CHAPTER 3 BACKGROUND AND CONSTRAINTS IN LAO AGRICULTURE

3.1 Policy and Strategy of Agricultural Development in Lao PDR

3.1.1 Overview of Agricultural Development and Performance

Agriculture is the main economic activity in Lao PDR and covers a wide range of activities from subsistence production to agriculture related industries. In 1999, the sector accounted for 53% of Gross Domestic Product (GDP). Rice remains the most important crop accounting for about 20% of national GDP and 53% of total agricultural outputs but its share is gradually declining. Livestock rearing is the next most important agricultural activity and in 1999 accounted for 34% of output. Commercial crops contributed 14% of output. Over 80% of the population live in rural areas and are engaged in agricultural activities that include livestock, forestry and fisheries.

Table 3.1 Gross Domestic Product 1999

GDP Share	1999 (Kip million)	Percentage of GDP*	
Agriculture (of which)	5,541,551	53.4%	(100%)
Paddy	2,132,727	20.5%	38.5%
Other Cereals	120,625	1.2%	2.2%
Commercial Crops	796,592	7.7%	14.4%
Livestock	1,889,621	18.2%	34.1%
Fisheries	78,098	0.8%	1.4%
Forestry	523,888	5.0%	9.4%
Industry	2,333,009	22.5%	
Services	2,421,964	23.4%	
Unallocated	74,989	0.7%	
Total GDP (1999 prices)	**10,371,513**	100 %	

* Percentage Share of Agriculture GDP in parenthesis.
Source: RTM7 documents

Recent Performance

Until very recently, agriculture was unable to meet the needs of the growing population and provide a consistent surplus for export and animal feed. Food production per capita declined in individual years. The incentive structure was not conducive to agricultural growth with deteriorating terms of trade for agriculture, poor transportation network, poor animal health coverage, and the lack of a national research and extension system. Since 1990, and particularly since 1996, the trend has improved markedly. This is partly due to the market orientation of NEM and partly due to large investments in dry season cultivation under the National Pump Installation and Management Program that led to strong growth in paddy output.

The share of agriculture in Gross Domestic Product (GDP) has fallen slowly but steadily while agriculture's share of GDP continues to fluctuate widely due to the influence of weather conditions. The declining share of agriculture is to be expected because of the relatively large rate of urbanization and the relatively high growing rates of the manufacturing and service sectors. But the declining share of agriculture has also been due to the relatively slow growth in many sub-sectors within agriculture. Particularly before 1997, this has resulted in small increases or actual decreases in per capita food availability.

Performance of Sub-Sectors

Within the agriculture sector the contribution of forestry varied widely over the past ten years depending on the government policy relating to concessions and export policy as well as the fluctuations in price for logs and timber products. The contribution of forestry has actually declined since 1996. Livestock and fisheries increased substantially due to market incentives under NEM. However, the rate of increase has now slowed down partly due to the reported growth of unrecorded border trade.

Table 3.2 Agriculture Sub-Sector Growth Rates – 1994-99 in 1999 Prices

(Unit: %)

	1995	1996	1997	1998	1999	Average
Paddy	0.1	0.3	16.2	1.3	15.1	6.4
Commercial Crops	6.0	10.1	9.8	17.9	15.8	9.5
Livestock	3.7	2.8	2.4	2.5	1.7	1.5
Fishery	3.0	5.3	5.0	5.0	5.0	5.5
Total Agriculture	**3.1**	**2.8**	**7.0**	**3.1**	**8.2**	**4.8**

Source: RTM7 documents

Rice and Livestock

Rice production registered declines in the period from 1990-96 but has since registered strong growth, mainly due to the substantial investments in installation of water pumps made in recent years and favorable weather. This trend could continue over the next few years if weather conditions are favorable. Livestock populations in all categories continue to increase, particularly for cattle, pigs and poultry. Overall, provided weather conditions remain favorable, increased agricultural production could be expected to grow faster than population increase insuring food self-sufficiency.

Commercial Crops

The commercial crops, mainly coffee, sugar cane, tobacco, peanuts and cotton have shown a steadily increasing trend both in terms of yields as well as areas planted

and overall have shown a rapid growth in value added over the past five years of around 10 % per annum. Prospects for further increase in yields are favorable.

3.1.2 Government's Strategies for the Agriculture Sector

The overarching development goal is to liberate the country from the group of least developed countries (LLDC) by the year 2020 through sustainable and equitable development. The GOL's National Socioeconomic Development Plan for 1996-2000 (4th five year plan) launched eight national priority programs within these objectives: (i) food production ensuring food security; (ii) stabilization/reduction of shifting cultivation; (iii) commercial production; (iv) infrastructure development; (v) improved socio-economic management and foreign economic relations; (vi) rural development; (vii) human resource development; and (viii) service development. The implementation of these programs on a step-by-step basis is a prerequisite to attain its long-term objectives. The 5th five year plan for 2001-2005 published in March 2001 also incorporates the same programs (see Section 2.2).

The agriculture sector incorporates all the eight programs, with slightly less emphasis on national infrastructure development and national services development. In 1998, based on the national priority programs, the MAF produced a development strategy to the year 2020 (Vision 2020)[1/] presenting six programs which are being or will be implemented through specific plans, projects and activities. They are: (i) food production; (ii) commodity production support; (iii) stabilization/reduction of shifting cultivation; (iv) irrigation development; (v) agriculture and forestry research; and (vi) human resources development.

Vision 2020 was followed by the ADB assisted "Lao Agricultural Strategy Study" and this study provided MAF with the basis for "The Government's Strategic Vision for the Agricultural Sector" (Strategic Vision)[2/] finalized in December 1999 with a review at the Donor Round Table Conference in November 1999. The Strategic Vision is now the GOL's agricultural strategy on which the operational action plan is based.

The Strategic Vision presents a two distinct zone oriented approach; the flatlands along the Mekong corridor and the sloping lands. Since 1994, both areas have followed divergent paths of development. The Mekong corridor has entered a period of transction to market oriented agriculture, while the mountainous areas, occupying 80% of the country, remain basically in subsistence agriculture

[1/] Summary text of Vision 2020 is presented in Appendix 2.

[2/] Summary text of Strategic Vision is presented in Appendix 2.

dominated by acute rural poverty. The divergence between the Mekong corridor and the sloping land economies needs separate agricultural and rural development strategies. However, both strategies target further market expansion and market oriented development. The Strategic Vision gives a clear direction to the development strategies for both zones as stated below.

For the Mekong corridor, the strategy is to maintain and accelerate the pace of agricultural diversification and intensification with increased productivity per unit area, improved value added processing and expanded marketing and sales. Market forces are now driving this process. Policies and strategies should support and maintain the pace of market integration in the flatland areas and gradually expand the market economy to the sloping lands.

The sloping land present a different set of problems due to remoteness, inaccessibility, endemic rural poverty, poor credit and capital accessibility and other factors. These include all the problems of transforming shifting cultivation farming systems away from "low-input/low-output" regimes to ones that will stabilize communities, enhance resources productivity, improve the socio-economic environment and minimize the degradation of the natural resource base. With increasing population densities in the sloping land areas, the present farming systems inevitably condemn these people to continued poverty.

The Strategic Vision suggests the specific development initiatives for the both areas, respectively, and these are summarized in Table 3.3. In conclusion, the Strategic Vision developed Seven Thematic Approaches. The respective themes are directly linked to Lao PDR National Programs[3/]. The Thematic Approaches are:

1) the planning approach: MAF planning and decentralization;
2) human resources development;
3) business regulatory adjustment;
4) external trade;
5) flatland transformation;
6) sustainable sloping land development and environmental management/ shifting cultivation stabilization; and
7) irrigation.

[3/] See Appendix 2

Table 3.3 Specific Development Initiatives for Flatland and Sloping Land

Flatland Strategic Initiatives	Sloping land Strategic Initiatives
(1) Improving and diversifying farming systems with increased and intensified cash crops, livestock and fisheries production (2) Expanding and intensifying value added processing enterprises through promoting local and direct foreign investment in agro-businesses (3) Government and private sector sponsored market research, market information systems and regional marketing links between producers and wholesale and retail buyers throughout the region (4) Developing internationally accepted product grades and standards; (5) Strengthening and expanding rural credit facilities through free competition and market determined interest rates (6) Supporting and strengthening rural and agribusiness lending by State Owned Commercial Banks (SOCBs) and private commercial banks (7) Rehabilitating, expanding and intensifying dry season irrigation schemes with participatory community based management	(1) Land-use zoning based on bio-physical (e.g. slope and land capability) and socio-economic parameters (2) Participatory land allocation and land-use occupancy entitlement (3) Community management of natural resources (4) Farming systems diversification and agro-forestry development through adaptive research, trials and demonstrations on farmers' fields (5) Expansion of small-scale community managed irrigation systems (6) Farmer demand-driven extension (7) Sustainable land-use management with soil erosion control, afforestation, plantation forestry and conservation management (8) Rural savings mobilization and micro credit extension (9) Competitive rural finance system development with market determined interest rates in most areas and subsidized rates in some areas to promote technology adoption among the poorest socio-economic strata (10) Strengthening of capacity and legal framework of state-owned commercial banks in commercial and banking transactions (11) Opening community market access through feeder road upgrading and expansion and market information delivery

Source : the Government's Strategic Vision for the Agricultural Sector, MAF, December 1999

3.2 Present Conditions and Constraints in Lao Agriculture

3.2.1 Natural Resources and the Environment

(1) Water Resources

Annual rainfall ranges from 1,300 mm to 3,300 mm nationwide. Rainfall of more than 2,400 mm/year is found in two regions, (i) the northern and eastern area of Vientiane Province to the western area of Borikhamxai Province and (ii) the Boloven Plateau. The annual rainfall in the region from Xaignabouri Province to southern area of Louangphrabang Province is only around 1,300 mm/year. There are 35 meteorological stations and 135 rain gauging stations over the country. Of 135 stations, about 40% function properly and about half of the non-functional stations are in the northern mountainous areas.

The water resources in Lao PDR are vital not only to the country, but also for the whole region. Almost all of Laos is situated in the Lower Mekong Basin with 24

major rivers flowing into the Mekong, while two major river basins, occupying about 10% of the Lao's land, belong to the Vietnam's river basins. Hydrological observation stations are installed at 89 sites on the Mekong River and its main tributaries, however about 30% stations are closed or not in operation. The hydrological records on the Mekong tributaries are much shorter and most stations are located in the lower reaches. At present there is no accurate estimate for the total runoff from the country.

An attempt has been made to assess the mean annual runoff from the major rivers based on annual runoff ratio, surface runoff to basin rainfall, estimated from available hydrological data on nine major river basins. The average runoff ratio is estimated to be 0.55, although it ranges widely from 0.2 to 0.8. Thus, the total mean annual runoff of major rivers is roughly estimated at 229,900 MCM, of which the runoff from the major Mekong's tributaries is estimated at 214,500 MCM.

The monthly distribution of the river flows closely follows the rainfall pattern with about 80% during the rainy season (May - October) and 20% in the dry season from November to April. For some rivers in the central and southern parts of the country, the flow in the dry season decrease to about 10 to 15% of the annual flow. This results in acute shortages of irrigation water.

(2) Forest Resources.

The forest area has been gradually declining over the last 20 years with the loss of about 1.5 million ha or 8% since 1982. This is caused by increased permanent and rotational arable agriculture (0.5 million ha) and forest cleared for timber and shifting cultivation (0.9 million ha). The driving forces behind these land-use changes are population increase and poverty. Increased agricultural productivity did not keep pace with population growth, resulting in the gathering of products to make up the food deficit or to earn cash to buy rice. The GOL encouraged the sale of sawlogs, timber and wood products in order to earn foreign exchange to purchase rice.

A DOF's report in 1992[4/] estimated the areas under permanent agriculture and shifting/rotational cultivation in the years 1982 and 1989 as shown in Table 3.4.

[4/] Forest Cover and Land Use in Lao PDR/Final Report on the Nationwide Reconnaissance Survey" (Report No.5)

The same agricultural land use in the year 2000 is roughly assessed to be 1,130,000 ha and 680,000 ha, respectively, thus totaling 1,810,000 ha, taking the increase in population, land use trends between 1982 and 1989 and other relevant land use surveys into consideration. These figures differ significantly from government agricultural statistics and census figures.

Table 3.4 Agricultural Land Use in 1982 and 1989

Unit : 000 ha

Agricultural Land Use	Year 1982	Year 1989
Permanent agriculture	708.7	849.5
Shifting/rotational cultivation	597.4	625.6
Total	1,306.1	1,475.1

Source : DOF in 1992

Although some of the assessed shifting/rotational cultivation area (680,000 ha) may include fallow, it is four to five time the area given in the Census and MAF's statistics areas (about 152,000 ha). In 2000, there were an estimated 340,000 families living in upland rural areas (2.06 million people), and while some of these families have paddy land, the bulk grow dryland rice. The average dryland rice holding according to Agricultural Statistics is, therefore, 0.45 ha. per farming family. This should be compared to the paddy land holding in flatlands of 1.28 ha. This is nearly three-times greater than for dryland rice, yet on average dryland rice productivity is half that of paddy land. Thus, the Agricultural Statistical data on dryland rice area seem anomalous. There is an urgent need to obtain more accurate statistics, so that a correct diagnosis can be made and an appropriate prescription formulated.

