The effects of land tenure policy on rural livelihoods and food sufficiency in the upland village of Que, North Central Vietnam

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Abstract

The paper documents how the implementation of the land tenure policy of the Vietnamese government has affected the agricultural system, livelihood strategies and food self-sufficiency of Thai farmers in a remote upland village, Que, in Nghe An Province, North Central Vietnam. It is shown that the enforcement of restrictions on the area under swidden agriculture has resulted in a strong reduction of swidden agriculture production and shortened fallow periods, not compensated for by the slow increase in paddy rice production. It is suggested that while the changes imposed on land use certainly lead to an increase in forest cover, it is likely that the shortened fallow cycle on the land allocated to swiddening will lead to declining yields and replacement of forest fallow by bush and grass fallow, and thus to decreases in labour productivity. It is discussed whether there are options open to farmers for changing their portfolio of income generating activities in order to maintain and improve food self-sufficiency, income and living conditions. Finally, new trends in Vietnamese land tenure policy are outlined, and their possible implications discussed.

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1. Introduction

Agricultural systems in the uplands of Vietnam are undergoing profound changes, that are being driven by a variety of internal and external forces, including population growth (Pandey and Nguyen, 2002; Tran, 2003), national economic development (Pandey and Van Minh, 1998), improved access to markets and new technology (Alther et al., 2002; Sikor, 2001), and finally government policies on agricultural development, land tenure and environment (Castella et al., 2006). While reductions in the extent of upland shifting cultivation are observed in many parts of South-East Asia, the relative importance of the mechanisms driving these changes, as well as the consequences for both people and environment, are not generally agreed upon. This paper will mainly focus on the effects of government policies on land use and local livelihoods. Government policies aiming at ‘modernizing’ agriculture and protecting forests against the degradation supposedly caused by swiddening are widespread in the region, and thus it is of general interest to study cases where the effects of implementation of government policies on land use, livelihood strategies and environment are particularly clear. To this end, a case study from Que village in Con Cuong district, Nghe An province, is presented to illustrate how villagers attempt to cope with and adapt to the effects of government policies.
More specifically, we will address the following research questions:

- What agricultural transformations are taking place and what factors drive them? Special attention will be paid to land use changes.
- What effects do these changes have on food security, livelihoods, labour productivity and environment?
- How do farmers react to the constraints and pressures put on them by government policies?
- Do government policies meet their objectives?

The precondition for answering these questions is, of course, that the effects of the various driving forces, causing the changes observed, can be separated.

The paper begins with a brief discussion of the relationship between swiddening and the forestland allocation policy in Vietnam. The analytical framework and methodology are then presented, and how the combination of the collected field data and interpreted remotely sensed data are used to analyse the current transformation of the land use system is outlined. Subsequently, the results and consequences of an agricultural system in transition are presented and discussed. Concluding remarks discuss new trends in Vietnamese land tenure policy and their possible implications.

2. Swiddening and land tenure policy in Vietnam

2.1. Swiddening

The term ‘swidden’ refers to the use of fire to clear fallow land before cultivation. Other terms used to describe the same system may be ‘slash and burn’, or simply ‘shifting cultivation’. The latter term has strong negative connotations in SE-Asia, and Vietnam specifically (Fox, 2000), since it is associated with a system, termed ‘pioneer swiddening’ (Conklin, 1957), in which farmers are cultivating primary forest for a few years, then leaving it and moving on to new areas with primary forest, a system which is perceived as destructive. The prerequisite for this practice is a very low population density. Today there are very few people using this technique due to increasing population density and competition over land in most areas of Vietnam (Lundberg, 1996). In ‘established swidden’ cultivation, on the other hand, the settlement is permanent and fields are rotated within walking distance from the village. This practice is frequently referred to as rotational swiddening (Schmidt-Vogt, 2001). The ‘established swiddening’ system, described here, falls within what is normally termed ‘shifting cultivation’, that is a system in which the maintenance of fertility is achieved by use of fallow and the following period is longer than the cultivation period.

