

IIED Forestry and Land Use Series No. 5

Shifting Cultivation in Lao PDR:

**An overview of land use and policy
initiatives**

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1995

IIED

INTERNATIONAL
INSTITUTE FOR
ENVIRONMENT AND
DEVELOPMENT

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An overview of land use and policy initiatives

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Vientiane, 1995

This national report forms part of the study "Shifting cultivation in Thailand, Laos and Vietnam: its social, economic and environmental values relative to alternative land use". The study was financed by the Netherlands Ministry of Foreign Affairs (contract no. RA/91/851 and WW006101) and coordinated by the International Institute for Environment and Development.

Copies of this report may be obtained from the Shifting Cultivation Stabilisation Office of the Department of Forestry in Vientiane or from the International Institute for Environment in Development. Copies of companion reports for Thailand and Vietnam, and the Regional Overview report, may be obtained from IIED.

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PREFACE

This report presents the outcome of one of three inter-linked national studies of shifting cultivation in south east Asia. The three studies make up the project 'Shifting cultivation in Thailand, Laos and Vietnam: its social, environmental and economic values relative to alternative land uses'. The purpose of the overall project, coordinated by the International Institute for Environment and Development (IIED), was to examine the current situation of shifting cultivation in each country, with particular regard to the social, economic and environmental values. The overall study also aimed to examine some of the alternative land use systems developed in areas of shifting cultivation, and to make recommendations to policymakers. National research teams developed a set of issues on which to focus, in terms of what was most relevant to the particular country, and met to discuss common issues and approaches in Hanoi and Chiang Mai.

Considerable institutional change has taken place in the Department of Forestry over the project period. Particular disruption was experienced with the re-organisation of the Department in mid-1993. In July 1993, the original team (Noukone Symmavong and Kham Keosacksith) was informed that responsibility for this project would be transferred to another section of the Department. Consequently, they did not attend the interim meeting in Hanoi. In November 1993, this project was assigned to me (Mr Pheng Souvanthong, the Director of the Shifting Cultivation Stabilisation National Office). Thus between July and November 1993, no progress could be made. I have had to undertake the completion of the project in a short period, entailing additional fieldwork as well as report preparation.

Given these interruptions in the research, the paucity of recent information on the trends in land use in Lao PDR, and the limited possibilities for conducting case studies over a range of sites, the Lao National Report represents an overview of the current situation regarding land use, and shifting cultivation in particular. It also presents a distillation of relevant recent policy documents, a description of potential impacts of the new policies, brief reports of field study, an identification and discussion of priority issues and policy recommendations.

This national report on shifting cultivation in Lao PDR was carried out in collaboration with IIED. Funding for this project was provided by the Netherlands Ministry of Foreign Affairs. I especially thank Elaine Morrison for assistance with coordinating and editing the work as well as valuable comments and suggestions for this report.

This report should be read in conjunction with Bass and Morrison (1994): 'Shifting cultivation in Thailand, Laos and Vietnam: regional overview and policy recommendations'. (Published by IIED, London).

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1 DESCRIPTION OF SITUATION AND PROBLEM

1.1 Background

The Lao PDR National Report to UNCED (1992) states that "the major environmental problems in Lao PDR are deforestation, including shifting cultivation by slash and burn practices which cause depletion of the forest cover and reduction of the ground water level, including recurrent floods and droughts". It is one of the aims of this report to examine whether the assumption that shifting cultivation has such impacts is true.

The major causes of recent deforestation in Lao PDR are said to be inappropriate logging and shifting cultivation in areas with short fallows and steep terrain. The latter is, in turn, thought to be caused by an increasing population and lack of suitable agricultural land. Lowland farmers encroach on the forest to grow rice since paddy production is not sufficient for their needs; and shifting cultivators in the uplands also encroach on the forest where land suitable for permanent agriculture is insufficient. Consequently forest loss occurs and has many impacts including loss of water resources, sedimentation of water courses, and loss of the economic values of the burned timber.

The First National Forestry Congress, held in Vientiane in 1992, recognised the environmental impacts caused by uncontrolled shifting cultivation. In general, most of the initiatives promoted to overcome such impacts commonly refer to the following as priority issues:

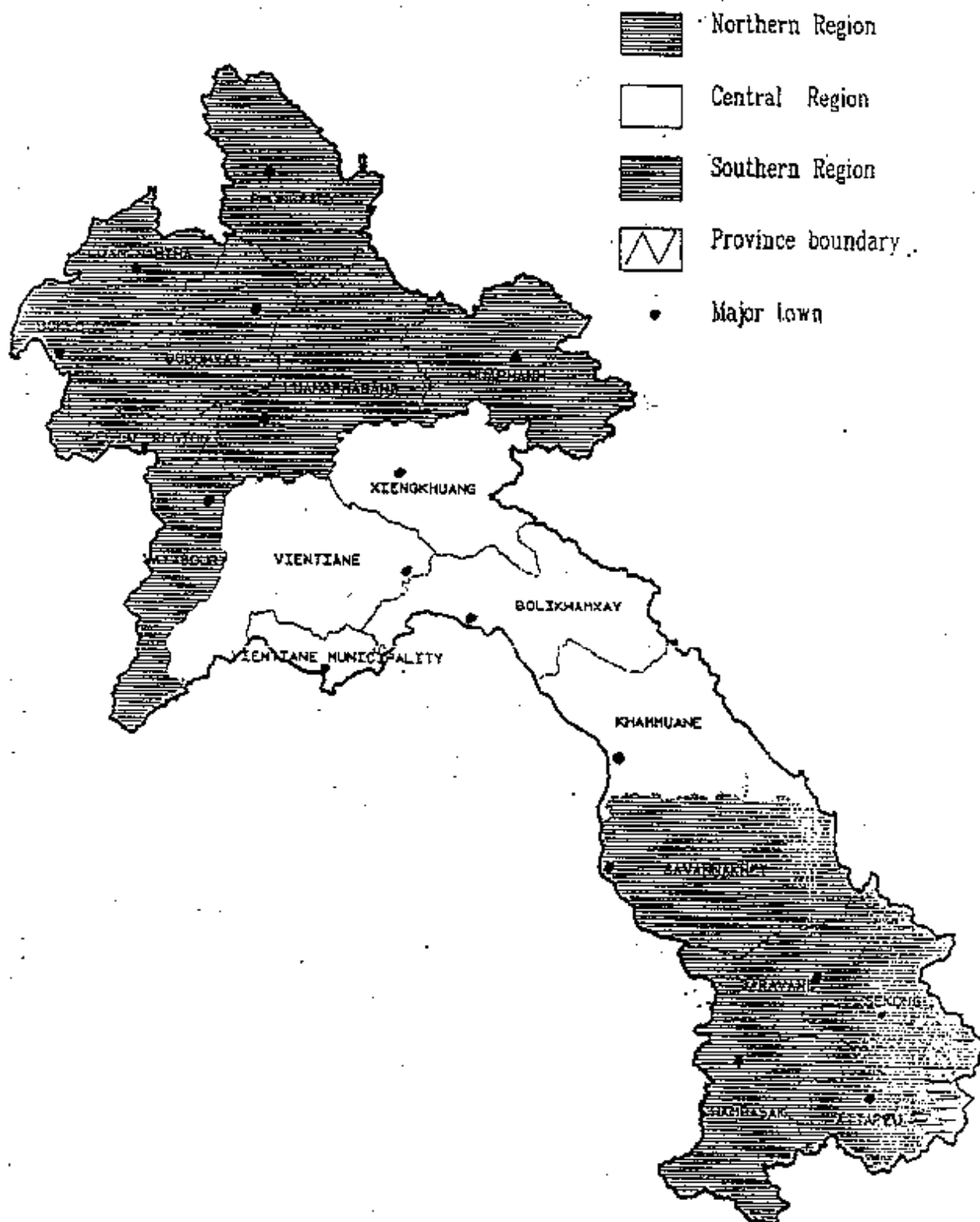
- rural development and environment/forest conservation through community participatory control of shifting cultivation, and
- institutional strengthening.

1.1.1 *Geography and Environment*

Lao PDR is a landlocked country with a total area of 236,800 km², bordering China, Vietnam, Cambodia, Thailand and Myanmar. It is one of the least densely populated and least economically developed countries of southeast Asia, with a population of 4.36 million (1992) and a gross domestic product (GDP) per capita of about US\$ 230 (1994).

The Mekong river, originating in China and traversing Lao PDR from north to south, drains virtually the whole country, except for a small area in the northeast. The alluvial plains and terraces of the Mekong and its tributaries cover about 20 per cent of the country, mostly along the borders with Thailand and Cambodia. The remaining 80 per cent is mountainous, with altitudes generally ranging from 1000 to 2000 metres, and up to 3000m. in the centre and east. Due largely to the topography, significant variations occur in climate, demography, accessibility and socio-economic conditions. In this report, the term uplands will be used for all land except plains and valley bottoms.

The total annual rainfall is unreliable, and droughts in 1993 seriously limited agricultural production (in particular, wet field paddy production). Especially hard hit were unirrigated areas in the provinces of Xekong, Saravanh, Champasack, Savannakhet,



Division of Laos into Provinces and Regions

Borikhamxay, Xayabury, Luang Prabang and Houaphanh.

1.1.2 Social and demographic trends

The population is unevenly distributed, with an estimated 60 per cent living in the plains of the Mekong and its tributaries, while 40 per cent live in the mountainous areas. Between 75 and 85 per cent of the population live in rural areas, primarily in the paddy rice growing areas of the Mekong Plain. Sixty-eight ethno-linguistic groups have been identified: these are commonly grouped into three categories according to the altitude at which they tend to live:

- *Lao Lum* (56 per cent of the total population) traditionally live in the lowland areas and comprise 17 ethnic groups: Lao, Thailao, Phouthai, Thainuea, Thaitai, Thaidam, Thaideng, Thaikhao, Thaiphuane, Thaiyuane, Thaimoy, Thaimey, Thaitheng, Thailu, Near, Meune and Mane;
- *Lao Theung* (34 per cent) tend to live at the middle altitudes and comprise 34 ethnic groups: Laogae, Laonuk, Laolamaeth, Laokene, Laobig, Laosamhang, Laodam, Laohok, Laofai, Laobanchou, Laoxae, Phouthung, Theungnam, Theungbok, Theungfox, Sela, Pana, Sida, Kaleung, Souay, Taoy, Lavene, Lave, Alak, Katong, Inthi, Yaheune, Kayak, Khamu, Talio, Talieng, Talay, Talu and Tali;
- *Lao Sung* (10 per cent) live at the higher altitudes and comprise 17 ethnic groups: Monglay, Mongkhao, Mongdam, Mongkhiao, Yao, Ho, Hodeng, Hodam, Mouxeu, Mouxeune, Mouxae, Lenetene, Leneto, Phounoy, Kouy, Ko and Solo.

