

# **SOME RECENT RESEARCH BY HANOI AGRICULTURAL UNIVERSITY ON NATURAL RESOURCE USE AND RURAL LIVELIHOOD PROTECTION IN VIETNAM'S UPLANDS**

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## **INTRODUCTION**

In the years after the *Doi moi* policy reform in the second half of the 1980s, Vietnam's economy has grown at a remarkable rate. Highlights of this growth are as follows: from 1990 to 1997, GDP increased at an average rate of 8% per year, and last year it was 8.4 percent, the second highest in the world; the inflation rate fell from 774.7 percent in 1986 to 8.2 percent in 2005; per capita income has risen from US \$220 in 1994 to \$640 in 2005; and most impressively, the percentage of the population living in acute poverty has been reduced from 57 percent in the 1980s to 37 percent in 2000 to around 7.0 percent in 2005. Contributing to these impressive economic achievements has been spectacular growth in agricultural production. Last year rice production reached nearly 40 million tons, of which 5.2 million tons was exported. In addition, these results were accomplished in the face of extreme drought in parts of the country and in the face of a typhoon and then flooding in other parts of the country!

Ironically, the recent success of socioeconomic development was achieved primarily in the urban and fertile delta areas in the lowlands and not in the uplands. In terms of food security, Vietnam exports of rice do not mean that food security is assured for the entire population. Rice is exported from the deltas while farmers in mountains still suffer from food shortages. The upland areas, in general, remain isolated and are still largely characterized as low-income and subsistence-based economies. Normally, when discussing the upland or mountainous areas, people wrongly believe that the mountainous areas are unimportant places and do not contribute to the development and security of the country. Few people appreciate the importance of the mountains to Vietnam's future. In the mountainous areas, almost all members of the ethnic minority groups are reliant on subsistence agriculture. These upland people still face challenges of pervasive poverty, high population growth, deepening environmental degradation, and social and economic marginalization (Jamieson et al. 1998). This situation in the mountains seriously threatens the development of Vietnam as a whole.

In this paper I first review general issues of problems of development and natural resource management in Vietnam's uplands and then describe some recent research on these problems being carried out by Hanoi Agricultural University.

## **1. PROBLEMS OF DEVELOPMENT IN VIETNAM'S UPLANDS**

In this section I first review the development situation in Vietnam's mountains, particularly with regard to the ethnic minorities and their use of forest resources, then I discuss the major challenges to upland development, followed by a review of government upland development policies.

### **1.1. The Development Situation in Vietnam's Uplands**

The mountains play such a critical role in Vietnam's development because, compared with other countries in Asia, Vietnam has the highest proportion of sloping land (Table 1).

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The uplands of Vietnam occupy some 24.7 million hectares (ha) or three-fourths of the country's total land area of 33 million ha; therefore, Vietnam is considered a mountainous country. Of this area, 17 million hectares have slopes in excess of 25°.

Table 1. Proportion of sloping lands in some Asian countries

| <i>Country</i> | <i>Sloping land (%)</i> | <i>Country</i> | <i>Sloping land (%)</i> |
|----------------|-------------------------|----------------|-------------------------|
| Vietnam        | 75.0                    |                |                         |
| Laos           | 73.7                    | Indonesia      | 35.5                    |
| South Korea    | 49.8                    | Thailand       | 34.4                    |
| Malaysia       | 47.8                    | Philippines    | 28.7                    |
| China          | 45.9                    | Cambodia       | 22.3                    |
| Japan          | 40.7                    | India          | 10.0                    |

*Source: NISF, 1997*

The uplands are home to 28 million people - nearly one-third of the national population, and contain 50 of the Vietnam's 54 officially recognized ethnic groups. They are also where most of Vietnam's forests are located (Vien, 2005).

For people in the uplands, forests have always been an important resource - contributing greatly to both their livelihoods and to their well-being. Forests help upland peoples to generate income, provide subsistence goods, supplement inputs for farming [Vien, what does this mean?], and reduce vulnerability during times of crop failure, unemployment, and other hardships. The ethnic minority groups in the uplands traditionally extract forest resources and use them as one of their livelihood strategies. This traditional activity is illegal under the forestry laws of Vietnam. Moreover, in many areas, local people have applied various forms of shifting cultivation in forest areas - the areas in which the government has prohibited cultivation - in order to meet their basic needs. These extraction and cultivation activities have been critical parts of upland livelihood systems for hundreds and probably thousands of years. In the past, when human pressure on the landscape was of a lesser degree, these practices could be done in a way that allowed for sustainable practice. Today, however, in many cases, the increased frequency with which non-timber forest products are collected from a specific area, or the increased frequency that a swidden field is being cleared can have a negative effect. If the frequency of these practices is too high for a specific area, then the natural resources (e.g. forests, different aged fallow fields, soil, etc.) can become degraded. The degradation of these resources can negatively affect the practitioners' living standard and can cause, both directly and indirectly, soil erosion, drought, and flood.

