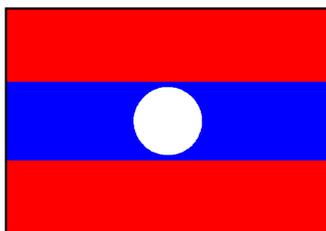


**Regional Environmental Technical Assistance 5771
Poverty Reduction & Environmental Management in Remote Greater Mekong Subregion (GMS)
Watersheds Project (Phase I)**



UPLAND AGRICULTURE

Lao PDR

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1. INTRODUCTION

The individual country briefs present the general features of agricultural production systems with particular focus on upland agriculture. The production systems are viewed in their agro-ecological, policy and socio-economic contexts. The connection between poverty and environmental degradation is accepted as the platform for analysis. The analytical framework for decision-making in search of alternative environmentally, economically and socially sustainable livelihood options is presented in the Regional report; this country

report applies that, in a broad sense, to the situation in Lao PDR.

2. UPLAND AGRICULTURE IN LAO PDR

2.1 Variety of crops

In Laos, 300,000 families get their living from forests. Rainy season rice in shifting cultivation systems accounts for 34% of the national rice area and on an annual basis for 20% of the production (National Statistics, 1992). Other crops include maize, cassava, vegetables, fruit-trees, oil crops, cotton, cucurbits, indigo, aromatic plants etc. Another 100,000 families use the forested areas for crops that thrive better in that agro-ecosystem including pineapple, bananas, sesame, cotton and opium. These communities have sufficient lowland rice but have diversified into high-value crops. Other groups add to their rice production by upland planting to secure enough to eat. It has been estimated that 310,000 ha of vegetation is cleared annually, of which 235,000 ha is for upland rice, 30,000 ha for maize and 45,000 ha for other crops. As the average fallow period is 4.5 years, a total of 1.4 million ha in Lao PDR is in shifting cultivation systems, i.e. 6% of the national territory (MOAF, 1994). One has to note though that these estimates vary from source to source.

2.2 Ethnic groups and production systems

There are in total 68 ethnic groups in Lao PDR. These can be divided into lowland Lao (Lao Lum 55%), midland Lao (Lao Theung 30%) and upland Lao (Lao Sung 15%). The number of shifting cultivators in 1985 was 253,000 families, i.e. 1.5 million people. In 1990 it had increased to 277,000 families (Phantanousy, 1994). It could be estimated that the number today is about 350,000 families.

Shifting cultivation practices in Lao can be divided into three broad categories (Chazee, 1994).

Shifting cultivation practised by the Lao Lum in the plains. This system is characterised by lack of land. The cultivated area per family is commonly not sufficient to use a buffalo or cultivation equipment for paddy rice production. Also the returns to investment have reduced because of lowered fertility in the soil.

Shifting cultivation at the foot of the mountains by Lao Theung. Some areas contain dense forests and traditional shifting cultivation is practised up to medium altitude. Fallow time ranges from 5 to 15 years. Rice, maize, cassava and chillies are produced primarily.

Shifting cultivation on steep slopes by Lao Sung. The Lao Sung communities are located at an elevation of about 1000m. Main crops include rice, maize and vegetables for food, with poppy and tobacco for cash.

2.3 Examples of production systems

A case study from Thongkhang pilot area, 65 km south from Luang Prabang showed that the primary income sources of these Northern Lao communities were: livestock 52%, crops 20%, wage labour 9%, handicraft 5%, remittance 9% and loans 4%. Upland crop production is very labour demanding, especially when weeding increases as fallow period shortens and herbaceous vegetation intensifies.

Labour requirements in shifting cultivation:

cutting 26%,

burning 2%,

planting 11%,

weeding 39%,

harvesting 19%,

threshing 9%.

Another case study from Luang Prabang demonstrates the dramatic impact of population growth on the fallow period. The fallow period has halved in 20 years from 6-8 years to 3-4 years (in 1993). It is likely that it will halve again in the next 20 years to a 1-2 year fallow period by 2013. Consequently, rice yields have fallen from 2.5-3 tn/ha to 1.2-2.4 tn/ha. Presently upland rice provides for 65% of the rice requirement of a household.

IRRI (International Rice Research Centre) has a very active upland rice research program in Lao PDR, which is well incorporated into the national programme (Lao-IRRI project, 1997). The programme has done extensive work to identify the major production constraints for upland rice production and to find solutions to alleviate those.