Swiddening also occurs as part of the ‘composite swiddening’ system, which combines irrigated wet rice production in valley bottoms with swidden fields on the hill slopes (Rambo, 1998). This system exploits the landscape diversity by combining two production subsystems having different demands with respect to labour. In addition, wet rice fields may benefit from an input of nutrients leached or washed away from the steep swidden fields on the hillsides (Tran et al., 2004). The ‘composite’ system may further include animal husbandry, extraction of non-timber forest products (NTFPs), fishponds and tree gardens. Compared to ‘pure’ swidden systems, ‘composite’ systems may also lead to higher levels of food security due to risk spreading. Also it evens out the temporal distribution of work load within the farming system. Lack of suitable land for wet rice cultivation may limit the extent of ‘composite swiddening’ in parts of Vietnam, and particularly in Nghe An Province, the location of the study site focused on here.

2.2. The forestland allocation policy

Swidden cultivation has often been blamed by the Vietnamese government as one of the major contributors to deforestation taking place in the country, where the government views swiddeners as leading a precarious existence with harmful effects on forest resources (Ireson and Ireson, 1996; Lundberg, 1996). By restricting access through allocation of certain pieces of land, the State hopes to end their slash-and-burn practices and motivate them to develop stable and fixed production systems that will allow them to produce and earn more. Hence, the Vietnamese government has issued various laws and programs in order to convert swidden agricultural practices, mostly practiced by ethnic minorities in the country, to fixed field forms of agriculture.

After allocating agricultural land to individual households, primarily in the lowlands, the Vietnamese government sought to allocate agriculture land and forestland to the upland population in order to stimulate their participation in sustainable natural resource management. As a result, the Government of Vietnam issued Decree 02/CP in 1994. Organisations, households, and individuals are allocated certain plots of production forest for a 50-year period, and then held responsible for the management of this area. Additionally, households are only allowed to use at maximum 20% of the allocated production forests for agricultural production (UNEP, 2003), which in most cases is swiddening. Thus, the forestland allocation policy has three major objectives: fixed settlement of the mountain populations to reduce swiddening, protection of forest resources, and development of plantations and sylvicultural production to improve living standards of mountain populations (Castella et al., 2006). Yet, the forestland allocation process in Vietnam has been carried out in many different ways, depending on the province, district and commune involved (Scott, 2000). In some cases, land has been allocated to individual households and in other cases land has been allocated to whole villages, where it is up to the villagers themselves to manage the land and distribute the land amongst themselves.
3. Analytical framework and methodology

3.1. Analytical framework

3.1.1. Representativity

Using a case study approach, attempting to answer general questions by studying one village, presumes that the village studied is somehow representative or ‘critical’, in the sense that it can be used to test a hypothesis. Que village has been selected in view of both these factors: it is in certain respects representative of relatively remote upland villages in rugged terrain, inhabited by the Thai ethnic minority group, and traditionally dominated by swiddening. Another criterion for its selection is that the land tenure policy, gradually being implemented in all upland villages in Nghe An and, with modifications, in other upland areas of Vietnam, has recently been implemented in Que, implying that its effects can be easily studied. The USEPAM project, under whose auspices this study is done, has carried out similar, yet less detailed, analyses in a number of other villages in the region, and while differences (due to distance to markets, ethnicity of the population, etc.) may be observed, the patterns found in Que are believed to be representative with respect to the effects of government policies.

3.1.2. Identifying ‘driving forces’ from temporal change

Most of the assumed driving forces mentioned, such as population growth, development of market opportunities and access, as well as improved access to new technology and agricultural extension services, are operating only at a moderate pace, and may be expected to lead to agricultural and livelihood changes which are also gradual. In contrast, abrupt changes in agriculture may be assumed to be related to ‘events’, such as the implementation of a government policy. No other singular event is known to have impacted agriculture in Que profoundly in recent years. The introduction of paddy rice production has been promoted by the government with support provided for building irrigation dams, yet this should be seen as part of the ‘package’, linked to the implementation of the land tenure reform.

3.1.3. The ‘analytical model’

In order to provide answers to the research questions, we have collected both quantitative and qualitative data on household livelihoods and agricultural activities in Que and the factors that influence them. The ‘analytical model’ guiding the study design is illustrated in Fig. 1.

3.2. Methodology

3.2.1. Collection of field data

The following information was collected:

- A village map was produced in collaboration with village authorities. This also involved the delimitation of the total village area.

![Analytical framework of the study. The agricultural transformation taking place is manifested in changing decisions on livelihood strategy, labour allocation between activities and land allocation. These changes are caused by ‘driving forces’ (full ellipses). Some changes, such as the reduction in swiddening in Que, are caused by ‘constraints’ imposed from outside, others by changing ‘opportunities’ and ‘pressures’.](image-url)
Transect walks were made to observe land use classes. This also provided ‘ground truth’ for satellite image analysis by use of global positioning system receivers to record the location of observations.