Related to this issue, please note that 100 years is needed in order to produce 2 centimeters of natural soil for cultivation, while in mountainous areas of Vietnam, soil erosion causes topsoil to be lost at an annual rate of 1.5 centimeters. The causes of this soil erosion are many. In the past, it was believed that the biggest cause of soil erosion was logging and shifting cultivation practices. However, recent research carried out by two hydrologists from the University of Hawaii in conjunction with researchers here in Vietnam and with Thai researchers in Thailand show that in many cases the construction of upland infrastructure, specifically roads and paths—infrastructure that everyone agrees are needed for upland development—can actually, in a direct and indirect manner, contribute the largest amount to soil erosion (Ziegler, A.D. & Giambelluca, T.W. 1997, Zeigler et al. 2004). This complication illustrates a dilemma that we see in other places with shifting cultivation. While the government brands this agriculture practice as 'bad', our research as well as others' has found that this form of agriculture is actually a sustainable farming system and one well-suited for the uplands. In other cases, we have found that the practice of shifting cultivation is necessary for local food security. This will be discussed more in our findings below.

Regrettably, however, Vietnam's forest area has been declining so that, in the past 50 years, Vietnam lost about 5 million ha of natural forests. However, in recent years, the rate of loss has slowed and may now have gone into reverse; forest cover decreased from 33 percent in the period 1954-1975 to 28 percent in 1986-1999 but then increased, thanks to implementation of several re-forestation programs beginning in the early 1990s, to 33.2 percent in 2002 and 37.7 percent in 2005. Yet the problem of forest degradation, mostly regarding forest quality, remains serious, as valued resources and biodiversity in many forest areas have dramatically declined.

Several phenomena have been widely cited as the causes for forest loss in Vietnam. Among these factors are warfare, inappropriate development policies, population growth, clearance for upland agriculture, inadequate transfer of farming technology (typically involving transfer of techniques developed for use in the lowlands without conservation methods necessary for the uplands), forest fires, relentless collection of fuelwood and timber (both legally and illegally), and shifting cultivation. Shifting cultivation (swiddening) has been singled out in many government reports as a major reason for the depletion of Vietnam's forests, although this claim is disputed by many scientists (see for example Schmidt-Vogt 1998, Fox and Vogler 2005).

This loss of forest cover and its quality has reduced the availability of subsistence food, decreased sources of income, eroded people's sense of well-being, and exacerbated the vulnerability of millions of forest-dependent people.

## **1.2. Major Challenges of Upland Development in Vietnam**

Challenges of Vietnam's upland development can differ based on the point of view of specific authors and researchers. Therefore, there are many opinions regarding what are the challenges to upland development. It is clear that the challenges are enormous and vast in number. One viewpoint suggests that the key challenges are: (1) Remoteness and inaccessibility; (2) Low biological productivity; (3) Environmental degradation; (4) Disease and health problems; (5) Population pressure; and (6) Ethnic differentiation and problems of inter-cultural communication (Rambo 1995). Another point of view suggests that the challenges can be summarized as (1) very poor material and technical infrastructure; (2) seriously damaged environment; (3) poorly developed economy; (4) low level of knowledge; (5) high population increase; (6) unemployment; and (7) poor education and training for local professional staff and administrators (Quy 1995). Yet another point of view says the challenges are: (1) slope is too steep given a concentrated rainy season; (2) agricultural soil is too acid, and poor in phosphorus; (3) forest degradation; (4) wide use of shifting cultivation; (5) rapid population growth and high poverty among mountain people; (6) unsuitable cultivation technologies, and (7) poor infrastructure (Vien 1996). Finally, another point of view, represented by Jamieson et al. (1998), found that the mountain communities are caught in a downward spiral of (1) Population Growth; (2) Environmental Degradation; (3) Poverty; (4) Integration into Non-local Systems; and (5) the Problems of Dependency and Social, Cultural, and Economic Marginalization.

Even the same author, by looking at the problem from a different vantage point (e.g., when considering the problem from an agriculture development perspective versus from a poverty alleviation perspective), might also emphasize somewhat different factors and challenges to upland development. For example, one of the aforementioned authors stated that, in these areas, low agricultural productivity, widespread poverty, changing migration patterns and the marginalization of Vietnam's diverse ethnic minorities are indicators of broader social and environmental challenges confronting Vietnam's future development. Then, later on, given different circumstances and after further research, this same author

stated generally that there are societal elements that threaten the livelihood of the upland communities. These include socioeconomic differentiation, which is rapidly appearing within and among different ethnic groups and areas in the region; high pressure on natural resources; rapid population growth; and social and economic marginalization (Vien, 2005).