Most forests and potential (degraded/recovering) forest areas are important grazing lands for cattle, buffalo and sheep and forage areas for pigs, especially after farm residues have been exhausted. The government has ambitious plans to expand animal numbers and some improved pastureland will come from these areas. They also provide food and other NTFP to farming families. Therefore, the natural forests play an important and integrated role in the farming system.

(3) Soil

Most soils in Lao PDR are acidic and poor in minerals and organic matter. In total, 38 soil types have been identified based on the FAO-UNESCO system. Five major soil types occupy about 74% of the land, i.e. Ferric acrisols (28%), Humic acrisols (20%), Ferric alisols (11%), Humic alisols (7%) and Ferric lixisols (8%). In general, these major soils are acidic, with pH values 4.0 or less, have a comparatively small cation exchange capacity (CEC) and have a shallow layer of suitable soil for agriculture use. The soils that are appropriate for agriculture are Luvisols (10%), Dystric cambisols (5.0%), Eutric cambisols (4.2%), Leptosols (1.9%), Fluvisols

(1.3%) and Gleysols (0.5%). Together these soils cover about 4.8 million ha with slopes less than 30%. They are found in alluvial and depression areas along the Mekong river, and other river basins. The soils are neutral to alkaline and have a good CEC with a favorable organic matter content.

(4) Natural Resources as Farm Inputs

There are certain natural resources found in the country that are of actual or potential importance to agriculture. These are limestone (Ca), gypsum (Ca), dolomite (Ca/Mg), sylvite (K) and rock phosphate (P). Calcium (Ca) when added to acid soils increases the pH, elevates the cation exchange capacity and releases such elements as P. Phosphorous (P), potassium (K) and nitrogen (N) are essential minerals for plant growth. There are many nitrogen fixing plants, and together with compost, dung from domestic animals and guano from bats droppings a supply of NPK can be obtained from all these sources.

(5) Environment.

With a large forest cover at 10.7 million ha or 45% of land area and an additional 10 million ha of potential forest, Laos is rich in biodiversity. It is one of the few areas in SE Asia where there are large blocks of forest still intact. From a global environmental perspective Laos is a very important country. This is why the Government has created 20 National Biodiversity Conservation Areas (NBCAs) covering over 3.4 million ha. Two mammals have recently been discovered in the forest of the central region, namely the Saola (Pseudoryx nghetinhensis) and the Giant Muntjac (Megamuntiacus muntgak). They are as yet undiscovered flora and fauna species; this emphasizes the global importance of the forests and the NBCAs.

Between 1990 and 2000, it is estimated that 335,000 ha of forests have been converted to arable agriculture and 37,000 ha to grasslands. In addition another 33,000 ha of forest has been cleared for dam construction or have been flooded with a small area converted to agriculture in compensation for agricultural land being urbanized. Thus, an estimated 405,000 ha of forest land were lost to agriculture etc. between 1990 and 2000.

Some of this area was on sloping land and some was close to rivers. Also, some shifting cultivation clearing occurred in NBCA and some was in watershed areas. Therefore, there is a negative environmental impact from clearing such areas. Again some agricultural practices leave much to be desired. These include:

- farming on steep slopes without taking precautionary measures such as terracing or contour ploughing;

- not taking precautionary measures such as planting strips of grass and or trees along the contours to prevent erosion and to build up a terrace;
- farming in close proximity to streams and rivers, thus exposing the river banks to erosion. In this regard, most gallery forests along river have been destroyed;
- unplanned expansion of farming sometimes in pristine forest areas and with little salvaging of valuable tree species;
- moving into wetlands for rice production;
- inappropriate irrigation application, thus making some soils saline;
- clearing old grass in grazing areas by burning, this can set off uncontrolled fires, kill young seedling and destroy wildlife habitat; and
- shortening the shifting cultivation cycle.

There is need to draw together all the best agricultural practices and publish them in the form of extension manuals, leaflets and poster and make them available to all interested parties.

3.2.2 Institutions and Organizations

(1) Central Organizations

Several government agencies are involved in agriculture and rural development at the central level. The State Planning Committee (SPC) is the secretary agency for the council of ministers for coordinating development activities and budgeting, and it prepares guidelines for project proposals. The Committee for Investment Cooperation (CIC) presents aid programs for donors and is responsible for the allocation and coordination of aid. The Central Leading Rural Development Committee (CLRDC) is the primary organization for "the Focal Site Rural Development" program. The MAF is responsible for making strategies and plans for agricultural production, issuing laws and regulations on agriculture/forestry, and for technical and scientific agricultural research. There are 11 organizations under the Ministry of Agriculture and Forestry as shown in Figure 3.1. The main functions of each organization are given in Table 3.5. The Ministry of Finance (MOF) is responsible for issuing guidelines on tax collection, for the preparation of detailed draft state budgets, for projecting revenue and expenditure and for detailed budget reconciliation. The Ministry of Commerce and Tourism (MCT) is in charge of agricultural products trading both in foreign and domestic markets. The Ministry of Industry and Handicraft (MIH) is in charge of agro-industries and handicraft such as spinning and weaving. The Lao Women's Union (LWU) is in charge of women's and gender issues and it aims to promote equality between men and women; it implements some small projects such as of handicrafts and micro-financing in rural areas.

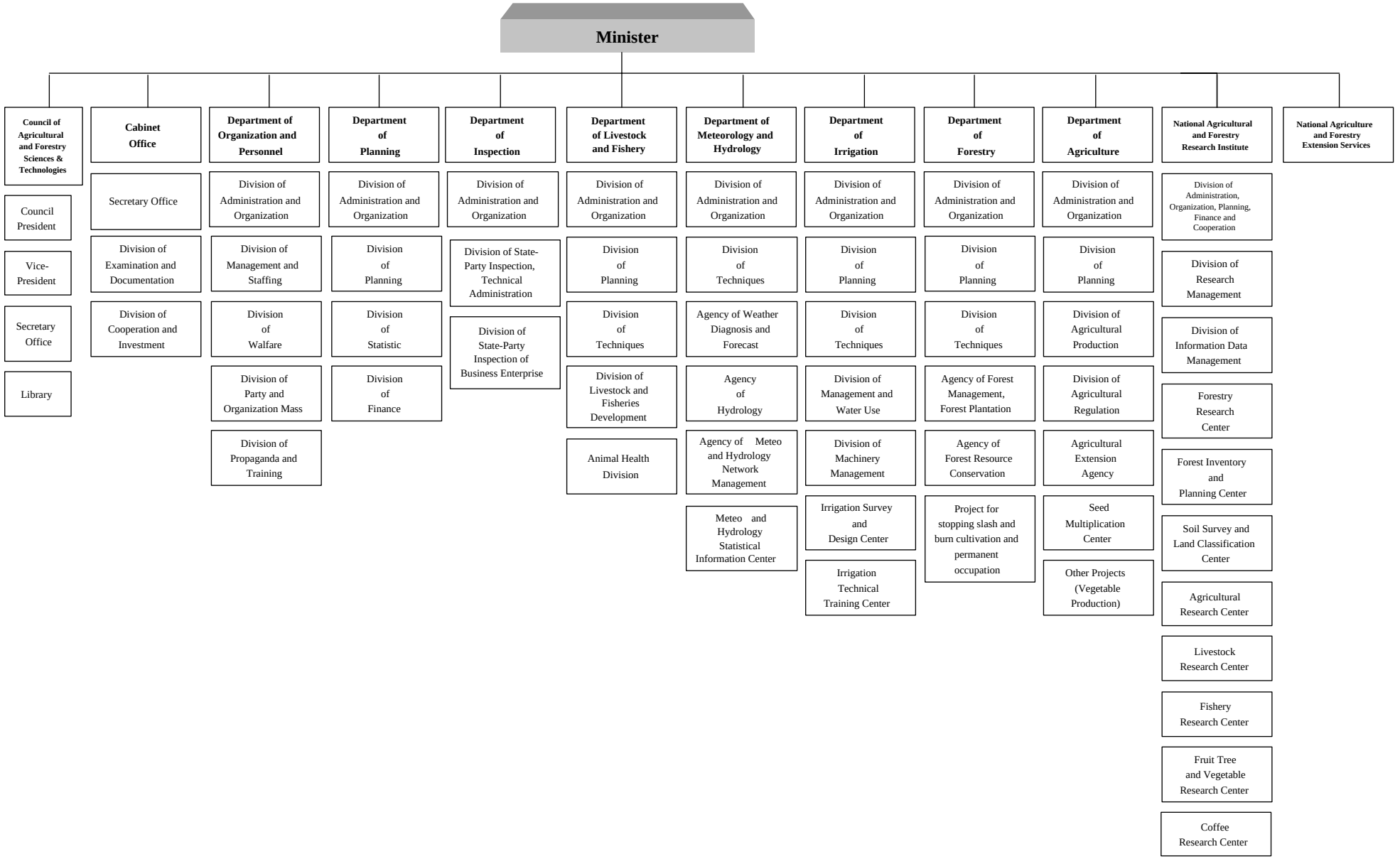


Figure 3.1 Organizational Structure of the Ministry of Agriculture and Forestry(MAF)

Table 3.5 Functions of Departments and Institution of MAF

Organization	Function
Cabinet Office	- To participate in committees to form plans and to summarize MAF activities weekly, monthly, quarterly, and yearly. - To study technical documents, laws policies and regulation for proposing to the minister. - To study and approve documents of regulations and decisions proposed by PAFS, DAFO before submit to the minister to approval. - To coordinate with international agencies, foreign organizations and NGO's on cooperation in the agricultural sector.
Department of Organization and Personnel	- To improve and to strengthen party members in political activities. - To monitor party activities and report to the MAFs' party committee. - To support and to supervise mass organizations. - To cooperate with other departments, divisions, units, sections to open meetings, workshops and training courses on technique and other professional subject inside the country and overseas. - To administer incentives and welfare systems to the staff and target group.
Department of Planning	- To activate the party's and government's policies and strategies on agriculture and forestry. - To plan a long-term and a five year plan. - To plan and manage spending on agriculture and forestry in all regions. - To coordinate with the ministry of finance to promote and to get approval on an annual budget for the agriculture and forestry.
Department of Inspection	- To control party, and government units and monitor private organizations under MAF. - To monitor implementation of agricultural and forestry development projects to control input-outputs and budget spending.
Department of Agriculture	- To study and propose policies for agriculture development in the short, medium and long terms and the 5th years plans - To analyze production, socio-economic and marketing data for agricultural development. - To study policies to support agriculture business units and production groups. - To manage training courses on extension, production group management, farm business management, economics and marketing for technical staff and farmers. - To regulate production, and marketing of farm inputs and machinery. - To study and to plan agricultural land use, crop protection and land holdings.
Department of Irrigation	- To study, regulate, plan and monitor irrigation, drainage, flood and drought protection development. - To form and manage regulations and technical standards for survey and designing. - To supervise, monitor and evaluate construction work. - To study and make regulations for operation and maintaining irrigation systems. - To supervise water user groups. - To formulate regulations for machinery/equipment operation and maintenance of irrigation projects.
Department of Meteorology and Hydrology	- To make weather forecasts, water level measurements and broadcast this information. - To summarize, analyze and publish data on meteorology and hydrology to help plan the national social-economic development.
Department of Forestry	- To formulate short, medium and long term forestry development plans in accordance with the Government's policies and strategies. - To monitor and evaluate forestry development projects. - To make laws and regulations for the forestry sector. - To manage forest planting, extension and forest industries. - To implement plans for forest conservation, forest protection, aquatic flora and fauna conservation and water resource development. - To reduce shifting cultivation and to induce permanent settlement of farmers.

Source : MAF

(Table continued)

Table 3.5 Functions of Departments and Institution of MAF (continued)

Organization	Function
Department of Livestock and Fisheries	- To make short, medium and long term livestock and fisheries development plans in accordance with government's policies strategies and guideline. - To formulate regulations and technical standards for livestock and fishery. - To extend technologies for animal/fish raising and processing. - To supervise and to support animal/fish raising station, training centers and other business sections related with the livestock and fishery department. - To control and look forward to reduce and eradicate strategic disease.
National Agricultural and Forestry Research Institute	- To study natural resources and socio-economy to make master plans for land use and agriculture and forest development plans by zones. - To study, research and make experiments regarding agriculture, forestry, livestock and fisheries for supporting integrated agriculture, food production and commodity production programs. - To extend information and technologies on agriculture for priority plans for other departments and for the agriculture extension services.
Council of Agricultural and Forestry Science & Technologies	- Review and approve agricultural research activities. - Collection of information on agricultural technologies. - Coordination with related agricultural science department and technologies development.
National Agriculture and Forestry Extension Services	- To provide extension services and disseminate agriculture & forestry technologies in the pursuit of achieving the government goals. - To study and adopt regulations, methods and policies in relation to agriculture and forestry extension. - To deliver and transfer the adapted technologies to end users and feedback all shortcomings to technology generation institute. - To provide training of different levels. - To provide inputs for agriculture and forestry production if necessary.