Focus group discussions were organized to establish labour calendars and assess labour inputs, as an input to estimation of labour productivity.

A questionnaire survey was carried out in 30 randomly selected households. The questionnaires were filled in during an interview lasting between 1 and 1.5 h. The questionnaire was specifically focused on identifying the livelihood portfolio of the household.

Interviews with key-informants, including the village leader, members of the Commune’s People Committee and traders, were carried out.

Semi-structured interviews were carried out with a number of farmers to get additional qualitative information on their farming system practices and livelihood strategies.

3.2.2. Satellite image interpretation

In order to obtain knowledge of the temporal trends in the extent of swiddening, six satellite images covering the period 1991–2003, were visually interpreted. All images were from the November–December period, shortly after the harvest of upland rice fields where it is possible to visually separate areas with bare soil from areas covered with grass, bush and secondary forest. The 1993 Landsat TM image originates from NASA’s global Landsat data archive (Tucker et al., 2004), and this image was used to carry out image-to-image rectification of the remaining images. Twelve to twenty ‘ground control points’ (GCPs) were used to derive image-to-image first-order polynomial transformation models (with sub-pixel residuals). Finally, the images were transformed into a UTM projection (zone 48N, datum WGS84) using the nearest neighbour resampling routine and a 15-m pixel size. The dimensions of the resulting scenes were 12 × 12 km with an upper left corner positioned at X: 480.799, 5 m; Y: 2.128.786, 5 m. Table 1 contains data on the six scenes used in the visual classification.

4. The upland village of Que

4.1. The setting

Que village is located in Binh Chuan Commune, Con Cuong District, Nghe An Province, in North Central Viet-

Table 1
Satellite images applied in the visual classification of recently harvested swidden fields

<table>
<thead>
<tr>
<th>Year</th>
<th>Acquisition date</th>
<th>Sensor</th>
<th>Pixel size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>20th November</td>
<td>Landsat TM</td>
<td>30 m</td>
</tr>
<tr>
<td>1993</td>
<td>27th December</td>
<td>Landsat TM</td>
<td>30 m</td>
</tr>
<tr>
<td>1998</td>
<td>7th November</td>
<td>Landsat TM</td>
<td>30 m</td>
</tr>
<tr>
<td>2001</td>
<td>23rd November</td>
<td>Landsat ETM</td>
<td>30 m</td>
</tr>
<tr>
<td>2002</td>
<td>10th November</td>
<td>ASTER</td>
<td>15 m</td>
</tr>
<tr>
<td>2003</td>
<td>18th December</td>
<td>SPOT</td>
<td>20 m</td>
</tr>
</tbody>
</table>

Fig. 2. Que village is located in Binh Chuan Commune, Con Cuong District, Ca River basin, North Central Vietnam.
nam, about 35 km north of the district town of Con Cuong and the Ca river (see Fig. 2). The district town of Con Cuong is located about 120 km west of Vinh City, the province capital, and about 500 km south of Hanoi.

The village is located in a valley-bottom along a large stream traversing the village area. Small streams cross most of the valley, and these are used on a daily basis as a water source for cooking, bathing, irrigation for paddy fields and drinking water for humans and livestock. Steep slopes covered with secondary forest characterize the topography of Que village. Bamboo is the natural undergrowth invading fallows and rapidly growing back in forest openings caused by dead falls or selective logging. Hence, forests in Que village are dominated by various species of bamboo. Primary forest cover was not found to any great extent in Que village. Elevations range from 175 to 500 m above sea level.

In December 2003 there were 69 households in Que village, with a total population of 409 people. With regard to ethnicity, 99% are ethnic Thai. The size of the village area, as determined from a satellite image and a PRA mapping activity done with village authorities, was estimated to be 15.7 km². Documents provided by the village leader and the Commune’s People’s Committee during key-informant interviews state that the total area of Que village is 21.9 km². The sources of this discrepancy are not known. The population density in Que village is therefore between 19 and 26 people/km². It is clear that Que village has experienced a steady population growth over the years. Since 1980, the population has almost doubled, corresponding to an annual growth rate of 2.5–3%.

5. Results

5.1. The land use system in Que village

Most households in Que village base their livelihood strategy on a number of different agricultural activities. Today the land use system is primarily based on the following components: swidden agriculture, paddy rice cultivation, animal husbandry, and collection of NTFPs, whereas home gardens, aquaculture, hunting and wage labour play minor roles.

