

Globally optimum cropping pattern as a part of policy solution towards achieving net-zero greenhouse gas emissions (GHGEs)

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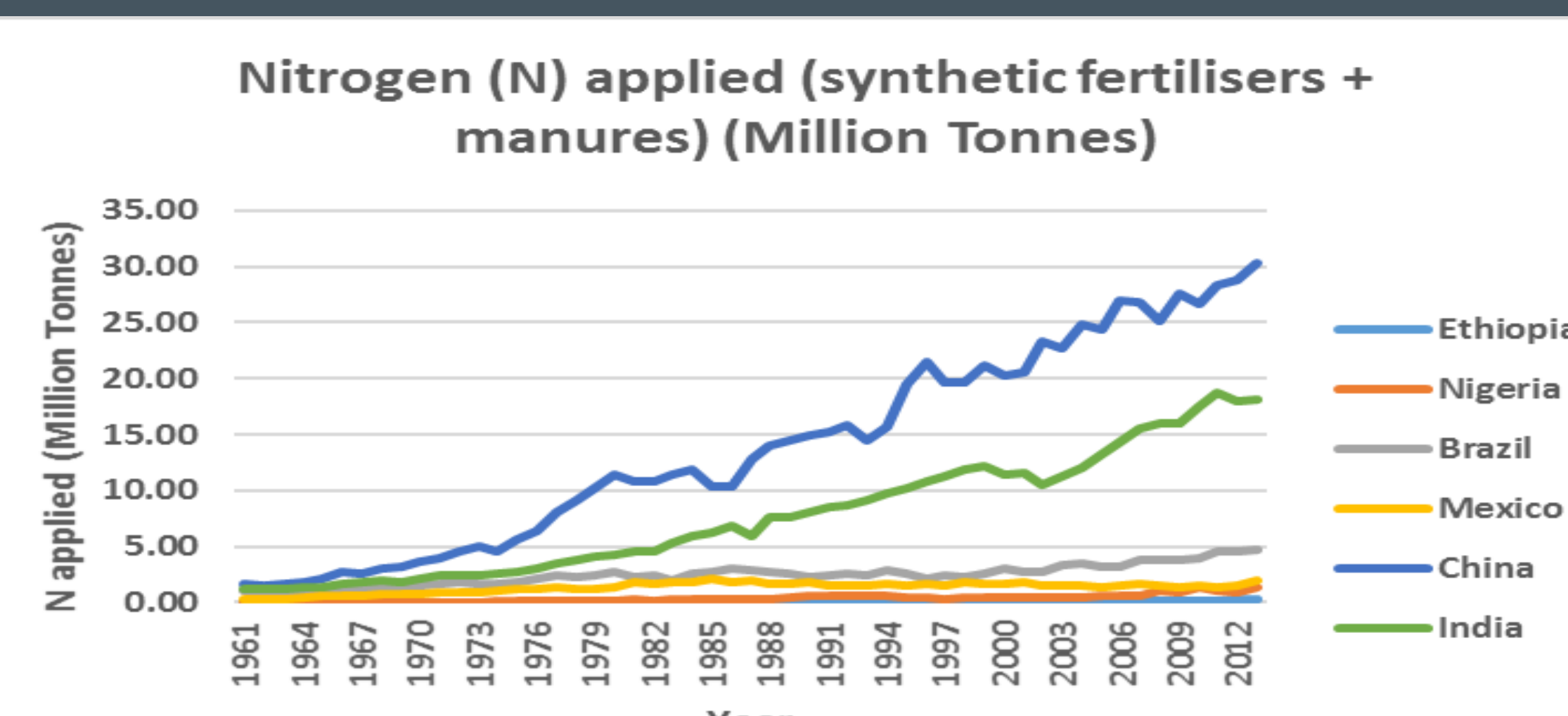
