E. & Goggin, P. (1995) 'Ecodesign and Beyond: Steps towards 'sustainability*", Paper to the European Academy of Design Inaugural Conference 'Design Interfaces'*. University of Salford.

Dey, I. (1993) *Qualitative Data Analysis: A user-friendly guide for social scientists*, London: Routledge.

Diener, E. (1984) 'Subjective well-being', *Psychological Bulletin*, Vol.95 pp.542-575.

Diener, E. & Biswas-Diener, R. (2002) 'Will money increase subjective well-being? The dark side of the American dream: A closer look at the negative consequences of the goal for financial success', *Psychological Science*, Vol.14 pp.531-536.

Diener, E. & Lucas, R. (1999) 'Personality and subjective wellbeing' In: D. Kahneman, E. Diener, & N. Schwartz (Eds.), *Wellbeing: The foundations of hedonic psychology*, New York: Russell Sage Foundation, pp.213-229.

Diener, E. & Saligman, M. (2002) 'Very happy people', *Psychological Science*, Vol.13 pp.81-84.

Diener, E., & Seligman, M. (2004) 'Beyond money: Toward an economy of well-being', *Psychological Science in the Public Interest*, Vol.5 pp.1-31.

Diener, E. & Suh, E. (1997) 'Measuring quality of life: economic, social and subjective indicators', *Social Indicators Research*, Vol.40 pp.189-216.

Diette, G., Lechtzin, N., Haponil, E., Devrotes, A. & Rubin, H. (2003) 'Distraction theory with nature sights and sounds reduces pain during flexible bronchoscopy', *Chest*, Vol.123 pp.941-948.

Dobson, A. (1995) *Green Political Thought*, London: Routledge.

Dodge, K. & Crick, N. (1990) 'Social information-processing bases of aggressive behaviour in children', *Personality and Social Psychology Bulletin*, Vol.16 pp.8-22.

Dolan, P. & Peasgood, T. (2006) *Research on the Relationship Between Well-being and Sustainable Development,* DEFRA publication.

Dolan, P., Peasgood, T., & White, M. (2006) *Review of Research on the Influences on Personal Well-being and Application to Policy Making*, DEFRA publication.

Dominelli, L. (1995) 'Women in the community: Feminist principles and organising in community work', *Community Development Journal*, Vol.30(2) pp.133-143.

Donovan, N. & Halpern, D. (2002) *Life satisfaction: The state of knowledge and implications for government*, Cabinet Office, Prime Minister's Strategy Unit.

Donovan, R. (2005) 'Increasing walking: how important is distance to, attractiveness and size of public open space?', *American Journal of Preventative Medicine*, Vol.28(2) pp.169-176.

Donovan, R.G., Stewart, H.E., Owen, S.M., Mackenzie, A.R. & Hewitt, N.C. (2005) 'Development and application of an urban tree air quality score for photochemical pollution episodes using the Birmingham, United Kingdom, area as a case study', Environmental Science and Technology, Vol.39 pp.6730-6738.

Drummond, I. & Marsden, T. (1998) *The Condition of Sustainability*, London: Routledge.

DTLR (2003) *Green Spaces, Better Places*, Final report of the urban green spaces taskforce.

Dunnett, N., Swanwick, C. & Woolley, H. (2002) *Improving urban parks, play areas and greenspaces*, Office of the Deputy Prime Minister, London.

Dunnett, N. & Qasim, M. (2000) 'Perceived benefits to human wellbeing of urban gardens', *Hort-technology*, Vol.109(10) pp.40-45.

Easterlin, R. (1996) *Growth Triumphant: the twenty-first century in historical perspective,* University of Michigan Press: Ann Arbor.

Edensor, T. (2005) *Industrial Ruins: Space, aesthetics and modernity*, Oxford: Berg.

Egan, J. (2004) *The Egan Review, Skills for Sustainable Communities*, The Office of the Deputy Prime Minister, London.

Elster, V.J. (1983) *Sour Grapes: Studies in the subversion of rationality*, Cambridge: Cambridge University Press.

English Nature (1996), *A Space for Nature* (http://www.english-nature.org.uk/pubs/publication/PDF/spacefornature.pdf)

English Nature (2004) *Urbio – Urban diversity and human nature*, Issue 6.

Environment Agency (EA) (2001) *Conserving Water in Buildings*. http://www.environment-agency.gov.uk/subjects/waters/286587/286599/286911/548861//version=i&lang=_e[12 [February 2006].

EA (2004) *Water Resources for the Future: Annual Review 2004*. Bristol: EA.

Ewert, A., Place, G. & Sibthorp, J. (2005) 'Early-life outdoor experiences and an individuals environmental attitudes', *Leisure Sciences*, Vol. 27 pp.225-512.

Ezzy, D. (2002) *Qualitative Analysis: Practice and innovation*, London: Routledge.

Fay, B. (1987) *Critical Social Science: Liberation and its limits*, Cambridge: Polity.

Felce, D. & Perry, J. (1995) 'Quality of Life - Its definition and measurement', *Research in Development Disabilities,* Vol.16(1) pp.51-74.

Fern, K. (2000) *Plants for a Future: Edible and useful plants for a healthier world*, East Meon: Permanent Publications.

Ferris, J., Morman, C. & Sempik, J. (2001) 'People, Land and Sustainability: Community gardens and the social dimension of sustainable development', *Social Policy & Administration*, Vol.35(5) December.

Finnis, J. (1980) *Natural Law and Natural Rights,* Oxford: Oxford University Press.

Fitzpatrick, A (1998) 'The implications of ecological thought for social welfare', *Critical Social Policy,* Vol.18(1) pp.9-13.

Fjortoft, I. (2001) 'The Natural Environment as a Playground for Children: Landscape perception and analysis of a natural landscape', *Landscape and Urban Planning*, Vol.48(112) pp.83-97.

Fjortoft, I. (2004) 'Landscape as Playscape: the effects of natural environments on children's play and motor development', *Children, Youth and Environments*, Vol.14(2) pp.21-44.

Forman, R.T. (1986) *Landscape Ecology*, New York: Wiley.

Forman, R.T. (1995) *Land Mosaics: The ecology of landscapes and regions*, Cambridge: Cambridge University Press.

Forman, R.T. (2008) *Urban Regions: Ecology and planning beyond the city*, Cambridge: Cambridge University Press.

Frank, R. (1999) *Luxury Fever: Money and happiness in an era of excess*, New York: Free Press.

Frediani, A. (2007) *Housing Freedom, Amartya Sen and Urban Development Policies – Squatter settlement upgrading in Salvador Da Bahia, Brazil*, PhD thesis (Oxford Brookes University).

Frediani, A. (2008) 'Planning for Freedoms: The Contribution of Sen's Capability Approach to Development Practice', *Practical Action Briefings,* Rugby: Practical Action.

Frediani, A. (2010) 'Capability Approach as a Framework to the Practice of Development', *Development in Practice*, Vol.20(2) pp.172-187.

Frances, M, Cashden, L. & Paxson, l. (1984) *Community Open Space*, Washington DC: Island Press.

Fredrickson, B. & Levenson, R. (1998) 'Positive emotions speed recovery form the cardiovascular sequelae of negative emotions', *Cognitive and Emotion*, Vol.12 pp.191-220.

Fredrickson, L & Anderson, D. (1999) 'A qualitative exploration of the wilderness experience as a source of spiritual inspiration', *Journal of Environmental Psychology*, Vol.19(1) pp.21-39.

Freire, P. (1997) 'Forward' In: Smith, S., Williams, D. & Johnson, N. (eds.) *Natured by Knowledge – learning to do participatory action-research*, New York: The Apex Press.

Freire, P. (1970) *Cultural Action for Freedom*, Harvard: Harvard Educational Review.

Frumkin, H. (2001) 'Beyond Toxicity: The greening of environmental health', *American Journal of Preventative Medicine*, Vol.20 pp.234-240.

Fuller, R. A., Irvine, K.N., Devine Wright, P., Warren, P.H. & Gaston, K.J. (2007) 'Psychological Benefits of Greenspace Increase with Biodiversity', *Biology Letters*, Vol.3 pp.390-394.

Garden of Easton Community Environment Project Newsletter, Summer 2004.

Garling, T. & Golledge, R. (Eds.) *Behaviour and Environment: Psychological and geographical approaches*, Amsterdam: Elsevier Science Publishers.

Garnett, T. (1996) *Growing Food in Cities, A report to highlight and promote the benefits of urban agriculture in the UK*, SAFE Alliance/National Food Alliance, London.

Garreau, J. (1991) *Edge City: Life on the new frontier*, New York: Anchor Books.

Gasper, D. (2004) *Subjective and Objective Well-Being in Relation to Economic Inputs: Puzzles and responses*, WeD – Working Paper No. 9.

Gebhard, U. (1994) Kind und Natur; Die Bedeatung der naturf_rdie psychische Entwicklung Opladen: Westdeatcche verlag [The meaning of nature for the physical development of children] *cited in* Online Ethics for Engineering (2006) *How Children and Adolescents relate to nature, Paper presented at the Center for the Study of Ethics in Society*, Western Michigan University, Sept. 21 1999.

Gesler, W. (1992) 'Therapeutic landscapes: medical issues in light of the new cultural geography', *Social Science and Medicine*, Vol.34(7) pp.735-746.

Gibson, J. (1979) *The Ecological Approach to Visual Perception*, Boston: Houghton Mifflin.

Gibson-Graham, J. (2003) 'An ethics of the local', *Rethinking Marxism*, Vol.15(1) pp.9-74.

Giddens, A. (1984) *The Constitution of Society: Outline of the theory of structuration*, Oxford: Polity Press.

Gilbert, O. (1989) *The Ecology of Urban Habitats*, London: Chapman and Hall.

Gilchrist, A. (2000) *Community Work in the UK – An overview*, ACW Talking Point No.191.

Giles-Corti, B. & Donovan, R. (2002) 'The relative influence of individual, social and physical environment determinants of physical activity', *Soc, Sci Med*, Vol.54(12) pp.1793-1812.

Gillham, W.E. (2000) *Case Study Research Methods*, London: Continuum.

Gilroy, R. (2005) 'The role of housing space in determining freedom and flourishing in older people', *Social Indicators Research*, Vol.74(1) Oct 2005.

Girardet, H. (2004) *Cities, People and Planet: Urban development and climate change*, London: Wiley.

Glaser, B. & Strauss, A. (1967) *The Discovery of Grounded Theory: Strategies for qualitative research*, Chicago: Aldine.

Goldsmith, E. (1996) *The Way: An ecological worldview*, Totnes: Green Books.

Goodin, R. (1992) *Green Political Theory*, Cambridge: Polity Press.

Gordon, D. (ed.) (1990) *Green Cities: Ecologically sound approaches to urban space,* Montreal: Black Rose Books.

Gore, C. (1997) 'Irreducible social goals and the informational base of Amartya Sen's capability approach', *Journal of International Development*, Vol.9(2) pp.235-250.

Graham, P. (2003) *Building Ecology: First principles for a sustainable built environment*, Oxford: Blackwell.

Grahn, P. (2005) ‘t bota människor i en trädgård' In: Schmidtbauer, P., Grahn, P. & Leiberg, M. (Eds.) *Tänkvarda Trädgårdar*. Sweden: Movium, SLU. *cited in* Starback, E. (2007) ‘Landscape planning to promote wellbeing’, *Environmental Practice*, Vol. 9(3) pp. 206-219.

Granow, J. & Warde, A. (2001) *Ordinary Consumptions*, London: Routledge.

Grant, W. (2003) ‘The Politics of Agricultural Trade’ In: M. N. Cardwell, M.R. Grossman & C.P. Rodgers (eds.) *Agriculture and International Trade: Law, Policy and the WTO*, Wallingford, Oxon: CABI Publishing.

Greenhalgh, L. & Worpole, K. (1995) *Park Life: Urban parks and social renewal*, Stroud and London: Comedia and Demos.

Griffin, J. (1986) *Wellbeing: Its meaning, measurement, and moral importance*, Oxford: Clarendon Press.

Griffin, J. (1996) *Value Judgement*, Oxford: Clarendon Press.

Growth Point (1999) ‘Your future starts here: practitioners determine the way ahead’, *Growth Point*, Vol.79 pp.4-5.

Guba, E. & Lincoln, Y. (2000) ‘Paradigmatic controversies, contradictions and emerging confluences’ In: Denzin, N.K. & Lincoln Y.S. (eds.) (2000) *Handbook of Qualitative Research,* Thousand Oaks CA: Sage pp.191-215.

Gunderson, L.H. & Holling, C.S. (2002) *Panarchy: Understanding transformations in human and natural systems*, Washington DC, USA: Island Press.

Haas, B. K. (1999) 'A Multidisciplinary Concept Analysis of Quality of Life', *Western Journal of Nursing Research*, Vol. 21(6729).

Hajer, M. (1995) *The Politics of Environmental Discourse: Ecological modernisation and the policy process,* Oxford, UK: Oxford University Press.

Halliwell, J. & Putnam, R. D. (2004) ‘The Social Context of Wellbeing’, *Philosophical Transactions of the Royal Society* (London) Series B, Vol. 359, pp.135 -152.

Hammersley, M. & Atkisson, P. (1983) *Ethnography: Principles in practice*, London: Tavistock.

Handicap International (2005) *Towards Wellbeing for Afghans with Disability – The health challenge,* National Disability Survey in Afghanistan.

Hardin, G. (1968) 'The Tragedy of the Commons', *Science,* Vol.162 pp.1243-1248.

Hardin, G. (1985) *Filters Against Folly*, New York: Penguin Books pp.141-163.

Harper, D. (2002) ‘Talking about Pictures: A case for photo-elicitation’, *Visual Studies,* Vol.17 pp.13-26.

Harper, P. & Halestrap, L. (1999) *Lifting the Lid – An ecological approach to toilet systems*, Machynlleth: Centre for Alternative Technology.

Harrison, C. Burgess, J., Millward, A. & Davie, G. (1995) *Accessible Natural Greenspace in Towns and Cities: A review of appropriate size and distance criteria*, English Nature Report 153, English Nature, Peterborough.

Harsanyi, J. C. (1996) 'Utilities, preferences, and substantive goods', *Social Choice and Welfare,* Vol. 14, pp.129-145.

Hart, R. (1996) [rev. ed.] *Forest Gardening*, Portland, Oregon: Green Earth Books.

Hartig, T. (2007) 'Three steps to understanding restorative environments as health resources' In: Ward Thompson, C., Travlov, P. (Eds.) *Open Space, People Space*, Abingdon Oxon: Taylor and Francis, pp.163-180.

Hartig, T., Böök, A., Garvill, J., Olson, T. & Garling, T. (1996) 'Environmental influences on psychological restoration', *Scandinavian Journal of Psychology*, Vol. 37 pp.378-393.

Hartig, T., Evans, G., Jamner, L., Davis, D. & Garling, T. (2003) 'Tracking restoration in natural and urban field settings', *Journal of Environmental Psychology,* Vol.23 pp.109-123.

Hartig, T., Kaiser, F. & Bowler, P (2001) 'Psychological restoration in nature as a positive motivation for ecological behaviour', *Environmental and Behaviour*, Vol.33 pp.590-607.

Hartig, T., Mang, M. & Evans, G. (1991) 'Restorative Effects of Natural Environmental Experiences', *Environment and Behaviour,* Vol.23 pp.3-26.

Harvey, D. (1996) *Justice, Nature and the Geography of Difference,* Oxford: Blackwell.

House of Commons (1998) *The Future of Allotments*, Report of the Environment, Transport and Regional Affairs Committee, HC 563, London, House of Commons.

Healy, P. & Shaw, T. (1993) 'Planners Plan and Sustainable Development', *Regional Studies*, Vol.27-28 pp.769-776.

Helliwell, J. F. & Putnam, R. (2004) 'The Social Context of Wellbeing' In: F.A. Huppert, B. Keverne and N. Baylis (Eds.) (2004) *The Science of Wellbeing*, Oxford: Oxford University Press, pp.435-59.

Henwood, K. (2003) 'Environment and Health: Is there a role for environmental and countryside agencies in promoting benefits to health', *Issues in Health Development*, NHS Health.

Hester, R.T. (1995) 'Life, liberty and the pursuit of sustainable happiness', *Places*, Vol.9(2) pp.4-17.

Heywood, A. (1992) *Political Ideologies: An introduction*, London: Macmillan.

Hickey, S. & Mohan G. (eds.) (2004) *Participation: From Tyranny to Transformation?,* London: Zed Books.

Hill, R.C & Bowen, P.A. (1997) 'Sustainable Construction: Principles and a framework for attainment', *Construction Management and Economics*, Vol.15(228).

Hinchley, A. (2006) *Longevity of Public Interest in Community Gardens*, PhD thesis (Sheffield University).

Hinchliffe, S. & Whatmore, S. (2003) 'Living Cities: Making Space for Urban Nature', *Soundings, Journal of Politics and Cultures*, Jan 2003.