In 1998, the commune authorities in collaboration with the Con Cuong District Forest Protection Unit, allocated a fixed area through Decree 02/CP to the farmers in Que village where swiddening could be practiced – in order to limit the extent of forest destruction and fragmentation within the village area, (see Fig 3). Instead of allocating agricultural plots to individual households, it was decided to allocate the entire area to the whole village – thereby building on the customary tenure system. According to the head of the village, the allocated area was 80 ha, while the map in Fig. 3 from the Commune’s People’s Committee showed that the allocated area was 123.8 ha.

As a consequence of the land allocation, it is the intention that the village every year cultivates 20% of the allocated area in a 5-year rotation cycle, corresponding to 16 ha/25 ha/year with a 4-year fallow period.

5.2. Swiddening

Swidden cultivation is currently practised by 64 out of 69 households in Que village, and according to the data from the questionnaire survey, the average household cultivated about 6000 m² in the May–September rainy season of 2003. The smallest field cultivated by a household is 400 m², while the largest field cultivated is 12,000 m². Based on the data from the questionnaire survey, average yields in 2003 were approximately 950 kg/ha. Thus, the average production in the swiddening component is 570 kg rice per household.

Rice is currently the staple crop, but maize and cassava are important supplements. Some farmers also plant pumpkins, beans, and sweet potatoes in their upland rice fields, but only to a limited extent. Most upland rice fields are located in the allocated area, a 30 min walk southeast of the village, while the current cassava fields are located closer to the village. Cassava is a crop that can be harvested from one to four years after being planted which makes it a very flexible crop in the agricultural system. Yet, most households only substitute rice with cassava in times when rice supplies are low. Consequently, cassava is primarily used as feed for pigs.

In order to identify the most labour demanding activities and assess the labour productivity of the swiddening system, a focus group discussion was carried out concerning the different labour tasks throughout the year. Five men and five women were randomly selected and invited to participate in the discussion. Together with the research-
ers, a scenario was suggested which illustrated the labour tasks in a swidden field throughout the year. Obviously, estimates obtained this way are not as accurate as those obtained from field measurements and from interviews carried out throughout an entire growing season. The scenario was based on the cultivation of a 1 ha field after a 5-year fallow period, where 35–45 kg of rice is planted, and the yield eventually is 1200 kg. One male farmer and one female farmer were assumed to provide the labour, and one labour day was assumed to be 8 h/worker.

According to results from the focus group discussion, the total number of days spent in the swidden field was 134 days. Thus, return to labour is (1200 kg/134 days) about 9 kg/day. The most labour demanding activity turned out to be weeding, which accounted for about 30% of the time spent in the field. Clearing and fencing were also quite time consuming. An increase in the number of cattle and buffalo in the village has meant that farmers have to protect their fields more carefully, and this is done by putting up fences across streams and paths in order to prevent livestock entering the swidden area.

Most households practising swidden cultivation are members of a particular working group. The creation of these groups takes place at the beginning of the agricultural season when farmers decide exactly where to cultivate. Of the 64 households engaged in swiddening, 61 households belonged to six different groups in 2003. The major purpose of creating these groups is to improve labour productivity by reducing the fencing required to protect the fields and crops from being trampled and eaten by the livestock.

5.3. Paddy rice cultivation

The head of the village was the first farmer who began experimenting with paddy rice cultivation in 1999. Faced with the restrictions on the swiddening component, he was encouraged by extension workers to initiate paddy rice cultivation. The next year 17 farmers were cultivating paddy rice covering 2 ha, and in 2003 the number had increased to 40 households and a total area of 4 ha. Among the 30 households from the questionnaire survey, 22 cultivated paddy rice. Of these 22, the average area established was 1100 m², the smallest field being 400 m², the largest 4000 m². Of these 22 households, 7 had only recently established their fields and had not yet harvested. Of the remaining 15 households, the average field size was 960 m², and the average production per year is 475 kg. All households double crop. Consequently, the land productivity was about 5000 kg/ha/year.

