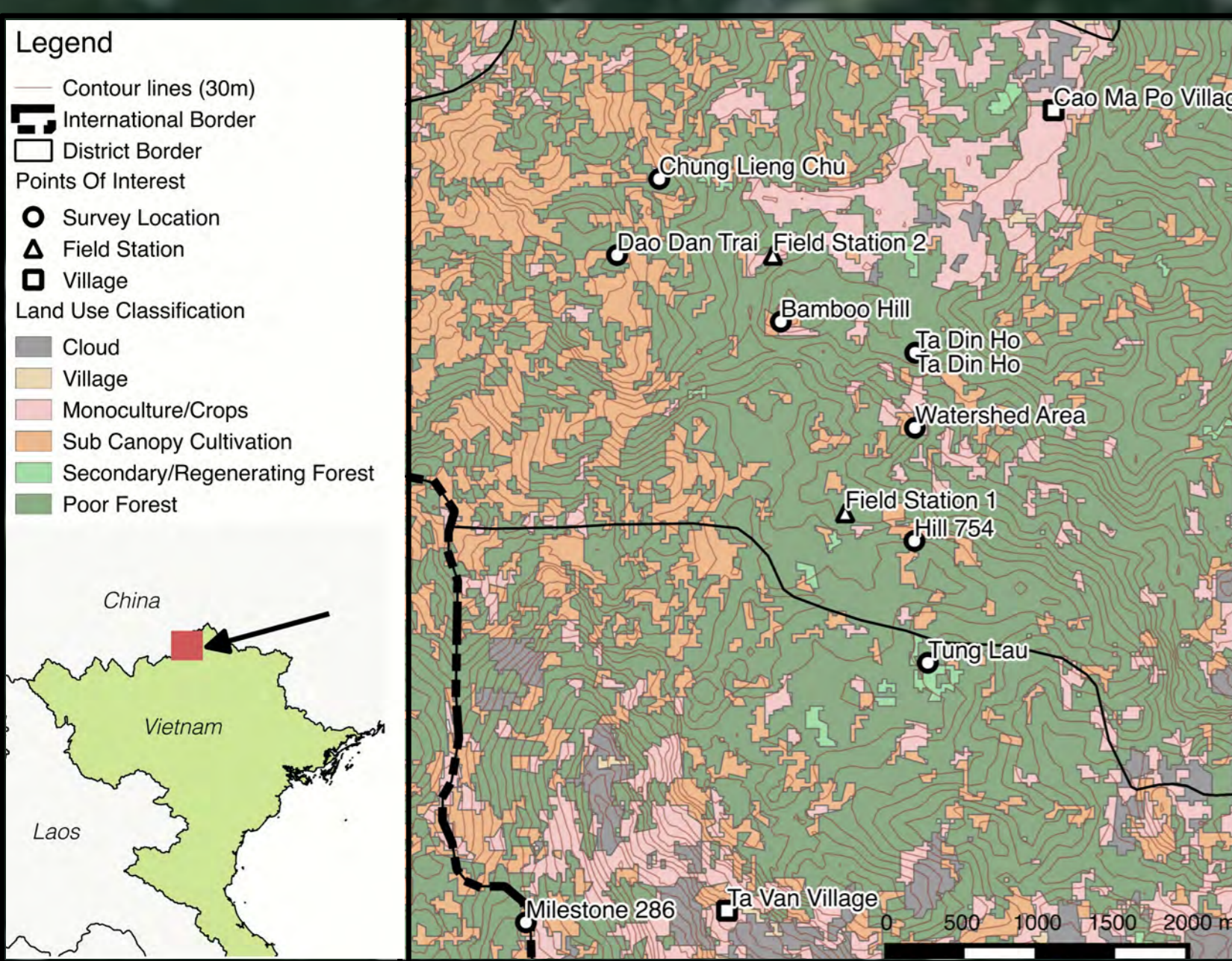


Cardamom sub-canopy crop cultivation threatens critically endangered primates in Vietnam

Tonkin snub-nosed monkeys (*Rhinopithecus avunculus*; TSNM), are one of Asia's rarest primates and were thought to be extinct from 1987 to 1992. The global population is currently lower than 200. In 2007, the second largest sub-population (c.40) was discovered in Tung Vai forest, Ha Giang Province, Vietnam. People living in this rural area typically have low income, as such Vietnamese government has subsidised hybrid crops,



Figure 1: Dominant male Tonkin snub-nosed monkey. Photo Nicholas James



for over a decade. The scheme was designed to protect natural forests from clearing for agriculture by increasing food availability and incomes (1;2). However, crop yields decreased by 8% (3). To make up losses many farmers have started cultivating sub-canopy cardamom, which fetches a high return as a delicacy in China. The spread of cardamom cultivation under the Tung Vai forest canopy (Fig. 2;4) has had a number of effects on the TSNM population that live there including:

- Thinning of canopy to allow more light for crops
- Tree cutting for firewood
- Opportunistic hunting

Resultantly the TSNM population is suspected to have halved (6;7). The most influential disturbance being the cutting of trees and canopy thinning due to the TSNM's dependence

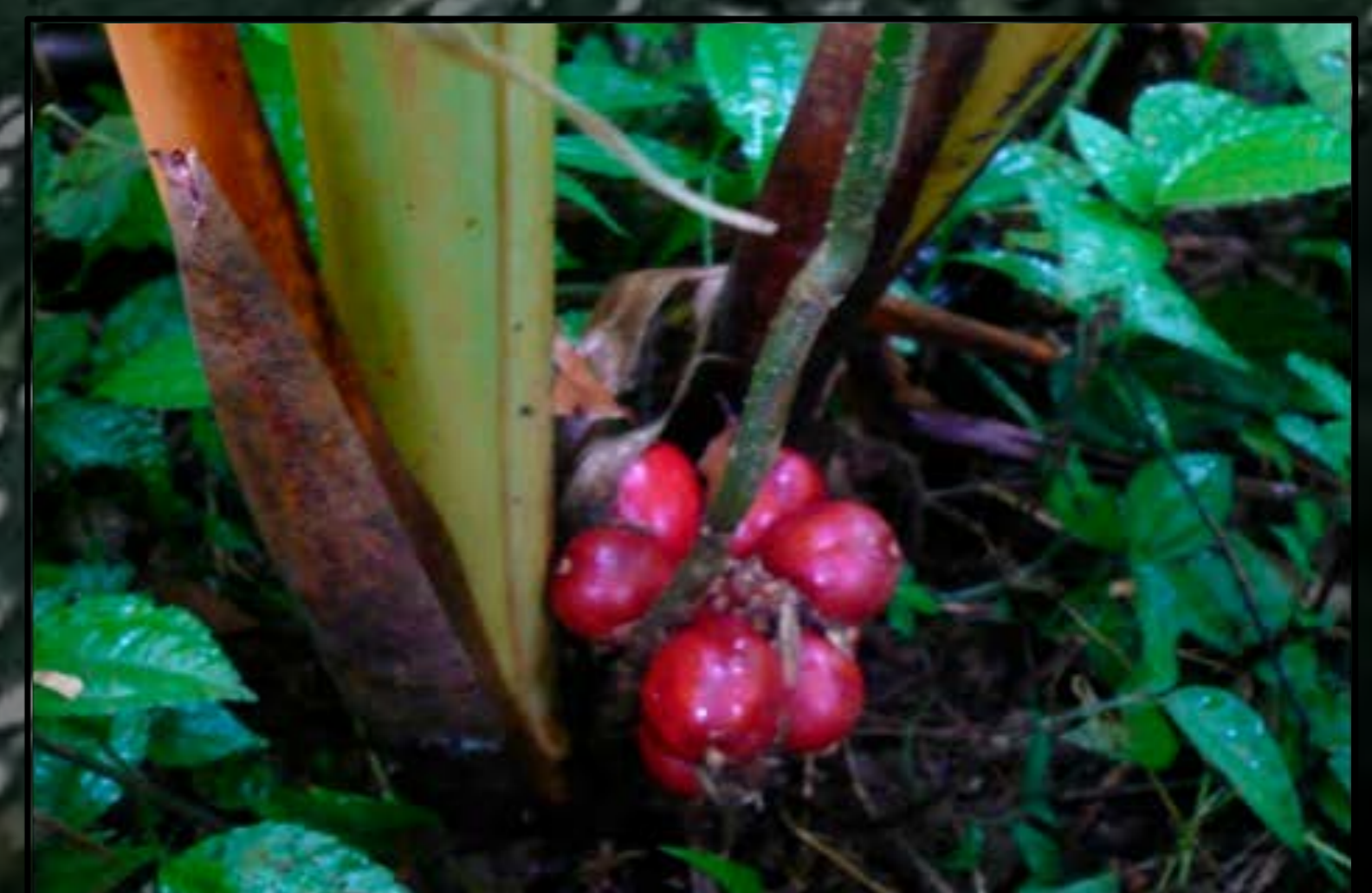


Figure 3: Ripe cardamom fruit. Photo Sarah Turner

on 'canopy pathways' to move around the forest. As such, accessibility to food resources and chances for reproduction were severely reduced. Based on this research, a strict protection area has been proposed to the Ha Giang Provincial Council and managing non-government organisations to help recover the population.



Figure 2: (Top) A land use classification of the Tung Vai forest, Vietnam. Showing the extent of Cardamom cultivation. (Bottom) A pregnant female Tonkin snub-nosed monkey. Photo Nicholas James