This overview suggests that ideas about challenges to upland development in Vietnam are quite diverse and are based on factors such as who the researcher is, what his/her background is, what the focus of his/her study or research is, and when and where he/she carried out the study or research project. In short, it is very hard to definitively identify all the challenges to upland development in Vietnam. However, what one can do is to identify the points of agreement among these diverse perspectives and, further, to generate a list of generally recognized challenges.

All the perspectives reviewed agree that:

(1) Population growth is one of the major challenges for upland development.

(2) The area of agricultural land has been shrinking and, to some extent, environmental degradation is taking place. As a result, highland populations, especially many upland ethnic minority communities, must find ways to cope with excessive demands that the growing populations place upon their limited (and in many cases decreasing) natural resource base while trying to maintain and hopefully improve their living standards. Nearly half of the upland population is composed of ethnic minority people and slightly over half are ethnic Kinh. Recent studies indicate that on average upland Kinh are catching up with the lowlands; but upland ethnic minorities, on average, cannot match this pace. If one were to disaggregate the data further, one would find that some ethnic minority groups in some locations are doing rather well, benefiting from development programs and from being able to take advantage of access to growing markets—allowing them to achieve substantial increases in their income and overall standards of living—but many other upland ethnic minority people are falling behind in the general improvement of living standards.

(3) The uplands are very ecologically and culturally diverse. This is in contrast to the lowlands, where the natural environment is relatively homogeneous and populated by Vietnam's ethnic Kinh majority who display a common cultural and institutional pattern. Indeed, the uplands, as indicated above, are a complex human ecological mosaic. As a result, the successful lesson(s) gleaned from this area, given this time and this minority, may not be successful if applied to another area, in another time, and with another minority.

### **1.3. Government Policies for Upland Development**

After the application of the *Doi moi* economic reform policy in the 1980s, the lowlands' economy developed rapidly. Although the uplands have also been on a developing track, they have lagged very far behind the lowlands. The majority of people in upland areas experience acute poverty. The dramatic disparity between the lowlands and uplands is actually increasing over time. This problem has come to the attention of the Vietnamese government and its resolution has been made a priority. A number of policies and programs have been issued and applied with the hope of improving upland peoples' livelihoods. In general, the government policies aim to increase and improve infrastructure and market access for low-income upland farmers; at the same time, policies emphasize poverty alleviation and income generation. Moreover, given that Vietnam's mountainous areas coincide with the country's main forested areas, the government is allocating production forests - the areas on which farmers are able to legally create extra incomes - to individual households from state-run Forest Enterprises. Owing to the importance and significance of the uplands, such programs and projects have not only been supported by the government, but they have also been supported by other countries' bi-lateral aid organizations and by international aid organizations.

These programs and projects for upland development focus on several main areas:

- Eradicating poverty and hunger and ensuring good governance for poverty reduction;
- Promoting ethnic minority development and reducing inequalities;
- Reducing vulnerability and providing social protection;
- Providing quality basic education for all;
- Ensuring environmental sustainability; and
- Enhancing access to basic infrastructure.

Within the government policy framework for upland development various research projects have also been launched in the uplands under the support of Vietnam's government, sometimes in collaboration with foreign donors. Objectives of these projects are summarized as follows:

- Investigating causes of and solutions to land degradation;
- Poverty Alleviation and Hunger Eradication;
- Investigating trends in upland agroforestry production over periods of time;
- Study of ethnic minorities' indigenous knowledge of natural resource management;
- Searching for agroforestry techniques for the uplands;
- Improving techniques for agroforestry production and increasing the forest cover rate;
- Applying systematic and human-ecological approaches for sustainable upland development.

In general, these research programs/projects have significantly contributed to poverty alleviation in the uplands of Vietnam in recent years. Commercial agroforestry production has been promoted and developed in areas that have relatively lower elevation, are near roads, and are near towns where farmers have more access to new technologies and markets. By contrast, in remote areas where most of the ethnic minorities live and traditionally do different types of agroforestry production, these programs have been less successful. This is due to the following reasons:

- Farmers can not afford the expensive technology needed;
- Agroforestry technologies for specific ecological areas in the uplands have not yet been determined;
- Communities have not accepted new agroforestry technologies;
- Programs used inadequate approaches to upland research and development;
- Improvement of the market for agroforestry production has not been a focus of research or development;
- Programs/projects have not paid attention to local conditions that could hamper the combination of traditional practices with new technologies.

One note of concern is that all of these efforts are mainly based on external inputs, such as planning and implementing by outsiders. These efforts are designed by outsiders and agriculture inputs (seeds and/or seedlings and fertilizers) come from the outside and are subsidized, etc. These plans are not based on what local people have but, rather, they are based on what local people lack. This is a main reason for the failure of many of Vietnam's upland development projects.