Hird, S. (2003) *Community Wellbeing: A discussion paper for the Scottish Executive and Scottish Neighbourhood Statistics,* Glasgow: NHS Health Scotland.

HM Government (2005) *Securing the Future*, UK Government Sustainable Development Strategy.

Holland, B. (2008) 'Justice and the environment in Nussbaum's 'capabilities approach'', *Political Research Quarterly*, Vol.61(2) pp.319-322.

Holland, L. (2004) 'Diversity and Connections in Community Gardens: a contribution to local sustainability,' *Local Environment*, Vol.9(2) pp.285-305.

Holliday, R. (2004) 'Reflecting the Self' In: C. Knowles & J. Sweetman (Eds.) *Picturing the Social Landscape: Visual methods and the social imagination*, London: Routledge, pp 49-64.

Holling, C.S. (1986) 'The Resilience of Terrestrial Ecosystems: Local surprise and global change' In: W.M. Clark & R.E. Munn (eds.) *Sustainable Development in the Biosphere*, Cambridge: Cambridge University Press, pp.292-230.

Holmgren, D. (2002) *Permaculture – Principles and pathways beyond sustainability*, Victoria: Holmgren Design Services.

Hopkins, R. (2008) *The Transition Handbook*, Totnes: Green Books.

Hoskins, W.G. (1965) *The Making of the English Landscape*, London: Hodder and Stoughton.

House of Lords and House of Commons (2011) *New Localism Bill* (HL Bill 71-1). (http://www.publications.parliament.uk/pa/bills/lbill/2010-2012/0071/2012071pt1.pdf accessed 2 June 2011)

Hough, M. (1984) *City Form and Natural Process: Towards a new urban vernacular*, London: Routledge.

House of Commons Hansard Debates 2010, Vol. 519, Part No. 78 (Q8 Wellbeing). (www.partliament.uk accessed April 16 2011).

Howarth, C.I. (1976) 'The psychology of urban life' In: G.A. Harrison & J.B. Gibson (Eds.) *Man in Urban Environments*, Oxford: Oxford University Press.

Howe, J, & Wheeler, P. (1999) 'Urban Food Growing: The experience of two UK cities', *Sustainable Development*, Vol.7(1) pp.36-52.

Hsin, R. (1996) *Guidelines and Principles for Sustainable Community Design: A study of sustainable design and planning strategies in North America from an urban design perspective*. PhD Thesis (Faculty of the School of Architecture at Florida Agricultural and Mechanical University) (http://sustainable.state.fl.us/fdi/edesign/news/9607/thesis/thesis.htm).

Huby, M. & Bradshaw J. (2006) *A Review of the Environmental Dimension of Children and Young People's Well-being,* Sustainable Development Commission.

Humpel, N., Owen, N. & Leslie, E. (2002) 'Environmental factors associated with adults' participation in physical activity', *American Journal of Preventative Medicine*, Vol.22(3) pp.188-199.

Iles, J. (2010) *Community Land Bank Consultation: Executive Summary*, Bristol: Federation of City Farms and Community Gardens.

Irvine, S., Johnson, L. & Peters K. (1999) 'Community gardens and sustainable land use planning: A case study of the Alex Wilson community garden', *Local Environment*, Vol.4(1) pp. 33-46.

IUCN, WWF & UNEP (1991) *Caring for the Earth: A strategy for sustainable living*, Switzerland: Gland.

Jackson, T. (2002) 'Evolutionary psychology in ecological economics: Consilience, consumption and contentment', *Ecological Economics,* Vol.41 pp.289-303.

Jackson, T. (2005) *Motivating Sustainable Consumption: A review of evidence on consumer behaviour and behavioural change,* Sustainable Development Research Network.

Jackson, T. & Marks, N. (1999) 'Consumption, sustainable welfare and human needs - with reference to UK expenditure patterns between 1954 and 1994', *Ecological Economics,* Vol. 28 pp.421-441.

Jacobs, J. (1961) *The Death and Life of Great American Cities*, New York: Vintage Books.

Jacobs, M. (1995) *Sustainability and Socialism*, SERA, London.

James, N. & Desai, P. (2003) *One Planet Living in the Thames Gateway,* BioRegional Development Group.

Jasek-Rysdahl, K. (2001) 'Applying Sen's Capability Framework to Neighbourhoods: Using local asset maps to deepen our understanding of wellbeing', *Review of Social Economy*, Vol.LIX(3) pp. 313-329.

Johansson, M., Heldt, T. & Johansson, P. (2006) 'The effects of attitudes and personality traits on mode choice', *Transportation Research Part A - Policy and Practice,* Vol.40, pp.507-525.

Johnston, J. (1990) *Nature Areas for City People: A guide to the successful establishment of community wildlife sites*, Oxford: Packard Publishing.

Johnston, R.J., Gregory, D. & Smith, D.M. (Eds.) (1994) *The Dictionary of Human Geography*, Oxford: Blackwell.

Jonas, B. & Mussolino, M. (2000) 'Symptoms of depression as a prospective risk factor for stroke', *Psychosomatic Medicine*, Vol. 62(4) pp.463-472.

Junker, B. (1960) *Fieldwork*, Chicago: University of Chicago Press.

Junker, B. (2004) 'The Field Work Situation: Social roles for observation' In: C. Seale, G. Gobo, J. Gubrum & D. Silverman (Eds.) (2004) *Qualitative Research Practice*, London: Sage. pp. 221-225.

Kahn, P. & Friedman, B. (1995) 'Environmental views and values of children in an inner city black community', *Child Development*, Vol.66(5) pp.1403-1417.

Kahn, R.L & Juster, F.T. (2002) 'Wellbeing: Concepts and Measures', *Journal of Social Issues*, Vol.58 pp.627-644.

Kahneman, D., Diener, E. & Schwarz, N. (1999) *Wellbeing: The foundations of hedonic psychology*, New York: Russell Sage Foundation.

Kaplan, R. (1993) 'The role of nature in the context of the workplace', *Landscape and Urban Planning*, Vol.26 pp.193-201.

Kaplan, S. (1987) 'Mental fatigue and the designed environment' In: J. Harvey & D. Henning (Eds.) *Public Environments*, Edmund: Environmental Design Research Association, pp.55-60.

Kaplan, R. & Kaplan, S. (1989) *The Experience of Nature: A psychological perspective,* Cambridge*:* Cambridge University Press.

Kaplan, R. & Kaplan. S. (1998) *With People in Mind: Design and management of everyday Nature*, Washington DC: Island Press.

Karnblum, W. (1978) *Urban Open Spaces*, London: Academic Press.

Kashdan, T., Rose, P. & Fincham, F.D. (2004) 'Curiosity and Exploration: Facilitating positive subjective experience and personal growth opportunities', *Journal of Personality Assessment*, Vol.82 pp.291-305.

Kasser, T. & Ryan, R.M. (1996) 'Further examining the American dream: differential correlations of Intrinsic and extrinsic goals', *Personality and Social Psychology Bulletin*, Vol.22 pp.80-87.

Kasser, T. (2002) *The High Price of Materialism*, Cambridge, MA: MIT Press.

Kay, J. (1984) *Self-Organisation in Living Systems,* PhD Thesis (University of Waterloo) *citied in* Kay, J. (2002) 'On complexity theory, exergy, and industrial ecology' In: C. Kibert, G. Sendzimir, & B. Guy (Eds.) *Construction Ecology: Nature as the basis for green buildings*, London: Spon Press.

Kay, J. (2002) 'On complexity theory, exergy, and industrial ecology' In: C. Kibert, G. Sendzimir, & B. Guy (Eds.) *Construction Ecology: Nature as the basis for green buildings*, New York and London: Spon Press, pp.72-107.

Kay, J. & Scneider, E. D (1992) 'Thermodynamics and measures of ecosystem integrity in ecological indicators' In: D.H. McKenzie, D.E. Hyatt & V.J. Mc Donald (eds.) *Proceedings of the International Symposium on Ecological Indicators*, Amsterdam: Elsevier, pp.159-182.

Kellert, J. (2005) *Building for Life: Designing and understanding the human-nature connection*, Washington DC: Island Press.

Kellert, S. & Wilson, E.O (1993) *The Biophilia Hypothesis*, Washington DC: Island Press.

Kendle T. & Forbes, S. (1997) *Urban Nature Conservation: Landscape management in the urban countryside*, London: Taylor & Francis.

Keyes, C., Schmotkin, D., & Ryff, C. (2002) 'Optimizing Wellbeing: The empirical encounter of two traditions', *Journal of Personality and Social Psychology*, Vol.82 pp.1007-22.

Kibert, C., Sendzimir, G. & Guy, B. (2002) (Eds.) *Construction Ecology: Nature as the basis for green buildings*, New York and London: Spon press.

Kingsley, J. & Townsend, M. (2006) ' 'Dig In' to Social Capital: Community Gardens as Mechanisms for Growing Urban Social Connectedness', *Urban Policy and Research*, Vol.24(4) pp. 525-537.

Knowles, C. & Sweetman, P. (2004) *Picturing the Social Landscape*, London: Routledge.

Kohr, L. (1978) *The Breakdown of Nations,* New York: E.P. Dutton.

Krieps, R. (Ed.) (1989) *Environment and Health: A holistic approach*, Farnham: Gower.

Krippendorf, K. (1980) *Content Analysis: An introduction to its methodologies*, London: Sage.

Krueger, R. & Gibbs, D. (eds.) (2007) *The Sustainable Development Paradox: Urban political economy in the United States and Europe*, New York: Guildford Press.

Kubzansky, L., Kawachi, I., Weisse, S. & Sparrow, D. (1998) 'Anxiety and coronary heart disease: A synthesis of epidemiological, psychological, and experimental evidence', *Annals of Behavioural Medicine*, Vol.20 pp.47-58.

Kuo, F. (2001) 'Coping with poverty: impacts of environment and attention in the inner city', *Environment and Behaviour,* Vol. 33(1) pp.5-34.

Kuo, F. & Sullivan, W. (2001a) 'Aggression and violence in the inner city: Effects of environment via mental fatigue', *Environment and Behaviour*, Vol.33(4) pp.543-571.

Kuo, F. & Sullivan, W. (2001b) 'Environment and Crime in the Inner City: Does vegetation reduce Crime', *Environment and Behaviour*, Vol.33(3) pp.343-367.

Kuo, F., Sullivan, W., Coley, R. & Brunson, L. (1998) 'Fertile ground for community: inner-city neighbourhood common spaces', *American Journal of Community Psychology*, Vol. 26 pp.823-851.

Kuser, J. (2000) *Handbook of Urban and Community Forestry in the Northeast*, New York: Plenum Publishers.

Kweon, B., Sullivan, W. & Wiley, A. (1998) 'Green common spaces and the social integration of inner-city adults', *Environment and Behaviour*, Vol.30 pp.832-858.

Lake, A. & Townsend, T. (2006) 'Obesogenic Environments: Exploring the built and food environments', *Journal of the Royal Society for the Promotion of Health*, Vol.12(6) pp.262-267.

Landscape Institute (2009) *Green Infrastructure: Connected and multifunctional landscapes*, London: The Landscape Institute Position Statement. (Available at www.landscapeinstiture.org).

Latham, A. (2003) 'Research, performance, and doing human geography: some reflections on the diary-photograph, diary-interview methods', *Environment and Planning A*, Vol.35 pp.1993-2017.

Layard, R. (2003) *Happiness: Has social science a clue?* Lionel Robbins Memorial Lectures 2002/2003, London School of Economics.

Layard, R. (2005) *Happiness: Lessons from a New Science*, London: Penguin.

Leopold, A. (1949) *Sand County Almanac,* New York: Oxford University Press.

Levett-Therivel (2007) *Wellbeing: International policy interventions*, DEFRA report.

Lewin, K. (1951) 'Field Theory in Social Science: Selected theoretical papers' In: D. Cartwright (ed.) New York: Harper & Row. Reprinted in Lewin K. (1997) 'Resolving Social Conflicts and Field Theory in Social Science', Washington DC: American Psychological Association.

Lewis, C. (1990) 'Gardening as a healing process' In: M. Francis & R. Hester (Eds.) *The Meaning of Gardens,* Cambridge: MIT Press, pp.244-251.

Lewis, G. & Booth M. (1994) 'Are cities bad for your mental health?', *Psychological Medicine*, Vol.24 pp.913-915.

Lewis, L. (2004) 'Modesty and modernity: photography, race and representation on Mexico's Costa Chica (Guerrero)', *Identities, Global Studies and Culture and Power,* Vol.11 pp.471-99.

Lilienfeld, R. (1978) *The Rise of Systems Theory: An ideological analysis*, New York: Wiley.

Lister, M. (1995) *The Photographic Image in digital culture*, New York: Routledge.

Little, B.R. (1993) 'Personal projects and Distributed Self: Aspects of a cognitive psychology' In: J. Suls (Ed.) *The Self in Social perspective: Psychological perspectives of the self*, Vol. 4 pp.157-185, Hillsdale NJ: Lawrence Errbaum.

Lofland, J. & Lofland, L. (1995) *Analysing Social Settings: A guide to qualitative observation and analysi*s, Belmount CA: Wadsworth.

Lomba-Otiz, E. (2003) 'Questioning Ecological Design: A deep ecology perspective', *Ecotecture*, July 2003.

Louv, R. (2006) *Last Child in the Woods: Saving our children from nature deficit disorder*, Chapel Hill USA: Algonquin.

Lovelock, J.E. (1979) *Gaia: A new look at life on earth*, Oxford UK: Oxford University Press.

Lovins, A. (1977) *Soft Energy Paths,* New York: Harper and Row.

Luke, T. (1995) 'Sustainable Development as a Power/Knowledge system: The problem of governmentality' In: F. Fischer & M. Black (eds.) *Greening Environmental Policy: The politics of a sustainable future.* London: Paul Chapman pp.21-32.

Lutz, C. & Collins, J. (1993) *Reading National Geographic*, Chicago, IL: University of Chicago Press.

Lyle, J. (1985) *Design for Human Ecosystems: Landscape, land use, and natural resources*, New York: Van Nostrand Reinhold.

Lyle, J. (1996) *Regenerative Design for Sustainable Development,* New York: Wiley.

Lynch, K. (1981) *Good City Form*, MIT Press.

Maan, N. (2005) 'The delivery of environmental play projects by the Better Play funded organisations', *Barnados Briefing 4*.

Mabey, R. (1999) [1973] *Unofficial Countryside*, London: Pimlico Press.

Madge, P. (1997) 'Ecological Design: A new critique', *Design Issues*, Vol.13(2) pp.44-54.

Maller, C., Townsend, M., & Brown, P. (2002) 'Healthy Parks Healthy People: The health benefits of contact with nature in a park context: an Annotated Bibliography', *Social and Mental health priority area occasional paper series, volume two, Melbourne:* Faculty of Health & Behavioural Sciences.

Mbiba, B. (1995) *Urban Agriculture in Zimbabwe; Implications for urban management and poverty*, Hants UK: Avebury.

Manzini, E. & Jegou, F. (2003) *Sustainable Everyday: Scenarios of urban life*, Milan: Edizione Ambiente.

Margolin, M. (2000) 'The Human Nature Dance: People as a keytone species' In: K. Ausubel & J.P. Harpignies (Eds.) (2000) T*he Bioneers Series – Nature's Operating Instructions,* Sierra Club Books, pp.69.

Marks, N., Thompson, S., Eckersley, R., Jackson, T. & Kasser, T. (2006) *Sustainable Development and Wellbeing: Relationships, challenges and policy implications,* DEFRA.

Marten, G. (2001) *Human Ecology: Basic concepts for sustainable development*, London: Earthscan.

Maruta, T., Colligan, R., Malinchoc, M. & Offord, K. (2000) 'Optimists vs Pessimists: Survival rate among medical patients over a 30-year period', *Mayo Clinic Proceedings*, Vol.75 pp.140-143.

Maslow, A. (1943) 'A theory of human motivation', *Psychology Review*, Vol.50, pp.370-396.

Maslow, A. (1954) *Motivation and Personality.* London: Harper & Row.

Massey, D. (2007) *World City*, Cambridge: Polity.

Max-Neef, A.M. (1993) *Human Scale Development: Conception, application and further reflections,* London: Apex press.

Maynard, D.W. & Schaeffer, N. C. (2002) 'Standardization and Its Discontents In: D.W. Maynard, H. Houtkoop-Steenstra, N.C. Schaeffer and J. van der Zouwen (Eds.) *Standardization and Tacit Knowledge: Interaction and Practice in the Survey Interview*, New York: John Wiley & Sons, Inc., pp. 3-46

McAllister, F. (2005) *Wellbeing Concepts and Challenges: Discussion Paper*, Sustainable Development Research Network (SDRN).

McAndrew, R. (1993) *Environmental Psychology,* California: Brookes/Col.

McDonagh, W. (2002) 'The Hannover Principles' In: Y. Birkeland (2002) *Design for Sustainability: A sourcebook of integrated eco-logical solutions*, London and Virginia: Earthscan, pp 25.

McDonagh, W. & Braungart, M. (2002) *Cradle to Cradle: Remaking the way we make things*, New York: North Point Press.