The natural rate of population increase of is 2.62% (State Statistical Centre, 1992), as shown in table 1. The rates of population increase of the Lao Theung people tend to be higher, eg. in the province of Xekong where the population is mainly Lao Theung, the natural rate of increase is 4.04 per cent, but in Phongsaly province where the population is Lao Lum and Lao Sung, the natural rate of increase is only 1.71 per cent.

There is also migration between regions: from uplands to lowlands and from lowlands to towns. Such migration mainly comprises young people, who move in search of work (including government jobs and military service) as well as for further education. But the exact figures for those migrating are not known.

1.1.3 Recent economic developments

The GDP per capita of Lao PDR is about US\$ 230 (1994). An estimated 65 per cent of the gross national product (GNP) comes from the agricultural sector, and 10 to 15 per cent is derived from the forestry sector. In 1993-1994, the State expected to allocate 15.2 per cent of total investment to the agriculture and forestry sector ('Pasason', 1993).

The Ministry of Economy, Planning and Finance (1991) states that national self-sufficiency in food is a desirable goal. In addition, provinces have a relatively high degree of economic autonomy, and aim to be self-sufficient in terms of food supply.

Table 1: Natural rates of population increase in 1992.

Province	Sampling villages	Total popn.	Outflow	Inflow rates	Birth rates	Death rates	Natural increase rates
Vientiane Mun	31	24963	4639	3184	2.68	0.60	2.08
Phongsaly	10	3899	593	421	2.26	1.55	1.71
Luangnamtha	8	3789	686	524	4.26	2.31	1.95
Oudomxay	21	8219	1223	1309	4.48	2.07	2.41
Bokeo	5	2173	351	258	2.86	0.87	1.99
Luangprabang	25	16618	2869	2324	4.42	1.48	2.94
Huaphanh	18	6852	1195	977	4.30	1.92	2.38
Xayabury	14	11693	2281	1721	3.90	1.02	2.88
Xiengkhuang	14	7966	1493	830	4.46	1.21	3.25
Vientiane	22	13989	1918	1815	3.70	1.08	2.62
Borikhamxay	10	6540	877	676	3.62	1.09	2.53
Khammuane	18	9061	1518	1545	3.48	1.82	1.66
Savannakhet	45	29050	4676	4000	3.87	1.50	2.37
Saravane	16	11410	1774	1332	4.57	1.72	2.85
Xekong	4	2546	361	375	5.56	1.61	4.04
Champasack	33	19526	2711	2429	3.93	1.55	2.38
Attapeu	6	2850	625	329	4.33	1.83	2.50
Special region	..	..	..	..	..	..	..
	300				4.16	1.54	2.62

Source: State Statistical Centre, data from multi-round survey on vital statistics, 1988-1991

Such provincial autonomy is encouraged by the central government, but is also largely forced upon the provinces due to very poor transport communications: where all-weather roads do exist, they are not connected, such that, during the wet season, interregional traffic is difficult or impossible. (However the central and southern lowlands are much the more fertile areas, and it would make sense to pay more attention to food production in those areas, provided adequate transportation and communication facilities are developed and maintained. It might even be possible to export agriculture surpluses in the south, and undertake food imports in the north, if this should prove more economical).

Telecommunications are also poor: together with inadequate transport links, this hampers connections with other countries. Nevertheless, Lao PDR is completely dependent on its neighbours for its imports, having no seaport and, until the recent building of a bridge over the Mekong between Lao and Thailand, the only reliable connections to adjacent countries were by air or by boat. Access to external markets is also restricted by foreign regulations.

The New Economic Mechanism, introduced in 1988, caused policy changes and reforms that completely altered the role of government in agriculture and forestry. The objective was to create a new supportive commercial environment for farmers to expand production and increase profits. The government's role is changing from direct management of collective farms, irrigation and other agricultural enterprises to provision of support and regulatory functions. Traditional public sector functions such as research and extension,

protection of natural resources, and disease control are to be expanded. The broad objectives of the government now centre around the shift to market-oriented agriculture and forestry, and include the intention to:

- expand agriculture to accommodate diversified commodity production
- protect individual farmers' property rights
- increase farm productivity with incentives and support services
- reform taxes to provide production incentives
- protect the forest, soil and water resources and introduce modern conservation and management techniques (Government of Lao PDR, 1992).

However, despite the emphasis on a market-oriented economy, government institutions still tend to be centrally-planned.

The medium and long term economic development plans are based on significant growth in agriculture and forestry (Ministry of Economy, Planning and Finance, 1991). Irrigation, particularly in the south where there is greater productive potential, is a priority development objective, as is the building of dams to produce hydropower. At present, central Lao PDR sells electricity to Thailand, but the southern provinces of Savannakhet and Khammouane buy it from Thailand. There is great potential for increasing electricity generating capacity in Lao PDR, and various sites have been earmarked for reservoirs and dams.

1.2 Land use

Rural land use in Lao PDR covers a spectrum from extensive, pioneer shifting cultivation at high altitudes, through a range of forest types and uses, to intensive, permanent, irrigated lowland agriculture. Shifting cultivation itself covers a range of farming practices that occur within this spectrum. In this report, farming practices are grouped according to the social categories generally in use, ie. Lao Lum, Lao Theung, Lao Sung. However, it may be more appropriate to categorise land use systems according to region: north, central and southern Lao PDR show quite distinct geographical characteristics, and it is likely that future forestry planning will be based on these three categories. Types of shifting cultivation are described below, following a background description of forestry and agricultural activities.

Until very recently, *land tenure* in rural areas has followed the traditional system, whereby informal agreements are made between families or through village chiefs. It has been unnecessary to register land and there are often no written documents. Land is free and there has been no restriction on how much land a farmer claims. In areas of lowland cultivation, *na* land is inherited through families. In areas of traditional agricultural systems that have been developed over thousands of years - particularly those practised by the Lao Theung - access to resources is regulated by customary institutions, beliefs and laws (Colchester, 1992). In some rural and remote areas the tradition is that tenure of shifting cultivation land is held only as long as it is cultivated. However, since 1993, the government has instituted a more formal tenure system, such that land is allocated to each family (described further in section 2).

1.2.1 Forest cover

Forest land is defined as all areas under the management of the Ministry of Agriculture and Forestry, whether covered with forests or not, but which is not used for, or defined as, permanent agricultural land (Prime Minister's Office, Lao PDR, 1993).

The most recent comprehensive survey available is one undertaken with assistance from the Soviet Union in 1981. Aerial photographs were used to update a regional land use map from 1973, which was prepared by the Mekong Committee based on satellite imagery. This survey indicates that the total forest area of Lao PDR in 1981 was 11,273,100 ha or 47 per cent of the land area. The distribution of forest area by province, according to the 1981 survey, is given in table 2. With the exception of Luang Namtha, Xayabury and Bokeo, the northern provinces show low forest coverage compared to the rest of the country.

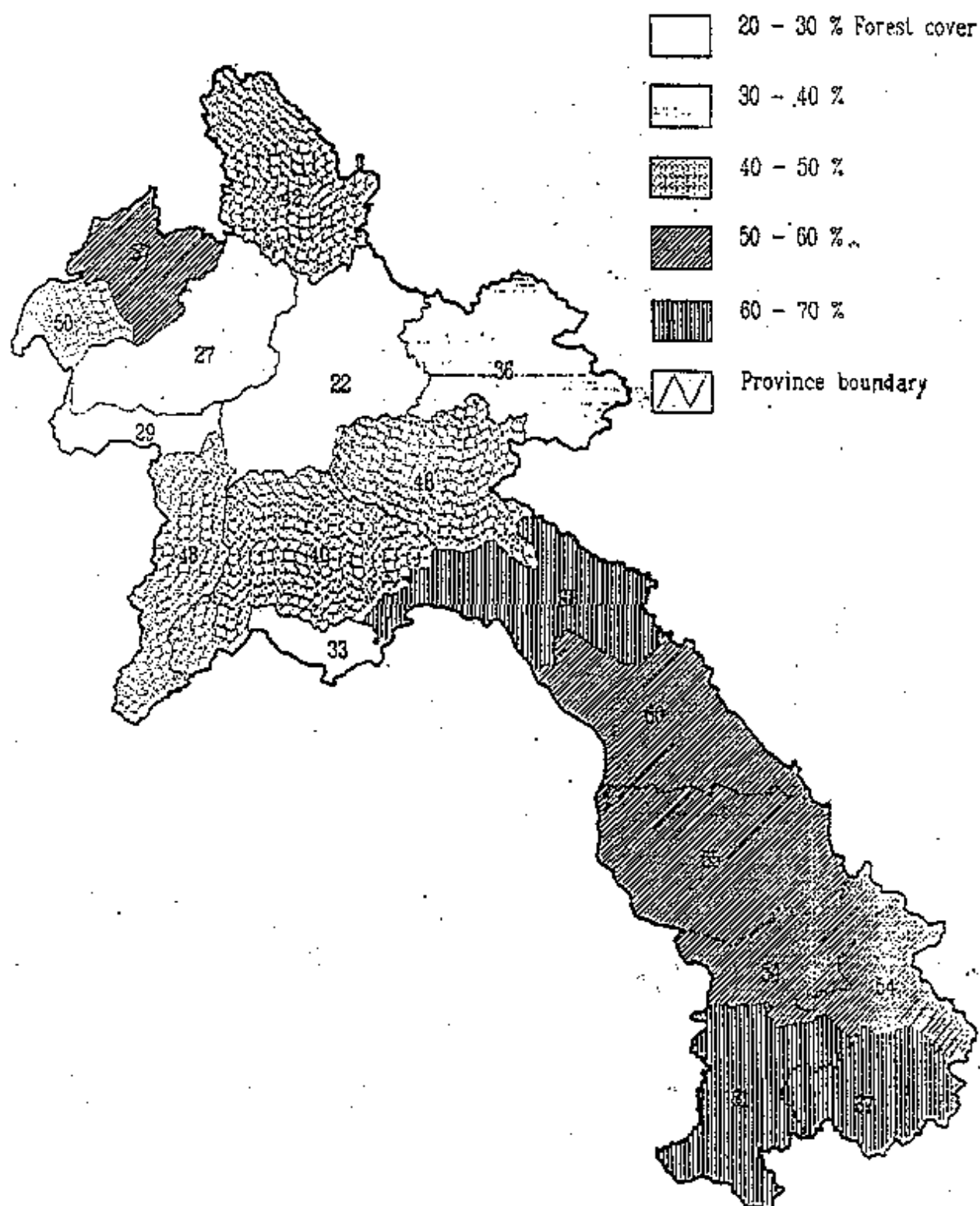
Table 2: Estimates of forest distribution by province

Province	Forest cover (ha)	Forest cover (%)
Vientiane municipality	104,200	34
Phongsaly (N)	480,000	30
Luangnamtha (N)	441,900	53
Oudomxay (N)	230,000	15
Bokeo (N)	278,100	57
Luangprabang (N)	187,000	10
Houaphanh (N)	312,000	17
Xayabury (N)	812,000	50
Xiengkhuang	679,000	39
Vientiane	1,188,800	60
Borikhamxay	786,800	47
Khammouane	766,300	46
Savannakhet	1,598,000	73
Saravanh	840,200	74
Xekong	677,800	87
Champasack	1,041,000	72
Attapeu	850,000	82
TOTAL	11,273,100	47

Source: Forestry Survey, 1981. (N) northern provinces

NB: Special regions not included.