## 2. RECENT RESEARCH BY HANOI AGRICULTURAL UNIVERSITY IN THE UPLANDS

Hanoi Agricultural University (HAU) researchers, especially researchers from the Center for Agricultural Research and Ecological Studies (CARES), are carrying out several

research programs in the uplands. In this section I will describe (1) the overall strategy that guides our research efforts, (2) review some of the major studies we are doing, and (3) discuss the significance of their findings for upland development.

## **2.1. The Strategy Guiding HAU Research**

In our experience, the most effective approach to reducing poverty and the disadvantaged position of many of those in the uplands is to find ways that individuals and households can acquire, protect, or improve their assets. This focus starts by looking at what poor people already have, not at what they lack.

Thus, HAU's overall program for upland research and development is set up to reinforce the advantages and overcome the disadvantages of the above mentioned government development programs. We start with an innovative idea that an important contribution to poverty alleviation can be made by poor people themselves by building, protecting, and using their own assets effectively.

Over the long term, HAU's upland research and development program intends to continue, expand, and refine research activities that emphasize building local capacities and assets. These activities are built from the following components:

### **1. Building Local Capacity**

- 1.1. Study how the relationship within and between levels (village, commune, district, province) affect natural resource management
- 1.2. Study the factors that affect social capital, and social solidarity at local level
- 1.3. Identify and respond to gaps or emerging problems in local knowledge, information and technology

### **2. Building and Protecting Local Assets**

- 2.1. Study nutrient flows and nutrient balance in upland agro-ecosystems to increase the capacity to predict, mitigate, and protect against threats to sustainability
- 2.2. Reassess traditional crop varieties that may have been hastily abandoned
- 2.3. Work with local people to develop criteria and benchmarks for evaluating trends in local farming systems and local environment
- 2.4. Study the impacts of government policies and programs (i.e., land allocation) upon local livelihoods, land use, food security, equity, gender issues, etc.

### **3. Training activities emphasize:**

- The role of trainees as active participants in a learning process rather than as passive recipients of knowledge; and
- Building networks of collaboration for future activities

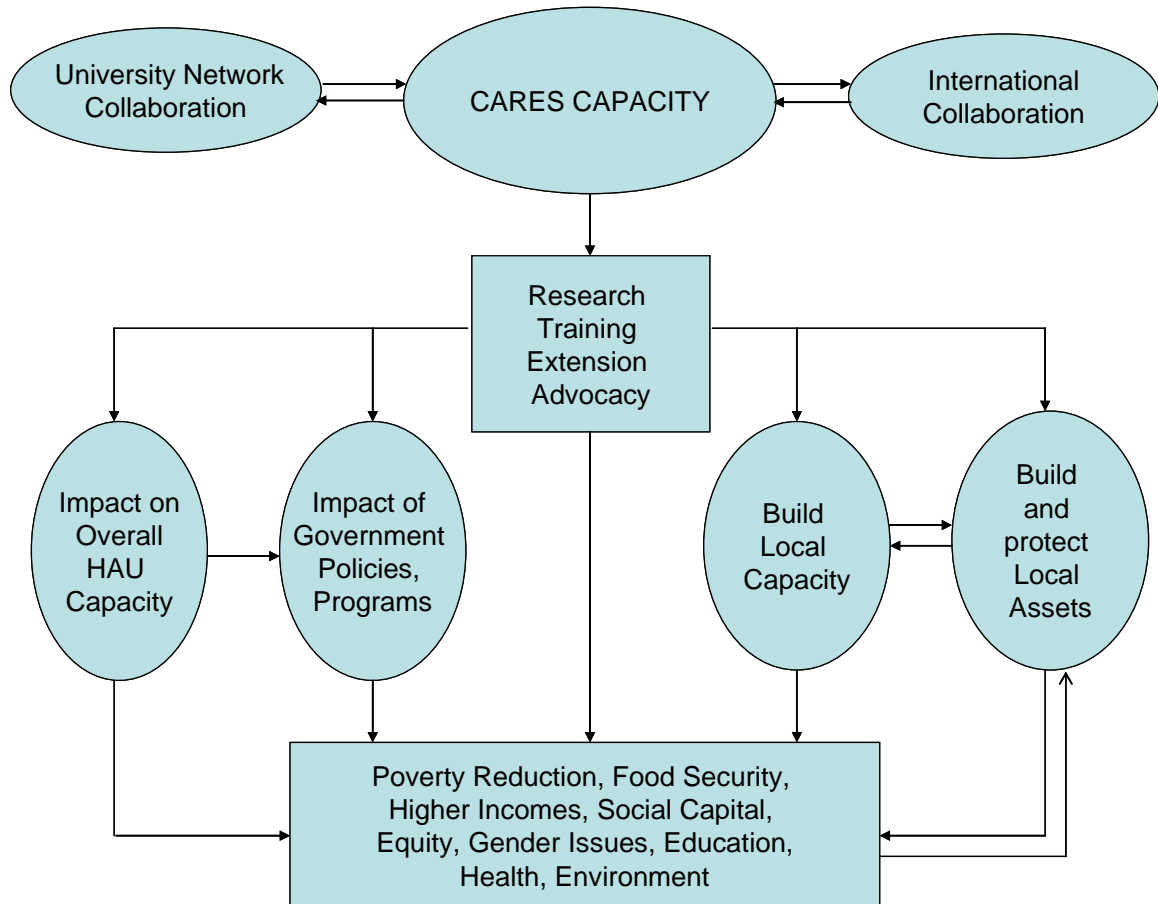
### **4. Extension Activities emphasize:**