Source : MAF

(2) Local Organizations

Provincial Governors are primarily responsible for agricultural and forestry projects in provinces. Departments or units of line ministries provide consultative services to Governors. The Provincial Agriculture and Forestry Services (PAFS) is in charge of planning and enforcing regulations and laws for agricultural production in each province. Their actual main activities are monitoring the progress of projects, irrigation projects in particular, and providing consultative services to governors in connection with Focal Site development and agri-businesses within provinces. PAFS are not involved in activities concerning agricultural marketing and agricultural financing. PAFS have six departments; (i) cabinet, (ii) agriculture/ extension, (iii) livestock/fisheries, (iv) forestry, (v) irrigation, and (vi) meteorology/ hydrology. The director of PAFS is responsible to the Minister of Agriculture and Forestry and the Governor of the province to which the PAFS belong.

The District Agriculture and Forestry Offices (DAFO) have five sections; (i) administration, (ii) agriculture/extension, (iii) livestock/fisheries, (iv) forestry, and (v) irrigation. The director is responsible to the district chief and the provincial director of the PAFO. The main activities of the field staff are monitoring irrigated paddy (crop/extension); vaccination, meat inspection and data collection

(livestock); monitoring of irrigation construction/ rehabilitation projects (irrigation); and in the forest sub-sector inspecting wood processing factories, monitoring forest products and overseeing forests/wild animals.

The Village Administrative Authorities pass on to farmers instructions, regulations, laws and information related to projects in agriculture and forestry. The village head is responsible to the district chief and district units of the central government. Village heads are the only officials subject to direct election by the people. Remuneration for village administration members are minimal, and other members work without remuneration. There is no budget for village administration, though they have to collect various taxes from villagers such as VAT from animal and crop sales, land tax, irrigation service fees, etc. However, the decentralization of the budgeting and planning systems allows villages to make their own plans and budgets under the supervision of the district authorities. This process is on-going nationwide. Village authorities have to report various statistics weekly, monthly, and quarterly to the district authorities. In the case of agriculture, village heads have to collect data on irrigated crops weekly and animals or crops monthly in addition to data for other sectors such as education, health, security etc.

(3) Farmers' Organizations

There are many formal and non-formal farmers' organizations established under donor assistance projects, credit programs, and government development initiatives. The most progressive organizations are the water users' organizations. Non formal organizations called "groups" have been formed under the guidance of the village authorities or under the village organizations for specific income development activities.

(a) Cooperatives

There are no agricultural cooperatives at present; this is mainly a result of past experiences.[5/] In early 1978, a decision was made to collectivize Lao agriculture through the formation of village-based cooperatives. By mid 1979, the cooperative program was brought to a halt and by the end of 1980 only 60 out of 2,500 cooperatives retained an organizational basis. Membership was to be voluntary but, in fact, it was compulsory and members had to hand over their land to the cooperatives. This system was in direct conflict with virtually every aspect of traditional Lao society. In July 1979, the program was effectively abolished due to complaints, prospects of a severe food shortage, continued

[5/] TA No.2883-LAO Agriculture Strategy Study, ADB/MAF, December 1998.

movement of people to Thailand and the need to reduce opposition to the program from peasants. A second effort was made at establishing cooperatives, but more for the provision of inputs and marketing surplus production. The Cooperative Department of the then Ministry of Agriculture, Irrigation and Cooperatives was put in charge of all matters concerning agaricultural cooperatives. However, implementation of the NEM basically halted any further efforts at collectivization through cooperatives.

(b) Water Users' Association (WUA)

A water users' association (WUA) is a formal farmer organization, which acts as a juristic entity. Despite their legal independence, the WUA is also a communal organization. Therefore, it is governed by a steering committee representing village administrative authorities of all the villages located in the irrigation scheme. The WUA management committee, which is elected by the WUA's General Assembly, operates the irrigation scheme. In 2001, there are 453 WUAs for 1,706 irrigation schemes in the country.

The WUA is not only responsible for the operation and maintenance of the irrigation schemes, but is also responsible for the procurement of inputs, credit for agriculture production of its members, and for the marketing of farm products. With their legal status, the WUAs have the right to undertake business ventures with the APB/SOCB and trading companies. About 10% of the WUAs deals with marketing of inputs and produce.

Irrigation public assets (pump, headwork, canals and structures) are fully transferred to the associations and the irrigation system is under the full responsibility of a WUA. An Irrigation Service Fee (ISF) system is introduced in order to recover running costs and provide capital for future investments. The WUAs are in the process of increasing their Irrigation Service Fee (ISF) to cover all O&M costs, and to contribute to village revenues.

Despite the establishment of WUAs through a stepwise process developed by the government, the associations are still young and need further strengthening. The balance sheet and reports of these WUAs have not been properly audited and there has been very limited support from PAFS and DAFO. APB is also hesitating to provide medium and long term credit to the associations. Firstly, due to the precarious legal status and lack of financial transparency of these organizations, and secondly, because APB is lacking funds to provide credit.

(c) Water Users' Groups (WUG)

Water users' groups (WUG) have been established by village authorities in all the irrigation schemes constructed with the assistance of DOI and PAFS. WUGs are established under the directive of DOI for the operation and maintenance of the irrigation schemes. The WUG organization is a village driven organization headed by the chief or deputy chief of the village. For an irrigation scheme covering more than one village, the WUG committee includes members of all villages. The village that has most land/members takes the lead and chairman position. The by-laws and articles of association are drafted by the PAFS of each province. The organization chart of a WUG is similar to a WUA but with less functions depending on the size of the scheme.

In the case of a WUG, the responsibility for the operation and maintenance of the irrigation scheme has been transferred to the farmer's organization. The WUG operates and collects water charges from the farmers. Water charges in most schemes are structured to cover electricity or fuel expenses (in case of pump scheme), cost of mechanical operations and maintenance, and a fee for the pump operator. In some of the schemes, fees for a water master and a premium for the WUG committee members are also included. In the case of WUG, the public irrigation assets still belong to the government. For major repair, WUGs get assistance from PAFS.

In the organization chart of WUGs, the water block groups are called production groups. However, the groups function is mainly for water management. The function of "production grouping" is very limited. Farmers cannot obtain funds to buy fertilizers and other inputs for production and still have to sell their own farm products.

In the long run, WUGs that rely on the village status to manage and operate irrigation system would not be legally reliable to undertake any obligations i.e. to borrow from APB. This is because the function of the village authority as a social administration does not conform to the business status of a farmers' organization.

(d) APB Credit Groups

Credit groups have been established by APB to provide loans to groups of farmers (5 to 10 families). The APB credit groups are formed for seasonal (short term) loans. They are heterogeneous, therefore they are not composed of the same persons when they are reformed again. The APB credit groups only

borrow money to cover short term requirements and pay it back at the end of each harvest. After payment is made the groups disband.

No support is provided by APB to the credit groups in term of information about the use of the supplies (fertilizer) and equipment. However, PAFS and DAFO provide some limited technical information concerning the appropriate use of fertilizers and equipment.

(e) Revolving Funds Groups

These groups are formed through revolving funds programs or credit programs in donor assistance projects (IFAD, Lao-Swedish Forestry Program, SIRAP, Namthan Irrigation etc.). Most of the revolving funds and credits are targeting village income generating activities such as weaving, chicken and pig raising, and other small cottage industries. The funds are provided to a village and are managed by a committee. Revolving funds groups are of small size (5 to 15 families). The loan amount is small (50,000 to 500,000 kip per families depending on the project).

(f) DAFO's Farmers' Production and Contract Groups

DAFO has organized farmers into production groups for growing particular crops or for undertaking irrigated agriculture. It is a kind of intermediate group before encouraging the farmers to form a WUG. It is observed that these groups are not viable and disappear as soon as support from DAFO is stopped . Contract farming groups are organized for particular cash crops such as tobacco and coffee. The Lao Tobacco Company makes contracts with group of farmers to grow tobacco. Coffee groups make contracts with the Coffee Association, which represents state and private enterprises in the coffee business. The contract-farming groups obtain loans from APB as legal credit groups.

(g) Other Buying and Selling Groups

Livestock buying and selling groups have been established in some provinces by the district authorities or by the Provincial Food Supply Company. A group is contracted by the company to buy cattle, pigs and poultry from the village and sell them to the company for specified prices. Usually, the group is formed of three to five small village entrepreneurs who also have the right to borrow money from APB as a credit group. Nonetheless, APB has provided few loans to buying and selling groups. Similar organizations are organized for the procurement of rice for the Provincial Food Supply Company. These groups are formed by rice-mill owners and mechanical rice-threshing machine owners.

(4) Main Institutional Issues

In the market economy, the government's role for agriculture is to provide supporting services to farmers and consumers. There are at least three conditions for the proper functioning of the market economy; the rule of law, a guarantee of property rights, and free economic activities. The rule of law restricts arbitrary government intervention in economic activities such as arbitrary taxing, forfeiture, penalty charging, establishing monopolistic enterprises, price controls, movement controls and canceling of land use right. In this regard, several institutional issues need rectifying to propel the market economy and invite more investments.

(a) Unpredictable and arbitrary local taxing

Provinces have a mandate to determine detailed items to be taxed and to determine tax or penalty rates, based upon the generic decrees or instructions from the central government. The implementation of such decrees and laws depend upon the local enforcement authorities. All regulations are not necessarily enforced. The degree of economic freedom varies between provinces. Some provinces are very liberal and some very authoritarian.

(b) Price controls

Agricultural marketing has not been fully liberalized. Prices of rice and meat are controlled by the government. The central government sets allowable price ranges for rice and meat. Actual prices are determined by the respective provinces. Maximum prices are found mostly in the Vientiane municipality and lower prices are fixed in smaller provinces.[6/] There is a quota system for livestock trading in some provinces. For example, in Louangphrabang province, only one license per district is issued due to the limited tradable livestock. The movement of rice and livestock between provinces is strictly controlled by local governments through transport permits.

(c) Lack of working judicial system

The rule of law is still weak. Protection from arbitrary government actions is supposed to be covered by law. But, the judiciary system is weak. There are only 24 attorneys at present, and each attorney handles ten to fifteen cases a year. Only one judge is stationed in each province. Suing the government is very rare. Court procedures are time-consuming and judicial costs are high, ranging from 0.5million to a million kip for a small case and five million kip for a large case. Common people have difficulty in using the judicial system for solving disputes.

[6/] Examples of price variations of rice and livestock are presented in Section 3.2.8.

(d) Restriction on crop selection

Crop selection is sometimes controlled. There are cases of strong guidance from the central and local governments. For irrigated fields for example, farmers are obliged to plant paddy regardless of its economic viability.

3.2.3 Land Tenure

(1) Background

All land belongs to the state, but since the late 1980s the Government has taken legal steps to broaden access to land use rights. In 1991, a constitution was adopted which enshrined the principle that land belongs to the state, but individuals are guaranteed its use. There are legal measures to ensure access to land such as the Forestry Law (FL) and Land Law (LL) promulgated in 1996 and 1997, respectively. Under these laws land use rights can be inherited, transferred, or leased, all of which are legitimately recognized by the State provided the land is registered and land tax is paid [7/].

Traditionally, land tenure agreements were made between families or through the village chief and there were no restrictions on how much land a farmer could claim. Likewise, land tenure could be obtained, for example, by farmers clearing and cultivating a piece of land with the rights remaining during the fallow period; this is still practiced in certain villages in remote areas. Population pressure, however, has led the government to create a legal framework to mitigate conflicts among villages over village boundaries. At the same time, in order to establish sustainable land use, legal land use rights are allocated to individuals through a land allocation process, which has been underway since the early 1990s.

(2) Land Tenure and Management

Individuals and families may receive allocations of land for agricultural purposes and this is defined as follows (LL Article 17):

i) up to 1 ha per full-time family labor unit for rice and fish farming;
ii) up to 3 ha per full-time family labor unit for commercial crops;
iii) up to 3 ha per full-time family labor unit for an orchard; and
iv) up to 15 ha per full-time family labor unit of deforested land or grasslands for pasture[8/]

[7/] Purchase and selling of land use right is not legal but the transactions are virtually occurring.

[8/] A family labor is a person exceeding 15 years (according to the law), but 10 years in practice.