A 1:1 million scale map from 1987 indicates 67,780 km² of closed forest with a further 56,820 km² of degraded formations, i.e. roughly 29 and 25 percent of the land area



FOREST COVER BY PROVINCE, 1989

respectively¹ (referred to in Collins *et al*, 1991). The 1987 figures are not broken down by province. Estimates of forest extent by forest type are given in table 3.

Table 3: Estimates of forest extent by forest type

	Areas intact (km ²)	% of land area	Areas degraded (km ²)	% of land area	Total	% of land area
Rain forest						
Lowland	31,130	13.5	56,820	24.6	87,950	38.1
Montane	10,840	4.7			10,840	4.7
Sub total	41,970	18.2	56,820	24.6	98,790	42.8
Monsoon forest						
Lowland	22,220	9.6			22,220	9.6
Montane	3,950	1.6			3,950	1.6
Sub total	25,810	11.2			25,810	11.2
Total	67,780	29.4	56,820	24.6	124,600	54.0

Source: Collins *et al*, 1991.

Knowledge of the extent and state of the forest is poor. However the table indicates that: intact rain forest is estimated to cover 18 per cent of the land area, monsoon forest 11 per cent, and degraded forest a further 25 per cent. The total area of intact closed forest is thought to have decreased by about 10 per cent from 1981 to 1990 (Collins *et al*, 1991). Highest quality moist forests are now confined mainly to the central and southern areas; in the north, previous moist forest areas are now largely deforested. Very little virgin forest remains in Lao PDR today except in the most remote and inaccessible places, and in the provinces bordering Vietnam substantial forest areas are degraded due to war damage. Typically, secondary grassland, savanna, shrubland and bamboo forest succeed the primary forest. The Lao government intends to undertake a survey of forest status in each province, and to construct management plans, but in the meantime, plantations of fast-growing trees are being promoted for timber production (Pasason, 1993).

A national forest inventory is currently underway: figures for the whole country are not expected until the late 1990s. However, early results from a national reconnaissance survey indicate the change of land use and forest cover 1982-1989. Based on NRS satellite imagery, the net loss of forest cover during the period is estimated at 67,000 ha per annum. The total forest cover has decreased by 470,000 ha (ie. 2 per cent of the land area or 4 per cent of the current forest area) during the seven year period (see table 4)

¹ Whilst the total area of closed and degraded forest (124,600 km²) appears to exceed that measured in 1981 (112,731 km²), the measurement criteria for each survey are not known and the figures should not therefore be compared.

(Forest Inventory & Management Office, 1991).

Table 4: Change in area distribution of land use classes and vegetation types between 1981/2 and 1988/9.

Land use/ vegetation class	Area					
	1981/82		Change		1988/89	
	%	1000ha	%	1000ha	%	1000ha
1. Current forest	49.15	11639	-1.93	-458	47.22	11182
Dry Dipterocarp /DD	6.11	1447	0.10	22	6.21	1470
Lower dry evergreen /LDE	0.41	97	-0.17	-40	0.24	58
Upper dry evergreen /UDE	4.59	1086	-0.09	-20	4.50	1066
Lower mixed decid. /LMD	4.23	1001	-0.44	-104	3.79	897
Upper mixed decid. /UMD	31.88	7550	-1.58	-374	30.31	7176
Gallery forest /GE	0.41	98	-0.05	-12	0.36	85
Coniferous /S	0.50	119	0.08	18	0.58	137
Mixed broadf & conif/MS	1.02	241	0.22	52	1.24	294
2. Potential forest	36.05	8537	1.13	268	37.18	8805
Pure bamboo /B	6.62	1568	-1.70	-403	4.92	1165
Unstocked /T	26.83	6354	2.42	574	29.26	6928
Hai in fallow /H	2.60	615	0.41	96	3.01	712
3. Other wooded area	6.68	1582	-0.13	-30	6.55	1552
Savanna, open woodland /SH	4.18	990	-0.12	-29	4.06	961
Heath, stunt. scrub forest /R	2.50	592	-0.01	-1	2.50	591
4. Permanent agriculture	3.38	801	0.87	207	4.26	1008
Rice paddy /RP	3.21	759	0.66	156	3.86	915
Fruit plantation/ AP	0.04	10			0.04	10
Other agriculture/ OA	0.14	32	0.22	52	0.35	84
5. Other non-forest lands	4.73	1120	0.06	13	4.79	1134
Barren lands/ rock /R	0.44	105	0.03	7	0.47	112
Grassland /G	2.73	648	-0.06	-14	2.68	634
Urban areas /U	0.38	89	0.19	45	0.57	134
Swamps /SW	0.15	36	-0.06	-14	0.09	22
Water/ W	1.03	243	-0.05	-11	0.98	232
Total	100	23680			100	23680

Source: reconnaissance survey by Lao Forest Inventory & Management Office, 1991

Note: Figures for change in forest cover are estimates only; they are based on incomplete satellite imagery.

To date, 18 protection forests and reserves have been demarcated on maps but not on the ground (Decree of the Prime Minister no. 164, 1993). Locations are shown on map 3. Villagers are permitted to stay on their land following demarcation of the reserve. Management plans for four reserves (as show on map 3) are now being developed, with the participation of villagers.

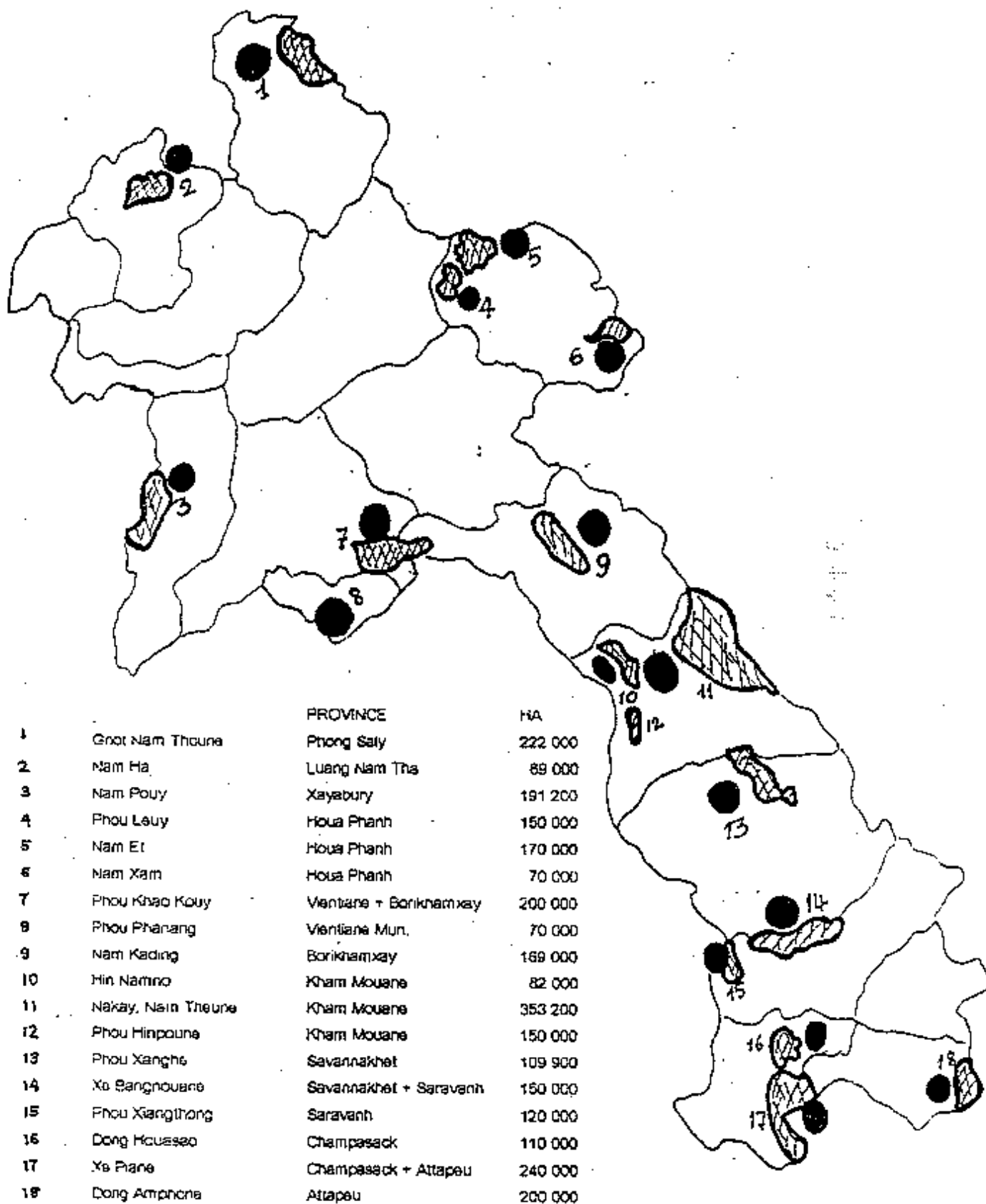
1.2.2 Agriculture

Agricultural land per head (0.31 ha/person) is comparatively higher than the average for developing countries in the Asia Pacific region (0.23 ha/person) (1990 figures).

Agriculture in Lao PDR is dominated by cultivation of the national staple food, glutinous rice, which occupies about 90 per cent of the cultivated area. In 1992, 77 per cent of rice production was under lowland rainfed conditions, 4 per cent under lowland irrigated conditions and 19 per cent under rainfed shifting cultivation in the uplands. In fact, most agricultural activity in the uplands is centred around production of glutinous rice, except on the highest slopes, where maize is the predominant cereal.

Lao PDR has made self-sufficiency in rice production a national priority, hence large scale, capital intensive irrigation projects have been promoted, especially in the lowlands. The area under rice on irrigated land doubled from 1980 (7,700 ha) to 1993 (13,000 ha). During the same period yields from irrigated areas quadrupled, from 11,000 ton in 1980 to 45,000 ton in 1993. By far most irrigated land (half of the national total) is in Vientiane province. In the eight provinces belonging to the northern region there are only 2,000 ha of irrigated land, half of which is in Luang Prabang. It is estimated that the potential for improved rice production is quite significant - even without large scale systems (Department of Forestry, 1995).