McDowell, I. & Newell, C. (1987) *Measuring Health: A guide to rating scales and questionnaires*, Toronto: Oxford University Press.

McGee, R. (2002) 'The Self in Participatory Poverty Research' In: K. Brock & R. Mc Gee (Eds.) *Knowing Poverty*, London: Earthscan, pp 20.

McGillivray, M. (2006) *Human Wellbeing: Concept and Measurement*, New York: Palgrave Macmillan.

McHarg, I. L. (1992) *Design with Nature: An ecological basis for architectural design*, New York: Doubleday and Co.

McHarg, I. L & Steiner, F.R. (1998) *To Heal the Earth: Selected writings of Ian L. McHarg*, New York: Island Press.

McIntosh, R.P. (1989) 'Citation Classics of Ecology', *The Quarterly Review of Biology*, Vol.64(1) pp.31-49.

McLoughlin, B. (1968) *Urban and Regional Planning: A systems approach*, London: Faber & Faber.

Meadows, D.H.., Meadows, D. L. & Randers, J. & Behrens III, W.H. (1974) [2nd edition] *The Limits to Growth,* New York: Potomac Associates/Universe Books.

Meadowcroft, J. (1997) *Planning, Democracy and Sustainable Development, Political Science Review*, Vol.18(2) pp.167-189.

Mebratu, D. (1998) 'Sustainability and Sustainable Development: historical and conceptual review', *Environmental Impact Assessment Review*, Vol.18(6) pp.493-520.

Michalos, A.C. (1985) 'Multiple Discrepancies Theory (MDT)', *Social Indicators Research*, Vol.16 (4) pp.347-413.

Millennium Ecosystem Assessment (2005) *Ecosystems and Human Wellbeing: Biodiversity Synthesis*, World Resources Institute, Washington, D.C.

Miles, M. & Huberman, M. (1994) *Qualitative Data Analysis: An expanded sourcebook*, London: Sage.

Millennium Ecosystem Assessment (2005) *Ecosystems and Human Wellbeing: Biodiversity Synthesis*, Washington, D.C: World Resources Institute, pp. 1-100.

Mind (2007) *Ecotherapy: The green agenda for mental health*, London: Mind.

Minter, S. (1993) *Healing Garden: A natural haven for body and senses and spirit*, Vermont: Tuttle Publications.

Minton, A. (2009) *Ground Control: Fear and happiness in the twenty-first century city*, Penguin Books.

Mitchell, J. C. (1983) 'Case and situation analysis', *The Sociological Review*, Vol.13, pp 187-211.

Mitchell, K. (2004) *Crossing the Neoliberal Line: Pacific-rim migration and the metropolis*, Philadelphia: Temple University Press.

Mitchell, W. (1994) *Picture Theory: Essays on Verbal and Visual Representation*, Chicago: Chicago University Press.

Mitchell W. (1996) 'What do pictures really want?' *October,* Vol. 7 pp.71-82.

Mitchell, A. E., Hong Y., Koh, E., Barrett, D., Bryant D. E., Ford Denison, R., & Kafka, S. (2007) 'Ten year comparison of the Influence of organic and Conventional Crop Management practices on the Content of Flavonoids in Tomatoes', *Journal of Agriculture and Food Chemistry*, 23 June 2007.

Mollison, B. (1988) *Permaculture: A Designer's manual*, Tyaglum Australia: Tagari.

Mollison, B. (1990) *Permaculture Two: Practical design for town and country in permanent agriculture*, Tagari Books.

Mollison, B. (1991) *Introduction to Permaculture*, Tagari Books.

Mollison, B. & Holmgren, D. (1978) *Permaculture One: A perennial agriculture for human settlements*, Tagari Books.

Montuori, A. (1998) *Postmodern Systems Theory, Epistemology, and Environment: The challenge of reconceptualisation,* PhD thesis (California Institute of Integral Studies).

Monzingo, L. (1997) The aesthetics of ecological design: seeing nature as a culture, *Landscape Journal*, Vol.16(1) pp.46-59.

Moore, E. (1981) 'A prison environment's effect on health care service demands', *Journal of Environmental Systems*, Vol.11 pp.17-34.

Morin, E. (1994) *La Complexit Humane* [*Human Complexity*], Paris: Flammarion.

Morris, N. (2003) *Health, Wellbeing and Open Space,* OPENspace.

Moughtin, C. (1996) *Urban Design: Green dimensions*, Amsterdam: Elsevier.

Moulsecoomb Forest and Wildlife Project Annual Report 2007.

Michaelson, J. (2010) 'David Cameron's wellbeing index could help transform lives for the better*'*, *New Economics Foundation Blog* 26 November 2010 (www.neweconomics.org accessed 18 April 2011).

Mulholland, H. & Watt, N. (2010) 'David Cameron defends plans for wellbeing index', *The Guardian*, 25 November, 2010.

Naess, A. (1989) *Ecology, Community and Lifestyle*, Cambridge: Cambridge University Press.

Naess, A. (2005) 'Architecture and Deep Ecology', *Trumpeter*, Vol.21(2).

Nakamura, J. & Csikszentmihalyi, M. (2003) 'The construction of meaning through vital engagement' In: C. Keyes & J. Haidt (eds.) *Flourishing: positive psychology and the life well-lived*, American Psychological Association: Washington, pp.88-104.

Natural England (2009) *Green Infrastructure Guidance*, Natural England (NE176) (www.naturalengland.org.uk.)

Neuman, L. (2000) *Social Research Methods – Qualitative and quantitative approaches*, Boston: Allyn and Bacon.

Neumayer, E. (2004) *Sustainability and Wellbeing Indicators,* United Nations University and World Institute for Development Economics Research (WIDER).

Newcastle City Council (2001) *West End Regeneration Plan*, Newcastle City Council.

Newton, J. (2007) *Wellbeing and the Natural Environment: A brief overview of the evidence* DEFRA Report.

Nicholson-Lord, D. (1987) *The Greening of the Cities*, London: Routledge.

Nicholson-Lord, D. (2003) *Green Cities – And why we need them*, New Economics Foundation (NEF).

Norgaard, R. (1987) 'Risk and its Management in Traditional and Modern Agro economic Systems', Paper presented at the Society of Economic Anthropology, April, 1987 *cited in* Redclift, M. (1987) *Sustainable Development: Exploring the Contradictions*, New York: Methuen, pp.151.

Noss, R. & Cooperrider, A. (1994) *Saving Nature's Legacy: Protecting and restoring biodiversity*, Washington DC: Island Press.

Nussbaum, M. (1988) 'Nature, Functioning and Capability: Aristotle on political distribution'. *Oxford Studies in Ancient Philosophy*, Supplementary Volume, pp. 145-184.

Nussbaum, M. (2000) *Women and Human Development: The capabilities approach,* Cambridge: Cambridge University Press.

Nussbaum M. & Sen, A. (eds.) (1993) *The Quality of Life*, Oxford: Clarendon Press.

O'Brien, L. (2004) 'Feeling Good in the Woods: The increasing interest in health, wellbeing and woodlands', *Green Places*, July / August 2004.

O'Brien, L. & Tabbush, P. (2003) *Health and wellbeing: trees, woodlands and natural spaces.* Outcomes from expert consultations held in England, Scotland and Wales 2002.

O'Neill, J. (1993) *Ecology, Policy and Politics - Human wellbeing and the natural world*, London: Routledge.

O'Reilly, P. & Handforth, J. (1955) 'Occupational therapy with refractor patients', *American Journal of Psychiatry*, Vol.111 pp.763-766.

Office of the Deputy Prime Minister (2002) *Living Places: Cleaner, Safer, Greener*, Office of the Deputy Prime Minister: Housing, Planning, Local Government and the Regions Committee.

Office of the Deputy Prime Minister (2005a) *Making it Happen in Neighbourhoods: The national strategy for neighbourhood renewal – four years on,* Wetherby: Office of the Deputy Prime Minister.

Office of the Deputy Prime Minister (2005b) *Sustainable Communities: Homes for all*, Norwich: Office of the Deputy Prime Minister.

Office of the Deputy Prime Minister (2006) Planning Policy Guidance 17: Planning for open space, sport and recreation, Office of the Deputy Prime Minister

Odum, E. (1983) *Basic Ecology*, Philadelphia: Saunders Co.

Offer, A. (2006) *The Challenge of Affluence: Self-control and wellbeing in the United States and Britain since 1950*, Oxford: Oxford University Press.

Orr, D. (1992) *Ecological Literacy: Education and the transition to a postmodern world,* Albany: State University of New York Press.

Orr, D. (2002) *The Nature of Design: Ecology, culture and human intention*, New York: Oxford University Press.

Osmond, P. (2002) 'The Sustainable Landscape' In: Y. Birkeland (2002) *Design for Sustainability: A sourcebook of integrated eco-logical solutions*, London and Virginia: Earthscan, pp.99-104.

Ostir, G., Markides, K., Black, S. & Goodwin, J. (2000) 'Emotional wellbeing predicts subsequent functional independence and survival', *Journal of American Geriatrics Society,* Vol.48 pp.473-478.

Palka, E. (1999) 'Accessible Wilderness as a Therapeutic Landscape: Experiencing the Nature of Denali National Park, Alaska' In: Williams, A. (Eds), *Therapeutic Landscapes: The dynamic between place and wellness*, Maryland: University Press of America pp.29-51.

Parkins, W. & Craig, W. (2006) *Slow Living*, Oxford and New York: Berg.

Parr, H. (2005) *Sustainable Communities? Nature Work and Mental Health*, Department of Geography, University of Dundee.

Paxton, A. (1997) 'Farming the City', *Landscape Design*, Vol.263 pp.53-55.

Pearce, D. (1993) *Blueprint 3: Measuring sustainable development*, London: Earthscan.

Pears, P. & Stickland, S. (2000) *Organic Gardening*, Royal Horticultural Society, Octopus Publishing.

Pilgram, J. (1993) 'Human-nature Relationships: Leisure environments and natural settings' In: T. Garling & R. Golledge (Eds.) *Behaviour and Environment: Psychological and Geographical approaches,* Amsterdam*:* Elsevier Science Publishers.

Pink, S. (2006) *Doing Visual Ethnography*, London: Sage.

Pink, S. (2007) 'Walking with Video', *Visual Studies*, Vol.22(3) pp.240-252.

Pink, S. (2008) 'Sense and Sustainability: The case of the slow city movement', *Local Environment*, Vol.13(2) pp. 95-106.

Polanyi, M. (1978) [1958], *Personal Knowledge: Towards a post-critical philosophy*, London: Routledge and Kegan Paul.

Pollan, M. (2001) *The Botony of Desire*, New York: Random House.

Pollan, M. (2006) *The Omnivore's Dilemma: A natural history of four meals*, New York: Penguin Press.

Pollan, M. (2008) *In Defense of Food*, New York: Penguin Press.

Pollan, M. (2009) *Food Rules: An eater's manual*, New York: Penguin Press.

Pretty, J. (2007) *The Earth Only Endures*: *On reconnection with nature and our place in it,* London: Earthscan.

Pretty, J., Griffin, M., Sellens, M. & Pretty, C. (2003) *Green Exercise: Complementary roles of nature, exercise and diet in physical and emotional wellbeing and implications to public health policy*, CES Occasional Paper 2003, Colchester: University of Essex.

Pretty, J., Griffin, M., Peacock, J., Hine, R., Sellens, M. & South, N. (2005a) 'A countryside for health and wellbeing: The physical and mental health benefits of green exercise', *Report for the Countryside Recreation Network.*

Pretty, J., Peacock, J. Sellens, M. & Griffin, M. (2005b) 'The mental and physical health outcomes of green exercise', *International Journal of Environmental Health*, Vol.15(5) pp.319-337.

Pretty, J., Peacock, J., Hine, R., Sellens, M., South, N. & Griffin, M. (2007) 'Green exercise in the UK Countryside: Effects on Health and Psychological wellbeing, and Implications for Policy and Planning', *Journal of Environmental Planning and Management*, Vol.50(2) pp.211-231.

Prigogine, I. & Nicolis, G. (1977) *Self Organisation in Non-Equilibrium Systems*, New York: Wiley.

Prince, P. & Prince, C. (2001) 'Subjective quality of life in the evaluation of programs for people with serious and persistent mental illness', *Clinical Psychology Review*, Vol.21(7) pp.1005-1036.

Pyle, R. (1978) 'The extinction of experience', *Horticulture*, Vol.56 pp.64-67.

Qizilbash, M. (2002) 'Development, common foes and shared values', *Review of Political Economy*, Vol.14(4) pp.463-480.

Qizilbash, M. (1998) 'The Concept of Well-being', *Economics and Philosophy,* Vol.14 (1) pp.51-73.

Raco, M., (2007) 'Spatial Policy, Sustainability and State restructuring: A reassessment of sustainable community building in England' In: R. Krueger, D. Gibbs (eds.) *The Sustainable Development Paradox: Urban political economy in the United States and Europe*, New York: Guildford Press, pp.214-238.

Randall, K., Shoemaker, C., Relf, D. & Geller, E. (1992) 'Effects of plantscapes in an office environment on worker satisfaction' In: Relf, E. (Eds.) *The Role of Horticulture in Human Wellbeing and Social Development*, Portland: Timber Press.

Rappaport, R.A. (1992) [1979] *Ecology, Meaning and Religion*, Richmond: North Atlantic Books.

Raskin, P. D. & Margolis, R. M. (1998) 'Global energy, sustainability, and the conventional development paradigm', *Energy Sources,* Vol.20 pp.363-383.

Redclift, M. (1987) *Sustainable Development: Exploring the contradictions*, London and New York: Routledge.

Redwood, M. (Ed.) (2009) *Agriculture in Urban Planning: Generating livelihoods and food security*, London: Earthscan.

Rees, J. (1990) *Natural Resources: Allocation, economics and policy*, London: Routledge.

Reeves, R. (2003) 'The Politics of Happiness', *NEF Discussion Paper,* New Economics Foundation.

Register, R. (2002) *Ecocities: Rebuilding cities in balance with nature*, San Francisco CA: New Society Publishing.

Reis, H. & Gable, S. (2003) 'Toward a positive psychology of relationships' In: C. Keyes & J. Haidt (Eds.) *Flourishing: Positive psychology and the life well-lived*, Washington: American Psychological Association, pp. 129-159.

Report for Planning is D Sept 2005 Learning and Skills Council: Sussex Strategic Area Review report for Brighton and Hove: Planning Area D.

Reynolds, R. (2008) *On Guerrilla Gardening: A handbook for gardening without boundaries*, London: Bloomsbury.

Reynolds, V. (1999) *The Green Gym: An evaluation of a pilot project in Sonning Common, Oxfordshire*, Report 8*,* Oxford Brookes University, School of Health and Social Care.

Reynolds, V. (2002) *Wellbeing comes naturally: An evaluation of the BTCV Green Gym at Portslade, East Sussex*, Report 17, Oxford Centre for Health Care Research and Development, Oxford Brookes University.

Rhode, C.L.E. Kendle, A.D. (1994) 'Human well-being, natural landscapes and wildlife in urban areas: a review', *English Nature Science Report No 22*. Peterborough: English Nature.

Robeyns, I. (2003) *The Capability Approach: An Interdisciplinary Introduction*. (http://www.ingridrobeyns.nl/.)

Robeyns, I. (2008) 'Sen's Capability Approach and Feminist Concerns' In: Commin, F., Qizilbash, M. & Alkire, S. (Eds.) *The Capability Approach: Concepts, measures and applications*, Cambridge: Cambridge University Press.

Robinson N. (1992) 'Healing with Nature', *Landscape Design,* June 29-31.

Rose, G. (2007) [2nd ed.]*Visual Methodologies: An introduction to the interpretation of visual materials*, Sage.

Rounsefell, V. (2002) 'United Human Community Ecology' In: J. Birkeland (2002) *Design for Sustainability: A sourcebook of integrated eco-logical solutions,* London and Virginia: Earthscan, pp. 78-81.

Ryan, A. & Bohman, J. (1998) 'Systems Theory in Social Science' In: *Routledge Encyclopedia of Philosophy* (version 1.0), London: Routledge.

Ryan, R. M., & Deci, E. L. (2000) 'Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being'. *American Psychologist,* Vol.*55* pp.68-78.

Ryan, R. M. & Deci, E. L. (2001) 'On Happiness and Human Potentials: A review of research on hedonic and eudemonic wellbeing', *Annual Review of Psychology,* Vol.52 pp.141-166.

Rycroft, V. (2000) *Taste of a Better Future: A participatory evaluation*, London: WEN.

Ryff, C.D. (1989) 'Happiness is everything, or is it? Explorations on the meaning of psychological well-being', *Journal of Personality and Social Psychology Inquiry*, Vol.57 pp.1069-1081.

Ryff, C.D. (1995) 'Psychological wellbeing in adult life', *Current Directions in Psychological Science*, Vol.4(4) pp.99-104.

Ryff, C.D. & Keyes, C (1995) 'The structure of psychological wellbeing revisited', *Journal of Personality,* Vol.69 pp.719-729.