The total land area for one household could be up to 22 ha per adult laborer, but there is insufficient land to fulfill this objective. The government assigns land management responsibilities including Land Allocation to relevant ministries such as MAF and the District Administrative Authority (DAA). They are responsible for agricultural land allocation and issue Temporary Land Use Certificates (LUCs). The Temporary Land Certificate attests the provisional use right for agricultural or forest land and this is valid for three years (LL Article 18, 22). At the end of this period, if the land is used as originally specified, an individual may request a *Land Title*, which is the *main evidence for permanent land use right*. The government obligates holders of land use rights to protect the land and the environment, not to violate the rights and interests of other persons, to accept valid servitude, to pay taxes and fees relevant to land use, and to comply with other land and forest regulations. (LL Article 6 and 60, FL Article 8 and 57).

(3) Land Taxation

Tax is imposed on agricultural land with the rate ranging from 3,000 Kip/ha in cleared grassland in mountainous areas to 20,000 Kip/ha on the fallow rice fields in lowland areas. There is a tax incentive for stabilized land use such as sedentary rice fields in upland rural areas are having the rate of 14 kg/ha while the rotation land is 15 kg/ha. This rate was stated in the newly announced Decree on the Implementation of the Presidential Decree on Land Tax, dated 22 October 2000. According to Department of Lands of MOF, the land tax collection is generally improved at the district level since the execution of the decree (See annex 5 for Land Tax Rate). Land tax is not imposed as long as lands are not registered. While the land allocation is ongoing slowly, cultivated areas are under-reported since people try to avoid payment of taxes.

(4) Present Status of Land Allocation

There is a consensus among relevant government organizations that efficient land markets and security of land tenure are important in order to permit the allocation of land to its most efficient use and in order to encourage land-related investments and sustainable use of land.

The World Bank financed Land Titling Project, under the MOF, aims to provide title to individuals, groups and companies for long-term use of rural land. The project deals with the establishment of land registers at the provincial level and the issuing of title documents, with the ultimate aim of creating a nation-wide, parcel-based, land registration system. The project is working in provinces identified by the

Government as priority areas, containing high value land. So far, communities in more distant rural areas have not been targeted for land titling.

The executing agency for land allocation in rural area is the Central Committee for Land Management and Land & Forest Allocation under the Prime Minister's Office and the Shifting Cultivation Stabilization Program under Department of Forest, MAF. The Committee was created in 1996 and has line offices at the provincial and district levels. The shifting Cultivation Stabilization Program, as its title shows, was established for the purpose of stabilizing shifting cultivation and it is responsible for general land management including formulation and implementation of general program for Land Use Planning at the village level as well as Land Allocation for individual households. Land allocation has a multi-purpose function including securing land tenure by formalizing land use rights, to reduce endemic land disputes within and between villages and to enhance land tax revenues by increasing productivity and income from better land use.

The present land ceiling is relatively generous since people can obtain land up to 22 ha per family worker by having the land on a lease basis. In practice, actual allocations are far below the LL ceiling due to land scarcity and this is cited as one cause of unsustainable short rotation shifting cultivation.

At the initial stage of land management undertakings including legal issues by the government, the most important and urgent issue was the clarification of boundaries of village and community forests. This is called *Baeng din baeng paa* (land zoning or land use planning). By demarcating the land, users could be required to use the land in an effective manner. At this stage, the more emphasized issue is *Mop din mop paa* (land allocation) in which clarification of individual land use rights and registration are required.

In this process, some sensitive issues are observed such as land redistribution, as there are cases where well off families are persuaded to allocate some of their land to poorer households. Also, there are cases where households possessing plots located adjacent to water sources have to relinquish them in order to protect and conserve the water supply. In such cases extra land is required for compensation.[9/] Likewise, it is often difficult for villages and villagers to make clear boundaries between villages since their conventional land use is relatively complex and sometimes overlapping. In most cases, there have been attempts to follow

[9/] E. Eklind, C. Johansson (1997), *Land Allocation and Land Use Planning in Rural Area in Lao PDR*, Royal Institute of Technology (Sweden) Thesis Report Series 1997: 6, p.60

customary land rights as much as possible, but this has been difficult with swidden fields since they are ill-defined. Moreover, with regard to traditional perceptions of land and its use, it is often the case that people do not really understand the meaning of land registration since it is a brand-new perception. Poor households are reluctant to declare more swidden plots than they actually cultivate in any one year for fear of the land tax. Thus, they do not receive the amount or quality of land for which they would be entitled to.[10/]

At the central level, there is a lack of information and data on ongoing land allocation countrywide. Due to a lack of human resources, there is also a constraint in accelerating land allocation in an amicable manner.[11/] Now there is a risk that the legal solution to land tenure has become very diverse throughout the country. One reason is that many constraints are observed in villages within a certain project where various allocation solutions are tested. Any project or activity will have to consider land allocation and its location-specific solutions before undertaking agricultural development activities.

3.2.4 Human Resources Development

(1) General

In general, human resource development (HRD) aims to develop national core values, train civil servants, provide quality education and training to children, build an efficient and skillful labor force, preserve the Lao culture, disseminate knowledge and information and mobilize mass organizations. The HRD program of MAF focuses on training more qualified technicians and specialists needed for agricultural and rural development. The strategy is to have district farming systems generalists at the grass root level to provide adaptive research-based extension services and on the-the-job (OJT) training to farmers and shifting cultivators on sustainable adaptive technology, particularly in the intensive rural development areas (focal areas).

(2) Educational Level of Farmers

In 1995, Literacy in the country was as low as 60%. There are significant difference between genders and among provinces. Female literacy was 48%, while male's was 73%. The lowest was 20% for females in Louangnamtha. The highest was 92% in Vientiane municipality. It is difficult to promote agricultural development without improved literacy. Females are the main labor force for arable farming and animal

[10/] ADB/MAF(1998) Agriculture Strategy Study Working Paper No.6, Some Key Issues Related to the Agriculture Strategy Study: Upland/Highland Agriculture Systems, Ethnic Minorities and Resettlement

[11/] Peter Bloch(undated), Report on Planning-Land Allocation

husbandry. Therefore, rural female education is most important for agricultural development considering their present high illiteracy rate.

(3) Present Staffing of MAF and the Line Agencies

The staffing of MAF and its line agencies at province and district levels is characterized by low education and skill levels particularly in the provinces and districts. The educational levels of MAF and its line agencies are specified in the following three tables (Tables 3.6, 3.7 and 3.8).

Table 3.6 MAF Personnel Education Distribution

Educational Level	Ministry				Province	%	District	%	**Total**	%
	Departments	NAFRI	Total	%						
Ph. D	6	8	14	1	1	0	0	0	15	0
Master Degree	35	17	52	5	5	0	1	0	58	1
Bachelor Degree	193	58	251	26	183	9	68	2	502	9
High Technical	148	64	212	22	529	26	301	11	1,042	18
Medium Technical	164	100	264	28	999	49	1,691	60	2,954	51
Vocational	105	59	164	17	326	16	742	26	1,232	21
Total	651	306	957		2,043	100	2,803	100	5,803	100
% to total staff	11.2%	5.3%	16.5%		35.2%		48.3%		100%	

Note: The above figures cover only personnel at MAF's Departments, NAFRI, PAFS and DAFO. Personnel at the project level are not accounted for. In total, MAF has 6,492 staff.
Source: Personnel Division, MAF

Table 3.7 PAFS Staff Allocation by Region

Region	Admini-stration	Crops	Livestock & Fisheries	Forestry	Irrigation	Meteo/ Hydro-logy	Total	%
North	93	97	77	153	102	30	552	27.0%
Central	148	121	111	437	158	35	1,010	49.4%
South	101	68	70	149	68	25	481	23.5%
Total	342	286	258	739	328	90	2,043	100.0%
% to total PAFS staff	16.7%	14.0%	12.6%	36.2%	16.1%	4.4%	100.0%	

Source: Personnel Division, MAF

Table 3.8 DAFO Staff Allocation by Region

Region	Admini-stration	Crops	Livestock & Fisheries	Forestry	Irrigation	Meteo/ Hydro-logy	Total	%
North	185	115	119	232	71	4	726	25.9%
Central	276	284	279	505	117	20	1,481	52.8%
South	139	95	101	209	31	21	596	21.3%
Total	600	494	499	946	219	45	2,803	100.0%
% to total PAFS staff	21.4%	17.6%	17.8%	33.7%	7.8%	1.6%	100.0%	

Note: Extension Staff comprise Crops, Livestock/Fisheries, Forestry and Irrigation staff.
Source: Personnel Division, MAF

There is an uneven staff distribution in term of numbers and educational level at MAF and its line agencies at the provincial and district levels. The districts located in the mountainous areas are the least staffed and most uneducated. Due to budget constraints, especially in relation to the decentralization policy, these districts will have many difficulties increasing their staffing level as well as providing enough incentives and support for their extension activities. There are also other factors, which hamper the assignment of new staff to these poor and remote areas. The major factor is the lack of accessibility, poor socio-economic conditions, and difficulties to integrate into local communities that are strongly ethnologically based. The concept of Farming System Extension Workers (FSEW) should further address these issues and constraints. There is also an uneven distribution between the number of staff in the provinces and in the districts. In almost all provinces, staff is concentrated at the PAFS level. Many districts are understaffed and have less than ten. To address it the M/P Study recommends strengthening the management capacity of PAFS and DAFO. This could be done by implementing the decentralization policy and through the development of PAFS and DAFO in fulfillment of their administrative and regulatory functions as well as developing their agricultural extension functions as specified earlier.

(4) Strengthening of MAF Institution

The ADB financed a series of Technical Assistance (TA) projects for developing and strengthening MAF from 1993 to 1996. A supply/demand analysis for MAF personnel was made under the implementation of the project, focus was given to the demand for Subject Matter Specialist (SMS) at PAFS level and for FSEW at the district level. According to the supply/demand analysis (1996) there is a district deficit of 713 staff and a province surplus of 227 staff. Recommendations were given to reshuffle personnel within MAF, the provinces and the districts in order to rectify this imbalance. However, the status in 2000 remained the same as in 1996. Since 1998, the MAF Personnel Department indicates that action taken to transfer some personnel to the provinces and from the provinces to the districts.

The study found that training programs under donor assistance projects are neither coordinated nor reviewed under any personnel career development plan. On the other hand, overseas training projects mostly benefit staff at the ministry level rather than at the provincial and district levels. Mainly this is due to the uneven educational distribution within PAFS and DAFO and to the small number of staff with English and other languages working skills. Therefore, there is need to strengthen MAF personnel management by pursuing the activities already initiated by the ADB projects.

(5) Existing Training Institutions and Facilities

In relation to human resource development and the extension programs of each sub-sector, there exists a number of training facilities under the institutional framework of MAF. There are about 29 training centers spread throughout the country as shown in Table 3.9. Most of them are under the responsibility of NAFRI. It is clear that due to the lack of an integrated extension and training system, these training facilities have not been fully utilized and tend to be abandoned after the completion of donor assistance projects. However, the existence of these facilities is a good basis for developing future national training programs for government staff and farmers. It is a prerequisite to strengthen the capacity of existing training centers in the framework of developing an integrated agricultural extension system and of strengthening MAF's management system.

(6) Formal Technical Education in Agriculture and Forestry

Under MAF there are 3 Regional Agriculture and Forestry Technician Schools (AFTS) located in Louangphrabang (Northern), Borikhamxai (Central), and Champasak (Southern). All schools are providing a three year technical education to upper-secondary school graduates. The objective of technician training in agriculture and forestry is to provide extension workers for the public and private sectors. The formation of "technical generalist" in agriculture and forestry is one of MAF's objectives.

The curricula of the three AFTS are poor and do not match the objectives of building extension workers. Neither are their curricula uniform nor are they linked with formal education criteria required by the Ministry of Education[12/]. In addition, in all three schools, teaching methods involve more theory that practice. Apart from the above problems, the schools lack qualified teachers and trainers, teaching aids, lecture notes and books, laboratories and areas for field practice (land, rice fields, demonstration farm etc.). On the administrative and operational side, all schools are having budget problems, have insufficient facilities (classrooms, dormitories, water and lavatories, kitchens and refectory etc.), and have not enough vehicles and equipment. Another burden the schools are facing is the over-intake of students resulting from the overflow of upper-secondary school graduates all over the country since 1998. The schools are obliged to receive more students than their academic and management capacity. This situation further more diminishes the academic capacity of schools and further reduce the quality of teaching as well as the quality of the graduated students.

[12/] This involves establishing a uniform curriculum that allows future bridging to the academic program of NUOL.

(7) University Education in Agriculture and Forestry

Following the establishment of the National University of Laos (NUOL) in June 1995, the Tadthong Irrigation School, the Dongdok Forestry College, and the Nabong Agriculture College were transferred from MAF to NUOL. These three institutions now form respectively the Department of Irrigation Engineering of the Faculty of Architecture and Engineering, the Faculty of Forestry and the Faculty of Agriculture. The academic program of the faculties has been developed recently and consists of two years' foundation studies followed by three years of professional bachelor degree study by the faculties.