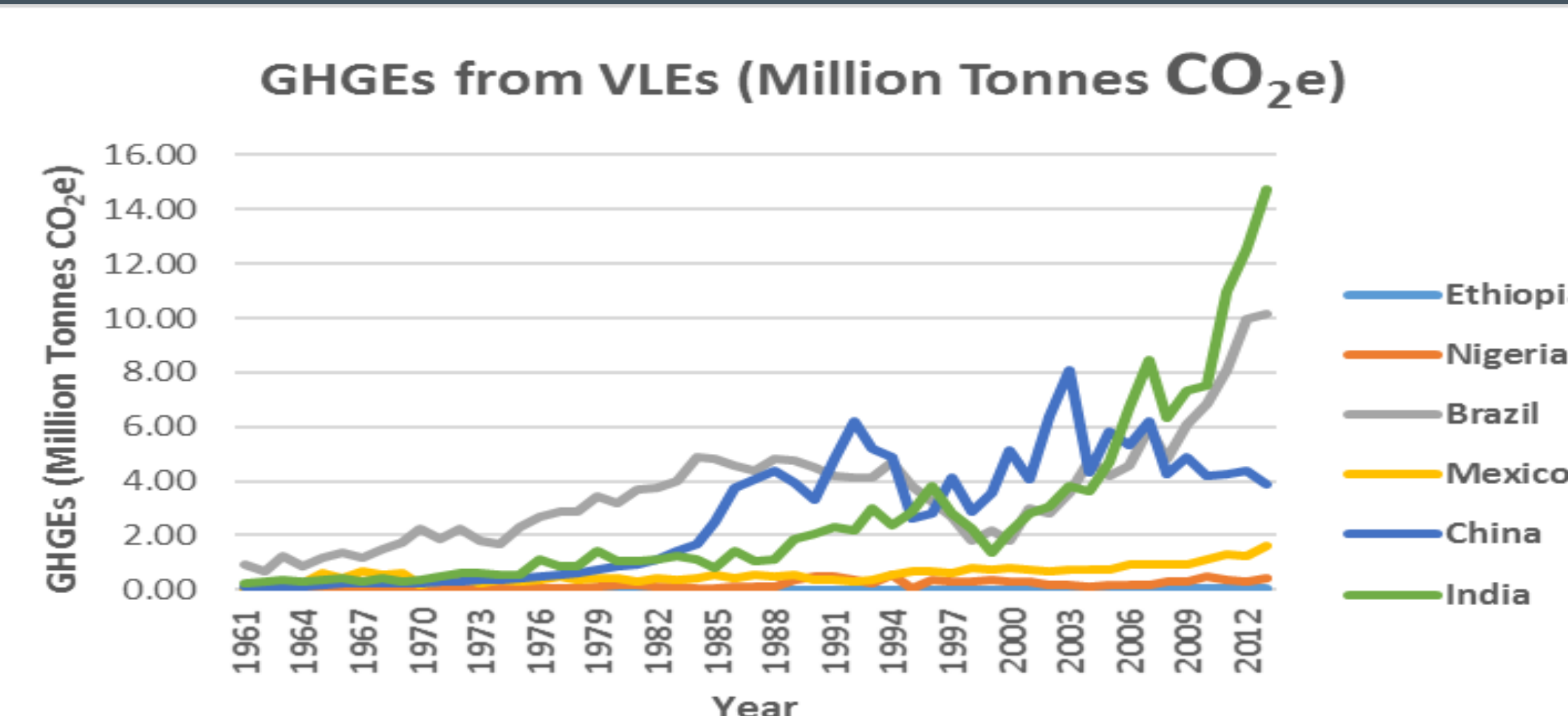
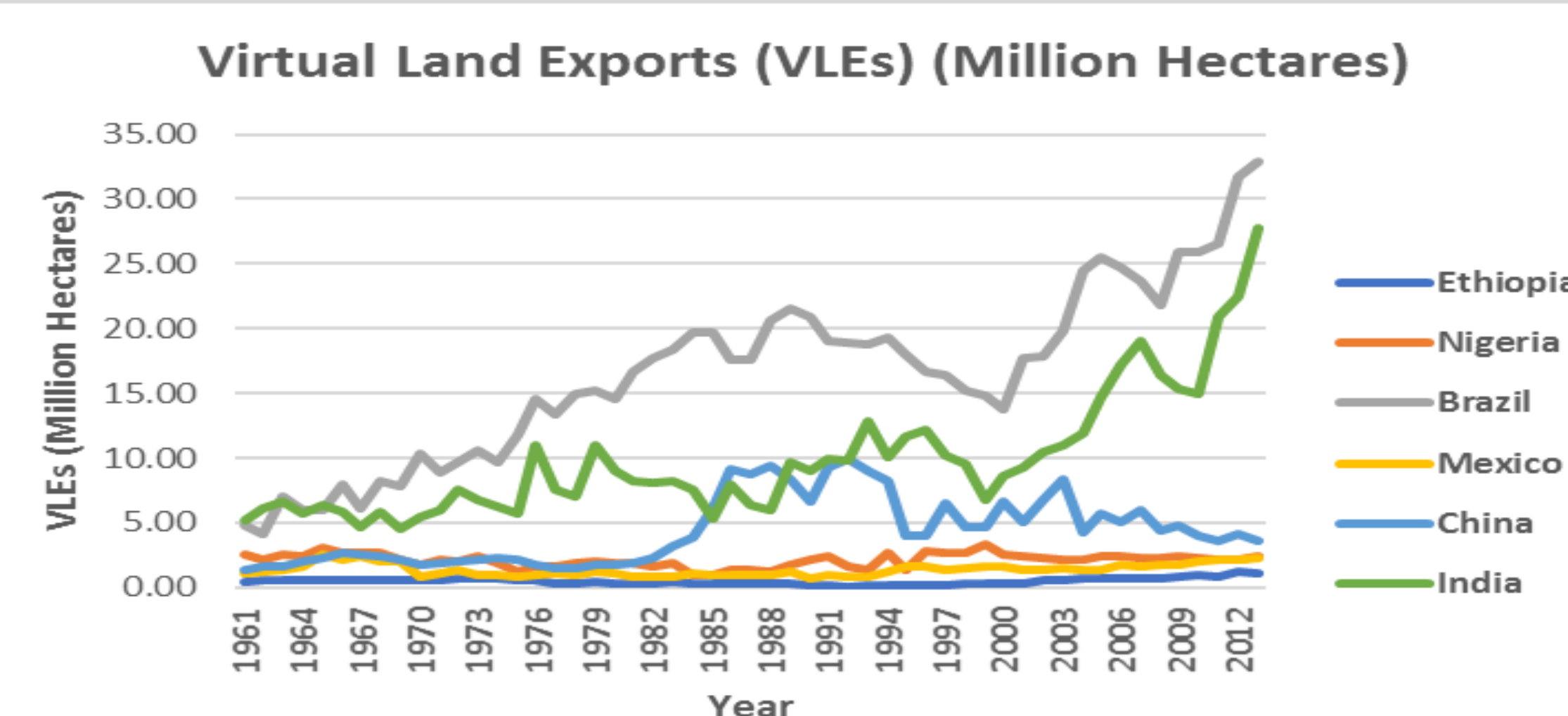
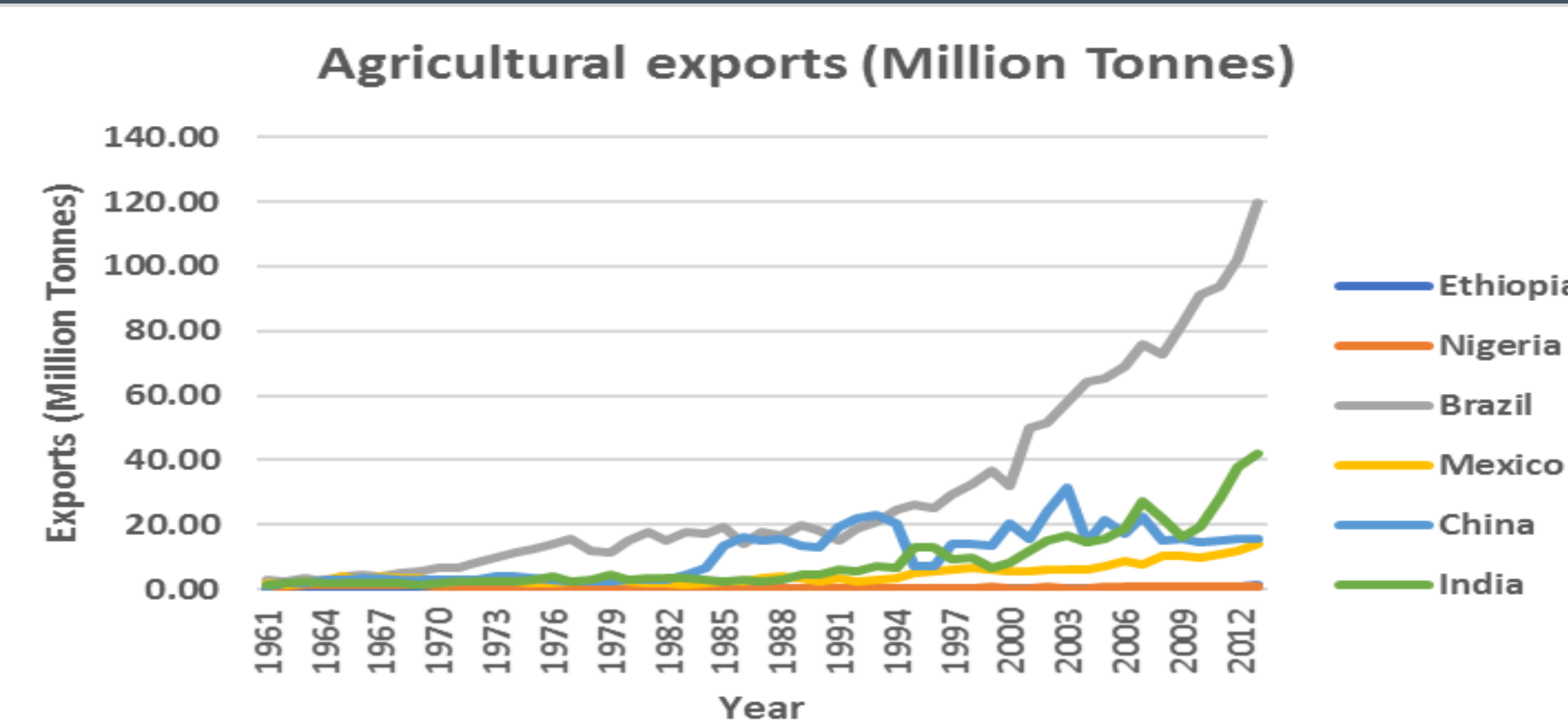
Findings