Ryff, C.D & Heidrich, S.M (1997) 'Experience and wellbeing: explorations on domains of life and how they matter'*, International Journal of Behavioural Development*, Vol.20(2) pp.193-206.

Sale, K. (1982) *Human Scale*, New York: Perigee.

Samuels, J. & Tibaijuka, A. K. (2006) *Removing Unfreedoms: Citizens as agents of change in urban development*, Rugby: Practical Action.

Sandvik, E. Diener, E. and Seidlitz, L. (1993) 'The Convergence and Stability of Self-Report and Non-Self-Report Measures, *Journal of Personality*, Vol.61 pp. 317-342.

Sanne, C. (2002) 'Willing consumers-or locked in?, Policies for a sustainable consumption', *Ecological Economics*, Vol.42 pp.273-287.

Schmelzkopf, K. (1995) 'Urban Community Gardens as Contested Spaces', *Geographical Review*, Vol.85(3) pp.364.

Schneider, E.D. & Kay, J.J. (1994a) 'Complexity and Thermodynamics: Towards a new ecology', *Futures*, Vol.24 pp.626-647.

Schneider, E.D. & Kay, J.J. (1994b) *Life as a manifestation of the second law of thermodynamics, Mathematical and Computer Modelling*, Vol.19 (6-8) pp.25-48.

Schumacher, E. (1974) *Small is Beautiful*, New York: Harper Torchbooks.

Scottish Executive (1996) *Quality of Life and Wellbeing: Measuring the benefits of culture and sport*, Scottish Executive.

Scottish Executive (2006) *Sustainable Development: A review of international literature*, Scottish Executive Social Research.

Scottswood Natural Community Garden (2007) *Trustees Report and Financial Statements 2007*.

Seale, C. (2004) *Researching Society and Culture*, London: Sage.

Searle, B. (2008) *Well-being: In search of the good life?*, Bristol: Policy Press.

Seligman, E. (2002) *Authentic Happiness: Using the new positive psychology to realize your potential for lasting fulfilment*, Sydney: Random House.

Selman, P. (2008) 'What do we mean by sustainable landscape?', *Sustainability Science, Practice and Policy*, Fall/Winter Vol.4(2).
Http://sspp.proquest.com/archives/vol4iss2/communityessay.selman.html

Sempik, J., Aldridge, J. & Becker, S. (2002) *Social and Therapeutic Horticulture: Evidence and messages from research*, Reading: Thrive in association with the Centre for Child and Family Research.

Sen, A. (1984) 'Rights and Capabilities' In: *Resources, Values and Development*, Harvard University Press, Cambridge, MA.

Sen, A. (1992) *Inequality Re-examined*, Cambridge: Harvard University Press.

Sen, A. (1998) *Commodities and Capabilities*, Amsterdam: Elsevier.

Sen, A. (1999) *Development as Freedom,* Oxford: Oxford University Press.

Sen, A. (2004) 'Why we should preserve the spotted owl', *London Review of Books*, February 2004.

Sen, A. (2005) 'Human Rights and Capabilities', *Journal of Human Development*, Vol.6(2) pp. 151-166.

Senghaas, N. (1984) [rev ed.] 'The case for Autarchy' In: C. Wilbur (ed.) *The Political Economy of Development and Underdevelopment*, New York: Random House.

Seymour, L. (2003) 'Nature and Psychological Wellbeing', *English Nature Research Report* No. 533.

Sheffield City Council (1993) *Sheffield Parks Regeneration Strategy: A strategy for the future management of the 'inner city' parks and open spaces in Sheffield*. Sheffield City Wildlife Trust, funded by Department of the Environment.

Shiva, V. (1993) *Monocultures of the Mind: Perspectives on Biodiversity and Biotechnology*, London: Zed Books.

Shove, E. (2003) *Comfort, Cleanliness and convenience: The social organisation of normality*, London: Berg.

Shove, E. & Warde, A. (2002) 'Inconspicuous Consumption: The sociology of consumption, lifestyles and the environment' In: R. Dunlap, F., Buttel, F., Dickens & P. Gijswijt (eds.) Sociological Theory and the Environment: Classical foundations, contemporary rights, Lanham, MA: Rowman and Littlefield.

Slater, D. (1998) 'Analysing cultural objects: content analysis and semiotics' In: C. Seale (ed.) *Researching Society and Culture*, London: Sage, pp 233-44.

Smith, N.C. (1991) 'The Case Study: A vital yet misunderstood research methods for management' In: N.C. Smith & P. Dainty (Eds.) *The Management Research Handbook*, London: Routledge.

Smith, S., Williams, D. & Johnson, N. (Eds.) (1997) *Natured by Knowledge*, New York: The Apex Press.

Smyth, F. (2005) 'Medical Geography: Therapeutic places, spaces and networks', *Progress in Human Geography*, Vol.29 pp.488-495.

SNCG (2007) *Scottswood Natural Community Garden Annual Report 2007*, Newcastle: SNCG Office.

Social Exclusion Unit (2001) *A New Commitment to Urban Renewal: National Strategy Action Plan*, Cabinet Office, January 2001.

Spiro, Avopn III & Bosse, R. (2000) 'Relations Between Health-Related Quality of Life and Wellbeing: The Gerontologist's New Clothes?', *International Journal of Ageing & Human Development*, Vol.50(4) pp.314.

Stewart-Brown, S. (1998) 'Emotional wellbeing and its relation to health', *British Medical Journal*, Vol. 317 pp.1608-1609.

Stibbe, A. (ed.) (2009) *Handbook of Sustainability Literacy*, Totnes: Green Books.

Stilwell, W. E. (2002) 'Community Subjective Wellbeing: Personality Traits and Quality of Life Therapy', *Social Indicators Research*, Vol.60(1-3).

Stocker, L. & Barnett, K. (1998) 'The significance and praxis of community–based sustainability projects: community gardens in Western Australia', *Local Environment*, Vol.3(2) pp.179-188.

Stone, M.K. & Barlow, Z. (Ed.) (2005) *Ecological Literacy: Educating our children for a sustainable world (The Bioneers Series)*, San Francisco: Sierra Club Books.

Strauss A. & Corbin, J. (1990) *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* [2nd edition], London: Sage.

Strauss, A. (1987) *Qualitative Analysis for Social Scientists*, Cambridge: Cambridge University Press.

Stutzer, A. & Frey, B.S. (2005) *Stress That Doesn't Pay: The Commuting Paradox,* University of Zurich, August (16).

Sugden, R. (1993) 'Welfare, Resources and Capabilities: a review of inequality re-examined by Amartya Sen', *Journal of Economic Literature*, Vol.31, pp.1947-1962.

Suki Ali (2004) 'Using Visual Materials' In: Seale, C. (2004) *Researching Society and Culture,* London: Sage, pp.276.

Sun, L. & Jiang, Q. (2000) 'Community values according to the 'I Ching'', *International Journal of Social Economics*, Vol.27(2) pp.99-113.

Sussex Council (2005) *Sussex Strategic Area Review report for Brighton and Hove: Planning Area D*, Sussex Council.

Sustainable Development Commission (2007a) 'The Natural Environment: Health and wellbeing' *Healthy Futures no. 6*, London: Sustainable Development Commission.

Sustainable Development Commission (2007b) *Every Child's Future Matters,* London: Sustainable Development Commission.

Suzuki, D. (1990) *Inventing the future: reflections on science, technology and nature,* Sydney: Allen & Unwin.

Swanwick, C., Dunnett, N. & Woolley, H. (2003) 'Nature, Role and Value of Green Space in Towns and Cities', *Built Environment*, Vol.29 pp.94-106.

Swyngedouw, E. (2007) 'Impossible "Sustainability" and the Postpolitical Condition' In: R. Krueger, and D. Gibbs (Eds.) *The Sustainable Development Paradox: Urban political economy in the United States and Europe*, New York: Guildford Press, pp. 13-41.

Tabbish, P. & O'Brien, L. (2002) *Health and Wellbeing –Trees, woodlands ad natural spaces*, Social Research Unit, Forest Research.

Taillefer, M., Dupuis, G., Roberge, M., LeMay, S. (2003) 'Health related quality of life models: systematic review of the literature'*, Social Indicators Research,* Vol. 64(2) pp.293-323.

Takano, T., Nakamura, K. & Watanabe, M. (2002) 'Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable greenspaces', *Journal of Epidemiology and Community Health*, Vol. 56 pp.913-918.

Tansley, A.G. (1935) The use and abuse of vegetational concepts and terms, *Ecology*, Vol.16 pp.284-307 [reprinted as part of Trudgill, S. (2007) *Classics Revisited*].

Taylor, A. (2000) 'Physical activity, anxiety and stress' In: S. J. Biddle, K.R. Fox, & S.H., Boutcher (Eds.) *Physical Activity and Psychological Wellbeing*, London: Routledge, pp.10-46.

Taylor, A., Kuo, F. & Sullivan, W. (2001) 'Coping with ADD: The surprising connection to green play settings', *Environment and Behaviour*, Vol.33(1) pp.54-77.

Taylor, A., Kuo, F. & Sullivan, W. (2002) 'Views of Nature and Self-Discipline: evidence form inner city children', *Journal of Environmental Psychology*, Vol.22(1-2) pp.49-63.

Taylor, A., Wiley, A., Kuo, F. & Sullivan, W. (1998) 'Growing up in the inner city: Green spaces as places to grow', *Environment and Behaviour*, Vol.30(1) pp.3-27.

TCPA (2003) *Planning for a Sustainable Environment*, Town and Country Planning Association.

Teig, E, Amulya, J., Bardwell, L., Buchenau, M., Marshall, J.A., Lift, J.S. (2009) 'Collective efficacy in Denver, Colorado: Strengthening neighbourhoods and health through community gardens', *Health and Place*, Vol.15 pp.115-112.

Tennessen, C. & Cimprich, B. (1995) 'Views to nature: Effects on attention', *Journal of Environmental Psychology*, Vol.15(1) pp.77-85.

Thompson, E. (1999) *The Urban Gardener*, London: Orion/Sunday Telegraph.

Thoreau, H.D. (2004) [rev. ed.] *Walden*, Princeton University Press.

Tillman, L. J. (1994) *Regenerative Design for Sustainable Development*, New York: Wiley.

Todd, J. & Todd, N. (1980) *Tomorrow is our Permanent Address: The search for an ecological science of design as embodied in the bioshelter*, New York: Harper and Row.

Todd, J & Todd, N (1984) *Bioshelters, Ocean Arks, City Farming: Ecology as the basis for design*, San Francisco: Sierra Club Books.

Todd, N. & Todd, J. (1994) *Eco-Cities to Living Machines*, Berkeley, CA: North Atlantic Books.

Toman, M.A. (1992) 'The difficulty in defining sustainability', *Resources for the Future*. (http://users.uom.gr/~esartz/teaching/genvecon/adiffin.pdf (accessed 7/4/2011))

Torgerson, D. (1995) 'The uncertain quest for sustainability: public discourse and the politics of environmentalism' In: F. Fischer & M. Black (Eds.) *Greening Environmental Policy: The politics of a sustainable future,* London: Paul Chapman pp. 3-20.

Tralee Development Plan (2004) Tralee Town Council, Department of Planning.

Tranter, P. & Doyle, J. (1996) 'Reclaiming the residential street as playspace', *International Play Journal*, Vol.4 pp.481-497.

Travers, P. & Richardson, S. (1997) 'Material wellbeing and human wellbeing' In: F. Ackerman, D. Kiron, N. R. Goodwin, J. M. Harris and K. Gallagher (ed.), *Human Wellbeing and Economic Goals,* Island Press, Washington pp. 26-29.

Tuan, Y. (1971) *Man and Nature*, Washington: Association of American Geographers.

Turner, J. & Kelly, B. (2000) 'Emotional dimensions of chronic disease', *British Medical Journal*, Vol.172 pp.124-128.

Tzoulas, K. (2006) *Finding Links Between Urban Biodiversity and Human Health and Wellbeing*, PhD Thesis (University of Salford).

Tzoulas, K. & James, P. (2004) *Finding Links Between Urban Biodiversity and Human Health and Wellbeing* http://www.els.salford.ac.uk/urbannature/Projects/Kosta%20IPRC.doc

Ulrich, R. & Parsons, R. (1992) 'Influences of passive experiences with plants on individual wellbeing and health' In: D. Relf (Eds.) *The Role of Horticulture in Human Wellbeing and Social Development: A national symposium*, Portland: Timber Press, pp. 93-105.

Ulrich, R. (1979) 'Visual landscapes and psychological wellbeing', *Landscape Research*, Vol.4, pp.17-23.

Ulrich, R. (1983) 'Aesthetic and affective response to natural environment' In: I. Altman & J. Wohlwil (Eds.), *Human Behaviour and Environment: Advances in theory and research,* New York: Plenum, pp.163-203.

Ulrich, R. (1986) 'Human responses to vegetation and landscapes', *Landscape and Urban Planning,* Vol.13 pp.29-44.

Ulrich, R., Simons, R., Losito, B., Fiorito, E., Miles, M. & Zelson, M. (1991) 'Stress recovery during exposure to natural and urban environments', *Journal of Environmental Psychology*, Vol.11 pp.201-30.

UN Food and Agriculture Organisation (1998) 'Crop Genetic Resources', *Biodiversity for Food and Agriculture*, FAO.

United State Agency for International Development (USAID) (1996) 'Performance indicators for food security', *Final output of the December 1995 USAID Workshop on Food Security Performance Measurements*, USAID, CDIE, Washington DC, USA.

Urban Task Force (2005) *Towards a Strong Urban Renaissance*. (Available from www.urbantaskforce.org.)

Urban Biodiversity and Human Nature (URBIO) (2004) 'Open Space, tackling the barriers to urban nature', *English Nature*, Peterborough, Summer 2004.

Valentine, G. & McKendrick, J. (1997) 'Children's outdoor play: exploring parental concerns about children's safety and the changing nature of childhood', *Geoforum*, Vol.28 pp.219-235.

Van Boven, L., & Gilocich, T. (2003) 'To do or to have? That is the question', *Journal of Personality and Social Psychology*, Vol.85 pp.1193–1202.

Van der Ryn, S. & Cowan, S. (1996) *Ecological Design*, Washington: Island Press.

Veenhoven, R (1998) 'The Utility of Happiness', *Social Indicators Research* Vol.20 pp 333-354.

Victor, P. A. (2010) 'Ecological Economics and Economic Growth', *Annals of the New York Academy of Sciences*, Vol.1185 pp.237-245.

Viljoen, A. (2005) (ed.) *CPULs Continuous Productive Urban Landscapes – Designing urban agriculture for sustainable cities*, Oxford: Architectural Press.

Voltaire (1968) *Candide* (Clarendon French Series), Oxford: Oxford University Press.

De Vries, S., Verheij, R., Groenewegen, P. & Spreeuwenberg, P. (2003) 'Natural environments-Healthy environments? An exploratory analysis of the relationship between greenspace and health', *Environment and Planning A,* Vol.35 pp.1717-1731.

Walliman, N. (2005) *Your Research Project – A step by step guide for the first-time researcher*, London: Sage.

Ward Thompson, C. (2002) 'Urban open space in the 21st century', *Landscape & Urban Planning*, Vol.60 pp.59-72.

Ward Thompson, C., Travlov, P. (2007) (Eds.) *Open Space, People Space*, Abingdon Oxon: Taylor Francis.

Ward Thompson, C., Aspinall, P. & Montarzino, A. (2008) 'The Childhood Factor: Adult visits of green places and the significance of childhood experience', *Environment and Behaviour*, Vol.40 (1) pp.111-143.

Ward Thompson, C., Travlou, P. & Roe, J. (2006) *Free-Range Teenagers: The role of wild adventure space in young people's lives*, OPENspace Research Centre report for Natural England, November 2006.

Warm, J. & Dember, W. (1986) 'Awake at the Switch', *Psychology Today*, Vol.20(4) pp.46-53.

Warren, S. (2002) 'Show me how it feels to work here', *Ephemera: Critical dialogues on organisation,* Vol. 2 pp.224-65 (www.ephemeraweb.org).

Waterman, A. (1993) 'Two Conceptions of Happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment', *Journal of Personality and Social Psychology,* Vol. 64(4) pp. 678-691.

Watkins, D. (1993) *Urban Permaculture: A practical handbook for sustainable living*, Hampshire: Permanent Publications.

Weber, R.P. (1990) *Basic Content Analysis,* London: Sage.

Wellman, B. & Hampton, K., (1999) 'Living Networked On and Offline', *Contemporary Sociology,* Vol.28(6) pp.648-54.

Wellman, B. (2002) 'Little Boxes, Glocalization, and Networked Individualism' In: Tanabe, M. van den Besselaar, P., & Ishida, T. (Eds.) *Digital Cities II*, Berlin: Springer-Verlag, pp.11-25.

Wells, N. (2000) 'At home with nature: effects of greenness on children's cognitive functioning', *Environment and Behaviour*, Vol.32(6) pp.775-795.