- Learning about and responding to the expressed needs, desires, opportunities, constraints, and problems of poor farmers
- Providing farmers with options that they can adopt to improve their existing farming systems rather than packages of technology that they were urged to adopt
- Field jointly conducted trials with interested farmers to involve farmers in the evaluation and modification of innovations, including the selection of criteria by which innovations are evaluated
- Farmer-to-farmer transfer of knowledge information and ideas

- Producing audio-visual materials in local languages, using local farmers and teachers

It also should be noted that, anything belonging to a community is a kind of asset. Community-based natural resources management, community forests, and community based farming systems are all ways to promote local people’s assets; each of these needs to be thoroughly studied, especially in the ethnic minority communities of the uplands.

Based on HAU’s capacities, the above ideas are illustrated as follows:



## 2.2. Current HAU Research Projects in the Uplands

HAU is carrying out two main research programs in the mountains. One is a very detailed study conducted on a small scale over a long term (13 years), focusing on a specific hamlet in the uplands where shifting cultivation is the main farming system. The other program is being carried out on a larger geographical scale, looking at a number of hamlets in 10 communes/3 districts over a shorter time frame (8 years), focusing on how communities spread across a river basin are reacting to development policies affecting them. This study is looking at trajectories of farming system changes, changes in natural resources management, and environmental changes within each hamlet and across all three districts. The results of both research programs are being scaled up to mountainous areas as a whole in order to develop relevant policy recommendations.

### 2.2.1 Long-Term Research on Composite Swiddening Agriculture in Tat Hamlet

Swidden agriculture is a typical agroecosystem of the minorities in the uplands. For centuries, swidden cultivation has been one of the most important land use systems in the uplands. However, change is now occurring at a rapid pace and, in many places, the system is

being replaced by other land uses. Many lowlanders and government officers believe that swidden is the cause of environmental degradation and poverty, and they have tried to end the practice of swidden; many decades of work has been dedicated to swidden eradication.

There are three main types of swidden agriculture: (1) pioneering shifting cultivation, (2) rotating shifting cultivation, and (3) supplementary shifting cultivation or composite swiddening. It is in the area of composite swiddening agroecosystem (CSA) that HAU research scientists have focused on for the past decade.

Our research program on CSA, mostly funded by the Ford Foundation, is carried out in Tat hamlet, located in Da Bac District, Hoa Binh Province, an area that falls within the Black River Watershed. The people living in this community are mainly from the Da Bac Tay minority group who have practiced composite swidden agriculture there for more than a century.

The major goals of the HAU research project are (1) to better understand the structure, functioning, and dynamics of the composite swidden farming system; (2) to test innovative ways to enhance the productivity and sustainability of this system so as to improve the well-being of the farmers; (3) to provide information generated by this research to government policy makers working on rural development; and (4) to improve the capabilities of HAU academic staff, particularly in economics and social science, to do applied participatory research aimed at improving the livelihoods of upland people (especially those living in marginal areas that include the poor and disadvantaged ethnic minorities and women).

The composite swiddening agroecosystem is a unique type of agroecosystem that integrates several types of land use - including permanent wet rice fields in valley bottoms, rotating swidden plots on the hillslopes, and exploitation of wild forest resources - into a single household resource system.