The above institutions play an important role in relation to MAF's human resource development, especially in building up a pool of SMS for PAFS. NUOL plans to establish a Master's degree starting in 2005 depending on the readiness of each faculty. It is anticipated that a Ph.D. degree would be initiated after 2010. In the mean time, there is a need to create university-bridging programs for technician diploma and higher diploma holders, which comprises more that 68% of MAF staff. The NUOL is presently analyzing the possibility of letting technician diploma holders enter the 3rd year of the bachelor program without passing through the School of Foundation Studies. Another bridging program for higher diploma holder should be initiated in order to encourage MAF staff to up-grade their education in a shorter period.

(8) Primary and Secondary Education in Agriculture and Forestry

Knowledge about agriculture and forestry is provided in the curriculum of primary education under the subject "world around us". Some schools initiated practical exercises in growing vegetables and raising tree seedlings with the help of donor assistance projects[13/]. Almost all rural primary schools are unable to provide enough agriculture related education due to a lack of teachers, teaching materials, lecture books and facilities. At the secondary school level, agriculture should be taught as a subject, however, in fact no programs are accommodated.

[13/] I.e. FORCAP, EU Micro Project.

Table 3.9 Training Facilities under MAF

Name of Institution	Agency Responsible	Location	Training Capacity (person)	Dormitory Capacity (person)
1. Agriculture Research Center	NAFRI	Thadokkham, Vientiane Mun.	60	30
2. NAFRI-Soil Research Center	NAFRI	Dongdok, Vientiane Mun.	50	NA
3. Living Aquatic Resource Research Center	NAFRI	Sikhotabong, Vientiane Mun.	50	NA
4. Horticulture and Vegetable Research Center	NAFRI	Haddockeo, Vientiane Mun.	30	30
5. Livestock Research Center	NAFRI	Nam Souang, Vientiane Mun.	30	30
6. Forest Research Center	NAFRI	Nam Souang, Vientiane Mun.	30	NA
7. Coffee Research Center	NAFRI	Km 35, Paksong, Champasak	50	30
8. Northern Agriculture and Forestry Research Center	NAFRI	Houay Khot, Louangprabang	30	30
9. Shifting Cultivation (slopping land) Research Station	NAFRI	Thonkhang, Nan District, Louangprabang	30	30
10. Teak Research Station	NAFRI	Kengben, Pakxueng, Louangprabang	30	NA
11. Namtha Rice Research Station Louangnamtha	NAFRI	Namtha, Louangnamtha	30	NA
12. 30 ha Rice Research Station Xaignabouri	NAFRI	Namtan, Phiang District, Sayaboury	20	NA
13. Thasano Rice Research Station Savannakhet	NAFRI	Thasano, Khanthaboury Savannakhet	20	NA
14. Phongnam Rice Research Station Champasak	NAFRI	Phongnam, Champassak	20	NA
15. Agriculture Development Center	DOA	Naphok, Vientiane Mun.	60	30
16. Agriculture Extension Agency (AEA)	DOA	Salakham, Vientiane Mun.	50	20
17. Forestry Training Center	DOF	Houaygnang Vientiane Mun.	60	30
18. Northern Agriculture & Forestry Extension Training Center	DOF	Xiang-Gneun Louangphrabang	60	60
19. Southern Agriculture & Forestry Extension Training Center	DOF	Xepon Savannakhet	60	60
20. Irrigation Training Center	DOI	Chanthaboury Vientiane Municipality	60	NA
21. Meteorology and Hydrology Training Center	DOMH	Sikhotabong	30	NA
22. Savannakhet Agriculture Training Center	PAFS Savannakhet	Nakae, Khanthaboury Savannakhet	60	60
23. Namtan Project Compound	PAFS Xaignabouri	Namtan, Phiang District, Xaignabouri	30	30
24. Vientiane Province Up-land Development Center	PAFS Vientiane Province	Hinheup, Vientiane Province	30	30
25. FORCAP	PAFS, Vientiane Province	Sivilay, Hinheup Vientiane Province	30	30
26. Sericulture Development Project Compound	PAFS Vientiane Municipality	Naxaythong, Vientiane Municipality	25	25
27. Namtha Livestock Development Center	DOLF, PAFS Louangnamtha	Namtha, Louangnamtha	25	25
28. Louangphrabang Livestock Development Center	DOLF, PAFS, Louangphrabang	Louangphrabang	25	25
29. Agro-Forestry Training Center	PAFS, Khammouan Province	Thakhek Khammouan Province	60	30

Source : Department of Pesonnel, MAF

3.2.5 Crop

(1) Agro-Ecological Zones and Agriculture Land Use

Six agro-ecological zones (AEZ) are defined in Lao PDR based on the agro-climatic data. The characteristics of each AEZ are summarized below:

Table 3.10 Summary of AEZ in LAO PDR

AEZ		Climatic Zone	Topographic Condition	Altitude	Dominant Agricultural Type
AEZ 1	Southern Lowland Plain and Terrace	Tropical wet and dry zone	Flat to undulating	100-200 m	Rainfed lowland rice, gardening and livestock
AEZ 2	Foothills	Tropical wet and dry zone	Undulating to rolling	200-500 m	Shifting cultivation of upland rice and livestock raising
AEZ 3	Foothills and Lower Mountains	Tropical monsoon zone	Rolling	500-1,000 m	Shifting cultivation of upland rice and livestock raising
AEZ 4	Plateau	Tropical monsoon zone	Undulating	500-1,500 m	Tree crops, some shifting cultivation of upland rice and livestock raising
AEZ 5	Central Northern Upland	Tropical wet and dry zone	Mountainous	500-1,500 m	Shifting cultivation, livestock grazing
AEZ 6	Highland Mountain Zone	Sub-tropical wet and dry zone	Mountainous	1,500-2,500 m	Shifting cultivation, livestock grazing

Source: Promotion of Sustainable Development, FAO, 1999

As shown above, the agro-ecological zones are closely related to altitude and topographic conditions.

According to the Agricultural Statistics of MAF, the area of agriculture land can be summarized as follows:

Table 3.11 Area Holdings by Land Use

(Unit: 1000 ha)

Region	Rice	Other Annual Crops	Fallow Land	Permanent Crops	Grazing Land	Other Land	Total
- North	205.3	40.7	50.4	11.9	0.8	15.0	324.4
- Central	308.6	34.1	39.4	14.8	15.0	43.3	455.2
- South	165.7	10.6	22.4	54.5	1.5	13.3	268.2
Total	679.6	85.4	112.3	81.3	17.6	71.6	1,047.7

Source: Lao Agricultural Statistics, 1975-2000, MAF

The total area of holdings for agriculture use is about 1.0 million ha including fallow land. However, from satellite imagery interpretation, the areas of agricultural land, excluding grassland, is estimated to be 1.8 million ha. Rice is the dominant crop, and it alone occupies 68% of the total area. Other annual crops and permanent crops account for only 9% and 8%, respectively. The proportion of grazing land is

very small, 2% of the total area of holdings. It is only able to support a small fraction of the more than 2 million ruminants.

(2) Farming Systems in Lao PDR

The major farming systems are identified as: i) lowland rainfed, ii) lowland irrigated, iii) upland and mountain, and iv) plateau. The lowland rainfed and irrigated farming systems are located mainly in AEZ 1. Upland and mountain farming systems are observed in AEZ 2, AEZ 3, AEZ 5 and AEZ 6. The plateau farming system is in AEZ 4.

The lowland rainfed and irrigated farming systems are seen in the five plain areas, i.e. the Vientiane plain (58,000 ha), the Pecan plain (12,000 ha), the Xebang Fai plain (49,000 ha), the Xebang Hegh plain (83,800 ha) and the Xedong plain (42,500 ha). In the plains, all cultivated land is used for lowland rice production in the wet season and for livestock grazing in the dry season. On the other hand, for irrigated farming, a two-crop system is developed, and many farmers grow irrigated rice in the wet season and irrigated rice or other crops in the dry season.

The upland and mountain farming systems are dominated by single wet season crop production in hilly or mountainous areas. The most important crop is upland rice prevailing in shifting cultivation areas. Other important annual crops include maize, sweet potato, cassava, ginger, groundnut, soybean, cotton and sugarcane. In this farming system, small irrigation areas are developed in valley bottoms for the production of paddy. Perennial crops are also grown in the fields, usually in scattered formations.

In the plateau farming system, commercial crops are increasingly produced, while the shifting cultivation area has been reduced. The major commercial crops including coffee, tea, cardamom, fruit and vegetables are cultivated under rainfed conditions. The farming system is being developed in various topographic and climatic conditions. The soil fertility is also favorable compared to other zones.

(3) Overview of Crop Production

The harvested area, yield and production of major crops from 1996 to 2000 are summarized in Table 3.12:

Table 3.12 Harvested Area, Yield and Production of Major Crops on Average from 1996 to 2000

Crops	Harvested Area		Yield		Production	
	Average	Annual Growth	Average	Annual Growth	Average	Annual Growth
	('000 ha)	(%)	(ton/ha)	(%)	('000 ton)	(%)
Rice	641.9	5.1	2.8	3.8	1,810.5	9.2
-Lowland Rice (Wet Season)	433.4	5.3	3.1	2.3	1,335.8	7.7
-Lowland Rice (Dry Season)	55.3	46.5	4.1	2.8	228.2	50.6
-Upland Rice	153.1	-3.2	1.6	0.6	246.4	-2.7
Maize	42.3	11.0	2.3	6.7	95.8	18.4
Root crops	17.7	6.7	5.7	-3.0	98.5	3.4
Mungbean	1.8	-17.1	0.8	4.1	1.4	-13.7
Soybean	5.1	2.0	0.8	0.3	4.2	2.2
Peanut	12.8	9.2	1.0	0.2	13.0	9.4
Tobacco	6.5	-2.0	4.3	6.8	27.3	4.6
Cotton	6.5	-13.4	0.9	1.4	6.0	-12.2
Sugarcane	5.1	25.6	31.0	8.8	164.6	36.7
Coffee	26.8	7.8	0.6	13.4	16.1	22.3
Tea	0.6	-0.5	0.3	-23.1	0.2	-23.5
Vegetables	43.5	61.7	5.1	-1.4	235.6	59.4

Source: Agriculture Statistics, 2000, DOP, MAF

Rice is the dominant crop. It is cultivated on the lowland plains along the Mekong River and its tributaries. The annual production of rice was 1.8 million tons on average from 1996 to 2000. Production increased by 9.2% per annum (p.a.) not only through the expansion of the doubled-cropped areas but also by increasing yield. On the other hand, the official production of upland rice decreased by 2.7% p.a. caused by a reduction of the shifting cultivation area.

Amongst other crops, the annual production of vegetables increased considerably by 59.4% p.a., followed by sugarcane (36.7% p.a.), coffee (22.3% p.a.), maize (18.4% p.a.), and peanut (9.4% p.a.) due to expansion of harvested area and the improvement of unit yield. Vegetables are cultivated mainly in suburbs of large urban centers on a commercial basis. Sugarcane is cultivated mainly in Phongsali and Louangnamtha provinces under contract farming with a Chinese company. Coffee is produced in Boloven plateau, and its recent development can be attributed to French technical assistance. Maize is produced mainly in the northern region, while peanuts are grown in many provinces. Annual production of tea declined by 23.5% p.a., followed by mungbean (13.7% p.a.) and cotton (12.2% p.a.). In the case of mungbean and cotton, the harvested area decreased due to low prices and a limited market.

(4) Farming Practices

The percentages of farm households using improved seeds, fertilizers, pesticides, and machinery have been calculated based on the data from the Agriculture Census in 1998/99. The results are given in the table below.

Table 3.13 Percentage of Farm Households Using Improved Seeds, Fertilizer, Pesticides, and Machinery

	Not Used	Used	-	-	Total
Improved Rice Seeds	69.6	30.4	-	-	100.0
Pesticides	89.4	10.6	-	-	100.0

Fertilizers	Not Used	Organic Fertilizers Only	Chemical Fertilizers Only	Both Organic and Chemical Fertilizers	Total
	57.0	14.8	9.9	18.3	100.0

Agriculture Machinery	Use of Draught Animals	Use of Tractor	Unknown	-	Total
	39.4	20.6	40.0	-	100.0

Source: Lao Agriculture Census, 1998/99, MAF

The above table reveals that most farm households carry out crop cultivation in the traditional way, without using modern farming practices. Local crop varieties are widely cultivated and give a low unit yield. In the case of rice seeds, only 30% of rice farms use improved varieties. However, probably most use improved seeds continuously without obtaining new supplies. The public seed multiplication system is only presently capable of supplying 500 tons of improved seed varieties. This can only service about 6,300 ha. Seed stock is renewed every five years, therefore, a continuous annual supply of 500 tons can only cover 32,500 ha or about 7% of the lowland rainfed paddy. For other crops, the supply of improved variety seeds is very limited with the exception of imported vegetable seeds which are mostly handled by the private sector.