But in much of the lowlands there is frequently a water shortage, and currently insufficient means of regulating the supply of water to agricultural land. In recent years, both floods and droughts have adversely affected rice production. Despite flood warnings from the Department of Meteorology (part of the Ministry of Agriculture and Forestry) and attempts to build bunds around paddy rice fields, floods have ruined crops in September and October, when it is too late to plant a second crop. It is hoped that provision of dams and irrigation systems will both regulate the supply of water, and intensify lowland rice production. However, the Asian Development Bank estimates that 88 per cent of the currently irrigated area consists of small projects run by farmers with no government assistance, and that the small diversion schemes built or installed by farmers themselves without government assistance seem to have the strongest support of the farmers. In recent years, though, some small scale irrigation systems inherited from the government have suffered from lack of maintenance: prior to the introduction of individual responsibility for agricultural production, there was little incentive for farmers to maintain irrigation systems. So the government irrigation agencies will be redirected to provide a support function to farmer's associations formed on irrigation schemes; and instead of undertaking direct investment in the development of new schemes, the focus will be on restructuring the control and management of public sector schemes to achieve self-sustaining systems (MEPF, 1991 and Government of Lao PDR, 1992).

PROTECTION FOREST & RESERVES

Traditional upland agriculture is practised as shifting cultivation, since productivity tends to decline rapidly after cultivation. Although Lao PDR has a relatively low population density, shifting cultivation covers a wide area in the uplands. Those ethnic groups who traditionally inhabited mountainous areas have long experience of upland agriculture, but more recently, farmers of lowland origin have increasingly turned to upland agriculture (see section 1.4). Thus a clear distinction should be made between the traditional farming systems which have been practised over hundreds of years, and those practised by relative newcomers to upland agriculture.

Like other sectors, agriculture suffers from a lack of roads and other transport systems. Nearly half of all Lao farmers have no direct road access to obtain inputs, including advice and technology, or to reach markets. This could be a contributing factor to the widespread practice of shifting cultivation, since the latter requires low external inputs and gives a diversity of products. As a result of the poor infrastructure, there has been little change in rice production practices in all but accessible lowland areas for decades, and yields in Lao PDR are among the lowest in Asia (Government of Lao PDR, 1992).

After forestry, the livestock and coffee sub-sectors have the greatest potential to increase production and foreign exchange earnings in the agricultural sector, especially in the southern provinces. There is good indigenous knowledge of animal husbandry and coffee plantation.

1.3 Shifting cultivation

1.3.1 *Shifting cultivation in Lao PDR*

The exact area of land under shifting cultivation and associated fallow is not known. However, this is the main farming system of 90 per cent of the farmers and is practised across all upland areas. It is practised countrywide but is most prevalent in all the northern and eastern provinces by different ethnic groups which have unique cultures, traditions and techniques for managing land, using systems which have been carried out for centuries. These ethnic groups live in small, isolated rural communities with little or no road access, and often practise shifting cultivation in inaccessible areas.

The *hai:na* ratio (ie. the ratio of upland, rainfed cultivation to lowland paddy cultivation) shows a clear picture of the highest shifting cultivation extent, in the northern provinces of Houaphanh, Phongsaly, Oudomxay, Luang Prabang and Luang Namtha (table 5 and map 4). A high agricultural pressure on the uplands also appears to exist in the south-eastern province of Xekong, where the population mainly consists of the so-called hilltribes (Lao Sung).

However, it is emphasised that the *hai:na* ratio is used here only because reliable data are unavailable; it does not adequately reflect the agricultural pressure on the uplands. Also, the economic value of alternative uses of upland cannot be calculated due to lack of data. Therefore, the *hai:na* ratio should be considered as indicative, and should not be used in absolute terms.

Table 5: Upland land use in 1988

Province	% <i>na</i>	% <i>hai</i>	popn./ <i>na</i>	<i>hai/na</i> x 100
Vientiane Munic.	1.26	0.09	10	0.86
Phongsaly	0.08	1.07	29	384.57
Luangnamtha	0.11	1.29	26	286.49
Oudomxay	0.13	1.73	29	382.61
Bokeo	0.12	1.14	17	155.78
Luang Prabang	0.19	1.89	35	342.90
Houaphanh	0.14	2.30	31	509.04
Xayabury	0.15	1.13	17	133.32
Xiengkhuang	0.10	0.50	17	81.48
Vientiane	0.15	0.60	10	39.72
Borikhamxay	0.08	0.68	11	92.56
Khammouane	0.14	0.10	11	7.55
Savannakhet	0.27	0.40	10	14.57
Saravanh	0.19	0.29	6	9.57
Xekong	0.07	0.71	58	567.95
Champasack	0.29	0.35	8	9.68
Attapeu	0.07	0.20	9	23.52
TOTAL	0.17	1.20	12	87.86

Source: Based on data from SSC, 1989

Note: *Na* = wet field paddy cultivation

Hai = upland shifting cultivation

Table 6 shows the approximate number of people and families practising shifting cultivation in 1992.

Very little is documented about types of shifting cultivation in Lao PDR. There has not been a specific and comprehensive study of the subject, and the sparse information that is available is mainly found in the reports concerning forestry and/or rural development, where the interest usually runs into direct conflict with those of shifting cultivation. Such reports generally do not distinguish between the various types, but draw the same conclusion from all, namely that shifting cultivation is harmful and should be stopped. Similarly, there tends to be a common solution advocated for all upland farmers, that is, resettlement and conversion to irrigated or lowland rice cultivation.

A broad categorisation provides three distinct groups (as described in section 1.1.2) practising shifting cultivation:

- Lao Lum, mostly living in the valleys,
- Lao Theung, mostly living at middle altitudes, and
- Lao Sung, mostly living at higher altitudes.

Comprehensive and reliable information on the distinctive farming practices of each group is not available, but brief descriptions are as follows.

MAP 4

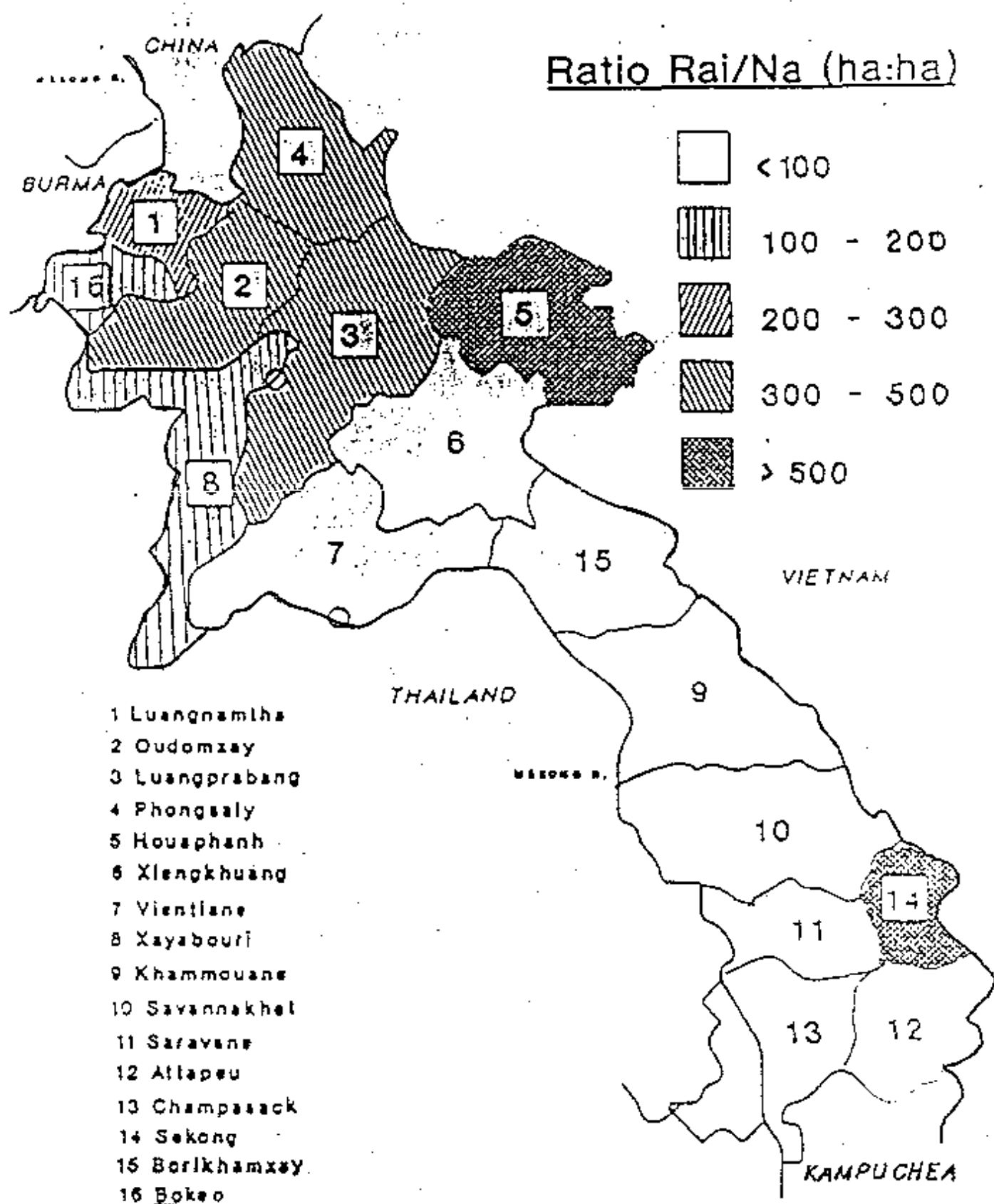


Table 6: Families practising shifting cultivation (1992)

Province	No. of families	No. of people
Vientiane Municipality	5,000	22,000
Phongsaly	15,830	93,980
Luang Namtha	10,916	65,496
Oudomxay	30,279	181,000
Bokeo	10,000	30,240
Luang Prabang	50,000	276,000
Houaphanh	33,000	299,000
Xayabury	25,000	90,000
Xiengkhuang	15,000	30,000
Vientiane	18,000	96,000
Borikhamxay	16,000	92,000
Khammouane	15,000	82,000
Savannakhet	14,000	68,000
Saravanh	6,000	35,000
Xekong	5,000	17,000
Champasack	5,400	30,000
Attapeu	3,000	17,000
Special Region		
TOTAL	277,000	1,637,526

Source: Department of Forestry, data from provincial report 1992.

Lao Lum: Lowland farmers are experienced in the cultivation of lowland paddy rice, their traditionally preferred method of agriculture. However, in recent years, the Lao Lum have tended to move upslope and to adopt new agricultural practices, namely shifting cultivation. Due to low soil fertility and limited application of improved management techniques, rice production from (unirrigated) lowlands has declined. This, together with an increased demand for rice, policies promoting local production for local use, and a taxation system favouring upland rice production, has meant that the Lao Lum have been driven to encroach on the uplands. Being relatively wealthy as a result of trading activities in the valleys, Lao Lum are sometimes able to employ Lao Theung in agricultural work.