Wendell B. (1987) *Home Economics*, San Francisco: North Point Press.

Westerhof, G. J., Katzko, M., Dittmann-Kohli, F. & Hayslip, B. (2001) ,Life contexts and health-related selves in old age: Perspectives from the United States, India and Zaire', *Journal of Aging Studies* Vol.15 pp.105-126.

Wheater, C. (1999) *Urban Habitats*, London: Routledge.

Wheeler, M. & Beatley, T. (Eds.) (2009) *The Sustainable Urban Development Reader*, London: Routledge.

Wheway, R. & Millward, A. (1997) *Childs Play: Facilitating Play on Housing Estates,* Chartered Institute of Housing.

Whitefield, P. (1993) *Permaculture in a Nutshell*, East Meon: Permanent Publications.

Whitefield, P. (2004) *The Earth Care Manual – A permaculture manual for Britain and other temperate climates*, East Meon: Permanent Publications.

Whitehead, M. (2004) 'The urban neighbourhood and the moral geographies of British urban policy' In: C. Johnstone & M. Whitehead (Eds.) *New Horizons on British Urban Policy: Perspectives on New Labour's urban renaissance*, Aldershot: Ashgate, pp. 59-73.

Whitelegg, P. (1997) *Critical Mass – Transport, Environment and Society in the Twenty First Century*, London: Pluto Press.

Williams, D. (2007) *Sustainable Design – Ecology, Architecture, and Planning*, New Jersey: Wiley.

Williams, K., Burton, E. & Jenks, M. (2000) *Achieving Sustainable Urban Form*, London: E & FN Spon.

Williams, S. (2006) 'Active Lives: Physical Activity in Disadvantaged communities', *Bevan Foundation Policy Paper 9*, Gwent: Bevan Foundation.

Wilson, A., Uncapher, J. & McManigal, L. (1998) *Green Development*: *Integrating ecology and real estate*, New York: Wiley.

Wilson, E. (1984) *Biophilia: The human bond with other species*, Cambridge: Harvard University Press.

Winner, L. (1986) *The Whale and the Reactor*, Chicago: University of Chicago Press.

Wohlwill, J. (1983) 'Concept of nature: a psychologist's view' In: J. Altman & J. Wohlwill (Eds.) *Behaviour and the Natural Environment, Human behaviour and Environment - Advances in Theory and Research*, New York: Plenum.

Wooley, H. (2003) *Urban Open Space*, London: Spon Press.

World Commission on Environment and Development (WCED) (1987) *Our Common Future*, Oxford UK: Oxford University Press.

Worpole, K. (2000) *In Our Backyard: The social promise of environmentalism*, Green Alliance.

Worster, D. (1992) 'The Ecology of Order and Chaos' (paper given at Evergreen State University, April 1989 *cited in* Orr, D. (1992) *Ecological Literacy: Education and the Transition to a Postmodern World.* Albany: State University of New York Press.

Wright, J. (2000) 'Going for Growth', *Volunteering*, No. 57, April.

Yeang, K. (1995) *Designing with Nature: The ecological basis for architectural design*, New York: McGraw Hill.

Yin, R.K. (1989) [rev. ed.] *Case Study Research: Design and methods*, London: Sage.

Zizek, S. (2006) *The Parallax View*, Cambridge, MA: MIT Press.

Websites

Bristol's Ecojam www.ecojam.org (accessed 10/08/09)

Easton Community Allotment blog: www.myspace.com/eastoncommunityallotment (accessed 1/11/05).

Eglantine Community Garden – The Anarchist Plot blog: http://eglantine-community-garden.blogspot.com/ (accessed 1/11/05)

Ecological Literacy www.ecoliteracy.org/publication/ecodesign.html (accessed 03/03/06)

Federation of City Farms and Community Gardens Website (FCFCG) website: www.farmgarden.org.uk

Garden of Easton blog: http://ecojam.org/directory/listing/easton-community-allotment-garden-of-easton. (accessed 12/11/05)

Government Regeneration Strategy: www.regen.net

Government Statistics: www.statistics.gov.uk/census 2001 (accessed 3/7/09)

Guerrilla Gardening Network www.guerrillagardening.org

Human Development and Capability Association www.capabilityapproach.com

Index of Multiple Deprivation (IMD) (2007): www.communities.gov.uk. (accessed 15/7/09)

Moulsecoomb Forest Garden and Wildlife Project official website: www.seedybusiness.org (accessed 8/5/09)

Moulsecoomb - A Potted History (Mead): www.mybrightonandhove.org.uk (accessed 22/10/08)

Newcastle Action Plan: www.newcastleplan.org.uk (accessed 10/04/09)

Office of the Deputy Prime Minister (ODPM) http://www.odpm.gov.uk (accessed 3/3/06)

Permaculture Association UK: www.permaculture.org.uk (accessed 22/09/06).

The Official site of the PM Office http://www.number10.gov.uk (Transcript of PM Speech on Wellbeing, 25 Nov. 2010)

www.renew.net (accessed 11/12/05)

Royal Horticultural Society: www.rhs.org.uk

Scottswood Natural Community Garden official website: www.sncg.org.uk (accessed 4/3/06)

Shanakill and Rahoonane Community Garden official website: http://www.kingdomrecords.ie/Community_Garden_website/home.html (accessed 15/07/09)

Warwick Edinburgh Mental Wellbeing Scale (WEMWBS) www.healthscotland.com (accessed 15/8/06).

www.powerofcommunity.org (The Power of Community: How Cuba Survived Peak Oil (2006) Alchemy House productions Inc in Association with Community Solution)

Appendix A
Summary of sustainable design principles

Appendix A: Summary of sustainable design principles

Name	Design 'Principles'	Source
Ecological Design Principles	1. Solutions grow from place 2. Ecological accounting informs design 3. Make nature visible 4. Design with nature 5. Everyone is a designer	Van der Ryn S. and Cowan S. (1996) *Ecological Design*, Island Press.
Five Guiding Principles of Eco-effectiveness	1. Signal your intention – commit to a new paradigm 2. Restore - strive for good growth 3. Be ready to innovate further 4. Understand and prepare for the learning curve 5. Exert intergenerational responsibility	McDonagh, W. & Braungart, M. (2002) *Cradle to Cradle: Remaking the way we make things*, New York: North Point Press, pp.181
'Hannover Principles'	1. Insist on rights of humanity and nature to co-exist in a healthy, supportive, diverse and sustainable condition 2. Recognise interdependence 3. Respect relationships between spirit and matter 4. Accept responsibility for the consequences of design decisions upon human wellbeing, the viability of natural systems and their right to co-exist. 5. Create safe objects of long-term value 6. Eliminate the concept of waste 7. Rely on natural energy flows 8. Understand the limitations of design 9. Seek constant improvement by the sharing of knowledge	Mc Donagh, W. (2002) 'The Hannover Principles' In Y. Birkeland (2002) *Design for Sustainability: A sourcebook of integrated eco-logical solutions*, Earthscan pp.25.
Human Ecology Design Checklist	Criteria: 1. Genius loci (place) 2. Landscape 3. Elements (earth, water, fire, air, climate) 4. Biotics (Habitats, Biodiversity) 5. Community (relationship between human groups and humans and biota + formal relationships in society) 6. Population (number of species present) 7. Organism (basic needs) 8. Eco-cycles (waste and energy) 9. Connectivity (access, communications, services) 10. Time 11. Catalysts (feedback, ownership, implementation) 12. Unspecified (project theme)	Rounsefell, V (2002) 'Unified Human Ecology' In Y. Birkeland (2002) *Design for Sustainability: A sourcebook of integrated eco-logical solutions*, Earthscan pp.82.
Principles for Sustainable Landscape Design	1. Return to original sources of inspiration (Papanek, 1984) 2. Respond to the site 3. Minimise inputs 4. Maximise resilience 5. Create 'place' 6. Make systems visible 7. Minimise maintenance	Osmond, P (2002) 'The Sustainable Landscape' In Y. Birkeland (2002) *Design for Sustainability: A sourcebook of integrated eco-logical solutions*, Earthscan pp.99.
Principles for Designing Living Machines	1. Microbial communities 2. Photosynthetic communities 3. Linked ecosystems and the law of the minimum 4. Pulsed exchanges 5. Nutrient and micronutrient reservoirs 6. Geological diversity and mineral complexity	Todd, N. &Todd, J. (1994) *Eco-Cities to Living Machines*, North Atlantic Books, Berkeley, CA.

	7. Steep gradients 8. Phylogenetic diversity 9. The microcosm as a tiny mirror image of the macrocosm	
Permaculture Ethical Principles	1. Earth Care 2. People Care 3. Fair Shares	Mollison, B. (1988) *Permaculture: A designers' manual,* Tagari.
Design principles that have been distilled for use in permaculture	1. Work with nature, rather than against it 2. The problem is the solution 3. Make the least change for the greatest possible effect 4. The yield of a system is theoretically unlimited 5. Everything gardens (everything has an effect on its environment, therefore make use of everything)	Mollison, B. (1988) *Permaculture: A designers' manual*, Tagari pp.15-16.
Permaculture Design principles	1. Observe and Interact 2. Catch and Store Energy 3. Obtain a yield 4. Apply self-regulation and accept feedback 5. Use and value renewable resources and services 6. Produce no waste 7. Design from patterns to details 8. Integrate rather than segregate 9. Use small and slow solutions 10. Use and value diversity 11. Use edges and value the marginal 12. Creatively use and respond to change	Holmgren, D. (2002) *Permaculture - Principles and pathways beyond sustainability*, Holmgren Design Services.
The Bases/Rationale for Ecological Design	1. The ecological concept of the environment 2. Energy, materials, and ecosystem conservation through design 3. An ecosystems contextual approach 4. Project sites must be individually analysed 5. The life cycle design concept 6. Building involves ecosystem spatial displacement and the addition of new energy and materials to the project site 7. The total-system or holistic approach 8. The problem of the waste products disposal 9. Responsive and anticipatory design strategy	Yeang, K. (1995) *Designing with Nature: The Ecological Basis for Architectural Design*, McGraw Hill.
Principles for Designing Sustainably	Three scalar elements (building feature, site, region): 1. Connectivity; Design to reinforce the relationship between the project, the site, the community, and the ecology. Make minimal changes to the natural system functioning. Reinforce and steward those natural characteristics specific to the place. 2. Indigenous: Design with and for what has been resident and sustainable on the site for centuries. 3. Long life, loose fit: Design for future generations while reflecting past generations.	Williams, D. (2007) *Sustainable Design – Ecology, Architecture, and Planning*, Wiley, New Jersey pp.18.
Principles for Ecologically	**Law:** Consume resources no faster than the rate at which nature can replenish them	Graham, P. (2003) *Building Ecology –*

Sustainable Building	**Principles:** Minimise resource consumption; maximise use of renewable and used resources; Do more with less-resource efficiency **Law:** Create systems that consume maximum energy-quality **Principles:** Use solar income; Use energy in a large number of small steps, not in a small number of large steps; Minimise waste **Law:** Create only by-products that are nutrients or raw materials for resources **Principles:** Eliminating pollution; Use biodegradable material's before bio-accumulating materials; Reuse, then refurbishing and recycling of materials, components and buildings **Law:** Enhance biological and functional adaptability and diversity **Principles:** Apply life-cycle awareness and the precautionary principle; provide access to fast-cycling materials without destroying slow-cycling materials; protect and enhance biodiversity.	*First principles for a sustainable built environment*, Blackwell pp.206
Process-oriented principles of sustainable construction	1. Undertake prior assessments of proposed activities 2. Involve people potentially affected by proposed activities in the decision-making process 3. Promote interdisciplinary and multi-stakeholder partnerships 4. Recognise the necessity of comparing alternative courses of action 5. Utilise a life cycle framework 6. Utilise a systems framework 7. Exercise prudence 8. Comply with relevant legislation and regulations 9. Establish a voluntary commitment to continual improvement of performance 10. Manage activities through the setting of targets, monitoring, evaluation, feedback and self-regulation of progress. 11. Identify synergies between the environment and development	Hill, R.C & Bowen, P.A. (1997) 'Sustainable construction: principles and a framework for attainment', *Construction management and Economics*, Vol.15 (228).
An ecosystem approach – principles of industrial ecology	1. Interfacing 2. Bionics 3. Appropriate Biotechnology 4. Use renewable resources	Kibert, C., Sendzimir, J. and Guy G. (Eds.) (2002) *Construction Ecology – Nature as the basis for green buildings*, Spon Press p. 73 and 90.
Principles of landscape ecology	1. Landscape structure and function 2. Biotic diversity 3. Species flow 4. Nutrient redistribution 5. Energy flow 6. Landscape change 7. Landscape stability	Forman R.T. & Gordon, M. (1986) *Landscape Ecology*, New York, Wiley pp. 28.

Appendix B
Site survey

Appendix B: Site survey

Site Name:			
Date of observation and survey:			
Time of observation and survey:			
Principles	**Sub-principles**	**Examples of features of sustainable design**	**Note**
1. Solutions grow from place	**(i) Be sensitive to the local/regional ecological context**	• *Native/naturalised plants* • *Use of local seed varieties and saving seed*	•
	(ii) Use cooperative and supportive relative location	• *Windbreak placement to shelter from the wind* • *Integration with local water resource* • *Both shallow rooted and deep rooted plants* • *Use of drought tolerant and shade tolerant plants where appropriate* • *Relative placement* • *Reuse of local and on-site waste materials*	•
	(iii) Be sensitive to the cultural context	• *Use of local and traditional materials, skills and knowledge*	•
Note:			

2. Ecological accounting informs design	**(i) design in systems for reuse and recycling of waste and energy**	• *Use of renewables* • *Composting* • *Reclaiming/reusing materials*	•
	(ii) use water conservation techniques	• *Water butts* • *Rainwater harvesting*	•
	(iii) Use appropriate scale	• *Maximise use of space* • *Use multiple functions of features and elements*	•
	(iv) Plan for energy efficiency	• *Passive solar design* • *Low tech solutions*	•
	(v) Use of low energy and biological solutions	• *Minimise allelopathy* • *Natural building materials* • *Legumes (to fix nitrogen)* • *Biological/natural pest control* • *Use of natural fertiliser*	•
Note:			
3. Make nature visible	**(i) Design reflects underlying natural cyclical processes**	• *Successional Growth* • *Seasonal Growth* • *Woodland and timely placement of climax species* • *Wildlife Gardening* • *Use of 'wild soil'* • *Sensory plants* • *Medicinal Plants*	•

Note:			
4. Design with Nature	**(i) Produce a yield**	• *Edible Plants* • *Grow Perennials* • *Produce food from different sources -grow food from annuals and perennials, herbaceous and woods* • *Mix of early and late season planting* • *Multiple yields and outputs*	•
	(ii) Enhance successional growth and ecological integrity	• *Design in plant succession* • *Pioneering plants and timely placement of climax species e.g. woodland* • *Forest Garden* • *Polycultures*	•
	(iii) Relative Location and Linking	• *Links to other organisations*	•
	(iv) Develop reciprocity and Foster interdependence / interconnectedness and cooperation	• *Building with natural materials* • *Organic methods* • *Collective activities*	•

	(v) Work within the 'carrying capacity' of the site	• *Site gardener* • *Compost toilet*	•
Note:			
5. Everyone is a designer	**(i) Encourage active participation and empowerment**	• *Design days/Events* • *Inclusive Design -different sizes of raised beds for children and wheelchair users.* • *Communal tools available on site* • *Specific area for children/youth to work/play* • *Open door policy – level of access*	•
	(ii) Encourage a role of on site learning	• *Workshops/Courses* • *Signage*	•
Note:			

Appendix C
Interview Schedule – Active Users

Appendix C: Interview Schedule – Active Users			
Date of Interview –			
Location -			
Section 1 – Questions on neighbourhood			
1.Do you live in the_____ area? **If not –give location.**	Yes/No/Sometimes		
2.Thinking about this neighbourhood, what things do you feel are a risk to your own health or well-being (on card)... (abstracted from the Northern Ireland health and Social Wellbeing Survey 2001)	**Do you feel that this site helps this in any way?**	**If so, how?**	
Section 2 – Open questions about features, functionings and capabilities			
3.How long have you been coming here?			
4.How often do you use this space?			
5. What activities do you partake in within the site?	**Why do you partake in these activities –what is your motivation?**	**And again why…..?**	**What is it about the space that makes this possible for you/what features of the site assist this. (how)**
6. Is there anything that you would like to change/see done differently?			