All chemical fertilizers and agro-chemicals are imported, and only 28% and 11% of farmer use them, respectively. Regarding agriculture machinery, an estimated 21% of farmers use tractors and 39% use draught animals. The remaining farm households (40% of the total) don't plow the land. Most of them probably practice shifting cultivation in which most work is manual.

(5) Agriculture Support Service

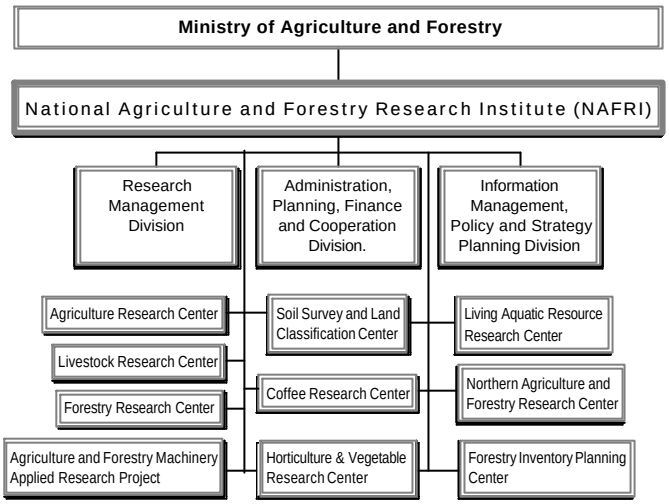
Agriculture Research

The National Agriculture and Forestry Research Institute (NAFRI) was established in June 1999 in order to concentrate the limited physical, human and financial resources. Prior to its establishment, various departments of MAF were conducting

agriculture research work separately. The coordination between NAFRI and MAF line departments is undertaken by the Council of Science and Technology (CST) chaired by the Minister. The Council consists of the Director Generals (DG) of all the departments including NAFRI.

The role of NAFRI is to implement technical research works on agriculture, forestry, meteorology and hydrology. NAFRI has three divisions, nine centers and one project unit (agriculture and forestry machinery) as illustrated in Figure 3.2. It focuses mainly on rice and forest research through various donor assistance. The research work in other fields like horticulture, livestock and fishery is relatively weak. The research facilities and skills are also limited in these fields. The current number of staff in NAFRI is 356, including 8 Ph.D's. However, the majority are technical or vocational graduates. An increase of postgraduate qualification staff and upgrading of skills are needed to develop the adaptive technology for many sub-sectors.

Figure 3.2 NAFRI Organization Chart



Source: MAF

Agriculture Extension Service

The establishment of an agriculture extension system was promoted by MAF's "Strategic Vision" as a new agriculture support body. This was followed by the establishment of an Agriculture Extension Agency (AEA) under the Department of Agriculture (DOA) in 2000, however, it is not properly functioning as yet. The AEA has a mandate to take the lead in farming systems extension and draw upon the technical staff of line departments and support the SMSs at the provincial level, and FSEWs at the district level for extension activities. The AEA consist of a limited number of staff from the DOA, therefore is not capable of performing extension activities for livestock, fishery, forestry and irrigation. National Agriculture and Forestry Extension Services (NAFES) has been established in August 2001 as a new extension organization that could cover all the sub-sectors of agriculture in place of AEA.

The proposed extension system is to be based on farming group training and on-farm demonstration activities through participatory planning with regular visits to villages by FSEWs and SMSs. However, its system is not working well due to a serious shortage of operation funds, equipment and qualified staff. In reality, the FSEWs and SMSs are engaged only in administrative work.

Agricultural Statistics

Agricultural statistics are published annually by the MAF. The raw data are collected by village chiefs under the guidance of DAFO's staff and finally processed by the DOP, MAF. The statistics include various data on crops, livestock, forestry, meteorology and hydrology, irrigation, GDP, prices, exports and imports, public and foreign investment. However, available data are still limited, for example, the data detailed on horticulture crops are not included except as an aggregated vegetable data. Various donors' reports point out the existence of considerable discrepancies between actual survey results and the statistics data. There is a possibility of data being distorted through political bias at the local level. For proper agriculture development planning, the supply of accurate data covering wider fields is a prerequisite.

(6) Major Constraints and Development Potentials

The Study found considerable constraints to agricultural development. However, it identified various development potentials, which augurs well for agriculture's future when these potentials are fully exploited and sustainably managed. These constraints and potentials are briefly summarized below.

(a) Constraints to rice production

Lowland area :

- farmers' reluctance and/or insufficient extension in using improved variety of rice seed;
- lack of knowledge about improved technologies including crop maintenance, pest control, irrigation water management and poor extension services being only at the development stage;
- flood and inundation damage during the wet season in lowland areas;
- lack of access to credit for new investment and to obtain farm inputs; and
- predominance of low productivity labor-intensive farming.

Upland and mountain Area :

- insufficient distribution of credit and fertilizer, especially in remote areas;

- poor road access for purchasing inputs and selling products;
- low soil fertility in terms of physical and chemical properties;
- lack of technology for cultivating upland rice or alternative crops including land preparation, crop maintenance, pests, and weed control because of poor extension services;
- insufficient development of adaptive research for upland and mountain areas;
- lower productivity of upland rice under shifting cultivation;
- declining soil fertility, increasing water runoff and soil erosion under shifting cultivation; and
- large labor inputs due to manual practices in shifting cultivation.

(b) Constraints of commercial crop production

- insufficient quality control and a lack of grading and classification systems for commercial crop production;
- unavailability of improved varieties/hybrid seeds and planting materials;
- lack of knowledge about improved technology including crop maintenance, insect and pest control, irrigation water management;
- insufficient development of adaptive research for integrated agriculture related to horticulture, livestock and fisheries;
- lack of access to credit and new investment;
- farmers' reluctance to use fertilizers and agro-chemicals due to high cost compared to crop income;
- limited market channels and market information;
- decreasing price incentive for commercial crop cultivation due to frequent oversupply in the domestic market and low international prices;
- limited or insufficient post harvest and agro-processing facilities for commercial crops;
- limited availability of manpower or agriculture machinery for intensive agriculture; and
- limited information on suitable crops to be introduced based on area-specific natural conditions.

(c) Development potential for rice production

- improved varieties of rice have been developed by the Lao-IRRI project;

- potential to further expand lowland paddy by about 1.0 million ha;[14/] and
- improved farm management system developed.

(d) Development potential for commercial crop production

- favorable natural conditions (soil & climate) to produce various commercial crops under rainfed condition;
- increasing private sector investment in agro-processing and marketing;
- potential to further expand cultivated area under irrigation; and
- increasing number of farmers having market oriented outlook thanks to a gradual infiltration of market information into rural areas.

(7) Food Security and Rice Output

A preliminary projection on paddy/rice food balance is made for the year 2010 and 2020 based on official data from the relevant agencies and assumptions set by the Study Team. The projection is shown in Table 3.14 and its detail are explained in Table 3.15.

Table 3.14 Paddy BALANCE Projection

Unit : 000 ton paddy

	Year 2000	Year 2010	Year 2020
Production	2,202	2,793	3,032
Consumption **(*1)**	1,846	2,345	2,894
Balance	356	448	138

(*1): including seed, processing loss and other use requirements
See: Table 3.15

The results of projection suggests the directions for rice security as follows:

a) lowland paddy could be increased mainly through increased unit yield by expanding improved seed varieties, strengthening extension services and water management technology, and supplying more credit, rather than through large scale irrigation development;

b) upland rice production from shifting cultivation has to be stabilized through research and extension activities: ways and means have to be promoted to convert shifting cultivation areas into permanent farmland, focussing on adaptable cropping patterns and farming technologies coupled with other annual crops, tree crops and several kinds of livestock;

c) rehabilitation and new irrigation developments in mountainous regions should have a high priority to obtain regional food security and shifting cultivation stabilization, with due consideration to its economic viability; and

d) crop diversification has to be promoted particularly in the lowland paddy areas to avoid possible over production of rice by the new generation of farmers who require land for their livelihood.

[14/] See Chapter 4

Table 3.15 Preliminary Projection on Paddy/Rice Balance for 2010 and 2020

PRODUCTION

Item			Yr. 2000 a/	Yr. 2010	Yr. 2020	Remarks
Lowland paddy	Area	(ha)	475,500	475,500	475,500	No expansion of harvested area is assumed for 2000-20 period.
	Yield	(ton)	3.27	4.30	4.50	Increase rate of 2.28% p.a (past trend of 1990-2000) is applied to 2000-20 period till its assumed maximum of 4.5 ton/ha.
	Production	(ton)	1,552,800	2,046,655	2,139,750	
Upalnd paddy	Area	(ha)	152,100	110,000	110,000	3.21% p.a decrease of past trend (1996-2000) is applied to 2000-2010 period. It is also assumed that use of upland paddy area would be stabilized in 2010.
	Yield	(ton)	1.70	1.70	2.00	Assumed yields
	Production	(ton)	258,750	187,000	220,000	
Dry season paddy	Area	(ha)	91,800	101,800	111,980	10% of area increase is assumed to be performed during 2000-2010 and 2011-2020 periods, respectively.
	Yield	(ton)	4.25	5.49	6.00	Increase rate of 2.26% p.a (past trend of 1990-2000) is applied to 2000-20 period till its assumed maximum of 6.0 ton/ha.
	Production	(ton)	390,150	559,256	671,880	
Total paddy	Area	(ha)	719,400	687,300	697,480	
	Yield	(ton)				
	Production	(ton)	2,201,700	2,792,911	3,031,630	
Projected production increase rate			(1990-00 period) 3.97% p.a	(2000-10 period) 2.41% p.a	(2010-20 period) 0.62% p.a	

CONSUMPTION

Production (tons)	2,201,700	2,792,911	3,031,630	
Seed and post-harvest losses, 16% b/	352,272	446,866	485,061	
Net paddy milled (tons)	1,849,428	2,346,045	2,546,569	
Milled rice (62% recovery) b/	1,146,645	1,454,548	1,578,873	
Rice for other uses, 2% b/	22,933	29,091	31,577	
Net milled rice available (tons)	1,123,712	1,425,457	1,547,295	
Rice requirement (kg per capita) b/	180	180	180	Assumed that the present consumption level estimated by the Government's Strategic Vision (1999) would continue
Population c/	5,234,000	6,650,000	8,207,000	
Total rice requirement (tons)	942,120	1,197,000	1,477,260	
Rice balance	181,592	228,457	70,035	

Source: a/; Agricultural Statistics, 25 years, 1995-2000, MAF
b/; These figures are obtained from "the Government's Strategic Vision for the Agriculture, 1999".
c/; Results from the Population Census 1995, State Planning Committee, National Statistical Center

Assumption for Projection

(1) Harvested Area
- Lowland paddy; There would be no increase and decrease of the harvested area in the future, and present harvested area of 475,500 ha in 2000 would continue for the next 20 years from 2001 to 2020.
- Upland paddy; Past declining trend (2.28% p.a. during 1990-2000) would continue to 2010. After 2011, utilization of decreased size of the area would be stabilized.
- Dry season paddy; A very small area expansion (10% in every ten years) would be performed through improvement and better management of irrigation systems.

(2) Unit Yields
- Lowland paddy; It would be increased with a growth rate of 2.28%p.a. (past trend during 1990-2000) till its assumed maximum of 4.5 tons/ha.
- Upland paddy; It is just assumed that the yield in 2010 would be the same with that at present (1.7 ton/ha), and 2.0 ton/ha in 2020.
- Dry season paddy; It would be increased with a growth rate of 2.26% p.a. (past trend during 1990-2000) till its assumed of 6.0 tons/ha.

(3) Per capita consumption

Per capita consumption for the year 2010 and 2020 is assumed to be 180kg rice.

In this projection, reliability of individual figures on harvested area and yield may not be very high as several donors have indicated. On the other hand, similar source of information reports that the self-sufficiency of paddy/rice in Lao PDR is almost achieved. The above projection is thus carried out based on the latter information in order to know the direction of Lao PDR keeping the present level of self-sufficiency in paddy/rice.

(8) Prospects of Development of Commercial Crop

The Study supports the Strategic Vision's approach to commercial agriculture. In the flatlands, the approach is to improve and diversify farming systems with increased and intensified cash crops, livestock and fishery production. While in the sloping lands, farming systems diversification and agro-forestry should be developed through adaptive research, trials and demonstrations on farmers' fields.

The most important step for commercial agriculture is to promote crop diversification in both flat and sloping lands. The main potential crops for diversification identified through the M/P Study are as follows:

Field Crop

The recent high growth rate of the production reveals that maize, peanuts, soybean and some root crops are strong candidates for diversification. In addition, the FAO indicates[15/] that sesame, soybean, sunflower, sorghum and safflower have a comparative advantage. It is noted that some field crops are not only used as food crops, but also as supplemental feed for livestock since the number of livestock is increasing rapidly.