Cultivating paddy rice is a completely new practice to the farmers in Que village, where lack of traditions, knowledge and skills complicates the establishment and cultivation of paddy fields. To remove some of the obstacles in this transition, some households hire farmers from the lowlands to establish and prepare their paddy fields at suitable places along streams where water is easily accessible. Other farmers have travelled to the lowlands to learn how to cultivate paddy rice. However, farmers still experience several obstacles in this shift of practice. From various semi-structured interviews it became clear that the following problems were the most severe:

- Lack of water for irrigation during spring months.
- Poor quality of seedlings causing great variability in yields.
- Lack of suitable land for establishing new fields.
- High prices on chemical fertilizer.
- Problems with rats eating the rice.

The scarcity of water resources during springtime especially creates problems. In addition, the steep topography in the area makes it difficult to expand the area under paddy rice cultivation.

Several farmers stated that a shortage of rice, caused by the decrease in swidden area, forced them to experiment with paddy rice cultivation. Another reason why farmers prefer to invest in paddy rice cultivation is the timing of the harvest of the spring crop. When rice supplies from the swiddening system begin to dwindle in May and June, the harvest of the spring crop takes place – filling up the rice supplies. Hence, swiddening and paddy rice cultivation seem to supplement each other perfectly in relation to food security.

In contrast to the swidden fields cultivated in Que village, farmers have individual tenure rights on the land they convert into paddy fields. When the village leader approves the selected area, the farmer has a permanent right to cultivate the area, which provides an incentive to invest labour and capital in the particular area. Yet, farmers have no official papers documenting this agreement. Instead the tenure system is based on a local oral agreement, which could in theory be overruled by public authorities.

As mentioned, the focus group discussion also dealt with labour inputs into the paddy rice production. The objective was to identify the most labour demanding activities and estimate the labour productivity. A scenario was proposed jointly between farmers and researchers, listing the labour tasks in the paddy rice production. The scenario was based on a field of 1000 m², cultivated twice a year. The production was assumed to be 600 kg/year, 250 kg from the spring crop and 350 kg from the summer crop.

Farmers estimated the number of days spent on any given activity, allowing the calculation of labour productivity. The total number of working days was 112 (spring 65 days + summer 47 days), which meant that the return to labour was (600 kg/112 days), or about 5.5 kg/day.

The most labour demanding activity was the irrigation of the spring crop, which required 20 days of labour. Shortage of water thus turned out to be a serious constraint in obtaining a higher labour productivity, as was also suggested from the interviews. Weeding was also very time-consuming, and adding this activity for the spring and summer crops, it actually becomes the most labour demanding activity over the year (32 days of the total of 112 working days).
5.4. Animal husbandry

According to Fig. 4, the role of buffaloes in Que village has increased considerably since the end of the 1990s. The number has tripled from 37 buffaloes in 1999 to 117 buffaloes in 2003. Increased market access, together with the agricultural transformation taking place in the uplands, has increased the value of buffaloes – making them an attractive investment for the farmers. Buffaloes are used as draft power in the ploughing of the paddy rice fields and in the transportation of timber from the forest to the village, but they also function as economic safety nets.

While the number of buffaloes has increased over the years, the number of cattle in Que village has decreased. The village leader explained the decrease as a result of the severe shortage of food, which forced many households to sell their cattle in order to purchase rice. The response of the farmers to such a situation highlights the primary role of cattle, which is to function as an economic safety net in times of crisis. By raising cattle, capital is being accumulated which can be released when necessary. Data from the questionnaire survey shows that 15 of the 30 interviewed households own between 1 and 8 heads of cattle. Of these 15 households, 13 had sold at least 1 cow within the last year at an average price at 2.6 Mill. VND (in 2003, 1 USD amounted 15,500 VND).

Like buffaloes, cattle roam freely. However, the fences put up across streams and pathways limit their search for feed. Still, some farmers complain about the buffaloes and cattle roaming around. When the livestock graze in the area set aside for swiddening, they eat the fallow vegetation, which then prolongs the period for the fallow vegetation to reach an appropriate level of biomass. In addition, other farmers complain about the cattle eating broom grass, which particularly is found in 3 and 4 year-old fallows. Broom grass is a valuable NTFP, which is harvested and sold to local traders. Yet, the presence of cattle in fallows limits the amount of broom grass that can be harvested.

5.5. Land use changes in Que village from 1991 to 2003

The results of the classification of the six satellite images are depicted in Fig. 5. The classification of the active swidden fields shows both remarkable changes in cultivated area and in the spatial distribution of fields.

With respect to the swidden area, a significant decrease from 1991 to 2003 in the total area under swiddening may be observed, see Table 2. The total swidden area decreased from 92 ha in 1991 to 43 ha in 2003. The average cultivated area per household (hh) in 2003 (43 ha/69 hh) was 0.6 ha/hh, which is consistent with the information obtained from the questionnaire survey.