Section 3 –Questions about specific functioning's and associated features and associated agency (if not answered in section 2)			
7. If you are physically active in the site, what sort of activities do you partake in?			
8. Do you produce food on site	**Why do you do this?**	**What methods do you use to grow food?**	
9. Have you learned anything new since using the site?	**What have you learned?**	**Have you used these skills elsewhere?**	**Where?**
10. To what extent have you brought new ideas and expressed yourself within the site?	**Can you explain why you have done this?**	**How is this made possible?**	**Is there anything that you feel could have been done differently?**

11. Have you learned new things since you have been using the site that you did not know before?	**What have you learned about the area?**	**How have you gained this knowledge?**	**Do you feel that this is important/beneficial and why?**
12. Do you meet other people within the site?			
13. Have you formed new friendships?			
14. Do you ever work within a group in the site?	**Do you usually achieve your aims**	**Do you think that the group is successful?**	
15. Do you think the site is visually pleasing?	**Why/Why not?**	**Is there anything you would like to see changed?**	

16. Do you feel safe living and walking around your neighbourhood?			
17. Do you feel safe within the space?			
18. How safe do you feel before/after dark?			
19. Why is this so?			
20. Do you go there alone?	**Is this a positive experience?**		
21. Do you feel that it actively benefits the local community?	**If yes, how is this so?**		**If no, why not?**
22. Do you feel that the space makes your neighbourhood different from others?	**If yes, how is this so?**		**If no, why not?**
23. Do you feel that the site has an impact on the environment?	**If yes, how is this so?**		

24. Do you feel that this is a relaxing environment?	**Can you think of times when you were particularly relaxed?**	**If so, can you describe this and identify features of the site which help you to relax.**	
25. Do you feel like you are no longer in an urban area when you are in the site?	**Why do you think that this is so?**	**Do you like this aspect of the site and why?**	
26. Have you ever felt energized / revitalized when using the site?		**Can you describe this?**	
27. How do you usually feel when you leave the site?		**Why do you think this is so?**	
28. Do you ever lose your sense of time while in the site and forget about the surrounding urban environment?		**Is this a positive experience and can you describe it?**	

29. Do you ever feel close to nature in the site?		**Can you describe this?**	
30. Do you notice the space changing through the seasons?	**Can you describe this?**	**What features particularly enhance this?**	
31. Have you noticed the site itself changing through time?		**How?**	
Section 4 – Questions on Ownership, Expression, Decision Making -AGENCY			
32. Do you express ideas about activities in and decisions made about the space?	**If so, can you give examples of when this occurred?**		**How was it made possible?**
33. Do you feel you have been creative and used your imagination?	**Can you describe this?**		**How was this made possible?**

34. Would you like to use this space more often?	**If so, what prevents this from happening?**	
35. Overall, do you feel that you have the ability and opportunity to express your opinions and enhance your environment?		
36. Do you feel that this has changed since you have been using the site?		
Section 5 - Environmental Awareness		
37. If we think about the future, how would you describe your Quality of Life/Well-being in years to come?		
38. How concerned are you about the environment in general. (Survey of Public Attitudes towards the Environment and Quality of Life 2001)		
39. In what way (if any) do you feel these issues may affect your future?		
40. Do you feel that your actions can affect/help this situation?		
41. Do you feel that such behaviour has changed in any way since you have been		

actively using the site?	
Section 6 –Identification of capability of the users and perception of general level of health and well-being.	
42. How is your health in general? (Abstracted from Survey of Adult health and Wellbeing 2000 (England, Scotland and Wales)	
43. Do you have any long standing illness, disability or infirmity? By longstanding I mean anything that has troubled you over a period of time or that is likely to affect you over a period of time? (Abstracted form Survey of Adult Health and Wellbeing 2000 (England, Scotland and Wales)	
44. Can I ask what they are?	
45. Have you recently been feeling reasonably happy, all things considered? General Health Questionnaire 12 (Q12)	
46. Do you find that spending time in the garden affects this in any way?	**Can you explain why this is so?**
Section 7 - Background Questions	
Age-	18; 18-19; 20-24; 25-34; 34-44; 45-54; 55-64; 65-74; 75 & over.
Gender-	M/F

Appendix D
Interview Schedule – Passive users

Appendix D: Interview Schedule – Passive users		
Location of Interview -		
Date of Interview -		
Address of Interviewee and passive use-		
Section 1- Question on neighbourhood		
1.Do you live in the_____ area? **If not – give location.**		
2.Thinking about this neighbourhood, what things do you feel are a risk to your own health or wellbeing.(abstracted from the Northern Ireland health and Social Wellbeing Survey 2001)	**Do you feel that this site helps this in any way?**	**If so, how?**
Section 2 – Open questions about features, functionings and capabilities		
3. Do you use the community garden for any reason?		
4. How do you use the space?		
5. Why do you do this?	Functioning -	
6. How is this made possible for you?	Feature –	
7. If you use the space for any reason - how often would you say that you use it? (passive activities)		
8. If you do not, is there a particular reason why you do not use the space more?		
9. Is there anything that could improve the site that would then make it more useful to you?		

Section 3 –Question about specific functioning's and associated features and associated agency	
10. How safe do you think the space is?	
11. What leads you to think of it as safe/unsafe?	
12. Do you think that the space is well cared for/ neglected/ poorly maintained?	
13. Why do you think that this is so?	
14. Do you feel that the space generally benefits the local area?	
15. If yes, in what way does it do so?	
16. If no, what is the reason for this and how can this be improved?	
17. Do you feel that is the space is important?	
18. Do you feel that the site has an impact on the local environment?	
19. If yes, in what way does it do so and how?	
20. Do you feel that the site has an impact on the health of the wider global environment?	
21. If so, how?	
22. Do you feel that this is a different space from the surrounding urban environment?	
23. If so, how?	
24. Do you feel that the space makes your community different from others?	

25. If so, how?	
26. Do you receive any outputs from the site? If so, what are they?	
27. If your house looks onto the space, how would you describe the view?	
28. What makes it so?	
29. Do you ever lose your sense of time while looking onto the site? (passive local residents)	
30. Do you find this a beneficial experience?	
31. Why is this so?	
32. Do you notice the space changing during the course of the year?	
33. Can you describe this?	
34. Have you noticed the site developing through time?	
35. Can you describe this?	
36. Over what length of time has this been?	
37. Is there anything in particular that you enjoy most about the site (if anything)?	
38. Why is this so?	

39. How is this made possible?		
40. Would you like to use this space more often? In what way?		
41. If so, what prevents this from happening?		
Section 4 – Questions on Ownership, Expression, Decision Making -AGENCY		
42. Is there anything you would do to improve the site? Is there anything you would like to see done differently?		
43. Do you feel that you have had opportunities to influence decisions made about the site?	**How was this made possible?**	
44. Would you like to become more involved?		
45. If so, what prevents you from doing this?		
46. Overall, do you feel that you can influence your environment?		
Section 5 - Environmental behaviours and knowledge		
47. Are you concerned about the environment in general? (Survey of Public Attitudes towards the Environment and Quality of Life 2001)		
48. How if at all do you think your life may be affected by these issues?		
49. Do you feel that your actions help the situation in any way?		
50. Do you feel that such behaviour has changed in any way since you have been using the site?		

Section 6 –Identification of capability of the users and perception of general level of health and wellbeing.		
51. How is your health in general? (Abstracted from Survey of Adult health and Wellbeing 2000 (England, Scotland and Wales)		
52. Do you have any long standing illness, disability or infirmity? By longstanding I mean anything that has troubled you over a period of time or that is likely to affect you over a period of time? (Abstracted from Survey of Adult health and Wellbeing 2000 (England, Scotland and Wales)		
53. Can I ask what they are?		
54. Have you recently been feeling reasonably happy, all things considered? General Health Questionnaire 12 (Q12)		
55. If not, do you feel that the garden helps at all in any way?		
56. Can you explain how this is so.		
Section 7 - Background Questions		
Age-	18; 18-19; 20-24; 25-34; 34-44; 45-54; 55-64; 65-74; 75&over.	
Gender-	M/F	

Appendix E
Coding for analysis

Appendix E: Coding for analysis

Interview Schedule
The interviews were undertaken with both active and passive users in all of the sites. They are identified by their site code (Sh = Shanakill; En=Easton; Eg=Eglantine; Sd= Scottswood; Mb=Moulsecoomb). In this way, individual responses remain anonymous, but variation in responses both within and between sites can be identified. This way of proceeding was agreed by the interviewee. Background information on individual interviewees in the example below (section 7 of interview schedule) is omitted for reasons of anonymity in the coding example below.

Introduction: The research is focused on community gardens and wellbeing.
Research is focused around five types of questions for active users with specific questions to prompt the interviewee within each section:

1. **Questions about the local area, and where you are from**
2. **General open questions about activities you are involved in**
3. **More specific questions about using the site**
4. **Questions focusing on the way in which you participate in the design and development of site and what you might like to see done differently**
5. **Some general questions about the environment**
6. **A number of questions about your general level of health**

Transcript DPM 105

1. Some questions about the local area and where you are from.
I am not form this area (estate), but from Caherslee. (Caherslee is in the town of Tralee. Walking distance – 20 minutes from site)

2. Open questions about activities you are involved in.

I have been coming here for two years. I come every week, yes. If there is a job to be done we do that or go off and find things to do myself like repotting things. What I do a lot of the time is the stuff that's over by the back wall there. There are loads of plants and trees and stuff that tend to get neglected and I've been repotting a lot of those. We reuse rainwater for watering because we have buckets (water butts). We plant new seed and harvest, I do enjoy **Cap1(3)Pr4(i)Pr2(ii)** *doing everything, everything. I like all of it.*

3. Specific questions about using the site.

I am physically active **Cap4(4)Pr4(i)Pr2(ii)** *doing these things* (above)*and I feel that it helps me when I go home from here - I tend to do more stuff in the garden. It makes it more interesting and it gives you more incentive to do it. You get new ideas* **Cap10(4)Pr4(i)Pr2(ii)** *as well.*

I bring home food with me, plus seedlings (to plant). I have learned lots of new things **Cap5(3)Pr4(iv)Pr1(i).** *I have learned about organic growing - how to make liquid feeds, more about how to grow plants and what companion planting is. I have learned about seed savers. We went here on a trip a year and a half ago and I found that very interesting altogether. I became a member of seed savers then and you get your annual allocation of seeds then and stuff.*

You learn a lot about environmental issues (at courses) *because people know a lot and take paper cuttings and bring them in or you learn from other people as well you get new ideas or new ways of looking at things* **Cap10(4)Pr5(ii)); Cap5(2)Pr5(ii).**

I work both on my own and with others. It would depend on what I am doing. We are successful working in a group **Cap5(2) Pr4(iv).**

I think the site is visually pleasing. If you are trying to be organic, tidy does not quite go along with it. The combination of the stuff in the tunnel which is so lush and just the variety of everything **Cap10(1)(6)Pr4(iv)** *growing outside. There is more variety here then people would normally have in their own gardens because people would normally only grow a certain amount of things.*

It is a relaxing space **Cap3(1)Pr4(iii)** *- when the sun is shining, or when you are in the tunnel and it's raining and it's warmer than it is outside. I feel like you are visiting the country (countryside) for a few hours….. Last Monday we were here painting and there was a downpour in the middle if it, we had to be dragged in.*

Sometimes I am tired when I go home from here, but it does give me more incentive to do more at home even if I am tired **Cap10(2)Pr5(ii).**

I completely lose my sense of time when I am here. Yes, this is a good thing. I very much feel close to nature and sit is different every single week **Cap1(1)Pr3(i)** *when I come here. There is a constant change in the site also. I notice that people I did the first course with might not come back every week but occasionally they will come back to see what is going on, to get a tomato plant or whatever, but they all come back and have a look in every now and again.*

It's important to recycle anyway in the first place, but also to show people how you can do it, or to show people how they can do it in their own gardens afterwards **Cap6(3)Pr2(i)Pr5(ii).**
I grow veg in my garden at home. I always come during the day. I feel safe here.

4. Questions focusing on the way in which you participate in the design and development of site and what you might like to see done differently.

If people took part more – the locals, it would benefit the local environment more. The site certainly improves the area, even though nobody ever comes in. People come from local areas if they are doing courses but not many of them come willingly, they have to be enticed a lot. You forget of course that a lot of people are not interested in gardening. No mater where they come from, they may not be interested regardless.

I don't do much decision making apart from where we are going to put plants or stuff like that.

5. Some general questions about your background and health.

Last summer I came to water the garden in summer once or twice on my own. I will be volunteering to come again. My children come. The site is beneficial locally but it is a pity that more people don't join in but some little bit of it has to rub off, hopefully. I am worried about climate change…fairly concerned. Well they say that everybody can make a difference **Cap6(3)Pr1(ii)***, e.g. like the adds on TV, if everyone does one thing, even though I do way more than one thing, I do everything I can to help, but if you can encourage a friend, that is good. So many people just don't care to be honest.*

End.

Example of Analysis for Transcript DPM 105

Valued freedoms	Principle (see appendixJ)	Feature	Functioning (frequency)	Capability
-repotting -planting new seeds to harvest -watering	Pr4(i) Pr2(ii)	-Produce a yield -Use of water conservation techniques	**Being active (2)**	Enjoyment (Cap 1)
-repotting -planting new seeds to harvest -watering	Pr4(i) Pr2(ii)	-Produce a yield -Use of water conservation techniques	**Being physically active (2)**	Physical Health (Cap 4)
-repotting -planting new seeds to harvest -watering	Pr4(i) Pr2(ii)	-Produce a yield -Use of water conservation techniques	**Stimulation of mind, new ideas and ways of thinking (2)**	Stimulation (Cap 10)
-learning about liquid feed -growing plants -saving seed (seed savers)	Pr4(iv) Pr1(i)	-Organic methods -Seed saving	**Learning, communication and thought (2)**	Psychological wellbeing (Cap 5)
-learning about environmental issues -learning from others	Pr5(ii)	-Courses	**Stimulation of mind, new ideas and ways of thinking (1)**	Stimulation (Cap 10)
-learning about environmental issues -learning from others	Pr5(ii)	-Courses	**Learning, communication and thought(1)**	Psychological wellbeing (Cap 5)
-working in a group	Pr4(iv)	-Collective activities	**Cognitive skills (self-efficacy)(1)**	Psychological wellbeing (Cap 5)

-growing many things *-having a variety of growing spaces*	Pr4(iv)	-Organic methods	**Sensory stimulation (1) + having variety (1)**	Stimulation (Cap 10)
-being in the polytunnel	Pr4(iii)	-Zoning, network, sector (polytunnel)	**Having opportunities to relax(1)**	Mental restoration (Cap 3)
-gaining incentive	Pr5(ii)	-Adaptive learning*	**Feeling of increased energy and vitality (1)**	Stimulation (Cap 10)
-having variety *-feeling close to nature*	Pr3(i)	-Seasonal growth	**-enjoying the here and now (losing sense of time) (1)**	Enjoyment (Cap 1)
-noticing constant change	Pr5(i)	-Open door policy	**-Longevity and time passing (1)**	Stimulation (Cap 10)
-recycling	Pr2(i) Pr5(ii)	-Design in reuse and recycling -adaptive learning*	**-having a sense that something is important* (2)**	Purpose(Cap 6)
-making a difference	Pr1(ii)	-Volunteer activity	**-having a sense that something is important (1)**	Purpose(Cap 6)

Pre-coding transcript for interview, video walkabout and photo-interview data.

