



Economy and Environment Program
for Southeast Asia
Tanglin PO Box 101
Singapore 912404

Phone: (65) 6831-6854
Fax: (65) 6235-1849
E-mail: eeipsea@idrc.org.sg
Web site: www.eeipsea.org

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 10 member countries: Cambodia, China, Indonesia, Lao PDR, Malaysia, Papua New Guinea, the Philippines, Sri Lanka, Thailand, and Vietnam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

EEPSEA Policy Briefs summarize the key results and lessons generated by EEPSEA-supported research projects, as presented in detail in *EEPSEA Research Reports*.

EEPSEA Policy Briefs and Research Reports are available online at <http://www.eeipsea.org>.

Saving the Soil: Erosion in the Upland Farming Systems of Vietnam

EEPSEA POLICY BRIEF • No. 2001 - PB15

Soil erosion is a major problem in almost all countries in Southeast Asia, particularly in upland areas. Farmers here often cultivate marginal land that is easily washed away if heavy rains occur or if soil conservation measures are not practised. One of the challenges facing these farmers is how best to manage their land in order to minimize soil loss at an affordable cost. A new study from Vietnam has shown how the on-site cost of erosion can be calculated for a variety of land use systems — providing vital information to farmers and policymakers about the best farming techniques. →

A summary of EEPSEA Research Report 2001-RR15, *The Economics of Soil Erosion and the Choice of Land Use Systems by Upland Farmers in Central Vietnam*, by Bui Dung The (Faculty of Economics, Hue University, 22 Phung Hung, Hue City, Vietnam; contact: buidungthe@hotmail.com).

ARCHIV
631.45(597)
B 81

Upland rice was most erosive *agroforestry the least*

→ Four Farming Systems

The study, by Bui Dung The from the Faculty of Economics, Hue University, looked at farms in the Xuanloc commune, Phu Loc district. Xuanloc is a relatively large, hilly commune located within Thua Thien Hue Province. The commune is bounded by mountains, which form the watersheds of the Huong and Nong rivers, and is in a transitional zone between the coastal lowland area and the Truong Son high mountain range. Overall it is representative of the hilly land of Thua Thien Hue province, as well as the central region, where erosion and land degradation are serious. The commune is inhabited by two main groups of people, the Kinh (lowlanders) and the Van Kieu (an ethnic minority group). At present there are 412 farming families with a total population of 2,218 people in Xuanloc. About one third of the population is Van Kieu.

To get the information he needed, The interviewed 260 farmers. His questionnaire focused on land use practices and the inputs and outputs of the different land use systems. The also collected socio-economic and institutional information on the farmers he interviewed.

The found that there are four main land use systems in Xuanloc: upland rice cultivation, sugarcane growing, eucalyptus plantations and

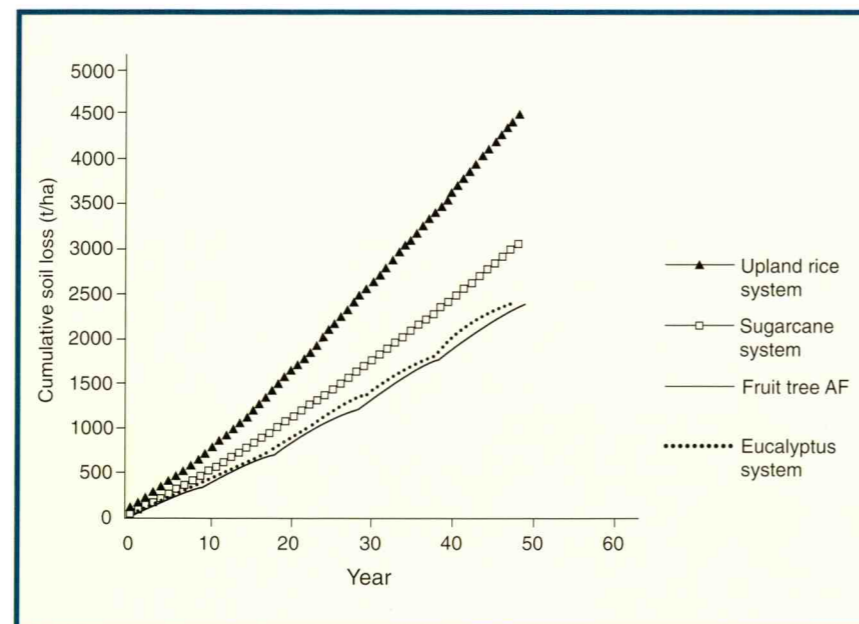
agroforestry (AF). More than two-thirds of household landholdings were used for sugarcane and forest plantations, while about a tenth of the land was used for upland rice. Land use for AF accounted for only a small proportion of farm landholdings.