Lao Theung: The traditional systems of shifting cultivation on the mid-altitude uplands are carried out by the Lao Theung. These systems have been developed over thousands of years in the hills of southeast Asia, and are relatively stable systems of rotational shifting cultivation. Usually a large number of fields are cultivated, alternated with a relatively long fallow of 5 to 15 years depending on soil condition and land availability. Although upland rice is generally the main crop, other crops such as maize, beans, cassava and chilli are also grown. In the traditional system, several steps are taken to ensure that the land is used in an efficient manner to allow a return to the same plot after the fallow period: trees stumps are kept alive to allow rapid soil regeneration, good care is taken to

prevent the spread of fire into the adjacent forest, weeding is thorough and soil cover is adequate. In the south of the country, the Lao Theung system is thought to be largely sustainable and is likely to continue: although the areas cultivated by the Lao Theung in the south are relatively small, productivity is high, population density relatively low and external inputs, low. In the north, however, larger areas are available yet productivity is low, and population density relatively high. Under these conditions, fields are completely cleared of trees in order to allow maximum crop cultivation, and the fallow period produces grassland and bamboo rather than forest regeneration. In addition, slopes are very steep and clearing of fields tends to lead to high erosion levels.

Lao Sung occupy land at high altitude, where soils are generally shallow and of low fertility, and slopes steep. Due to the remote location, poor accessibility and cultural isolation, very little is known concerning the farming practices of the Lao Sung. The most common crops are maize and opium poppy, while upland rice is cultivated at a slightly lower altitude where temperatures are higher. Maize and poppy are usually planted together as an intercrop, requiring an ample mineral supply from the soil, and pulses are planted to improve soil fertility. However, agricultural activities tend to be aimed at the highest possible immediate production and do not focus on conservation and stability. The often steeply sloping fields are weeded without great care to allow prolonged cultivation and no trees are left standing. Fires are not carefully controlled and frequently get out of hand. This practice of exhaustive exploitation of the soil continues until the soil is completely depleted of nutrients and the fields are abandoned without the intention to return after a fallow period. Because of the fragile nature of these areas the environment is threatened: the abandoned land is very susceptible to erosion, and rapidly becomes dominated by infertile savanna with grasses or bamboo where natural reforestation and soil regeneration is difficult or impossible. A major part of this ongoing degradation appears to occur in the northern provinces, but very few recent reports and field observations are available. Unfortunately, those reports that do exist do not fully support each others' findings. However, it is widely assumed that the agricultural practices of the Lao Sung present a major threat to the environment (IUCN, 1989).

A Lao Sung village, which tends to consist of only 15 to 20 families, typically settles in one site for about 20 years, although new fields are cultivated every 5 to 6 years. Then, once productivity around the village becomes too low, it is moved to a new site. A few Lao Sung villages are near roads and are able to trade, but most live in isolated small rural communities at high altitudes with little or no road access; any services to assist them in developing alternative ways of survival are extremely difficult to deliver. It is also difficult to change lifestyles and customs which have been practised for centuries. Neither do superior production models exist. Rice productivity is often less than 1 ton/ha due to low fertility, poor agricultural practices and poor seeds.

1.4 Land use changes in shifting cultivation areas

The majority of upland dwellers in Lao PDR have a long history of forest occupation. Those who typically live in the middle altitude forests have systems of land use which are widely acknowledged as being stable and environmentally sound (various authors quoted in Colchester, 1992). Many of the problems associated with shifting cultivation may be

due to recent migrants into the forest, as well as migration within the forest. It is necessary to determine how those problems may be alleviated, and to what extent pressures on the traditional upland dwellers have forced them to modify their practices.

Traditionally, the *Lao Sung* and *Lao Theung* have mainly practised shifting cultivation; *Lao Lum* have practised permanent agriculture in the lowlands. However, in recent years, declining productivity in the lowlands because of drought, decrease of soil fertility, and an increased lowland population making an increasing demand for rice, coupled with the requirement of self-sufficiency in rice of each family, have been the main driving forces for the *Lao Lum* to extend their rice production beyond the lowlands and to move uphill. But, they also continue to cultivate the land downhill, in the lowlands, in order to benefit from two rice crops. Given that the labour requirement for upland rice occurs at different times of year to that for lowland rice, a combination of the two types of rice cultivation is feasible. This has led to increased use of upland areas for rice cultivation, often without regard for conservation.

Thus the promotion of self-sufficiency at provincial level (described in section 1.1.3) is in conflict with the policy assumption that shifting cultivation must be stopped: the need to increase rice production only tends to increase the amount of land under shifting cultivation, particularly in the northern provinces. However, it is recognised that provinces are not all of uniform productivity, and the comparative advantages of different areas are to be exploited eg. grassland in Xiangkhouang province is particularly suitable for livestock production, Champasack province for coffee.

In moving to higher altitudes, the *Lao Lum* appear not to have adapted their agricultural practices and still cultivate one rice crop per year, with crop rotation, on an almost completely cleared plot with relatively intensive tillage by hand. The combination of often relatively short rotations of 3 to 4 years, and the exhaustive agricultural practices mentioned above, means that the rice yield of mid-altitude shifting cultivation systems are extremely low, often less than 1 ton/ hectare. Yields are probably still declining each year due to the lack of conservation measures.

Middle altitudes occupied by *Lao Theung*, although under a relatively sustainable rotational system in some areas of the north, generally do not produce high yields because of soil degradation. Knowledge of areas of potentially higher productivity has encouraged a few families to move south, to Saravanh province, where large areas of land are available. After hiring the extra labour required (on a share-cropping basis), these families have greatly increased their wealth. But most northern families prefer to follow their traditional systems and to stay in the north. Some have been given assistance, such as with the building of small reservoirs and other technical assistance, to enable permanent agriculture to be practised (see section 3.2). In recent years there has been an increase in pig farming amongst the *Lao Theung*, encouraged by favourable markets, with assistance and veterinary services provided by the government.

Pending more precise results from the reconnaissance survey, no detailed figures can be given as to the nature and distribution of the degradation of the upland as a result of cultivation practices of the *Lao Sung*. Much of the degradation appears to occur in the remote areas of northern provinces, supporting the common assumption that the

agricultural practices of Lao Sung present a major environmental threat.

The remote location, wide distribution of villages, and poor infrastructure preclude control of the opium growing activities, given current resources, and any long term development of alternative agricultural systems (including income substitution for opium) would require a high degree of external inputs. In addition, the Lao Sung show extreme reluctance to moving to lower altitudes.

As far as is known, there have been few changes in the agricultural practices of the Lao Sung in recent years. Those in more accessible areas sell vegetables from their home gardens, but the high income to be obtained from opium production acts as a disincentive to conversion to other systems. Other changes tend to be as a result of development assistance, which is scarce in the remote, high altitude regions.

2 POLICY PROCESSES AND CHANGING EMPHASES

2.1 The policy process

The Government of Lao PDR's 5 year plans are designed to give a general guide to policy, but allow flexibility and do not have to be strictly adhered to. The first draft of a new forestry policy, for example, is drafted by staff of the Forestry Department. At present, about 10 section directors and deputy directors are responsible for this, basing the draft on their own knowledge and observations and on information provided by provincial forestry staff. (The proportion of forestry staff posted to the provinces, and the volume of information thus obtained from the field, has increased dramatically following the re-organisation of the Ministry in 1993: see section 2.5).

This first draft of new policy is then circulated widely to provincial level staff. Successive drafts are developed in consultation with Forestry Department staff at all levels and all sections, and with the Ministry of Agriculture and Forestry, the Ministry of Justice and the Office of the Prime Minister; other Ministries concerned can comment at the session of Government conference. In 1992, a National Forestry Conference was held to discuss the new draft policy/decreed, and was attended by the head of each provincial forestry department. The final agreed draft is signed by the Prime Minister. Once a policy is formulated, the document is circulated widely. However, there is currently no formal process of monitoring its implementation and effect.

2.2 Background to policy on shifting cultivation and forest use

Since 1976 it has been a priority of the Lao government to stop shifting cultivation (Collins *et al*, 1991). During the late 1970s and early 1980s, government efforts focused on settling shifting cultivators in areas of permanent agriculture. A total of 6,700 families were resettled prior to 1977; 10,760 families were resettled during the period 1977-1980 (FAO/UNEP, 1981, in Collins *et al*, 1991). This programme was subsequently scaled down, but fixed or rotational farming continued to be encouraged in place of slash and burn cultivation. Favoured methods included clearing or rehabilitation of wet rice fields, intensification of agriculture on favourable land, and planting of fruit trees. The Fourth Party Congress in 1986 led to the plan to restrict slash and burn and clearing of forest for farming and to arrange fixed occupation for 277,000 families of shifting cultivators, by three means:

- integration of upland cultivation with reforestation (agroforestry);
- improvement of productivity of shifting cultivation;
- transformation of shifting cultivation into permanent upland agriculture.

However, this ambitious resettlement plan was never implemented and it is doubtful whether it would have been possible to do so.

Parallel to this plan was the intention to protect existing forest areas and to reforest some 10 million hectares of land. Restriction and eventual elimination of slash and burn cultivation was re-iterated as one of the strategic programmes for the future socio-economic development of Lao PDR in 1989 (Khao San Pathet Lao News Bulletin,

23.5.89, in Collins *et al*, 1991).

A study completed around 1990 entitled 'Reduction of shifting cultivation and protection of the environment programme' identifies targets of 50,000 km² to be managed as production forest, 95,000 km² to be managed as protection forest, and 25,000 km² to be managed as conservation forest. Implicit in these figures is an intention to reafforest cleared and degraded forest lands², some of which has already been started. An annual national tree-planting day sees hundreds of thousands of seedlings being planted, and limited replanting of areas formerly under shifting cultivation has been undertaken by logging enterprises (Collins *et al*, 1991).

Until recently there has been no effective protected area system. In the past, 17 forest reserves were declared but protective measures were never implemented. In 1989, more than 50 conservation areas were proposed, covering an area of 47,319 km² (Collins *et al*, 1991). Order no. 164 on natural forest reserves, issued on 18 October 1993, defines 18 areas to be demarcated as protection forest and reserve (see map 3 in section 1.2.1). Activities in a few of the reserves had already begun by mid-November 1993. Inhabitants of the new reserves are permitted to stay on their land, and are given land for agriculture, electricity supply and irrigation, such that their dependence on the forest may be decreased. Some of the planned reserves include potential sites for reservoirs.

2.3 Recent land use policy developments

At present the forestry sector is regulated by decrees: a forest law will be in force in 1995 at the earliest. New policy development focuses on the decentralisation and delegation of decision making to provinces and districts: the role of the central level is to provide support for policy development, development of strategies and guidelines, monitoring of implementation, etc. In late 1993 and 1994, several new policy documents relating to forest and land use were produced. These are summarised below.