Major constraints to upland rice production Identified by farmers (as % of respondents): (Lao-IRRI project, 1992)	
Weeds	90%
Rodents	58%
Low rainfall	50%
Land availability	43%
Insects	38%
Labour	28%
Soil fertility	22%
Erosion	18%
Domestic animals	18%
Disease	8%
Suitable varieties	2%

3. DEVELOPMENT TRENDS IN AGRICULTURE

Agricultural development trends in the country indicate that production is moving towards irrigated land in the North associated with crop intensification especially near the towns of Luang Prabang, Vientiane, Pakse, etc. Animal production is on the increase to supplement family income to purchase rice in Phongsaly, Luang Namtha and Bolovens Plateau. There is also migration by certain population groups, especially Lao Theung, because the allowed land area is too restricted. Migration happens from Luang Prabang, Houaphanh and Xieng Khouang to Luang Namtha and Vientiane. The yields on the sloping lands are so low that family members need to look for outside labour in agriculture and often end up in underpaid jobs. In northern Laos, some of the villages with limited arable land who practise shifting cultivation move when the current area has been exploited. In other communities the area per family is so large (30 ha) that the village does not have to move and the fallow period can be as long as 10 years. Weeding takes most of the family labour from May to August and is clearly the most restricting practice in terms of area versus labour availability. As the fallow period gets shorter the labour input to weeding increases because of increased herbaceous vegetation. As women do most of the weeding, their labour burden has significantly increased.

It has been estimated that the carrying capacity of the forests in Lao PDR is 12 persons/km² of forestland with average soil conditions. Under this population pressure the fallow period is long enough to restore soil fertility and degradation does not proceed. These conditions are prevailing in Sekong, Attapeu, north of Phongsaly and east of Luang Namtha. If population density exceeds 15 people the fallow cycle decreases. If density reaches 20 people the communities start to look for other alternatives. If density goes up to 25/km² as in Luang Prabang, there are quick changes in production patterns: off-farm employment, migration to low land areas, shift to irrigated agriculture and interest for adding value to primary production (jam, weaving etc.).

4. POTENTIAL FOR UPLAND AGRICULTURE DEVELOPMENT

The agricultural sector in Lao PDR has great potential. There is still agricultural land available (adequate up to 2020). The use of chemical inputs is very low (6 kg fertiliser/ha), as is access to rural services such as extension and credit. Largely due to the low labour cost and low expenditure on inputs, Lao PDR can produce rice, maize, groundnut, soybean, cotton and sugarcane with very competitive prices compared to most other producers including Thailand.

The development of the agricultural systems can be based on either making the existing shifting-cultivation and upland agriculture systems more environmentally sustainable through soil conservation measures and land use mosaics that reduce soil loss, or via increasing cash-crop production. Erosion rates vary according to the land use type: paddy rice 10 tonnes/ha, upland crops 500 tn/ha, opened swidden areas 800 tn/ha, orchards 100 tn/ha and forest areas 3 tn/ha. If conservation measures are effected the erosion rates drop significantly. For example the erosion rate of upland crops with conservation is 40 tons/ha. Interesting alternatives for improved cropping systems have been proposed by Oughton (1993). For a comprehensive review of erosion and soil conservation see annex 1 in the regional report.

Another approach is to increase the production of high value crops, thus reducing pressure from swidden fields and evolving the farming system into a mix of subsistence and cash crop production. Potential alternatives include fruit trees, rubber, improved pasture and spices to mention a few.

5. GOVERNMENT POLICY FOR UPLAND RICE CULTIVATION

From 1979 to 1990 the Government became aware of the environmental problems associated with shifting cultivation and took measures to reduce it. In some cases people were relocated, which was socially insensitive and not very effective in remedying the environmental problem. Thus, in 1994-96 a new policy 'management of the upland environment' was initiated. The policy is realistic and socially acceptable. The first version was published in 1995.

The short and medium term objective of the policy is to stop shifting cultivation in the country. The policy recognises that it would be impractical to stop upland rice cultivation and stresses that it should take place in a more sustainable way in view of national food security.

The policy also states that land tenure should be stabilised through allocation of land user rights to individual farmers.

More diverse and intensified production systems should be promoted: integration of lowland rice cultivation, cash cropping, animal production, tree planting.

Urgent attention should be directed to stop shifting cultivation in watershed areas (to be stopped by 2000).

In upland rice production areas, more productive rice production systems should be developed and adopted (high yielding varieties, fertiliser inputs, improved weed and pest management).

Tree planting should be promoted by individuals, departments, co-operatives and companies.