Code	Feature (Ft)	Functioning (Fxg)	Capability (Cap)	Activities/Valued freedom(from quote)
Adult Users				
En (Easton active user)				
Pen (Easton passive user)				
Eg (Eglantine active user)				
PEg (Eglantine passive user				
Mb (Moulsecoomb active user)				
PMb (Moulescoomb passive user)				
Sd (Scottswood active user)				
PSd (Scottswood passive user)				
Sh (Shanakill active user)				
PSh (Shanakill passive user				
Youth Users				
MbV (Moulsecoomb video still)				
Sd V (Scottswood video still)				
Sh V (Shanakill video still)				
Child Users				
MbP (Moulsecoomb photo)				
Sd P (Scottswood photograph)				
Sh P 9 (Shanakill photograph)				

Appendix F
Implementation of adult interviews

Appendix F –Interview schedule implementation and user references		
Site	**M/F**	**Age**
Easton (En)–Active (5)	F	34-44
	F	25-34
	F	55-64
	M	34-44
	M	45-54
Easton (PEn)–Passive (5)	F	75+
	F	34-44
	F	75+
	M	55-64
	M	55-64
Eglantine (Eg)–Active (5)	F	25-34
	F	25-34
	M	34-44
	M	25-35
	M	25-34
Eglantine (PEg)–Passive (6)	F	20-24
	F	25-34
	F	34-44
	F	20-24
	M	20-24
	M	20-24
Moulsecoomb (Mb)–Active (3)	F	20-24
	F	20-24
	F	20-24
Moulsecoomb (PMb)–Passive (5)	F	75+
	F	75+
	F	20-24
	F	18-19
	M	55-64
Scottswood (Sd) –Active (3)	F	55-64
	M	45-54
	M	45-54
Scottswood (PSd) –Passive (4)	F	45-54
	M	45-54
	M	55-64
	M	65-74
Shanakill (Sh)–Active(5)	F	34-44
	F	34-44
	F	34-44
	F	34-44
	F	55-64
Shanakill (PSh) –Passive (6)	F	25-34
	F	25-34
	M	18-19
	M	18-19
	M	18-19
No. of interviewees (47)	**M (19) F(28)** **Total 47**	**18-19 (4)** **20-24 (8)** **25-34 (8)** **34-44 (9)** **45-54 (5)** **55-64 (6)** **65-74 (1)** **75+ (4)**

Appendix G
Implementation of youth and child participant-led video and photography methods

Appendix G: Implementation of youth and child participant-led video and photography methods

Location	M/F	Age	No. of photos	Symbol
Shanakill (Sh)	M	9	6	A
Shanakill	M	9	12	B
Shanakill	M	10	7	C
Shanakill	F	9	13	D
Shanakill	F	11	4	E
Shanakill	F	11	8	F
Scottswood (Sd)	F	8	14	G
Scottswood	M	11	6	H
Scottswood	F	9	28	I
Moulsecoomb (Mb)	M	12	6	J
Moulsecoomb	F	11	6	K
Moulsecoomb	M	12	6	L
	6M 6F	Age 8-12	116	12 sets of prints

Youth participant – led video participants

Location	M/F	Age	Symbol
Moulsecoomb (Mb)	M	13	P1
Moulsecoomb	F	14	P11
Shanakill (Sh)	M	13	P3
Shanakill	M	14	P4
Shanakill	M	14	P5
Shanakill	F	13	P6
Shanakill	M	13	P7
Shanakill	F	14	P8
Shanakill	F	13	P9
Scottswood (Sd)	M	16	P12
Scottswood	F	19	P13
	6M 5F	Age 13-19	11 sets of video footage

Appendix H
Site Checklist of Sustainable Design Features

Appendix H : Site checklist of sustainable design features

	Easton Community Allotment	Eglantine Community Garden	Moulsecoomb Forest Garden and Wildlife Project	SNCG	Shanakill Organic Community Garden
1. Solutions grow from place					
Native/naturalised plants and proven exotics			✓		✓
Windbreak placement to shelter from the wind			✓	✓	✓
Use of local seed varieties/seed saving	✓	✓	✓	✓	✓
Wild Food			✓		
Integration with local water runoff source	✓			✓	✓
Both shallow rooted and deep rooted plants		✓			
Use of drought tolerant and shade tolerant plants where appropriate.					✓
Use of local and traditional materials, skills and knowledge	✓	✓	✓	✓	✓
Ethnic foods	✓			✓	
Reused local waste materials and locally produced products.	✓	✓	✓	✓	✓
2. Ecological accounting informs design					
Use small scale intensive systems	✓	✓			✓
Water conservation features	✓	✓	✓	✓	✓
Composting	✓	✓	✓	✓	✓
Use of renewable energy				✓	✓
Minimise allelopathy					
Legumes (to fix nitrogen)					✓
Biological/natural pest control	✓	✓		✓	✓
Use of natural fertiliser	✓	✓	✓		✓

Integration of multiple functions in	✓		✓	✓	
Passive Solar Design	✓				✓
Use of natural building materials	✓		✓		
Low tech ethos	✓	✓	✓	✓	✓
3. Make nature visible					
Successional growth	✓	✓	✓	✓	✓
Seasonal Growth	✓	✓	✓	✓	✓
Woodland and timely placement of climax species	✓	✓	✓	✓	✓
Medicinal plants/herbs grown on site		✓	✓	✓	✓
Use of 'wild soil'				no dig✓	no dig✓
Wildlife gardening	✓	✓	✓	✓	✓
Sensory plants –texture and smell.	✓	✓	✓	✓	✓
4. Design with nature					
Use plant succession			✓	✓	✓
Produce a yield	✓	✓	✓	✓	✓
Grow perennials		✓	✓	✓	✓
Mix of early and late season planting	✓		✓		✓
Timely placement of climax species i.e. trees and woodland.			✓	✓	
Forest Garden	✓		✓		
Capacity to grow food -	✓	✓	✓	✓	✓
Grow food from both herbaceous and woody plants.	✓	✓	✓	✓	✓
Development of network links to other organisations (env/health)	✓		✓	✓	✓
Arrangement of elements of the design - zone, network, sector and slope	-✓	✓	✓	✓	✓
Multidimensional design (stacking,	✓	✓		✓	✓

succession, edge)					
Tree foliage as mulch		✓		✓	✓
Compost toilet	✓		✓		
Open days and other events.	✓	✓	✓	✓	✓
Use of curved lines and edges	✓	✓		✓	✓
Use of crop rotation	✓		✓	✓	✓
Use of composting	✓	✓	✓	✓	✓
Zoning -Area to relax – fire pit, place to sit.	✓	✓	✓	✓	✓
Re-use of garden 'waste' e.g. tree foliage as mulch	✓	✓		✓	
Use of polytunnel to grow food.	✓		✓		✓
Multidimensional design (stacking, succession, edge)	✓	✓		✓	✓
Use of organic building structures	✓	✓	✓	✓	✓
Design in systems, links and networks.				✓	
A gardener/caretaker (s) who can creatively use and actively respond to change within the site.	✓	✓	✓	✓	✓
5. Everyone is a designer					
Design days and Events	✓	✓	✓	✓	✓
Different sizes of raised beds for children and wheelchairs.	✓	✓		✓	wheelchair ✓ access
Communal tools available on site	✓	✓	✓	✓	✓
Specific area for children to work	✓		✓	✓	
(24 hour)Public Access	1 day a week	24 hour open access ✓	Two days a week	mon-fri	1 day a week
Participatory/inclusive decision making	✓	✓			
Involvement of school groups, local community groups	✓		✓	✓	
Participation in site design		✓			

Appendix I
Narrative: Site Gardener The Anarchist Plot - Eglantine community garden

Appendix I - Narrative: Site Gardener The Anarchist Plot - Eglantine community garden

Miriam Turley – A site gardeners at Eglantine Community Garden, Belfast.

The garden began three years ago on a bit of waste ground in the heart of South Belfast. The land is owned by the landlords of surrounding houses, but has been abandoned or mismanaged for years. Apparently there was an ornamental garden on the ground years ago, and we've seen Aquilegia, evening primrose and ornamental daisies pushing up through the docks and dandelions. A group of people who met at an environmental activism day decided to create a garden, half vegetable beds and half trees and shrubs. The garden is now stunningly lush and green and a fantastic wildlife habitat, as evidences by the growing noise from the birds in the morning and the industry of bumblebees. The fact that the ground has not been tarmaced over makes it a valuable sink for rainwater, and with our drains running into the streets Belfast City council are vocal in the need for more spaces like this. We have irregular garden days, which are really tea parties. Interested people from Belfast city come to meet up and hang out and eat food in the garden. People generally know each other from environmental and social justice activism in Belfast; others come because they like the idea of the garden. Some parents see the garden days as being child friendly and bring their children. Others feel they are excluded because the events happen at the wrong time of day or they are worried about broken glass and dog waste in the grass. People who are already confident gardeners plant things; others have a go if they are asked to. People appreciate a free place to meet and socialise, where money is not necessary and there is an atmosphere of sharing and community. The people living in the surrounding houses have only come along on rare occasions, although they have been invited twice. On speaking to them on other occasions some of them seemed interested, and i think only need further encouragement to get involved. While the environmental and wildlife potential of the garden is being realised, the social side is more difficult for me to describe. In a culture where all activity must be deliberate, documented and often paid for in order for it to be valuable, a lot of people look at the garden a mess of weeds, and would like more organisation and tangible development on the site. Some things that people have mentioned that they would like are:

-more edible produce
-a core group of gardeners who make decisions about the space
- a tenancy agreement with the landlords to secure our right to be there and plan for the future.
-educational days for schoolchildren and adults, to connect people with nature and enable them to grow their own food
-Wildlife surveys to document the wealth of biodiversity on site, which could be used to prove its worth if the possibility of landlords building on the site ever came up.
-A mural on the wall at the bottom of the garden to make the space prettier and give us a sense of ownership.
-an application for funding to buy a portion of the land to give us equal rights with landlord in discussions about the future of the site.
-improved paths
- a community composting scheme, where neighbours are explicitly asked to contribute their kitchen scraps, and the scraps are possible even collected fro their doors.
-More flowers (and more flowers in a recognisable flowerbed) to make passers by feel more welcome, more like it is a garden.
- A fence to demarcate the space, to discourage vandalism.
-Something to encourage people to take over a spot of land and garden it for themselves, with consideration for others using the space.

Here are some social benefits, which I have noticed:
-a woman from Nepal was able to grow vegetables, an activity she missed doing, as it was a very normal thing to do back home. She stopped partly because her patch was vandalised.
-While out doing gardening I've spoken to a range of passers by, who feel able to stop and comment on what I'm doing, remark on the weather, discuss some aspect of gardening in technical detail, tell me their health problems or tell me how they think the whole thing would look better with a layer of concrete. Because the garden is screened from the street by houses on all four sides, the garden feels private (ignoring the hundreds of windows that over look it!) And people are more open to strangers, especially ones that are obviously doing some kind of public service off their own bat. People are really cheered to find out that there are still such things as hippies doing things like this for the good of the community. I think a lot of them think I'm incompetent because i haven't got everything weed free and tidy, but they feel entitled to stop and talk and share their ideas with me. Some of the neighbours (some business people from the offices on Malone road, some residents) have said how much they appreciate having a bit of green out the back, and how the state the landlords had left it in before was disgraceful.
-Quite a few neighbours have barbeques out the back. It's really satisfying for me to see this happening without me organising it. The best was one Sunday walking out the back and seeing a family group of about

25 people (of not-northern-Irish-origin, Indian maybe...?) of all ages having a full on bbq feast. A woman waved at me and i waved
back. They left the place spotless afterwards.
-Quite a few neighbours contribute to our compost bin, although we have no way of knowing how many. One woman even got a compost bin from the council and installed it to increase our capacity. Another person left an anonymous note advising us on what to put in the compost.
- The people who drink out there at weekends often leave their rubbish (beer cans and bottles) in neat piles for me to collect. I find this hilarious in one way and really sweet in another. They recognise the space as important, as somewhere where they are welcome and they want to contribute to its upkeep. One could even sort the rubbish and recycle it if one could be bothered.
-The people who come to the garden days find them useful to keep up with friends. The few people who help organise the garden days are practising their skills and realising community autonomy. I have had a place to try out gardening, and while I'm not a natural I'm learning all the time and love it dearly.
-I got an action pack from the federation of city farms and community gardens recently, and they recommended coming up with a proposal for the landowners which highlights the value of the garden, with a view to coming up with a tenancy agreement. I talked this over with friends and they thought we should have a session where everyone said what they valued about the garden, or what they imagined would be valuable from a landlord's point of view. I thought Second nature might help me plan or run the session. I have tried to do something like this before, but
I seem to run out of steam, I think because I'm working alone, or imagine that I am. I'm sure we could get some money to pay the consultancy fee, for example from the coop, who do small grants for community groups like ours. I could write up a constitution and get a bank account and apply for funding. Things like this increase our "official" status, and will be useful when trying to get people to take the value of the garden seriously if its future is ever in doubt.
We are having a garden day on the 24th June. We will also be having another one before the end of the summer. I'm hopefully meeting with the biodiversity officer at BCC to talk about how they can help us. I don't really know what I want anyone to help me to do, but I feel that more people could be benefiting from the garden, and that more would be happening if more people felt involved and committed to the garden. I am scared of letting people in and not being the main organizer as they
might do too much and attract attention to us and we could be evicted, or they could want to tidy it up and scare away all the birds and insects. But I think something needs to happen.

End.

Appendix J
Frequency of functionings for each principle and feature of sustainable design

Appendix J : Frequency of functionings for each principle and feature of sustainable design					
Principles	**Sub principles**	**Features**	**Adults (5 sites)**	**Youth (3 sites)**	**Children (3 sites)**
			(frequencies = no. of times a functioning was mentioned)		
1. Solutions grow from place	(i) Be sensitive to the local/regional ecological context	-Native/naturalized plants	1	0	0
		-Saving seed and use of local seed varieties	11	0	0
		-Gain information on local soil	5	0	1
	(ii) Use cooperative and supportive relative location.	-Shallow rooted and deep rooted plants	1	0	0
		-Natural windbreaks	1	0	0
		-Drought tolerant, shade tolerant and sun-loving plants	1	0	0
		-Relative placement – putting food and groups of people in the same space (urban location)	18*	0	0
		-Integration with local runoff water source	1	1	0
		-Re-use of local and on site waste materials	19*	14*	10*
		-Wild food	2	0	0
		-Volunteer activity	17*	0	0
		-Focus on community	24*	1	4
		-Reclaimed/Informal site	8	0	0
	(iii) Be sensitive to the cultural context	-Use of local materials and knowledge	4	1	0
		-Local art work	0	1	0
	Total		111	18	15

Principles 2 – Features found to impact on capabilities of wellbeing					
Principle	**Sub principle**	**Feature**	**Adults**	**Youths**	**Children**
Ecological accounting informs design	(i) Design in systems for reuse and recycling of waste and energy	-Composting	18*	2	3
		-Reclaiming materials	6	0	0
		-Solar lighting, wind, small-scale hydro, biomass	0	1	4
		-Ethos of reuse/recycle	19*	0	0

	(ii) Water conservation and rain water harvesting	-Rainwater harvesting: water butts	5	1	0
		-Water saving techniques in growing	0	1	0
	(iii) Appropriate use of scale	-Small scale intensive system (appropriate scale) *	18*	1	5
		-Use of multiple functions of features and elements	2	3	4
	(iv) Plan for energy efficiency.	-Passive solar design	0	1	1
		-Use of low tech activities + solutions	13*	2	1
	(v) Use of low energy and biological solutions	-Biological pest control, e.g. ladybirds	4	1	8*
		-Legumes (fix nitrogen)	0	0	0
		-Companion planting	2	0	0
		-Natural fertilisers	2	0	0
		-Use of natural building materials	0	0	2
	Total		89	14	20

Principle 3 –Impact of features on capabilities of wellbeing					
Principle	Sub principle	Feature	Adults	Youths	Children
3. Make nature visible	(i) Design reflects underlying natural cyclical processes.	-Successional growth	18*	1	1
		-Seasonal growth	4	2	1
		-'Wild soil' (not affected by human activity)	2	0	0
		-Sensory plants	1	0	0
		-Woodland and timely placement of climax species	2	1	5
		-Medicinal plants	3	0	3
		-Wildlife gardening (including pond)	24*	11*	24*
		-Nature celebrations and rituals	3	1	2
	Total		57	16	34

Principle 4 – Impact of features on capabilities of wellbeing					
Principle	Sub principle	Feature	Adults	Youths	Children
Design with Nature	(i) Produce a yield	-Edible plants –capacity to grow food *	32*	18*	29*

		-Grow perennials	0	0	0
		-Grow food from annuals and perennial plants	1	0	0
		-Mix of early and late season planting	1	0	0
		-Multiple yields - Produce food from different sources, annuals, perennial plants, trees, and herbaceous plants * (c)	1	2	8*
		-Polycultures	3	0	0
		-Food growing from both herbaceous and woody plants.	5	0	3
	(ii) Enhance successional growth and ecological integrity	-Pioneering plants	0	0	0
		-Timely placement of climax species i.e. trees and woodland	4	1	3
		-Forest garden	2	1	2
	(iii) Relative Location and Linking	-Multidimensional design (stacking succession, edge)	2	0	0
		-Zone, network, sector and slope arrangement of all the elements of the design *	22*	2	6*
		-Development of networks and links to other organisations	7	0	1
	(iv) Develop reciprocity and Foster interdependence/ interconnectedness and cooperation	-Natural building and structures (Y and C)	12	10*	10*
		-Organic methods (rotations, biological pest control …)	13*	1	11*
		-Collective activities	29*	4	11*
		-Diversity of activities	13*	0	0
	(v) Work within the 'carrying capacity' of the site	-A gardener – to stay in touch with the needs of the system allowing it to self-regulate	13*	0	0
		-Use of 'weeds' as fertilizers (dynamic accumulators) and as a mulch	0	0	0
		-Compost toilet	0	3	3
		-Non-rigid design	14*	0	0
	Total		170	43	82

Principle 5 –Features which impact on capabilities of wellbeing					
Principle	**Sub principle**	**Feature**	**Adults**	**Youths**	**Children**
Everyone is a designer	**(i) Encourage active participation and empowerment**	**-Design days and events**	28*	1	0
		-Communal use of tools	0	0	1
		-Inclusive design	7	1	0
		-Open door policy	17*	1	0
		-Inclusive decision making	4	1	0
		-Set tasks	24*	3	6*
		-Choice of activities	16*	0	0
		-Different levels of activities	5	0	0
		Participation in on-site art work	0	1	3
	(ii) Encourage a role of on site learning	**-Workshops and courses**	4	3	6*
		-Teaching of practical skills	6	1	0
		-Adaptive learning	14*	1	0
		Total	**125**	**13**	**17**

New emerging features

0 = features not impacting on wellbeing

- **Median for adult group=13**
- **Median for youth group=7**
- **Median for child group=6**
- **Key features ***