Why is composite swiddening worthy of attention? A review of some of our findings helps to explain why:

- Composite swiddening is a dynamic system:
  - ✓ It is a stable adaptation that has persisted for generations in the highlands of Vietnam;
  - ✓ It offers an indigenous model of relatively sustainable land use in montane mainland Southeast Asia. In contrast to pure swiddening systems, which often suffer rapid degradation, even collapse, in the face of increasing population pressure, composite systems are relatively robust;
  - ✓ It also offers considerable potential for intensification; and
  - ✓ It generates a high level of equitability among household incomes. Composite swiddening appears to promote equitability. The gap between mean per capita incomes of the richest and poorest quintiles of households in Ban Tat is the smallest gap found in any of the studied communities in a SIDA funded research project that looked at five communities each practicing a different farming system.
- Composite swiddens appear to suffer much lower rates of soil loss than pure swidden systems. This finding partially explains the high sustainability of composite swidden systems.
- Composite swiddening does not cause severe deforestation. This finding shows that the continuation of composite swiddening is compatible with forest protection. (Our research looked at land cover change in the community from 1952 to 2003. During this time, population increased 850%, but forest area and regrowth only decreased 6%; since 1995 forest tree cover and forest regrowth has increased by 52 %.)

- Swiddening is not the cause of poverty – rather, it is often a rational way of keeping poverty at bay under difficult circumstances. For a variety of reasons, swidden farmers are often poor and belong to the most vulnerable groups in Vietnam’s society. Changing farming practices therefore is no guarantee of poverty reduction and, in some cases, may actually increase vulnerability.

Thus, composite swiddening may offer an alternative production system for use in the mountainous tropics where pure swidden systems are producing excessive environmental degradation or are failing to meet the needs of expanding human populations.

HAU scientists are continuing to study this type of agroecosystem. At present, the focus points of our research in this hamlet are:

1. Soil erosion and nutrient balance
2. Indigenous Fallow Management
3. Household Economics and Community Development
4. Marketing of agroforestry products
5. Social organization and Natural Resources Management
6. Policy Impacts on land use and livelihood strategies of local people

We will soon be publishing a report that explains in much more detail many of the points that I have made above.

### **2.2.2. HAU’s Research Program in the Ca River Basin**

Our second main uplands research program is a research effort that has been jointly carried out between the Center for Agricultural Research and Ecological Studies, Hanoi Agricultural University; and the Institute of Geography, University of Copenhagen and mainly funded by DANIDA; additional funding comes from the Rockefeller Foundation. This research has been carried out in two different phases. From 1998 to 2001, research was initiated as part of the REPSI<sup>2</sup> project. From 2001 to the present, research has been carried out as part of USEPAM.<sup>3</sup> In 2004, HAU obtained additional funding for research in the Ca River Basin from Rockefeller to look at transboundary watershed management issues. The findings from the REPSI project have already been reported and published. The findings from the transboundary watershed management project were presented at a workshop in Vinh City in 2005. We are now analyzing our data, reflecting on our findings, and writing up a collection of reports and papers based on research from the USEPAM project. What I report here is an overview of our findings from all projects done in the Ca River Basin (CRB).

Our research in the CRB is focused on the northern part of the River Basin which runs through the Province of Nghe An, located in north central Vietnam. This river basin is unique in Vietnam because it is one of very few that runs on an east-west trajectory through Vietnam, with its headwater in a neighboring country. As such, it has the potential to provide land-locked Laos with a gateway to the sea. A road paralleling this river is National Highway 7 that follows the Ca River into Laos; the government of Vietnam recognizes the importance of this road and river to Laos and is working to upgrade the road. This development process mirrors on a smaller scale the changes that are on-going in much of the uplands of Vietnam.

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<sup>2</sup> Regional Environmental Policy Support Initiative, implemented in Vietnam by HAU, University of Copenhagen funded by Danida, and contribution from the World Resources Institute when research carried out in the CRB.

<sup>3</sup> University Support to Environmental Planning and Management – USEPAM, implemented in Vietnam by HAU and the University of Copenhagen, funded by Danida.

As noted, these changes are different in many ways from those taking place in the lowland and delta regions of Vietnam.

By focusing on the upper districts of the northern branch of the Ca River, we have examined at multi-district, district, commune, and hamlet scales the development trajectories taking place in an upland area of Vietnam and the concurrent land cover/land use changes. This research compliments our research in the Tat Hamlet in Da Bac district. In the Ca River Basin, we are focusing on many of the same questions that we examine in Tat hamlet, but we are looking at them over a larger geographic area, over multiple scales, albeit over a shorter time scale. Our initial findings from our research in the Ca River Basin follow.

### ***Impact of government policies that relate to development***

As noted, since 1986 there have been many government policies formulated to encourage development in the countryside. These policies have included land reforms of both agriculture and forest lands; policies aimed at encouraging the formation of markets; policies designed to take away restrictions on what farmers could grow and market; and policies to increase the quality and scope of the transportation and information networks (new roads, improved transportation infrastructure, television and radio coverage etc.). Forecasted impact of these policies indicates they lead to a much more productive rural economy.

In the lowlands privatizing land rights, improving access to market, and liberalizing control over farmer decision making, have all come together to increase farmer productivity. Furthermore, recent research indicates that these reforms, especially land reforms, were carried out in an equitable manner (see for example Ravallion and van de Walle 2003). The relevant question for the 75% of Vietnam's area that is upland is: how are the reforms realized there? This is not an easy question to answer for reasons presented above.