In practice the policy means that by 2000 upland rice production will be reduced by 52,500 ha, especially in the forested areas. The contribution from upland rice will be reduced from 36% to about 4%. This is to be compensated by 28% increase in the area under rainfed lowland rice by the year 2000 and a parallel increase of 17% in yields. Combining the horizontal and vertical production increases will give a figure of 50% increase in the rainfed lowland environment.

A strategic framework for putting the policy into operation has recently been proposed in an agricultural strategy study commissioned by ADB. It recognises the need for a "multisectoral approach to achieve increased permanent settlement and tenure by introducing community organisation and participatory planning". The policy implications involve site-specific and flexible approaches for land-use planning and involvement of all of the relevant players (NGOs, private sector, government, research...). These policies can be put into operation through an integrated, participatory project design including improved service provision and infrastructure support (ADB/MOAF, 1998). Lao PDR is lucky in having national leadership capacity that can conceptualise the development processes and lead the way in the change in upland agricultural systems (Parisak, 1998).

6. RESEARCH CAPACITY IN UPLAND AGRICULTURE

The upland agriculture policy recognises the importance of research in supporting the development of crop diversification and production intensification. IRRI, together with the national research programme, has provided excellent research support for upland rice production. The programme has included variety improvement, nutrient management, green manuring, plant protection and farming systems studies (LAO-IRRI project, 1997). Until recently the programme was focused on rice production only, but has now expanded to a more cropping systems/farming systems approach. The national capacity in agricultural research has however been limited in 1998 The National Agriculture and Forestry Research Institute was established and will hopefully take a leading role in finding answers to improve upland agriculture.

7. A RURAL DEVELOPMENT PROJECT PROPOSAL FOR NORTHERN LAO PDR

A recent project proposal was developed to reduce shifting cultivation in Luang Prabang area, which is described here to illustrate the comprehensive planning process and the outcome of it for development of a remote watershed in Northern Lao PDR.

The main objective of the project is to reduce shifting cultivation. A detailed socio-economic survey was conducted to analyse the situation. Poverty was identified as the main cause of environmental deterioration, not shifting cultivation as such. But shifting cultivation locks the community into poverty, because it is a highly labour intensive practice with small returns to labour. Gradually labour becomes a limiting resource and it is impossible to break out of the poverty cycle. As the yield potential is low in upland rice production, households can produce enough only for eight months of the year. There is very little cash flow and no surplus to invest to change the livelihood option. Technically the shifting cultivation practices do not cause so much erosion because seeds are planted in holes and the entire land surface is not cultivated. Road infrastructure can be much more damaging and lead to gully erosion.

The project design is based on a 4-5 ha land allocation per farmer. Intensification of the production system is envisaged by implementing an appropriate land-use framework and improving small-scale irrigation. The aim of the irrigation is to increase the production of high yielding wet rice varieties. Higher along the slope tree crops, NTFPs, livestock production with improved pastures, and coffee and tea will be promoted. Crop rotation and soil conservation measures will also be implemented. The level of community support services is rather limited and thus the project also saw the need to expand to social sectors such as health and education. Remoteness is another problem and road infrastructure is needed to get merchants to come to the villages, and for taking the produce to market. Rural financing is another constraint and the project also includes a credit component.

Internal rate of return was calculated to be acceptable to justify the investment. The most expensive component is road infrastructure. The investment was calculated at 4000 USD/household/7 years (hh has 6.5 members).

VDCs will be set up in the villages. They will facilitate land capability planning for the community. The land area in the village is divided into functional land capacity categories (paddy, forest, pasture, upland crops, etc.) and the individual farmers can make their own choices of crops to grow within that land-capacity framework. The socio-economic survey showed that ethnicity as such did not govern the choice of a farming system but rather the agro-ecological conditions did (soil, slope, altitude, rain, etc.).

8. CONCLUDING REMARKS

Upland rice production in Lao PDR is the highest of all the GMS countries. Government efforts to reduce shifting cultivation and to strengthen lowland rice production and upland crop-diversification have intensified. The policy and the thinking behind it is sound. The major constraints lie in the limited rural support infrastructure and political will for change to strengthen the livelihoods and economics of the farmer by expanding farm size. Following is a summary of the potentials and constraints for upland agriculture development in Lao PDR.

Table 1. Strengths and challenges for upland agriculture development in Lao PDR

STRENGTHS	CHALLENGES
Policy framework exists	Unclear land tenure system
National leadership in rural development exists	Lack of political support to expand farm size
Expansion of holding sizes possible	Poor support services (health, education,..)
Diversification and intensification possible	Labour intensive production systems reduce options for change
Competitive production prices	
Cross-border trade	
LAO-IRRI research program	

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