Fruit

A previous study pointed out that 50 fruit species can grow in Lao PDR (SIDA, 1998). However, Lao PDR is importing grapes, mandarin, apples, sapodilla, oranges, durian, pummelo, lichee, rambutan, mangosteen, jujube, cashew, longan, and tamarind. Most of these imported fruits can be produced in Lao PDR except apple and should have a comparative advantage. Mango especially should be very competitive, and DOA intends to promote it for export.

Vegetables

Various vegetables are cultivated mainly in the vicinity of large cities and town, and production has been increasing rapidly. However, because the domestic market is small, seasonal over supply and hence low market prices are widely observed. This is because many farmers cultivate vegetables using home gardens, the river side and irrigated areas. Therefore, the introduction of new techniques, especially the adjustment of cropping patterns is necessary to stabilize the supply of vegetables all year-round.

[15/] Promoting Sustainable Rural Development - A Review of the Rural Sector, FAO, December 1999.

Industrial Crops

Coffee and sugarcane have a comparative advantage on the export market. However, both crops face serious expansion problems. The coffee farmers are very sensitive to market price fluctuations since coffee is a monoculture. Also, sugarcane is cultivated without proper consideration of the sustainable use of land. These problems should be settled through crop diversification, introduction of improved husbandry, and better market intelligence. Cotton production and sericulture using mulberry leaves should also be promoted, since at present most raw materials are imported to Lao PDR for the handloom industry. It is noted that paper produced from paper mulberry could be an important crop through the experience of the JICA Forest Conservation and Afforestation Project. These industrial crops should not only have an import substitution advantage, but also find niche markets for export, preferably as finished products.

3.2.6 Livestock and Fisheries

(1) Livestock

The livestock sub-sector plays an important role in the livelihood of farmers. It accounts for about 20% of 1998 GDP, and generates more than half of a farmer's income. The majority of livestock production, as high as 94%, is on a small-holder basis, characterized as traditional, extensive and low input, resulting in a low output. However, there is considerable potential to increase livestock production and value-added products for export through improved animal health, animal nutrition and livestock breeding.

Traditionally, cattle and buffalo have been used for transport and as draught animals, and are an important household asset functioning as insurance in case of bad harvests, source of compost, etc. However, farmers frequently experience animal losses from various diseases due to very basic causes such as a feed shortage both in quantity and quality. Recently, large-scale pig and chicken farmers have increased in the suburbs of cities. Table 3.16 below shows livestock population over the last five years.

Table 3.16 Estimated Livestock Population 1996 - 2000

Unit: 1,000 head

Description	1996	1997	1998	1999	2000	Growth Rate
Buffalo	1,212	1,224	1,093	1,008	1,028	-2.91%
Cattle	1,186	1,228	1,127	1,000	1,100	-0.81%
Pigs	1,772	1,813	1,464	1,320	1,425	-3.73%
Goat/Sheep	159	165	122	112	121	-4.51%
Poultry	11,656	11,946	12,111	12,353	13,094	2.92%

Source: DOLF/MAF

The decrease in animal population except poultry from 1998 to 1999 compared to 1996 and 1997 was caused by an increased export to Thailand. This was because of favorable export prices due to the devaluation of the kip.

Forty eight percent of farmers raise buffaloes with an average of 3.1 head per household. For cattle and pigs, the respective figures are 31% of farmers with 4.8 head and 49% of farmers with 4.0 head. Animal feeding is traditional foraging except for a few large-scale livestock farms near cities. Cattle, buffalo and goat feed mainly on natural meadows, forests and the paddy fields after harvest. Ample fodder is available in the rainy season, but it is lacking in the dry season, resulting in poor nutrition, weight loss and deteriorating physical conditions as the dry season proceeds. Thus, resistance to disease decreases. Poultry and pigs are raised nearly in the wild state, but are fed with agricultural by-products and kitchen waste from time to time.

Though there is no information on animal morbidity by disease, its rate is relatively large. The Department of Livestock and Fisheries (DOLF), MAF, provides animal health services through provincial and district livestock and fisheries offices. At the village level, the district staff perform veterinary services in cooperation with Village Veterinary Workers (VVWs). VVWs are not civil servants, and they receive a fee from farmers for medicine, vaccination and treatment. Although Lao PDR has an animal health service system, it is poorly financed and weak with respect to (i) insufficient basic laws and regulations, (ii) lack of trained technicians, and (iii) inadequate knowledge by farmers of animal health.

In addition, livestock hygienic legislation is inadequate in terms of the law concerning the farm animal health, quarantine for importing and exporting farm animals, and meat inspection. This will hamper future livestock expansion in future. In this context, the DOLF has initiated improvement to farm animal health service through a project entitled: "The Strengthening of Livestock Services and Extension Activities" assisted by the EU, targeting the northern region. The MAF has a plan to increase livestock production by 300% by the year 2020. This can be achieved in two ways, one is to increase livestock raising by small holders. The other is to expand and strengthen medium to large-scale production systems by overcoming existing constraints and optimally utilizing Lao PDR's competitive advantage as outlined below.

Producer constraints

(a) High mortality rate from ordinary and epidemic diseases due to:

- lack of farmers' knowledge on epidemic disease and a reluctance to have animals vaccinated; and
- lack of feed in the dry season, resulting in a low resistance against disease.

(b) Low livestock productivity due to:

- extensive livestock raising without securing dry season feed; and
- lack of breeding systems.

Supporting services constraints

(c) Insufficient legal framework and related regulations on livestock such as veterinary laws, resulting in poor control systems for preventing epidemic diseases, enforcing quarantines, controlling meat hygiene, and handling veterinary drugs.

(d) Insufficient medical services against disease prevention and medical treatment due to:

- insufficient veterinary staff (Village Veterinary Workers : VVWs) combined with a lack of mobility;
- low technical level of VVWs; and
- insufficient supplies of veterinary drugs and equipment including vaccines.

(e) Insufficient livestock extension staff, coupled with lack of competent extension professionals to demonstrate feeding control, grazing land management, cultivation of fodder crops, feed storage, etc.

(f) Poor marketing and processing systems lacking market information services.

Competitive advantage

(g) Considerable potential grazing land suitable for livestock raising, especially in the Boloven and other plateaus.

(h) Many farmers familiar with animal feeding, though their present technical levels are low.

(i) Sufficient grass and fodder grown in the rainy season for all year round feeding if it is properly stored.

(j) Large markets in the neighboring countries, demonstrated by the unauthorized trading of livestock from Lao PDR to neighboring countries.

(2) Fisheries

Fish are a major animal protein source for the Lao people, accounting for about 40% of total animal protein. However, there are few reliable statistics on the fishing industry, and this is one of the constraints to fisheries development. Fish production is increasing and it was assessed at 46,000 tons in 1998, consisting of 28,000 tons (60%) of captured fish from the Mekong River and its tributaries, and the remaining

18,000 tons (40%) from aquaculture.[16/] This production figure does not include all the fish captured by individual farmers for self-consumption and its production must be larger than 46,000 tons estimated above. Although data are unreliable, fish production is increasing.

Inland aquaculture is classified into three types: (i) extensive aquaculture with low fish density and no feeding; (ii) semi-intensive aquaculture with a small amount of feeding; and (iii) intensive aquaculture with high fish density with feeding. Most aquaculture, as much as 90%, is of the extensive and semi-intensive types. In recent years, aquaculture has developed remarkably in the suburbs of major cities and towns including Vientiane. Advanced aquaculture technologies, such as the cage type in large-scale reservoirs and the pond type in irrigated paddy fields, are also being introduced.

There are 22 national hatcheries in the country. Out of these, DOLF assigns the role of "Central Fish Breeding Farm" to Nonteng Fish Breeding Farm in Vientiane. The Farm not only produces and distributes fish fry, but also trains farmers, the private sector, students and local government staff. These local government staff provide farmers with technical guidance on aquaculture at the local level, but their productivity remains low due to an absolute shortage of extension workers and their proficiency.

The 1996 statistics indicates that the demand for fingerlings was 52 million, but the actual supply was only 16 million or 30% of demand produced at 14 provincial and private hatcheries. The deficit was made up by imports from Vietnam, China and Thailand. Furthermore, the survival rate is low, being estimated at 15% from hatcheries to farm gates, i.e. the survival rate from fries to fingerling is 30% and then half of those that survive die during transportation to farm gate. It has been estimated that improvements to technology etc. may make it possible to meet 90% of requirements from existing public and private hatcheries. MAF has a plan to increase fish production by 360% by the year 2020. In February 2001, the DOLF started a project entitled "Aquaculture Improvement and Extension Project" with technical assistance from JICA from February 2001. The project is based in the newly established aquaculture center at Namxuoang in Vientiane. The project's main component are to improve seed production and train local extension workers.

[16/] Mr. N. Morimoto, JICA Expert in Vientiane, 2000

Fisheries will be developed as a combination of rural based fish production for self-consumption with commercial fish production mainly based in peri-urban areas. However, there are many problems to be solved; these are:

- lack of DOLF promotion capacity due to a poor database, few staff, and a limited budget;
- lack of extension workers;
- poor economic infrastructure (road, communication and electricity) and limited market;
- low technical level at hatcheries; and
- lack of a constant water supply due to deteriorated environmental conditions in hilly and mountainous areas.

There are many limiting factors to expanding fish production as mentioned above and it will take time to overcome such constraints. However, Lao PDR has various comparative advantages, which should encourage the development of inland fish production. These are:

- ample water resources;
- rural fish production integrated fully into the natural production cycle;
- increased consumption and market demand; and
- many farmers having considerable experience in rural based fish production.

3.2.7 Shifting Cultivation

(1) Current Conditions.

Shifting cultivation is a traditional upland cropping system whereby a piece of primary or secondary forest, bamboo or bush is cleared and farmed until the soil fertility is depleted, reducing labor productivity below a worthwhile level. The land is then left to fully or partially regain its fertility through regeneration of the original and/or new cover species. After this resting period, ranging from about 5 to 20 years, the cycle is repeated. There are three types of shifting cultivation.

(1) **A traditional swidden rotational system:** In this system, the cycle ranges from about fifteen to twenty years. The cleared upland sloping area is farmed for two to three years, either under rice or rice and maize etc. with the last crop sometimes being cassava. This system is sustainable at low population densities with sufficient time in bush fallow to ameliorate soil fertility depleted in the cropping phase. As population densities increase, the rotation shortens to the point where the system may not be sustainable.

(2) **A pioneering exploitive system:** This pioneering form of shifting cultivation is practiced in former opium poppy production areas. In these

areas the cleared land is continuously cropped until severely degraded after which it is abandoned. The cultivators then move to a completely new forest area to continue the cropping cycle. Imperata and other aggressive weeds and grasses invade abandoned areas. The land generally remains under these species without the usual succession to bamboo, bush and then trees.

(3) **A transitional shortening rotational system:** This is a transition system to sedentary agriculture. In many areas because of the land allocation, tax and the delineation of forest boundaries with village agreements, the shifting cultivation cycle has been truncated to between four and six years. Thus, the land is cleared after only a three to five year's rest and then put under rice and maize etc. for one or two years. Productivity is declining in these areas through soil degradation and erosion. Unless steps are taken, productivity will continue to decline presenting serious livelihood problems for the communities in these areas.

The major shifting cultivation areas are in the northern provinces and in the eastern parts of the southern provinces close to the Vietnamese border. Nationwide, the current area under shifting cultivation, including some recently abandoned land, has been estimated to be 680,000 ha i.e. about 3% of the country area. This does not include the majority of fallow scrub and bush land within the shifting cultivation cycle, which could amount to about an additional 2.5 million ha. Thus, the total area being utilized for all forms of shifting cultivation is about 3.2 million ha. or 13% of the land area.

The number of families practicing shifting cultivation in 2000 was about 340,000 or 2.06 million. This is 39% of the total population and 48% of the rural population. Table 3.17 gives the 1982 and 1989 land use, by region with estimates for 2000.

From the above table it can be seen that cropland per capita is relatively constant in each region, with a slight decline over time. However, changes over the last 10 years are leading to permanent and an increasing reduction in the length of fallow period and a decline in the access to new forest land. These changes are due to: increasing population pressure; establishment of NBCAs; Government rules and regulations about fallow period duration; higher land taxes per unit area on shifting cultivation land compared to permanent upland fields; and progressive land allocation and village agreements on land use, forest boundaries and forest conservation and management.

A number of past and on-going programs have been designed and implemented to facilitate the stabilization of shifting cultivation through the development of sustainable land-use systems incorporating conservation measures and a variety of agro-forestry systems. The goal is to facilitate transformation from shifting

cultivation to sedentary farming and livelihood systems that are capable of sustainability whilst improving living standards. Program interventions have covered a range of strategies including: land allocation and land-use planning, introduction and testing improved agro-forestry land-use systems, non-timber forest products (NTFP) management systems, cottage industry development, improved health, family planning services etc.