2.3.1 Decree 169

Decree 169, on the 'Management and use of forests and forest land' was approved on 3 November 1993. It includes regulations regarding management and use of forest and forest land, and defines tenure arrangements. It states that all existing forests and forest land are the property of the national community, represented by the State. Tenure of trees, natural forests and forest land may be authorised by the Ministry of Agriculture and Forestry, otherwise it remains the property of the State. Any tree or forest planted and maintained by individuals or groups from their own resources becomes their property, which may be managed, used, transferred and inherited. The State also recognises the right to the use and collection of forest products such as fuelwood, non-timber forest products and hunting.

² According to a map produced in 1987 there was 67,780km² of closed forest and 56,820km² of degraded formations (see section 1.2.1).

Part of the significance of decree 169 is that it concerns *land allocation*. Until very recently, land tenure in rural areas followed the traditional system (described briefly in section 1.2). However, decree 169 institutes a more formal tenure system, such that land is allocated to each family. In areas where permanent agriculture is feasible (such as land that is adequately flat for paddy rice cultivation), families may be allocated five hectares of land. Where permanent agriculture is not feasible and rotational cultivation is the most suitable form of land use, unlimited land may be used by the family, subject to contract.

Forest land may only be converted to other uses under authorisation of the Prime Minister. However, degraded forest land³ or non-forest land may be converted for the use of or assigned to the population for permanent agriculture, forestry and livestock production, under authorisation of the Land and Forest Distribution Committee. Forest can be managed in a variety of ways to optimise yields and ensure the sustainability of supplies. There are three types of *forest management contract* by which any forest and forest land may be assigned to a party for management: contracts with collectives, families and businesses. All forest management contracts are implemented in cooperation with the forestry officers of the relevant Forest Management Areas, who must establish detailed management plans.

The *collective forest management contract* may be for forest land and may cover several types of forest. However, *family forest management contracts* are made only for degraded forest land or non-forest land. This agreement provides for the management and use of the land in order to upgrade the family's living conditions. If the terms of the contract are adhered to for three years, the family will receive a certificate of permanent tenure and use of such forests and forest land, with the entitlement to transfer, inherit, and place it as collateral.

However, the conditions of forest management contracts to which families must adhere are not elaborated upon in this decree. In the absence of such conditions, it is assumed that they may be similar to those of the Land Law (1991) (quoted in Colchester, 1992). These include the conditions that land possessed by a farmer or farmer's organisation:

- must be in 'constant use';
- must not be 'cleared' to secure possessory rights only; and if it is not 'put into production' it may be 'confiscated' and assigned to others.

Decree 169 also addresses *shifting cultivation* specifically: Article 31 states that:

'in order to restrain the destruction of forests, water sources and the environment taking place in each locality from the indiscriminate practice of slash and burn cultivation, and in order to ensure the population's living conditions, individuals, families and village collectives are authorised to conduct rotating slash and burn or orchard cultivation only within degraded land or non-forest land as allotted within

³ Degraded Forest lands are forest land on which forest cover is seriously damaged or land without forest cover or bald land (as defined for the national reconnaissance survey by Lao Forest Inventory and Management Office).

each locality, and such cultivation shall have the sole purpose of meeting the requirements of their families as approved by the Land and Forest Land Distribution Committee, or the relevant village administrative authority/the village chief, where such a committee is not yet established'.

It goes on to state that:

'wherever possible, the local administrative authorities and the concerned parties must encourage, assist and establish favourable conditions for the individuals, families or collectives still practising shifting cultivation, to convert to the appropriate sedentary agricultural-forestry-livestock production, based on their will under a contract, such as the family forest management contract'.

This represents a more moderate response to the desire to control shifting cultivation than was apparent in the late 1970s and 1980s. Decree 169 indicates that shifting cultivation will be allowed only where viable alternatives cannot be found. It implies that rotational cultivation will be allowed in certain cases, for example, where paddy cultivation is not possible, but that pioneer cultivation is disallowed. The decree also states that shifting cultivation should be only for subsistence needs; however, it is permitted to trade craft items and forest products, but not upland rice from shifting cultivation. Only paddy rice may be traded. In the south of the country, people have the choice between rotational cultivation and permanent lowland agriculture; in the north, however, insufficient flat land prevents large scale conversion to paddy farming.

Degraded forests or land without forest cover may also be the subject of a '*forestation business contract*', designed to promote investment in commercial plantations. Commercial logging has long been restricted by the poor infrastructure; however, it has also been badly controlled and wastage is high due to inefficient techniques. The lack of sustained yield management is seen as a major threat to the forest resource (IUCN, 1988 and SIDA, 1988, both in Collins *et al*, 1991). Decree 169 states that logging is banned except where there is a government concession and if such felling is conducted for the implementation of forest management plan. Exceptions to this ban are those forested areas designated for reservoirs for irrigation, hydropower dams, airports, industrial sites, etc. There are strict controls on export of timber ('Pasason', 1993) in order to protect the domestic supply.

Sawmills are permitted only where the enterprise itself undertakes some rural development activities, such as the provision of a school, health centre, deep well water, livestock, roads, etc. Those businesses which do not meet this condition must stop production. At present, sawmills are allowed only in the south and centre of the country. In the north, potential sawmill enterprises must survey the area and set up fast-growing tree plantations for provision of timber, before the sawmill may be established. This restriction on the development of sawmills appears to be a remnant of central planning. In a fully market oriented economy, sawmills would be allowed to respond to market signals and establish themselves according to demand.

2.3.2 *The village forester*

The draft regulation on 'The stipulation of the role, right and task of the village forester'

were agreed by the Ministry of Agriculture and Forestry in 1993. It is not known whether this has now been legally ratified. This regulation is more concerned with policy implementation and is addressed in section 2.4.

2.3.3 Decree 186

Decree 186, regarding the allocation of land and forests for tree planting and forest protection, was issued in 1994. The decree emphasises the promotion of tree planting and protection and rehabilitation of natural forests. Tree planting may be done by villagers as well as enterprises, local or foreign. Foreigners cannot hold land concessions and are thus obliged to undertake joint concessions with enterprises. Up to 100 hectares of land for plantations can be allocated and approved by district authorities. Larger tracts need provincial approval. Land tax as well as resource tax will not be charged for wood from well-stocked tree plantations. Forest land with tree plantation can be sold and inherited. The decree also states that village forests will be set aside for household use but not for commercial purposes (Department of Forestry, 1995).

2.3.4. Policies concerning the agricultural sector

Proceedings of the 1993 Party Congress stated the target for rice production to be 1,656,800 tons in the period 1993 to 1994, in order to satisfy internal demand (1,526,000 ton) and produce some surplus (130,800 ton) (Lao newspaper, 1993). 350 kg paddy rice/year is considered sufficient to meet the annual rice requirement for each person. Current national rice production is 1,502,360 tons, indicating a shortfall on national subsistence needs of 23,640 tons (SSC, 1992). Most of the increased paddy rice production is planned to take place in six plateaux of central and southern Lao, where conditions are most favourable. In these and other areas, it is a priority of the government to expand the area of irrigated land, and to continue to increase small-scale irrigation systems for villagers.

Testing of alternatives to upland rice is being promoted: the 1993 Party Congress, quoted in a Lao newspaper on 13 October 1993, stated that the Agriculture and Forestry Service should embark on trials of home garden vegetables and crop species for *hai* cultivation, according to market demand. The trials are to produce more goods for the people to sell (ie. to promote changes in the agriculture system from a basically subsistence mode to a commercialised production system). In addition, the Congress stated that the Agriculture and Forestry Service must mobilise the farmers to cultivate the fast growing and industrial trees in their own farms, through provision of seeds and technical help.

It is likely that the forest and agriculture sectors will benefit from more general development priorities such as the provision of irrigation, hydropower development, road building and general infrastructural development. These will improve communications with remote areas and facilitate involvement in the mainstream economy.

2.3.5 Strategy Proposal for the Forestry Sector 1995-2000

In 1995, subsequent to the above decrees, the Department of Forestry produced a Strategy Proposal for the Forestry Sector 1995-2000. Included in the objectives are that:

- forest protection and sustainable forest management should be strengthened; 'inappropriate' logging and shifting cultivation are cited as causing forest destruction;
- the market economy should be encouraged, along with the introduction of improved production systems - both in agriculture and forestry.

To achieve these objectives the strategy proposal lists six tasks and activities:

- Provision of assistance to shifting cultivators especially in the areas which are critical to hydropower projects and irrigation schemes;
- Support of rehabilitation of (degraded) forest and tree plantations;
- Continuation of forest inventory and implementation of sound forest management;
- Intensification of work on protection of watersheds and conservation area management in the 18 proclaimed biodiversity areas (protected areas);
- Upgrade of forest and forest industry operations;
- Training and development of the whole workforce within the forestry sector (Department of Forestry, 1995).

Administrative reform and institutional development is also promoted, including:

- Development of the district level, and delegation of more decision making powers to districts;
- Support to development oriented village level organisations able to mobilise the villagers;
- A working relationship between the district service and village level organisations based on shared responsibility and cooperation.

2.4 Implementation of policy

Following a major re-organisation in mid-1993, the majority of Forestry Department staff are now located at provincial and district level, where they are responsible for all field related activities and the supervision of timber harvesting and wood processing. The central office is now responsible for coordination and cooperation, research, training, monitoring, and links with the policy process. The overall trend is towards much greater autonomy at provincial level. (For example, the forest police office and forest protection division formerly had more than 200 staff based at the central office; now all but 18 are in the provinces). This decentralisation allows for a much greater amount of information to be obtained from the field: provincial forest officers must report to the Department every three months. It also facilitates implementation of policy at the local level: 'village foresters' are appointed and trained, according to the draft regulation on 'the stipulation of the role, right and task of the village forester'.

This document states that the village forester will be responsible for managing forestry work in the village, under the village administrative committee. He or she must ensure that policies, plans, regulations, directives and laws on forests are fulfilled, and should provide assistance and training to villagers where necessary. It is also the task of the village forester to monitor slash and burn cultivation and to prohibit burning of the forest. He or she has the authority to stipulate the method and area of highland cultivation or to provide alternative employment: such job opportunities may be created in the management

of natural forests as well as in forest plantation activities, where this is possible. The village forester must also bring information from the village level to the district level, serving to facilitate a two-way flow of information regarding the use of forest land by the villagers.

It is intended that village foresters be appointed in all Lao Theung, Lao Sung and Lao Lum villages according to the draft regulation: typically there will be two or three people nominated for each village. However, the Lao Sung villages are much more remote and practise quite different forms of cultivation: to date, no village foresters have been appointed in such areas.