Why People Farm as They Do

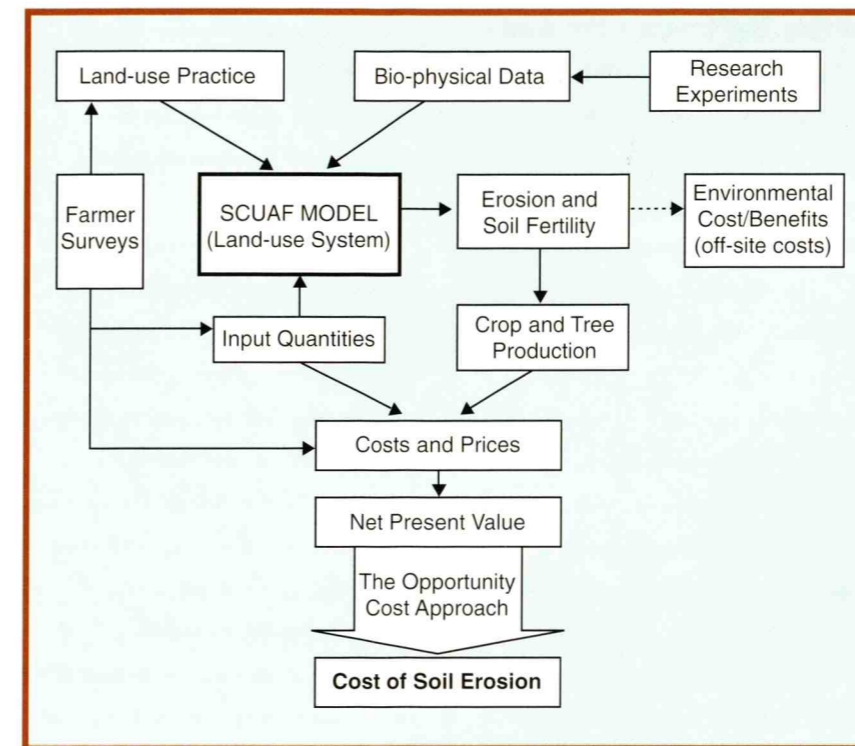
The found many reasons why farmers choose to adopt a certain land use system. For example, of those farmers who had adopted an AF approach, about a third reported doing so because of the high financial returns it gave. Others cited AF's suitability to the landscape, the advice of local authorities and the lack of alternatives as their reasons for taking it up. (AF refers to land use

systems in which trees or shrubs are grown with crops or pasture. The typical agroforestry system in Xuanloc is fruit-tree based and includes lemon and banana trees.)

Overall, The found striking differences between the agricultural practices of the two groups of people living in Xuanloc. For example, most Van Kieu farmers use their land to grow food crops to cope with the problem of food shortage. They are the only group to participate in upland rice cultivation. In contrast, the Kinh people tend to be more concerned with economic return, planting eucalyptus and sugarcane in response to subsidies and promotional campaigns by local authorities and businesses. At present, the Van Kieu people in



Cumulative soil loss modeled under four land-use systems



Bioeconomic framework for the study

Xuanloc have a very low standard of living and continue to practise slash and burn cultivation. But population pressures have forced them to shorten the fallow periods when they allow their plots to regenerate, jeopardizing the sustainability of their farms.

Soil Losses are Heavy

After exploring the current situation in Xuanloc, The set out to find out how much each system contributes to soil loss. He used an erosion-productivity model, Soil Changes under Agriculture, Agroforestry and Forestry (SCUAF), to estimate soil loss due to erosion. He found that upland rice was the most erosive

land use system, eucalyptus and fruit tree agroforestry the least. He calculated that over a 50-year period, the cumulative soil loss under the upland rice system would be 4.427 tonnes per ha; double that of the fruit tree AF and eucalyptus systems. This coincided with farmers' perceptions. Overall, the SCUAF analysis suggested that the soil loss associated with all of the land use systems is much higher than the tolerable level of 30 tonnes per ha/year. According to The, this indicates that none of the four systems practised by the farmers of Xuanloc is sustainable in the long run.

The investigated why this might

be and found that relatively little soil conservation was carried out in the commune. Only about 56% of all land plots had any sort of erosion control and of these the majority were under the AF system. Only 20% of upland rice plots were under erosion control and the share was not much bigger for the forestry and sugarcane systems. The asked why so little was being done to conserve soil resources and found that it was due to farmers' misunderstanding of natural resource management and the cost of available erosion control technologies.

The Financial Cost of Erosion

Once he had calculated the soil loss associated with each different type of farming, The then investigated the financial impact of this loss. He first looked at the financial returns of the four systems and found that the AF system has a higher annual profitability than the other systems, followed by sugarcane. However, when he examined a five-year time horizon he found that the upland rice system would be the best system. (This could be a plausible explanation of why Van Kieu farmers, whose living standards are at a subsistence level, prefer rice.) When a longer time span was examined, AF was again shown to be superior in terms of profitability. Overall, eucalyptus came out worst



in terms of financial performance, which explains why most forest plantations were only established under subsidy programs. Given the respective annual soil losses and annualized incomes of the four land use systems, The calculated the opportunity cost of soil erosion. (This he defined as the loss in the long-term profitability of a farming system that results from not investing in an economically worthwhile alternative.) The found that for upland rice, sugarcane and eucalyptus-based systems it is about VND 36,000 per tonne of soil loss. For the fruit tree AF system, he found that the opportunity cost falls to about VND 15,000 per tonne of soil loss.

Solving the Erosion Problem

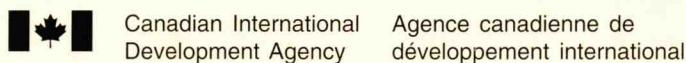
In light of his findings, The concluded that measures are urgently needed to prevent irreversible damage to Xuanloc's land — especially that under upland rice. He recommends the widespread introduction of soil conservation technologies (again, especially in the areas farmed with rice) and a shift towards the least erosive land use system, AF. However, he counsels against a general introduction of AF, arguing that it would make more sense to introduce soil conservation techniques in upland rice rather than converting it to new uses. This is because the AF system has a high establishment cost and requires

complex management — factors which would make its adoption difficult for many of the poor, isolated and uneducated upland farmers in the region.

The's findings are timely since the region's sugarcane factory has recently closed and all the farmers who have been growing the crop are now looking for alternative farming systems. The argues that these farmers, like the rest of the farming community in Xuanloc, will need help from government — particularly advice on soil conservation techniques and suitable replacement crops, as well as better roads to get crops to market.

15,000 VND = 1 USD (Sept/01)

EEPSEA is an international secretariat administered by Canada's International Development Research Centre (IDRC) on behalf of EEPSEA's sponsors:



MACARTHUR
The John D. and Catherine T. MacArthur Foundation