With respect to the spatial distribution, it is clear that while fields were widely dispersed over the village area in 1991, 1993, 1998 and 2001, they became concentrated in the area allocated for swiddening in the SE part of the commune in 2002 and 2003. While the first pattern would allow a fallow period of 5–10 years, a maximum of 2 years of fallow (after 1 year of cultivation), can be achieved within the allocated area, even with the strong reduction in cultivated area observed. One larger field located outside the allocated area, in the SW part of the village territory can be observed. This field was not discovered during the fieldwork in December 2003, possibly because farmers chose not to mention it since it was outside the allocated area. In a follow-up fieldtrip to Que village in August 2004 carried out by researchers from the Center for Agricultural Research and Ecological Studies, Hanoi Agriculture University, farmers stated that half of this area belonged to another village in the bordering commune of Cam Lam, while the other half belonged to Que village. It is difficult for public authorities to find this area since it is not visible from Que or the road. Thus, inter-village solidarity is stronger than fulfilling the requirements from the state.

5.6. Food security

Assuming a yield of 1 t/ha × year of upland rice and a yield of 5 t/ha × year of paddy rice, Table 3 shows how

![Graph](image-url)
the total rice production has developed over the years. The size of the swidden areas originate from the remote sensing analysis, given in Table 2, while the area of paddy rice and semi-permanent, ‘alluvial agriculture’ was derived from the household questionnaire and fieldwork.

Thus, the forced transformation of the system has lead to a decrease in the overall rice production. Introducing wet rice cultivation has currently not replaced the rice production gap created by the restrictions on swiddening. Sub-

Table 2
Development in swiddening in Que village from 1991 to 2003 – according to the visual classification

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Swidden area (ha)</td>
<td>92</td>
<td>110</td>
<td>109</td>
<td>80</td>
<td>54</td>
<td>43</td>
</tr>
<tr>
<td>Paddy rice areaa (ha)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

a Data on paddy rice area obtained through various key-informant interviews.

Fig. 5. The results of the classification of the six satellite images. The active swidden fields in Que village are located within the digitized polygons.
fed rice cultivation. Alluvial agriculture is taking place in the valley bottoms – primarily rain-wet rice production indicate that this increase is not likely rough estimates of labour productivity of swiddening and constraint on swiddening. indicates non-compliance with the government-introduced policy has been effectively implemented. The presence of a single field area outside the zone allocated for swiddening likely explanation for this change is that the land allocation tors being equal lead to decreased yields and labour productivity. The shortening of the fallow period will, all other fac-

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>92 ha swidden fields</td>
<td>109 ha swidden fields</td>
<td>43 ha swidden fields</td>
</tr>
<tr>
<td>30 households</td>
<td>61 households</td>
<td>4 ha paddy fields</td>
</tr>
<tr>
<td>92,000 kg rice</td>
<td>109,000 kg rice</td>
<td>13 ha alluvial agriculture</td>
</tr>
<tr>
<td>69 households</td>
<td>76,000 kg rice</td>
<td></td>
</tr>
<tr>
<td>1840 kg rice per household</td>
<td>1790 kg rice per household</td>
<td>1100 kg rice per household</td>
</tr>
</tbody>
</table>

Alluvial agriculture is taking place in the valley bottoms – primarily rain-fed rice cultivation.

sequently, the transformation of the system has had a negative impact on the rice production and hence the level of food security. As a response, farmers have had no choice other than to sell livestock in order to generate cash, which is spent on purchasing rice and other food items. Still, seven out of the 30 households from the questionnaire survey reported that they suffer from hunger between 1 and 8 months/year. This indicates that selling cattle has not been able to close the gap in relation to food security in all households. On the other hand, the selling of NTFPs has in most households contributed to filling the gap created by the restrictions on swiddening. The sale of bamboo shoots, broom grass and pherynium leaves thus plays an important role as a fall-back activity providing economic income, and thus food security to the majority of households in Que village.

6. Discussion and conclusions

6.1. Driving forces of agricultural change

In the period from 1991 to 1998 there was an increase in the area under swiddening from 92 to 109 ha. This corresponds approximately to the rate of growth of the population. In cases where land for swiddening is not in short supply and labour, rather than land, is limiting production, this trend is what might be expected, if the change is population-driven.