2.5 Contradictions and ambiguities arising from recent policy developments

Article 3 of Decree No 169 states that it is the duty of everyone to 'regenerate, maintain and develop forests in degraded forest land, non-forest land and bald land'. Article 16 of the same decree describes how families may claim tenure by conversion of degraded forest land to agriculture, forestry and livestock production in order to upgrade the family's living conditions. Given the long term investment required for forestry, and the capital required for livestock production, families are most likely to convert the land to agriculture to supply their subsistence needs. Yet Article 34 of the same decree states that those assigned the management of production forest areas, regenerated forests and degraded forests by forest management contract have the obligation to maintain such forests. Thus the same policy document appears to encourage reforestation of degraded forest, whilst providing a direct incentive to farmers to convert such areas to agricultural production.

Furthermore, given the lack of a comprehensive inventory of the types, areas, stocking, cover and yield of forests in Lao PDR, there is little accurate, up-to-date information to show the exact location and extent of degraded forests. Policy documents state that provinces should carry out land use classification, including categories for shifting cultivation, to show where conversion to permanent agriculture is appropriate, and where rotational cultivation may be the better alternative. However, such classifications have not yet been undertaken and in their absence, it is conceivable that farmers would continue current practices of shifting cultivation, including the burning of areas of forest, and subsequently claim tenure of the newly 'degraded' forest. In this way the policy could lead to increasing areas of forest becoming first degraded, then converted to agricultural production.

Legal provisions of the family forest management contract - assuming these are similar to those stated in the land law of 1991 - are clearly intended to encourage land clearance for permanent agriculture. Indeed, land must be in 'constant use'. This may not be environmentally sustainable, and may also lead to further destruction of forests and the spread of *hai* cultivation, as families seek to supplement their produce from *na* cultivation.

Article 31⁴ of Decree 169 appears to assume that all forms of shifting cultivation lead to destruction of forests, water sources and environment, and offers this as the sole reason for encouraging settled agriculture, although it permits rotational cultivation on allotted degraded or non-forest land. However, it is suggested elsewhere (Colchester, 1992) that the traditional practices of the Lao Theung are largely sustainable; indeed, they have been used in the same areas for long periods of time. This indicates the need to distinguish between differing land use practices (including shifting cultivation) and the different conditions under which they operate in the formulation of policy, and to target policy instruments appropriately, rather than desiring one approach to cover all practices.

The land allocation system allows for five hectares of land per family to be allocated for permanent agriculture and livestock rearing, but in areas where permanent agriculture is not feasible, some degraded forest land is permitted for rotational cultivation. This could encourage large families, in particular, to opt for rotational cultivation to increase the area available for cropping. It could also encourage families to choose to practise both permanent and rotational cultivation. To determine whether this scenario is likely, further information is required on the household economics of the different systems, and the preferences of individual farmers.

⁴ quoted in section 2.3

3 FIELD RESEARCH AND ANALYSIS

3.1 Field research

Field research questions for this study were initially defined by the Lao, Thai and Vietnamese study teams at the first workshop held under this project. Each national team then refined its list of priority issues as research progressed. Research questions used in the Lao study were further refined following the re-organisation of the Ministry and change of research team, in order to examine current pressures on forests, constraints and incentives that encourage changes in land use, and the possible alternative systems available. The questions considered during field work are given in Box 1.

Box 1: Field research questions

- What conflicts have there been over land or forest resources over the past five years?
- What changes have there been in the land use over the past five years? Has the area of *hai* expanded? Is there enough land available to expand the *hai*?
- What are the major pressures on the forest resource in the village?
- Is sufficient food produced for the needs of the village? For how many months is there food security? Where do the villagers obtain food in the 'hungry months'?
- How have the villagers adapted their systems to recent pressures?
- Do the villagers depend on a mixture of *na* and *hai*, or do some depend on only one form of land use?
- How can the different village communities be improved so that they can help develop the village? (eg Women's Union)
- What activities have the villagers suggested for developing their living conditions?
- How would these activities meet the objectives of policy on sustainable forest management and conservation?
- How do the villagers think the new land allocation/ ownership system will affect their land use? How will long-term security affect their decisions?
- How many years have you practised *hai* in the same plot - fallow periods/ rotation?
- Before being used for *hai*, what was the land - forest, grassland etc.
- When *hai* fields are abandoned, what happens to them? If they are abandoned permanently, do other farmers reclaim the fields, is there any enrichment planting by the forest service, etc?
- What are the returns and values of *hai* cultivation (positive and negative)?

Only a limited amount of field research was possible; the difficulty in accessing remote, high altitude areas prevented any direct research in Lao Sung areas. As an example of a more detailed analysis, the result of field research in a predominantly Lao Theung village are summarised in the Box 2.

Ban Lak Sip village is in Phou Pheung watershed, Luang Prabang province. 47 out of the 50 families are Lao Theung. Traditionally the villagers practised mostly shifting cultivation, with a limited amount of paddy cultivation. The village has access to relatively good infrastructure and has received some assistance. The villagers cited the main problems as:

- insufficient flat land to meet subsistence needs from paddy rice; some flat land is uncleared but there is a lack of resources for clearing the land
- erratic and unreliable water supply for irrigation, despite proximity to several streams and springs, especially during the rice growing period
- lack of draught animals due to frequent disease
- the majority of the forest in the area has been destroyed through shifting cultivation over a long period of time
- soil erosion
- lack of marketing facilities and reasonable prices for products.

However, yields from land under shifting cultivation are relatively high (1.6 ton per hectare) due to the high fertility of the forest soil in the first period of land use. The average area cultivated in this way is 0.88 hectares per family, producing an average family yield of 1.41 tons of rice (70 per cent of the subsistence requirement, using government estimates). However, years of low rainfall bring risk of insect infestation, and of those families interviewed, rice production did not meet food requirements. Poor harvests are offset by sale of livestock and non-timber forest products (such as bamboo shoot, mushroom, calamus shoot, rattan shoot, fruit, sweet leaves, edible flower, etc.), or by borrowing paddy rice from relatives. Numerous secondary crops (vegetables, fruit, spices) are planted, and are mainly for consumption within the village. Land available for clearing is becoming scarce, and the government bans clearing in all but low grade forest, where the resulting yields tend to be lower. Following the traditional system, tenure of shifting cultivation land is held only as long as it is cultivated.

In Ban Lak Sip, villagers expressed an increasing need to supplement *na* production with *hai* production to ensure food security, to meet food requirements of an increasing population, and because of lack of flat land on which to expand *na* cultivation. Lack of resources also impeded development of potential new *na* areas. *Hai* cultivation is estimated to contribute 30-45 per cent of staple food production in the village. Labour requirements are complementary so a combination of *na* and *hai* cultivation is feasible. Generally a fallow period of 10 years is required to permit regrowth such that subsequent clearing can permit cultivation at reasonable yields. But about 70 per cent of farmers reported a fallow period of less than 5 years. They know this to be too short, but are restricted by the amount of available land within an acceptable distance from the village.

(contd.)

Box: Ban Lak Sip (contd.)

Since 1985, a development project has been implemented in the area, executed by a branch of the Forestry Department and supported by UNDP and FAO in Ban Lak Sip, based on forest protection and watershed management. Much of the assistance has been in the form of materials and technical expertise. It is suggested that the *na* production is increased through expanding the cultivated area through: distribution of abandoned *na* land; clearing of land; irrigation/ drainage; terracing; and through increasing the productivity through improved techniques and seeds. Thereafter, more advanced technology will be considered. In this project, the improvement and transformation of *hai* cultivation is given equal attention to *na* cultivation. Research is being undertaken to determine ways of transforming *hai* into permanent cultivation, and to increase yields of current *hai* cultivation. The project also promotes the development of agroforestry systems at the fringes of the forest, where shifting cultivation is most likely to occur, in order to integrate shifting cultivation and reforestation and to protect the forest from further encroachment.

Present projections of population increase in this community indicate that even with an expansion of productive land, and an increase in productivity (to feasible limits), the village will not be able to maintain subsistence supplies. It is likely, therefore, that *hai* cultivation will continue to expand.

3.2 Brief assessment of various alternatives to shifting cultivation

In addition to field research at village level, a range of initiatives proposed as alternatives to shifting cultivation were reviewed.

In the effort to stabilise shifting cultivation, various alternative agricultural systems have been tested in recent years. These systems have been tested in only a small number of selected sites, but initial assessments of feasibility and potential sustainability may be made. The initiatives described below have all been implemented in cooperation with, or directly by, the Forestry Department. But so far implementation has been on a very limited or trial scale.

Basin terraces: UNDP and FAO has paid villagers to construct basin terraces. Initially the labour requirement was high and the soil was not sufficiently fertile to grow rice, so beans had to be grown for the first few years. However, the local people's need for rice was not addressed and they abandoned the terraces in order to grow rice elsewhere under shifting cultivation. The Forestry Department is presently trying to encourage people to return to the terraces, but now much weeding is necessary. Only few have returned but, provided with a pig for supply of manure to the terraces, are growing maize, beans and some rice. The land is near to a village and people are likely to return to cultivate the terraces, if they believe that rice can be grown there. But initially this project was unsuccessful as food security was jeopardised and the initial labour requirement was high.

Mid-slope reservoirs/ weir for basin terrace: In Luang Prabang at Nane district, the Forestry Department has assisted two villages of Lao Theung to construct two small mid-slope reservoirs and one large weir. A channel from the reservoir running across the slope enables *na* cultivation to be practised downslope from it, with pigs providing manure above the *na* fields, and fishponds near the base of the slope. Although these villages have been particularly successful, the costs are extremely high and it is not feasible to replicate the model on a wide scale. Construction of the three dams alone cost more than 70 million kip (\$100,000); in addition the villagers were given technical assistance, particularly training in *na* cultivation (since they were traditionally *hai* cultivators) and in marketing.

Agroforestry/ taungya system: There has been much interest at the village level in the taungya system, since the new policy regarding land ownership assures a long term interest in the land. The preferred tree species is teak, with rice and maize cultivated in the early years. This is popular for the long term financial gain coupled with provision of immediate subsistence needs.

Alley cropping system: Alley cropping is probably the most popular alternative to shifting cultivation on the middle slopes. The economic benefits are well known, and after the initial period, the labour requirement is low and soil fertility is maintained. Villagers are now assisted to establish their own small seedling nursery (rather than the Forestry Department distributing free seedlings, which tended to be abandoned or not well cared for). Alley cropping is established on grassland or low grade forest; higher grade forest is not cleared for this purpose. This 'alternative' tends to be the first choice of the villagers.

Mixed systems including shifting cultivation: In some provinces, the Forestry Department is currently implementing a new scheme of mixed land use. The forest area is divided into two sections: protection forest, where villagers are responsible for protecting the forest blocks and from where they may extract dead wood; and forest allocated to families for their own use (as forest), and where they undertake enrichment planting of fruit or fast-growing trees, depending on need and the potential of the land. The Forestry Department provides seedlings for this purpose. Also near the village is an area of mixed *hai* and *na* land, which is likely to be the traditional cultivation area. New *na* land may be cleared by the villagers where possible, or with assistance if necessary. The Forestry Department also provides credit for purchase of livestock. Once the new *na* land is prepared and productive, it may be possible for the old *hai* land to be abandoned.

