

Forest use, livelihoods and biodiversity: A case study from Phnom Kulen National Park, Cambodia

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Cambodia, along with the rest of Indo-Burma, is thought to be one of the world's greatest biodiversity hotspots. The forests in Cambodia are vitally important habitats that support eleven primate species as well as a variety of other flora and fauna. Major threats to these forests are mainly socio-economic in origin and include human population growth, corruption and poverty. The study area, Phnom Kulen National Park (PKNP), was thought to contain four primate species prior to this study, with one other, the Indochinese silvered langur (*Trachypithecus germaini*) possibly being locally extinct. Although PKNP is protected it has not escaped utilisation by locals for natural resource extraction. The use of Non Timber Forests Products (NTFPs) is a contributing factor adding to the pressures upon this area. There is clear evidence, with concern from both government and non-government organisations, that this is further degrading the quality of the habitat within PKNP. In order to better understand the socio-economic causes of the over utilisation of natural resources, it was necessary to comprehensively assess the current human population's livelihood strategies and forest resource use.

The principle investigator worked in conjunction with the Angkor Centre for Conservation of Biodiversity (ACCB) based in Kbal Spean, within the boundaries of PKNP. Data were collected in five mountain villages and three lowland villages, using semi-structured interviews of households along with loose participant observation methods. Population samples were selected using a systematic sampling method with the sample size being predetermined at 20-30 per cent of each population, or until no new relevant information was discovered. A total of 226 interviews were conducted and data were analysed by comparing mountain and lowland locations.



Conducting household interviews (Ta Pehn, April 2012)

Analysis of data showed that crop growing, permanent and non permanent, was the main source of income, with employment or entrepreneurialism the next most common occupation. Lowland households earned a greater mean annual income than mountain households. It is important to note that income earning relating to natural resource extraction had the second lowest earning potential. This demonstrates that the villagers did not rely heavily upon natural resources as an income source, although they are still extremely important for a household's own consumption.

Over 70 per cent of participants in both locations harvested natural resources at least once a week, making it clear that access to the forest is important. The harvesting of wood, fruit, vegetation and wildlife was significantly more likely to occur in mountain locations. 38 per cent of participants claimed to hunt and/or trap, with mountain households being more likely to participate than lowland. Many villagers were aware that hunting was illegal, but were comfortable to discuss trapping or the use of slingshots by children.



Child with small forest bird; sling shot. The bird had been shot by the child for food, who had then removed its flight feathers (June 2012)

The main reason given for trapping was to protect crops. 63 per cent of participants hunted or trapped around their agricultural land, more frequently during the harvest season. Pig-tailed macaques (*Macaca leonina*) were identified as main crop raiders.

Participants who spent time in the forest proved to have a good knowledge of biodiversity in the area. Ten participants regularly saw the Indochinese silvered langur (*T. germaini*), and when asked for the colour of the offspring as a ground truthing method, most replied 'red', making it likely that they were correct about the species identification. This took the number of primates thought to inhabit PKNP to five.

The most common species hunted were squirrel (the Cambodian striped squirrel (*T. rodolphii*) and variable squirrel (*C. finlaysonii*)) and rats (*Rattus* spp) rather than the preferred meat species, muntjac (*Muntiacus muntjac*) and wild pig (*Sus scrofa*). Muntjac (*M. muntjak*), which is the most valued wild meat, was the least caught species and the least commonly seen, along with other large mammals.



Variable squirrel (*Callosciurus finlaysonii*) trapped by a villager for own consumption (May 2012)

The income sources of populations living in and around PKNP are varied and multifaceted, giving them the best possible chance of earning enough to survive. The reliance on natural resources is not one that increases a householder's income in any substantial way, yet, the harvesting of natural resources is hugely important for own consumption and may prevent households slipping deeper into poverty. Therefore, schemes should be put in place to allow the sustainable harvest of natural resources. As a result of this study a list of recommendations have been created and passed to the ACCB for further examination and possible implementation. It is also recommended that evidence of the Indochinese silvered langur (*T. germaini*) inhabiting PKNP should be collated to enable adequate protection to be put in place for this Endangered species.