After 1998 the swiddening area drops sharply and the fields become increasingly concentrated in the allocated area. As discussed below this seriously threatens food security. The shortening of the fallow period will, all other factors being equal lead to decreased yields and labour productivity, as suggested by Boserup (1965). The most likely explanation for this change is that the land allocation policy has been effectively implemented. The presence of a single field area outside the zone allocated for swiddening indicates non-compliance with the government-introduced constraint on swiddening.

The paddy rice area develops rapidly after 1998. The rough estimates of labour productivity of swiddening and wet rice production indicate that this increase is not likely to be caused by farmers spontaneously switching from swiddening to wet rice production. Rather they are forced to do so by the constraints on swiddening imposed by the land reform.

Cattle numbers, which have been increasing through the nineties, have recently fallen. According to interview information this is mostly due to the need to mobilize cash to purchase rice and fill in the food gap caused by reduced upland rice production. Buffalo numbers have increased, which may be explained by the increased need for draft power associated with the expansion of wet rice production. In other parts of upland Nghe An, livestock production is currently increasing, which may be explained by the growing demand from the lowland market, driven by the extremely rapid development of the Vietnamese economy.

6.2. Effects on food security, in Que and generally

As documented above, the food security situation in Que has been seriously affected by the agricultural transformation that has taken place since 1998. It is worthwhile considering whether this is likely to be specific to Que or whether similar effects may be expected to occur elsewhere in the uplands of Nghe An and generally in Vietnam’s uplands. This question does not have a simple answer: a number of factors may influence whether or not a forced transformation, as the one observed in Que, will have significant negative effects on food sufficiency. Some of these factors are:

- Whether or not villages can replace upland fields with wet rice fields. This is both a question of terrain, of investments (in dams and establishment of terraces) and of water resource availability for producing at least two annual crops.
- Whether there are other viable elements of the livelihood portfolios of households which may be built upon. It appears from other studies in Nghe An that livestock development is currently the most realistic option. Access to market may be assumed to be a factor controlling the economic viability of several other livelihood portfolio elements, including production of fruit and vegetables as well as fish production from ponds.
- The extent to which land tenure rules are actually enforced. The implementation in Que appears to be particularly strict.

6.3. Farmers’ adaptation to the implementation of the land tenure reform

As noted above, farmers in Que generally seem to comply with the land use restrictions imposed on them. This is in contrast to the observation that illegal logging is quite widespread in the uplands of Nghe An. This difference may be explained by the greater ease of enforcement of bans on swiddening than on logging. Instead, farmers
increase their reliance on other elements of their livelihood portfolio, including wet rice production, NTFP collection, livestock production and, when possible, wage labour. The most important of these changes, towards wet rice cultivation, implies, however, a decrease in labour productivity, and it is likely that the same is true for NTFP collection. If it is assumed that farmers optimize, as a first objective, food security and, as the second, labour productivity, this development is obviously seen as negative. On the other hand, livestock production may be assumed to be less labour intensive, and this development pathway may therefore be assumed to be seen as favourable by farmers. The fact that it is not chosen may be attributed to the present ‘poverty trap’, in which Que farmers have been caught.

If a new/modified land tenure reform were to be implemented, allowing farmers to return, totally or partly, to swiddening, this would probably happen. This is not entirely excluded, as will be mentioned below.

6.4. Have the intentions of the land tenure reform been fulfilled?

As noted above, the government policies towards swiddening, including the land tenure reform, have several objectives, including general ‘modernization’, improved natural resource management, poverty alleviation and environmental improvements. Have these objectives been met? There is obviously no simple answer to this question, and an overall assessment of benefits and drawbacks must wait until the policies have been fully implemented and farmers have had time to adapt. However, some observations may be justified:

- If by ‘modernization’ is meant that farmers turn towards the external market, the policy may well be said to have succeeded: there is no doubt that subsistence oriented activities play a smaller role now than before in Que, as well as in other places where the reform has been implemented.
- Securing land tenure rights is often seen as a means of furthering sustainable natural resource management by increasing the incentive to invest in long-term soil improvement. As explained above, the traditional communal system of allocation of upland fields did not, however, lead to unsustainable practices in Que. However, in other parts of the uplands of Vietnam, characterized by higher population densities, problems of unsustainable use of common property land resources can be encountered.
- The land reform, as described in the case of Que, has lead to increased poverty and reduced food security. The generality of this finding needs to be tested in other villages and regions. It also needs to be studied in a longer time perspective.
- The objective of obtaining an increase in forest cover has been met. However, there are good reasons to assume that the combined effect of a shortening of the fallow period (to approximately 2 years) and increased grazing pressure will lead to degradation of the area allocated to swiddening. Also, greater areas close to rivers and streams will be cleared for alluvial and paddy fields, presumably with negative environmental implications. Others have noted that the landscape mosaic, created by swiddening, supports considerable biodiversity (Schmidt-Vogt, 2001), and the development of land cover into forest on one side and permanently cultivated fields on the other is not an environmental step forward when bio-diversity is considered.