Our initial analysis of data from the Ca River Basin suggests the following realities of policy implementation in the uplands.

- At the district level, officials are picking and choosing what policies they implement and how they are implemented.
- At the commune and hamlet level, farmers are often unaware of policies that the provincial level and district level say they have already implemented.
- Once implemented all aspects of policies are not necessarily enforced due to rejection by the local people.
- Similarly, agricultural extension policies, especially in the area of irrigated rice production and animal husbandry, that the district level say are being promoted have never been heard of by people at hamlet level.

### ***Development Trajectories***

The main agricultural development extension efforts that are encouraged by government policies are decreasing or eliminating traditional swidden/fallow systems, expanding irrigated rice agriculture in upland valleys and the subsidization of terrace construction, encouraging swine animal husbandry, and encouraging aquaculture. At the district level, these policies are the main thrust of agricultural extension efforts. However, it is sometimes recognized at this level (e.g. in Tuong Duong district, Ky Son district, and Con Cuong district) that all swidden/fallow systems can not be simply done away with. In these cases, the swidden/fallow systems are allowed, but limited to specific areas within each hamlet.

At the hamlet level, reality appears to intervene and the actual development trajectories at the hamlet level in the areas where HAU has been researching are different than the trajectories encouraged by the extension policies. In some hamlets, e.g., those that are

adjacent to the district town and/or have favorable conditions (adequate lowland areas, plentiful water), swidden/fallow systems are being limited or are disappearing and irrigated rice paddy is expanding. However, our research also shows that these hamlets are less food secure than they were when swidden/fallow agriculture was more widely practiced in them. In other more isolated hamlets, and hamlets without necessary resources, swidden/fallow systems are continuing and even expanding, and these hamlets are more food secure than those where swiddening has been abandoned. Cattle raising is expanding and is the main source of cash income for the upland hamlets we have studied. Other animal husbandry, e.g. swine husbandry, chicken and duck raising, and aquaculture, is only practiced on a subsistence basis or on a minor market basis.

Thus, we can compare the officially defined development trajectories for the upper Ca River Basin with our own findings. The government program calls for:

- (1) decreased swidden/fallow systems;
- (2) increased sedentary agriculture (irrigated rice paddy, maize production on permanent upland fields); and
- (3) pig raising and fish production via fish pond construction.

Yet the actual agriculture development trajectories at various villages include:

- (1) swidden/fallow systems for rice and maize production (even if in some communes this is allowed only in modified forms or in limited areas);
- (2) a large increase in cattle raising for the markets;
- (3) some expansion of irrigated rice paddy where conditions are favorable; and
- (4) some pig raising for household use and market;

Moreover, there is little expansion in our study area of:

- permanent maize production; and
- fish production from fish ponds for the market.

#### ***Land covers / use changes and the trajectories of these changes***

In the upper Ca River Basin, we see that changes in land cover and use are tied to changes in agricultural production systems and to livelihood systems in general. As noted above in the 1970s, 1980s and through much of the 1990s, it was argued that forest cover was decreasing, and since the mid-1990s, from the start of government re-greening programs (decrees 327 and 661, also called the 5 million hectare program), the official statistics suggest that forest cover is increasing throughout all of Vietnam. This pattern is also suggested for the upper Ca River Basin of Nghe An Province.

In order to gain a better understanding of the trajectories of forest cover and land cover/use changes we are first looking at how forest cover changes are measured in the Ca River Basin; and second, we are examining land cover/use changes at both the hamlet levels and at the district levels.

#### **Forest Cover Changes / Measuring Deforestation**

The main issue in trying to decide how land cover/use is changing in the uplands of Vietnam is to understand what really constitutes “change.” The Forest Protection Department monitors land cover at a provincial level; this information is then passed up to FIPI where maps of land cover are produced on a yearly basis; FIPI considers an area deforested if it loses vegetation that is considered ‘forest vegetation’ from one year to the next. This is the case, even if the area had been previously cleared for swidden agriculture (e.g. if it had been cleared 2, 3, 4, 5, or more years previous to the year in question). However, if an area was

once used for swidden agriculture, has had 'forest' vegetation regrow on it, then is recleared, is this really deforestation? Can we even call it landuse or landcover change?

To examine these questions and to measure land cover/use changes in the Ca River Basin, we are starting with the FAO definition of deforestation. Paraphrasing the definition, deforestation takes place when a permanent change in the land use and land cover takes place. If an area has been historically used for agriculture, is cleared and regenerates into a forest type vegetation after clearing, the process should be called forest degradation, and not deforestation, at the most. Since the area has previously been used for swidden agriculture, and is currently still used for it, according to the FAO view, there is no permanent change in land use as well as no permanent change in land cover.