3.3 Criteria of sustainability

Both the field research and brief assessment of the alternative initiatives described above suggest a number of elements which appear to be central to a land use system which is economically, environmentally and socially sustainable. This research suggests the following 'criteria of sustainability' in land use:

Social and economic criteria:

- Adequate productive land to meet subsistence needs.

- Food security, especially during the establishment of alternative systems.
- Exchange of knowledge among farmers.
- Manageable labour requirement.
- Access to markets and reliable prices for marketed goods.

Institutional criteria:

- Maintenance of community structure.
- Easily replicable model at low cost.
- Land and tree tenure (long term ownership).

Environmental criteria:

- Use of already non-forest land (to reduce clearing of forest for *hai* cultivation).
- Proximity to village and road.
- Adequate water supply for irrigation.
- Draught and domestic animals.
- Improved varieties.
- Introduction of compost for maintenance of soil fertility.

This list of criteria is not exhaustive and not all criteria necessarily apply to all land use systems in areas of shifting cultivation. But the criteria may be used to identify systems that are more likely to be successful in the long term.

3.4 Conditions for transition from shifting cultivation to alternative systems

Farmers practising shifting cultivation are likely to develop alternative, more stable agricultural systems only if there are adequate incentives and favourable conditions for them to do so. In general, any such transition will require some or all of the following conditions and will need to increase sustainability, productivity and equity. This may require some or all of the following conditions:

- Sufficient funds or labour for land clearing, where new *na* land is to be developed
- Provision of seed and other agricultural inputs
- Technical assistance in rearing livestock, cultivating vegetables, etc.
- Assistance in flood protection
- Assistance in marketing (for example in Thong Khang, vegetable production has been promoted such that a surplus is available for sale. The government gives a guaranteed price and provides assistance in transporting the produce to markets).
- Food security during development of new land. This may entail provision of food supplies by the government or donor, but is more likely to imply permission to continue *hai* cultivation until the new system is established.

Experience has shown (for example, during the construction of basin terraces) that an ensured supply of subsistence needs is vital during the transition from shifting cultivation to an alternative system. Only when the new system is demonstrated to be a reliable source of subsistence needs is the farmer likely to forego his or her former system of production, in order to minimise risk. Then, only when individual production increases such that farmers can become surplus rice producers, will farmers be in a position to become diversified commercial crop and livestock producers.

4 RECOMMENDATIONS FOR POLICYMAKERS

4.1 Development potential

There is thought to be significant scope for increasing food production in Lao PDR, should the large irrigation potential be developed. This would also allow for further crop diversification. Improved forest resource management and reforestation programmes would increase the potential for sustained development of high value timber, and enhance the significant export potential for both timber and non-wood forest products. However, such developments are long term measures that require substantial investment. Small scale measures requiring less investment could be implemented in the short term: there is thought to be great potential to increase livestock production, capitalising on the good indigenous knowledge of animal husbandry, and to develop coffee production. Both of these measures could bring increased foreign exchange earnings in the agricultural sector.

Thus systems such as agroforestry, particularly where livestock production can be incorporated, present possible alternatives or complements to shifting cultivation that would serve the national interest whilst meeting subsistence needs. Farmers are more likely to adopt complementary practices that can be used in conjunction with shifting cultivation, rather than abandoning shifting cultivation in favour of an entirely new practice.

However, constraints on development include inadequate physical infrastructure, the prevalence of subsistence farming and barter exchange among the vast majority of the population. As has been noted above, the successful transition to alternative agricultural systems will require certain conditions to minimise risk to the farmer: in addition, the transition to a cash economy and the trading of agricultural products will entail substantial changes in the local and household economy.

4.2 Need for better information and clarity of policy documents

Current policy is based upon information available to the Ministry of Agriculture and Forestry. It is acknowledged that there is a lack of comprehensive information on the natural resources of Lao PDR, particularly trends and changes in resources and land use over time. A clear priority is to undertake/ complete surveys of land use, such as the current national reconnaissance survey. Such surveys should particularly consider the dynamics of land use, such as changes that are occurring and the forces that are causing them.

National surveys would be well complemented by village level information. Whilst the decentralisation of the Forestry Department should lead to much greater exchange of information between the central level and villagers, there is a marked absence of the kinds of participatory methodologies and capacities in the Forestry Department that would facilitate the gathering of information on farmer preferences, needs and constraints. Mechanisms for popular participation in planning, implementation and monitoring the use of forest and agricultural land should be elaborated upon in the regulations for village

foresters, who are responsible for bringing the views and needs of the villagers to the attention of district and provincial forestry authorities.

Better information on which to base policy will serve to minimise assumptions and contradictions, evident in present policy. For example, in the decree addressing the management and use of forests and forest land (decree no. 169), the provision of long term tenure is an incentive for farmers to cultivate degraded forest, yet the stated priority is the protection and regeneration of the forest. A comprehensive survey of which areas are to be protected and regenerated, to contribute to a definition and demarcation of the permanent forest estate, and of which areas are suitable for conversion to agriculture, would avoid such ambiguity. In addition, there is a need for greater clarity in policy documents regarding the conditions under which rotational cultivation may be permitted, and under what conditions conversion to other forms of agriculture is appropriate. It is likely that further research on the agricultural systems themselves will be required for such clarification, in addition to improved survey information. Tools for assessment of land use systems in relation to resources and constraints (such as agroecosystem analysis) may be useful here.

Where conversion from shifting cultivation to settled agriculture does occur, the transition stage will require the greatest assistance. Risk reduction during changing circumstances, and minimisation of uncertainty surrounding new techniques, are likely to be priority concerns for the farmers. Diversification into cash crops has been occurring slowly over the past decade. But farmers are only willing to try other crops in a serious way when they feel secure with a rice surplus.

4.3 The need to distinguish between different shifting cultivation systems and different conditions

It is clear from descriptions of different types of agricultural practices observed in Lao PDR that a universal prescription to 'solve the problem' of shifting cultivation will not succeed. There is wide variation in environmental, social and economic conditions under which each system prevails. The problems under different conditions are of varied types, and under some circumstances problems are not significant. Therefore forestry and agricultural development policy requires different approaches and instruments for each of the three types of ethnic groups and regions, with full understanding of their systems of agriculture, forestry, livestock and land tenure. And, even within each group or region, there is a broad range of conditions and constraints. The newly decentralised approach of the Forestry Department should facilitate the tailoring of responses to the needs at a local level, provided feedback and information from villages, via the village forester, is taken into account in planning.

Better recognition of the differences between systems and regions would also improve the basis upon which policy presumptions are made. For example the policy presumption that shifting cultivation should be minimised because it leads to destruction of forests, water sources and the environment (Article 31 of Decree 169) has been shown to be not necessarily true in all cases. It is widely acknowledged that the traditional practices of Lao Theung are largely sustainable, and it is necessary for policy to recognise this.

The Lao Sung are perceived to represent the biggest problem regarding forest destruction through shifting cultivation. Policy responses to the 'problem' should be tailored to the particular conditions which distinguish Lao Sung farmers from Lao Theung and Lao Lum. But at present, policy is intended to be universal and implemented in all areas. However, the lack of any village foresters in Lao Sung villages demonstrates that a different approach would be appropriate. The remote location, wide distribution of villages, and poor infrastructure preclude control of the opium growing activities, and any long term development of alternative agricultural systems (including income substitution re: opium) would require a high degree of external inputs. In addition, the Lao Sung show extreme reluctance to moving to lower altitudes.

4.4 Intensification of uplands instead of resettlement

Given the large numbers of people dependent on upland cultivation, large scale resettlement and stabilisation would require very large investment and assistance. In fact, it is highly doubtful whether resettlement on such a scale would be physically possible, given the shortage of flat land in the north of the country. Lowland farmers in the north are already experiencing constraints that force them to move to upland areas. Indeed, Bouahom (1991) believes that given the productivity of shifting cultivation, the best option is to let people remain in the mountains, and rather than implementing agricultural models developed for the lowland, intensify existing upland practices.

4.5 Incentives and disincentives

For individual farmers to change their systems of cultivation, incentives are required to offset the risk and uncertainty of the change. At present, some incentives are present or proposed, but disincentives also exist.

Guaranteed prices, such as are provided through a pilot project in Thong Khang, may act as an incentive for production of surplus goods and cash crops. The proposed expansion in small scale irrigation schemes would also assist expansion and intensification of lowland agriculture, and represents a reduction in drought risk for the farmer. But experience shows that such schemes would themselves have to include incentives for farmers to maintain the systems.

The land tenure system can provide incentives and disincentives, depending on the socio-economic conditions of the family, and the potential productivity of the land. Where rotational cultivation is permitted, or even encouraged in favour of pioneer cultivation, there is no limit to the area of land each family may use. Where productivity is relatively high and subsistence needs are met, farmers are likely to continue shifting cultivation in order to maximise their yields. However, if farmers convert to permanent agriculture and the rearing of livestock, they are permitted a maximum of five hectares of land. This may be preferable where technical assistance is given and labour supplies are sufficient, but the five hectares would frequently represent an inadequate area to maintain the traditional economy of upland communities, who are accustomed to customary access to much larger areas, even though not all would be cultivated. Under the land allocation system,

customary rights are not recognised, nor is the variation in potential of the allotted land.

Use of participatory methodologies would provide information on both household economics of different systems and the preferences of individual farmers, so that incentives can be designed appropriately.

4.6 Inputs required for change to alternative systems

At present, the government prevents farmers from continuing with shifting cultivation only where alternative systems can be made available to them. But in many cases alternative systems require substantial investment, which is not feasible countrywide. For example, the government has actively encouraged permanent agriculture in favour of shifting cultivation in the south, where ample lowland is available. In the north, given the lack of available alternative systems and shortage of flat land, rotational shifting cultivation is allowed to continue.

The scope for increasing cultivated land can only be realised with high initial investment and the provision of security to farmers whilst new land is developed. But rather than extending the area under cultivation, the primary increases in output of paddy rice are more likely to come from the increased productivity that results from higher yields and labour efficiency. This, in turn, will require some technical assistance and incentives for farmers to intensify.

Both the Lao government and international NGOs have enabled greater security and diversification at the village level through the establishment of revolving funds. These have been most successful where the initial funds remain in the village, and are allocated in turn and according to need. In some cases, however, the initial funds have been repayable to the donor after a period of time: these have tended to result in lack of long-term investment and security for the village.

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The logo consists of the letters 'IIED' in a bold, serif font. The 'I' and 'E' are connected, as are the two 'D's. The letters are white and set against a black rectangular background.

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