6.5. Future perspectives

It is worth considering whether these observations are specific to only a few, remote areas in the Vietnamese uplands, or whether such negative effects of government policies are so widespread that they suggest the necessity to reconsider policies, legislation and/or their implementation.

It may be argued that it is too early to assess the success of the implementation of the land tenure policy, and that the problems pointed out in this study may merely be transitional. We will therefore briefly point out some perspectives for the future, which may affect the long-term outcome of the transformation process.

First, the observed decrease in labour productivity, associated with problems in the paddy rice production, may be counteracted by improving the irrigation system in order to overcome the problems of water shortage for the spring crop. Also, improved access to appropriate seeds and mineral fertilizers may lead to higher productivity, as will better training of farmers in appropriate farming techniques.

Second, the desired increase in income requires stronger market integration. It is not evident in which production niches the uplands of Nghe An will be able to compete with other, less remote regions. Agroforestry has been suggested as the solution, yet so far success has been limited (apart from the fact that swiddening itself may be seen as an agroforestry system). Expansion of paddy rice production may also not be the best solution, since topography and climate impose constraints and increase production costs. Animal husbandry is a more likely solution, due to the low population density of some of the Nghe An upland areas.

Third, it is worth noting that the changes in forest cover taking place as a result of the land tenure policy implies sequestration and increased storage of carbon in vegetation and soils, which is a ‘product’ which may be sold on the international market for carbon credits. While prices are presently low, mostly due to the fact that the demand for credits is small since the US has not ratified the Kyoto Protocol, and the supply is great, mostly due to the economic decline of Russia and Eastern Europe in the period after the dissolution of the USSR, this may change in the next ‘commitment period’ (after 2012). Thus, carbon sequestration and storage may become an interesting ‘product’ of the Vietnamese uplands.
Finally, it is worth noting, that the land tenure policy is itself undergoing change, even though these changes have not yet come into effect in the uplands of Nghe An. One change that has taken place and has had an impact in other parts of the Ca River Valley is an interpretation of Decree No 85/1999/ND-CP (1999) that modified the classification of land. In interviews in Tuong Duong district in Nghe An in 2003, land administration officials explained that they interpret the wording in the decree to mean that hillside land is agricultural land and can be allocated to a household if it has been used for the household economy in the past. This interpretation of the wording allows the administrators in charge of the allocation of agriculture and forestry land to allocate land that is currently covered in trees, bush, or grass, but has previously been used as agricultural land for agricultural purposes. This interpretation has been used in Ma village in Tuong Duong district, the next district up the Ca river valley from where Que village is located, to allocate all land that has been previously used for swidden for agricultural purposes (personal communication Ma village headman, December 2003). In this case, the locally flexible interpretation of land tenure rules changes means that the swidden area of the village has not been restricted.

More recently in 2003 a new Land Law was adopted that permits the issuance of land use titles to customary groups (Land law: 13/2003/QH11). In theory this law allows for the titling of land to groups of people, however, until recently there is still debate as to what types of “groups” will be allowed to gain title to land; e.g. will villages be able to gain title? Will work groups be able to gain title? The potential impact on a village like Que is great, as the target for lands that could be titled under this law are agricultural land and “unused land”. Large areas of Que village are currently classified as “unused land” according to the latest land use/land cover map distributed by the cartography publishing house (Cartography Publishing House, 2003). Thus, the questions that arise are twofold. First, how long will it take the 2003 land law and its enabling legislation to reach Con Cuong district? Second, will the district officials revisit the question of land allocation in Que village once the enabling legislation is transmitted to the district level? If this happens soon, and large areas of the land in the village that are currently considered as “unused land” is titled to the village, then there may be further changes in the farming system of the village, possibly reverting to the situation prior to 1998. However, if land is titled to other “groups,” a new configuration of land use may result.

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