Introduction

- According to the Intergovernmental Panel on Climate Change (IPCC) guidelines, for any country the national greenhouse gas inventories 'include greenhouse gas emissions and removals taking place within national territory and offshore areas over which the country has jurisdiction' (IPCC, 2006, p. 1.4).
- This has special implications for the greenhouse gas emissions (GHGEs) taking place in agriculture exports.
- The GHGEs take place and are accounted for in the national inventory of the country where the crop/food is produced. However the exported crop/food is consumed in the importing country. In a sense by importing crops/food the importing countries are safeguarding their environment by letting the GHGEs take place in a country where the crops/food is produced.
- It was decided to study how the Virtual Land Exports (VLEs) and the associated GHGEs changed from 1961 to 2013 from two most populated countries in each continent of the developing world i.e. Brazil and Mexico in Latin America, China and India in Asia and Ethiopia and Nigeria in Africa.

Methodology

- The export data for primary and processed crops, and crop based products was obtained from the statistics division of the Food and Agriculture Organisation (FAOSTAT), an organisation of the United Nations. The processed crops were converted to their primary equivalent by using extraction rate obtained from FAO library. The VLEs were obtained by dividing the quantity of the crop exported with the yield of the corresponding crop.
- The quantity of nitrogen (N) applied from the fertilisers and manures from 1961 to 2013 was calculated as per the methodology given by de Ruiter et al (2016).
- The GHGEs were calculated by using a mix of IPCC Tier 1 and Tier 2 methodology (IPCC, 2006).



Contribution to knowledge

- The exports from Brazil started to increase during 1970s and that from Mexico, India, Ethiopia from 1990s. China exhibited volatility in exports while exports from Nigeria recorded a decline.
- From 1961 to 2013 except for Nigeria the VLEs increased for all the countries, however, Brazil and India recorded significant increase in the VLEs. While for Mexico, China and Ethiopia the increase in the VLEs was not as much when compared to that of Brazil and India. For all countries the VLEs followed a trend similar to exports.
- Increase in GHGEs was recorded from the VLEs for all countries showing displaced emissions.
- It was astounding to note that 30.33% GHGEs for Brazil, 13.19% for India and 11.50% for Mexico took place from the VLEs to other countries.

Policy implications to achieve net-zero GHGEs

- Based on the findings/results I propose that 'globally optimum cropping pattern' built on the 'ecological comparative advantage' (Foster et al., 2006) could be further helpful in reducing the global GHGEs.
- Taking from the concept of 'ecological comparative advantage' (Foster et al., 2006), I propose that 'global ecological profits' should be given preference over economic profits in trade. Countries should be ranked for ecologically profitable production of crops and the global demand aligned to it. The countries losing economic profits should be adequately compensated.
- IPCC should adjust the accounting practices for GHGEs and until then the exporting countries should be compensated to mitigate the GHGEs.

References

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