#### Initial Land-cover/use Change Trajectories

If this understanding of forest and deforestation is used, then our analysis to date suggests that the following trajectories of land use/cover change are found at the hamlet level:

- From examining satellite imagery from 1993, 1998, 2000, 2001, 2002 and 2003 there is little to no incursion of swidden/fallow agriculture systems into areas that were not cleared within the past 10 years.
- In some cases there is evidence that from 2000 to 2003 areas that have been used before for swidden/fallow agriculture are being abandoned, and the swidden/fallow agriculture is being concentrated in certain quadrants of the hamlets. (If this situation continues, then it is possible that land cover in the abandoned areas will revert to vegetation that would be considered forest cover.)

At the district level we find the following trajectories:

- Land cover associated with swidden/fallow systems has remained relatively constant both in area and in extent from 1993 to 2003.
- In a few areas it appears that fields have been cleared in areas that could be considered previously uncleared forest.
- In many communes the pattern of the land cover suggests that swidden/fallow fields are:
  - being relegated to limited areas,
  - being abandoned all together in favor of the expansion of irrigated rice paddy, or
  - continuing being cultivated along with a mixture of irrigated rice paddy and permanent upland fields.

In summary, land cover change is not happening at a fast level in any of the three districts we have studied. The initial trajectories we are finding are a spatial limitation of where the land cover/use associated with swidden/fallow agriculture is found; and a concurrent expansion of the area of forest cover vegetation, irrigated rice paddy areas, and an intensification of the rotation of upland cultivated areas which if continued could lead to permanent upland agriculture fields being established.

### **2.3. Significance of HAU Research Findings for Upland Development**

By conducting two parallel research programs focusing on similar issues at different scales, we have been able to gain better understanding of the complex issues related to development and natural resource management in Vietnam's uplands. We have been able to use insights from each program to better understand the overall situation of development and

natural resource management in the uplands of Vietnam. On the one hand, we have found that some general insights that we see at the multi-district level in the Ca River Basin can be better understood by looking at the local situation in Tat Hamlet. On the other hand, we can scale up our understandings of how development is taking place and land cover/use are changing in Tat, and why these changes are happening, by taking our understanding of these issues from Tat and exploring them at the multi-district level in the Ca River Basin.

Thus, our overall conclusions regarding the changing rural livelihoods, development policy implementation and impact, and natural resource management in the uplands are as follows:

- The implementation of government development policies at district, commune and hamlet levels are often not in line with how higher level government agencies and officials believe these policies should be implemented;
- Upland rural household livelihoods are changing in a wide variety of ways at the local level. Moreover, these changes are more impacted by local realities and are not necessarily following the pathways that policies indicate they should follow. In many hamlets swidden/fallow farming systems are continuing to be practiced, and in some cases expanding, in conjunction with new livelihood practices, or with old subsidiary ones, such as cattle raising, being expanded;
- Land cover/use is not being destroyed by swidden agriculture systems. In fact, our preliminary conclusions from both our long-term local level study in Tat hamlet and from our multi-district level study in Ca River show that land cover has remained remarkably stable in areas where swidden/fallow agriculture systems are found. This conclusion is in line with other recent regional studies that have been done looking at land cover/use change and farming systems in the region (Fox and Vogler 2005; Thomas 2006).

From these overall conclusions, a number of policy recommendations can be made. Here I will limit myself to three recommendations that I think are the most important and, if followed, could lead to more appropriate policy formulation for both development and NRM in the uplands.

(1) More decentralization, but decentralization in more than just name alone. Essentially, we must ‘just let local people manage local resources as their own assets’ and make sure that policy regarding the management of resources and assets originates from the local level and makes its way to the upper level, rather than vice-versa. Certainly, we recognize that decentralization by itself will not make all things better in the uplands. We do believe that true decentralization, as I just described it, will go a long way towards making policies towards the uplands better. True decentralization will allow for upland policies to be more relevant to the upland situation; will allow for policies to be more context-specific; and will also steer away from the temptation to make ‘one size fits all’ policies, a trend we often see when policies are made at the central level.

(2) More emphasis on people's livelihood rather than just thinking about improving forest cover itself. In other words, make sure that when policies are designed and implemented, that they truly protect the upland people's food security and improve their overall livelihood situation. This will be done if the first recommendation on decentralization is followed.

(3) A bigger role for community organizations in the management of a community's natural resource base. In our research, every hamlet visited had some sort of hamlet level natural resource management already in place. This finding parallels findings from other countries. Since community-based forest management (CBFM) has proven to be successful

in improving the protection of forest resources and making people's livelihoods more secure in many places, recognizing these local organizations and empowering them would help to improve the overall level of NRM in the uplands.

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