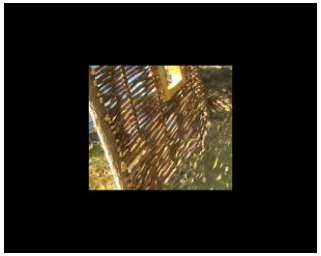
Functionings Set A – Functionings associated with key features

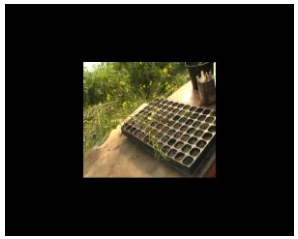
Functionings Set A – Functionings associated with key features for either Adult/Youth/Child users (20)
• Perception of a clean and health environment • Capacity to shape one's life • Experiencing pleasure • Healthy eating • Establishment of friendships and social networks • Having a sense of community • Gaining cognitive skills • Caring for others and the environment • Continuous role of learning • Bodily health • Physical activity • Developing reciprocity • Interacting with nature (spiritual wellbeing) • Enjoyment of the here and now • Opportunities to interact with nature (mental restoration) • Spiritual realisation • Sense of coherence, harmony and balance • Personal growth • Multiple stimuli • Long term recovery

Appendix K
Example of analysis of functionings of youth wellbeing using participant-led video data

Appendix K: Example of analysis of functionings of youth wellbeing using participant-led video data				
Moulsecoomb MbP 11				
V 1-35	**Feature**	**Functioning and valued freedom**	**Capability**	**Quote**
	Squash (edible plant)	Being mindful Care	Purpose	*Here are some squash plants, they are a bit small at the moment.(hand motion)*
	Courgette (edible plant)	Tasting Gustatory stimulation	Stimulation	*They (squash plants) are really tasty and sweet*

  	Natural Building	Being resourceful Building	Psychological well-being	*This is what we use pine for. We also use hazel because it's bendy.*

	Natural Building	Working Sense of ownership	Expression	*I've been working on this actually*
	Natural Building	Being creative Self-efficacy Opportunities to be creative Ownership Learning, communication and thought	Psychological well-being Expression	*That bit there –that's my work of art. It's going to be quite good. It's going to have that (and she pats it), which is mud, wallpaper paste, water and it makes a good inside thermal thing for the hut so that it does not get too cold and so the water does not come in.*
	Polytunnell (multiple yields/outputs)	Growing, learning about growing. Learning, communication and thought.	Psychological well-being	*This is the whole allotment. That there is the polytunnel which we use to grow things that can't be grown outside, in case it rains, or the seeds get pecked or the blight might spread t it and it's useful for lettuce and carrots.*

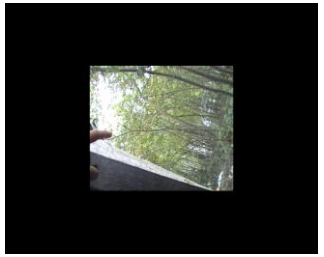
	Natural Building	Being mindful Physical activity Learning, communication and thought	Physical health Psychological wellbeing	*Making the hut is my favourite thing because it is physical, and you have to put a lot of thought into it as well.*
	Pumpkin patch (edible plant)	Others	Social wellbeing	*That one looks pretty big actually. The younger kids from ACE do this.*
	ACE programme (workshops/ courses)	Having a choice Having a choice – agency aspect	Expression	*No slide –(on entering polytunnel) i love coming here because it's better than being stuck in a classroom filled with kids constantly annoying each other.*
	Polytunnel seedlings (edible plants)	Being challenged	Psychological wellbeing	*And that should be lettuce –definitely because I planted that. It's not growing too well.*

	Herbs – Basil (edible plants)	Smelling Olfactory stimulation	Stimulation	*This is basil. It smells really good.*
	Tomatoes (edible plants)	Being mindful Longevity and time passing	Stimulation	*I think these are Italian long tomatoes. They usually don't tend to go red. They stay this yellow colour. You can eat them raw. I would not advise it at the moment though. I think they are a bit passed their date.*
	Low-tech biological pest control	Active participation		*Here we've got broccoli and kale –i think it is. We've made the rows for the kale and broccoli and planted them and some pigeons started to nip away at the leaves –we had to cover it –that took about an hour today.*

	Water Conservation	Cognitive functioning	Psychological well-being	*This is the water tank. It's partly to attract wildlife and also it's for the hoses and for the water supply to the tap that's up there and the tap that's over there (she point camera to 2 spots in the garden) It's got something underneath the goes though underground.*
 	Edible plants – Food growing	Gustatory stimulation	Stimulation	*I think we've probably picked all of them but there are probably a few little one's here and there. We eat the beans most weeks – I personally prefer them raw.*

	Edible plants - Food growing	Sense of longevity	Stimulation	*Here we've got some lines of carrots growing. They are not very big at the moment.*
	Workshops and courses - ACE programme	Being outside Having a choice Capacity to shape ones life	Expression	*I come Tuesday and Friday and stay all day. It's just so nice to be working outside –even in the winter.*

	Design – hub zone 1	Participation in social life and social activities	Social Integration	*This is like the centre of everything..*

  	Compost toilet	Being resourceful Being mindful Care Others Capacity to shape ones life	Expression Purpose	*'The legendary toilet' –they are quite a bit like festival toilets to be honest.* *So here's the toilet.* *It's going to smell!* *That's the toilet –you do your business and chuck it through the hole in the fence (see next slide).*

   					*That's for the other business (not a good shot). It's not wasting any water and it's completely natural and we're not flushing everything back out in to sea and destroying that part of the world.*

	Pond	Relaxing	Short term relaxation	Mental Health	*Here, sitting by the pond is relaxing*

Appendix L
Wellbeing Capabilities and Functionings of Community Gardens

Appendix L: Wellbeing Capabilities and Functionings of Community Gardens				
Capabilities	**Functionings**	**Adult users (5 sites)**	**Youth users (3 sites)**	**Child users (3 sites)**
		(frequencies = no. of times a functioning was mentioned)		
Stimulation	Stimulating the mind – new ideas and ways of thinking*	41*	1	7*
	Having a sense of longevity and time passing*	21*	11*	8*
	Opportunities to be creative	3	1	1
	Sensory stimulation*	29*	7*	37*
	Feeling of vitality *	17*	0	0
	Having variety*	13	3	8*
Total		124	23	61
Purpose	Having an aim *	20*	7*	3
	Having a sense that something is important *	39*	7*	12*
	Capacity to shape ones life	12	2	0
	Continuous role of learning	10	0	0
	Caring for others and the environment*	5	4	13*
Total		86	10	28
Psychological wellbeing	Learning, communication and thought *	54*	8*	1
	Experiencing personal growth	5	2	0
	Gaining cognitive skills*	15*	7*	13*
Total		74	17	14
Mental restoration	Short term recovery *	47*	4	4
	Long term recovery	6	0	0
	Opportunities to interact with nature	12	0	2
Total		65	4	6
Social wellbeing	Participation in social life and cultural activities *	28*	7*	9*
	Establishment of friendships and social networks*	11	2	8*
	Having a sense of community*	12	3	7*
	Developing reciprocity	5	0	0
Total		56	12	24
Expression	Opportunities to be creative	9	2	2
	A sense of ownership *	15*	9*	3
	Opportunities for exploration and discovery	0	2	2
	Political expression (choice and opportunity) *	26*	7*	0
Total		50	20	7
Security	Feeling of safety and freedom to use the local environment*	15*	0	1
	Having control of resources*	15*	2	0
	Feeling the local area is cared for/a sense of pride	5	0	4
Total		35	2	5

Enjoyment	Enjoyment of the here and now	10	0	0
	Having fun*	0	4	13*
	Being active*	17*	0	3
	Experiencing pleasure*	4	10*	5
Total		31	14	21
Physical health	Role of physical activity	11	2	0
	Healthy eating	2	1	3
	Bodily health	5	0	2
	Perception of a clean and healthy environment	5	0	0
Total		23	3	5
Spiritual wellbeing	Sense of spiritual realisation	3	0	0
	Sense of coherence harmony and balance	2	0	0
	Interacting with nature	3	0	0
Total		8	0	0

0 = functionings of wellbeing not impacted on by sustainable features

New emerging functionings

- * Key functionings
- Adult median=14
- Youth median=6.5
- Child median=6.5

Functionings Set B – Key Functionings* for either Adult/Youth/Child users. (20)
• Stimulating the mind – new ideas and ways of thinking* • Having a sense of longevity and time passing* • Sensory stimulation* • Feeling of vitality* • Having variety* • Having an aim * • Having a sense that something is important * • Caring for others and the environment* • Learning, communication and thought * • Gaining cognitive skills* • Short term recovery * • Participation in social life and cultural activities * • Establishment of friendships and social networks* • Having a sense of community* • A sense of ownership * • Political expression (choice and opportunity) * • Having control of resources* • Having fun* • Experiencing pleasure* • Being active*

Appendix M
Capabilities, interbeings and valued freedoms of wellbeing in sustainably designed community gardens

Appendix M: Capabilities, interbeings and valued freedoms of wellbeing in sustainably designed community gardens

Interbeings	Valued Freedoms
Enjoyment	
Having fun	• *Being resourceful and creative(A)*
	• *Taking part in activities with friends(C)*
	• *Making things from recycled materials(C)*
	• *Building with wood and natural materials(C)*
	• *Playing in willow(C)*
Enjoying the here and now	• *Hanging out(A)*
	• *Sharing a task(A)*
Being active	• *Gardening(A)*
	• *Volunteering(A)*
	• *Learning tasks(A)*
	• *Being busy(A)*
	• *Celebrating(A)*
	• *Gardening (C)*
	• *Composting (C)*
Experiencing pleasure	• *Watching things grow(A)(C)*
	• *Having a diversity of plants(C)*
Expression	**Valued Freedoms**
Opportunities to be creative	• *Having a space to be creative (A)(Y) (C)*
	• *Using imagination(A)*
	• *Working with natural crafts(Y)*
	• *Being in natural structures(Y)*
	• *Making things from recycled materials(C)*
A sense of ownership	• *Reclaiming a space(A)*
	• *Participating in plant maintenance(Y)*
	• *Having individual plots (Y) (C)*
	• *Having a space to display art(Y)*
Political expression	• *Having choice (of tasks, of green space and of learning environment)(A)(Y)*
	• *Expressing ideas(A)*
	• *Influencing environment(A)*
	• *Having an opportunity to Care for others and environment(A)(Y)*
Opportunities for exploration and discovery	• *Using paths and woodland(Y)*
	• *Interacting with creatures and bugs(C)*
Mental Restoration	**Valued Freedoms**

Short term recovery	• *Having an opportunity to relax(A)(Y)*
	• *Working with others(A)*
	• *Feeling satisfied(A)*
	• *Pacing oneself(A)*
	• *Using ones hands(A)*
	• *Having breaks(A)*
	• *Doing something useful(A)*
	• *Having green surroundings(A)*
	• *Being alone(A)*
	• *Losing ones sense of time(A)*
	• *Being away from the city(A)*
	• *Enhancing mood(A)*
	• *Having somewhere for kids to go(A)*
	• *Being by the fire(C)*
	• *Being by the pond(C)*
Long term recovery	• *Being in a therapeutic environment(A)*
	• *Using green space as a tool for recovery(A)*
	• *Meeting like minded people(A)*
Opportunities to interact with nature	• *Co-existing with nature(A)*
	• *Nurturing life(A)*
Physical Health	**Valued Freedoms**
Role of physical activity	• *Gaining energy(A)*
	• *Having a variety of activities(A)*
	• *Having a choice(A)*
	• *Pacing oneself(A)*
Healthy eating	• *Growing and eating food on site(A)*
	• *Growing organic food –knowing what you are eating(A)*
Bodily health	• *Being outside(A)*
	• *Learning about and eating plants(A)(Y)*
Perception of a clean and healthy environment	• *Having space(A)*
	• *Being is a less polluting environment(A)*
Psychological Wellbeing	**Valued Freedom**
Learning, communication and thought	• *Having a learning space(A)*
	• *Learning and adapting new skills, techniques(A) (C)*
	• *Learning from the gardener/others(A)*
	• *Learning by doing(A)*
	• *Applying learning(A)*

	• *Making connections(A)*
	• *Participating in low tech activities(Y)*
	• *Having a variety of growing spaces(Y)*
Experiencing personal growth	• *Feeling confident(A)*
	• *Being practical(A)*
	• *Learning about and eating new plants(Y)*
Gaining cognitive skills	• *Having a sense of achievement in tasks (A)(Y) (C)*
	• *Feeling challenged (A) (C)*
	• *Using solar water heating(Y)*
	• *Building with natural materials(Y)*
Purpose	**Valued Freedom**
Having an aim	• *Reusing and recycling(A)*
	• *Having a sense of achievement(A) (C)*
	• *Having a focus(A)*
	• *Having a role(A)*
	• *Participation in shared tasks(C)*
Having a sense that something is important	• *Being resourceful(A)*
	• *Having natural and green habitats(A)*
	• *Learning gardening/to grow food(A)(Y)*
	• *Having a community space(A)*
	• *Composting(Y)*
	• *Not polluting other environments(Y)*
Capacity to shape ones life	• *Having a sense of ownership(A)*
	• *Feeling empowered(A)*
	• *Having choice(A)*
	• *Feeling positive about the future of the planet(A)*
Continuous role of learning	• *Opportunities for life long learning(A)*
	• *Finding solutions(A)*
	• *Harnessing collective energies(A)*
	• *Celebrating(A)*
Caring for others and the environment	• *Teaching others/passing on skills(A)*
	• *Contributing to the site and the local area(A)*
	• *Loving the space(C)*
	• *Having a diverse site(C)*
	• *Maintaining and looking after plants(C)*
	• *Making arts and crafts with recycled materials(C)*
Security	**Valued Freedoms**
Feeling of safety and freedom to use the local environment	• *Feeling safe(A)*

	• *Being alone/having privacy(A)*
	• *Attending events(A)*
	• *Having a safe space for children to be(A)*
Having control of resources	• *Having a free space(A)*
	• *Being/learning to be self reliant(A)(Y)*
	• *Producing food organically/Knowing what you are eating(A)(Y)*
	• *Having access to green space(A)*
Feeling the local area is cared for/a sense of pride	• *Having a sense of civic pride(A)*
	• *Having space for children(A)*
	• *Rehabilitating a space(A)*
	• *Reusing and recycling(Y)*
	• *Being in contact with nature and seeing flowers grow(C)*
Social Wellbeing	**Valued Freedoms**
Participation in Social Life and Cultural Activities	• *Working together(A)*
	• *Volunteering(A)*
	• *Harnessing collective energies(A)*
	• *Celebrating(A)(Y)*
	• *Having a social hub e.g. fire(Y)*
	• *Making things from recycled materials(C)*
Having a sense of community	• *Building community(A)*
	• *Having a shared space(A)*
	• *Feeling different/special(A)*
	• *Feeling included(A)*
	• *Having a shared goal(A)*
	• *Working together with recycled materials(Y)*
	• *Eating together and drinking tea(C)*
Establishments of friendships and social networks	• *Learning from others(A)*
	• *Meeting new people(A)*
	• *Meeting people one would not normally meet(A)*
	• *Relaxing by the fire(A) (C)*
Developing reciprocity	• *Exchanging ideas(A)*
	• *Sharing food(A)*
	• *Learning from each other(A)*
Stimulation	**Valued Freedoms**
Stimulating the mind – new ideas and ways of thinking	• *Being mindful(A)*
	• *Gaining incentive(A)*
	• *Learning about systems(A)*
	• *Reusing/Recycling(A)(Y)*
	• *Working within a process(A)*
	• *Learning to grow food and eating*

	food(A)(Y)
	• *Being by the pond(Y)*
	• *Having multiple on-site activities(Y)*
	• *Exploring new tastes(C)*
	• *Making things from recycled materials(C)*
	• *Learning about and interacting directly with nature(C)*
Having a sense of longevity and time passing	• *Noticing change + feeling close to nature(A) (C)*
	• *Learning about the life cycle of plants(Y)*
	• *Maintaining plants(Y)*
	• *Engaging with pond activity(Y)*
Opportunities to be creative	• *Being both creative and destructive(Y)*
Sensory stimulation	• *Being amazed(A)*
	• *Loving the space(A)*
	• *Eating what you have grown(A)*
	• *Having a view(A)*
	• *Feeling close to nature and co-existing with nature(A)*
	• *Having variety(A)*
Feeling of vitality	• *Having a choice(A)*
	• *Feeling energized(A)*
Having variety	• *Having variety in nature(A)*
	• *Having a variety of expenses and activities(A)*
	• *Having a variety of outputs(A)*
Spiritual Wellbeing	**Valued Freedoms**
Sense of spiritual realisation	• *Nourishing soul and spirit(A)*
	• *Opening up wonders of nature(A)*
Sense of coherence harmony and balance	• *Meditating(A)*
	• *Seeing the natural world of God(A)*
Interacting with nature	• *Having company in nature(A)*
	• *Having a sense of wonder(A)*
	• *Feeling connected to nature(A)*