

## Change of forest cover and shifting cultivation in upland Thua Thien Hue province during 2000–2011: causes and implications for sustainable agricultural development

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Forest cover in Vietnam has changed dramatically in the last few decades for many reasons, chiefly slash-and-burn cultivation (Hoang and An 2007; Sunderlin and Huynh 2005). We measured the change of forest cover from 2000 to 2011, assessed the status of slash-and-burn cultivation and identified sites appropriate for sustainable food crop production, to support food security for and adaptation to climate change by the Pakôh ethnic minority in Hong Bac commune, Aluoi district, Thua Thien Hue province.

We analysed Landsat 7 and Spot 5 satellite images to identify changes in land use and forest cover. We also used GIS, in combination with indigenous knowledge, to identify sites most appropriate for sustainable food crop production that could achieve both food security and forest protection. We held interviews with key informants, group meetings with villagers and participatory field discussions in 4 villages of Hong Bac commune to learn about traditional slash-and-burn cultivation and the needs of the communities.

Forest cover has changed significantly during 2000 to 2011; a large area of rich forest was degraded to poor forest and bare land. Some 115 ha of rich forest and 63 ha of average forest were lost, while the area of poor forest increased by 163 ha. The area of acacia plantations was enlarged by 88 ha. Different causes of natural forest degradation were identified, principally slash-and-burn cultivation, followed by illegal logging and forest fire, among others. Generally, forest cover in Hong Bac has increased during the study period thanks to the national forest plantation program, under which bare land and fallow plots in shifting cultivation are afforested with *Acacia*. However, large areas of rich and average forests were felled to create slash-and-burn plots for food production. Thus, the forest cover increased, but the quality of natural forests decreased.

Slash-and-burn cultivation is closely associated with the livelihood of ethnic minorities in upland areas of the Truong Son mountain range, especially the Pakôh people. Ethnic minorities face problems caused by the lack of arable land. The area of slash-and-burn cultivation has been enlarged since 2000, mainly through the felling of rich and average natural forests on rich soils.

The areas of enriched fallow and bare land also increased. The area of slash-and-burn cultivation in Hong Bac commune increased from 204 ha in 2000 to 344 ha in 2005, to 372 ha in 2011. Almost all ethnic minorities practise slash-and-burn cultivation. That as practised in Pakôh community is closely associated with the tradition of honouring local spirits (Trần and Nguyễn 2003; Nguyễn et al. 2004; Hoàng 2007).

Almost all slash-and-burn plots are located in rich or average natural forests, close to water and along roads. Normally, the Hong Bac farmers fell all trees to grow upland rice in the first year. Because the hillsides are steep, rice is sown in holes. After the first year, the soil becomes degraded and eroded, and cassava and other food crops, including vegetables, are planted in the following 2 to 3 years. The land is then left fallow for another 3 or 4 years for the soil to recover its fertility. Although these slash-and-burn practices meet the needs of the local people, they cause deforestation, which in turn causes loss of biodiversity, soil erosion and reduced livelihoods.

In recent years, instead of leaving the soil fallow, the Pakôh people have planted Acacia and other forest trees. This increases the area of forest but reduces the area of land for food production. To overcome this problem, the farmers resort to illegal felling of natural forest. To help the farmers avoid the need to do this, we used local knowledge and GIS to identify land appropriate for sustainable crop production. We identified 456 ha as potential cultivable land. The land is currently under forest, but because it is appropriate for intensive cultivation, its deforestation would minimise environmental damage. The permanent allocation of this land to sustainable intensive food production will reduce problems of forest destruction caused by slash-and-burn cultivation.

Developing and promoting the adoption of improved sustainable cultivation techniques is of great importance to supporting the sustainable production of food on this land. Building the capacity of the local farmers in sustainable cultivation and food security strategies is also of vital importance.

## Keywords

Hong Bac commune, Vietnam

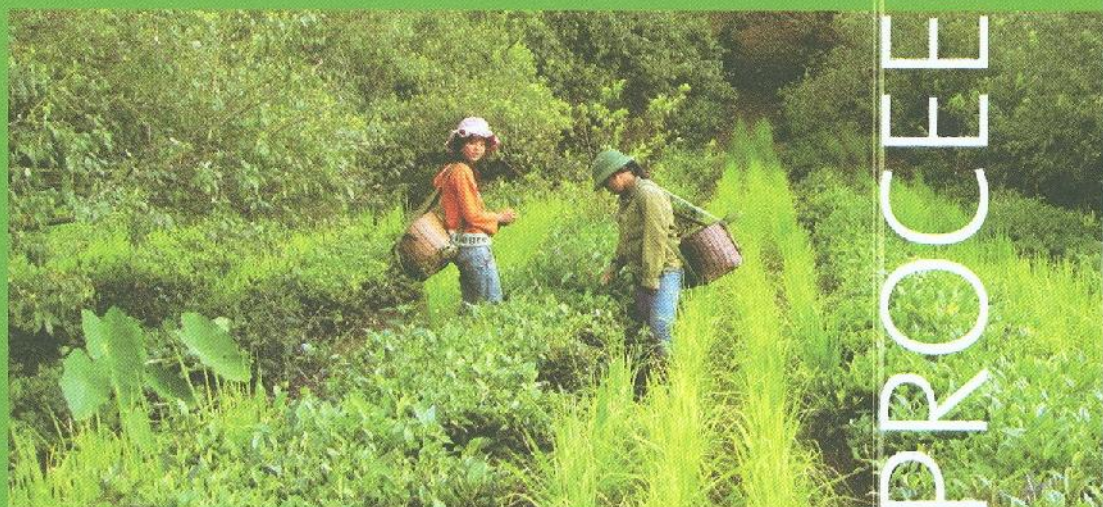
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PROCEEDINGS

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