Table 3.17 Land-use by Region – Lao PDR

1982 Land Use by Region (000 ha.)				
	Northern	**Central**	**Southern**	**Country**
Forest, potential forest & other wooded areas	8,995	6,298	5,846	21,139
Shifting cultivation	*353*	*144*	*101*	*598*
Permanent agriculture	*51*	*234*	*423*	*708*
Total agriculture	404	378	524	1,306
Grassland	368	311	125	804
Other areas	54	242	135	431
Total area	**9,821**	**7,229**	**6,630**	**23,680**
Population (000)	1,113	1,570	663	3,346
Cropland per capita (ha.)	0.36	0.24	0.79	0.39
1989 Land Use by Region (000 ha.)				
	Northern	**Central**	**Southern**	**Country**
Forest, potential forest & other wooded areas	8,980	6,189	5,767	20,936
Shifting cultivation	*365*	*155*	*106*	*626*
Permanent agriculture	*57*	*296*	*496*	*849*
Total agriculture	422	451	602	1,475
Grassland	365	332	126	823
Other areas	54	257	135	446
Total area	**9,821**	**7,229**	**6,630**	**23,680**
Population (000)	1,296	1,899	782	3,977
Cropland per capita (ha.)	0.33	0.24	0.77	0.37
2000 Estimated Land Use by Region (000 ha.)				
	Northern	**Central**	**Southern**	**Country**
Forest, potential forest & other wooded areas	8,871	6,054	5,605	20,530
Shifting cultivation	*380*	*185*	*115*	*680*
Permanent agriculture	*125*	*370*	*635*	*1,130*
Total agriculture	505	555	750	1,810
Grassland	380	350	130	860
Other areas	65	270	145	480
Total area	**9,821**	**7,229**	**6,630**	**23,680**
Population (000)	1,708	2,486	1,040	5,234
Cropland per capita (ha.)	0.30	0.22	0.72	0.35

Note: Some cropland may include abandoned and one-year old fallow land.

Source: 1. Forest Cover and Land Use in Lao P.D.R., DoF Report No. 5, 1992 for 1982 & 1989.

2. Year 2000 figures are based on this earlier data and estimated influence of population increases over the period 1989 to 2000.

With declining productivity under shortened fallow periods (non-existent in some situations) there has been increasing interest in agroforestry systems. These enhance soil amelioration and enable shortening or elimination of the fallow period. Another adaptive strategy of upland families is to increase gathering of NTFPs, both for subsistence and sale. The latter enables them to purchase goods, especially rice.

(2) Agro-forestry Land-uses/Systems

Agroforestry techniques have been employed in Laos throughout a range of situations in both the traditional and later developed farming systems.

(a) Arable Systems - Woody perennial / annual crop associations

The swidden rotational shifting cultivation is a form of *agro-forestry* since crops (predominately rice) are planted in rotation, over time, with bush fallow periods of varying lengths. Improved fallow and/or alley cropping systems provide potential to accelerate soil amelioration benefits from shortened fallow periods. Without such systems mono-cropping on shortened rotation is not sustainable. Examples are demonstrated at the Agro-forestry Research Station at Tong Khang, Luang Prabang, which include cover crops of legumes after rice, alley cropping within tree legumes along contours to control erosion and provide mulching material to improve the soil.

(b) Taunga Systems - Tree crop/annual crop associations

These permanent systems are capable of stabilizing steeper slopes in shifting cultivation areas and also have the potential to provide opportunities in other agro-ecological areas. There are now many examples of these agroforestry associations particularly in northern upland areas, such as: rice or maize/paper mulberry and rattan; rice or maize/bamboo; rice or maize/styrax for resin & wood production; rice or maize/teak; and pineapple/teak or fruit trees.

Within these systems there are many variations on the form of associations. Some strategies seek to maintain the association continuously over time with widely spaced rows or clumps of the woody species. Other systems, through optimal planting of the woody species may only enable annual cropping for a limited number of years. In these, crop yields decline as result of root competition and canopy shading.

Styrax and Paper Mulberry/Crop associations in Houaphan and elsewhere are established by encouraging the paper mulberry or styrax trees existing naturally in fallow land. This is simply achieved by not cutting and burning them during land preparation for rice or other crops.

(c) Pastoral systems

Transformation in shifting cultivation areas also involves improving livestock forage and feed supply systems. Increasing population and animal protein nutrition will increase demands for feed grains and crops. Ruminants will

require improved forages and non-ruminants will require more maize and other feed. Thus to provide sufficient future feed, forage systems also need to be developed.

Pastoral agroforestry systems provide benefits through increasing production and nutritional value of forages for ruminants. This expands the foraging capacity that can be sustained in grazing areas, and feed for non-ruminant forests and fallow lands. Pasture legumes of stylo and centrocaema can be seeded into grassland and bush lands along with introduction of bushy forage species such as gliricidia, leucaena and calliandra.

(3) Non-Timber Forest Products (NTFPs)

A very diverse range of NTFPs are gathered and utilized for a variety of family needs and also for sale. These form a major part of the overall livelihood system in upland shifting cultivation areas. Up to 80% of family subsistence needs are supplied by NTFPs. NTFPs also provide a large proportion of family cash income, up to 55% in some cases. In addition, the forest is a major source of browse and grazing for the animals owned by farmers, estimated to cover 5 to 10 million ha or one-quarter to one-half of the total woody area.

In many locations, NTFPs are being over-exploited and depleted. Project work has demonstrated the ability to improve management of NTFPs through participatory extension and by involving village networks, where several villages access common forest areas for NTFPs. Several NTFPs including: - paper mulberry, mulberry (for silk production), cardamom, styrax resin (benzoin), rattan and bamboo are being grown on farm with improved husbandry, providing increased production and benefits. In addition to these, some wildlifes, fish and other water animals, plant exudates, medical plants, spices/condiments and tree bark etc. are also important NTFPs.

(4) Trees and their Importance and Potentials for Farm Families

As mentioned above, trees and forests are important components of the farming system and are essential to livelihoods in shifting cultivation areas. They supply fuel, building materials, food and many other NTFPs. They also contribute the bulk of grazing and browse to farm animals and are a significant source of non-farm income for rural people.

Many forests are in areas of outstanding natural beauty with many rural people living in or near these areas. There is a considerable tourist potential to develop

these areas, especially the 20 NBCAs. This may be one of the best ways to protect the NBCAs as the local people will be involved in managing them for their own economic benefit. While forest trees supply most of the products that farmers require, trees outside the forest, especially trees on-farm, are becoming more important. Most arable and pastoral farming systems have trees as an integral component, the exception being lowland paddy production.

Through the efforts of many projects and several other private and public initiatives, planting trees on farm has increased. Agro-forestry initiatives are dealt with elsewhere in this report, but the planting of trees, bamboo and bushes for food, fruit, nuts, raw silk, paper bark, poles and timber is gaining momentum, especially where there is a developed market for these products. The Government and donors are encouraging tree planting. In the Forest Laws tree planting is promoted through various incentives, regulations. There is also an annual National Tree Planting Day on the first of June every year, when tree planting is encouraged by all the population. On the other hand, there are regulations in the Forest Laws, which inhibit the planting of trees through controls and other requirements. These laws, whilst principally established to cover the harvesting of forest trees and products are also affect farmer initiated plantings on-farm.

The government program to encourage planting the equivalent of 0.5 million ha by 2020 provides opportunities to involve farm families in both the seedling production and tree planting for the program. This is a long term effort which could provide an increased income generating potential to farm families. About 50 million seedling will be required each year to fulfil this target. While there will be some large government nurseries, there is also considerable scope for farmers to participate. They could grow tree seedlings, on their own land, for sale to the program. Additionally they could undertake seed and cuttings collection from valuable indigenous trees for direct sale to the government program, or to grow in their own nursery for later sale.

As discussed earlier, farm and forest trees also provide opportunities to establish cottage industries. Some of these include sericulture, bamboo weaving, and paper-making. There are many more cottage industries that have potential including: apiculture (honey, wax and royal jelly), wooden handicraft products, lime burning, brick/tile making, ceramic manufacture, food, fruit and fish processing etc. The potential for all such small-scale industries requires investigation through marketing studies and extension where promising opportunities are identified.

3.2.8 Marketing and Agro-processing

(1) Marketing

The present marketing of agricultural products still follows the traditional sales pattern. The small-scale farmers bring fresh products to the local markets immediately after harvesting. For medium to large-scale farmers, middlemen visit individual households during the harvesting period and buy products including paddy. Marketing of agricultural products is regionally confined and inter-regional distribution is very rare except for certain kinds of fish and fruit. Therefore, market prices vary significantly from region to region. Such regional unbalance is caused by the fact that most farming families are engaged in subsistence agriculture in fairly inaccessible areas. No large demand can be expected from urban areas, and additionally there is lack of transportation, poor access roads, high transport costs, and inter-regional transportation taxes.

Marketing of agricultural products

The State Foodstuff Company (SFC) or private middlemen visit farmers and purchase paddy. Paddy is stored and milled as necessary before being shipped to market, or supplied to military, police stations, and hospitals. The SFC, having a large collecting capacity with storage facilities and rice mills, handles major part of the rice in the market and the private middlemen share the rest. Rice is graded at the milling stage and then it is shipped to market. Both the glutinous and non-glutinous rice are classified into three grades.

Coffee is a representative commercial crop in Lao PDR. At present, about 15,000 tons are produced annually, and most of it is exported to the European and Singapore markets (14,300 tons in 1999) through middlemen who are members of "Laos Coffee Exporters' Association" based in Pakse, Champassak Province. However, its export price is about 10% lower than the international market price due to poor quality and limited supplies. Other food crops are collected by traders directly from farmers and sold to the retailers.

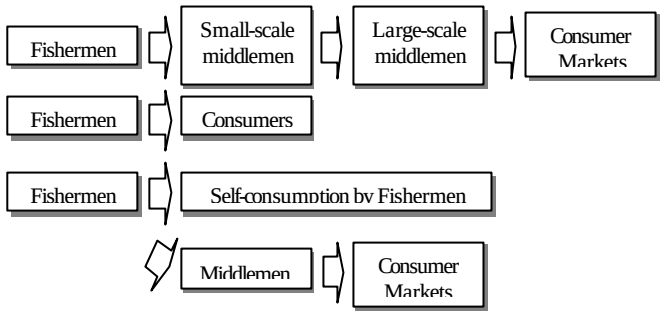
Marketing of livestock and fishes

Live cattle, buffalo, and pigs are collected from farmers by the SFC or individual middlemen and transported to slaughterhouses. The SFC and individuals sell the meat to the retail market, hotels, restaurants, hospitals, armed forces, and police agencies. The 1999 statistics indicates that more than 13,000 live buffaloes and cattle and 500 live pigs were exported to Thailand, however, it is said that 100,000 to 200,000 large animals were unofficially exported. Such large unofficial export is considered to be caused by: a monopoly by a few traders who have exporting

licenses; poor monitoring of illegal transportation; easy access to Thailand over the Mekong River; higher export taxes; etc. Unofficial trade should be curtailed in order to prevent the spread of epidemic diseases.

Poultry are directly slaughtered by traders or farmers, and taken to the local markets. Processed poultry meat is sold in markets without any food inspection. Fish is sold through traders or directly by fishermen. For example fish from Nam Ngum Lake may be distributed through three channels as illustrated in Figure 3.3. The market price is controlled by the large-scale middlemen, therefore, the fish price at these production sites is not always linked to market prices.

Figure 3.3 Marketing of Nam Ngum Lake Fish



Source: Mr. N. Morimoto, JICA Expert

Marketing facilities and information

Currently, there are 444 retail markets, consisting of 110 managed by GOL, 73 by Provincial and District Administrations and the rest 261 are in villages. None of the markets handling fresh food have cooling facilities or display cabinets. All in all, the market for goods is small, market areas are limited and people accept un-graded produce.

There is no systematic market information service available for producers and little or no market information in newspapers or on radio and television. The sole market information source are the traders including the SFC. The market price is basically controlled by middlemen, resulting in little bargaining power for the farmers. Moreover, proper pricing is almost impossible without wholesale markets.

Regionally isolated markets induce a large variation in market prices from area to area. Typical cases are shown in Table 3.18. The causes of such large price

Table 3.18 Regional Variation of Farm Gate Price in 1999

Product	Highest Price	Lowest Price	Ratio
Paddy	1,005 Kip/kg in Vientiane	605 Kip/kg in Saravan Prov.	1 : 1.7
Live cattle	15,185 Kip/kg in Vientiane	2,683 Kip/kg in Houaphan Prov.	1 : 5.6

Source : Agricultural Statistics, MAF, 2000

gaps are poor road networks, lack of market information, purchasing power of consumers and taxes imposed on the goods moving through Provinces.

With growing agricultural and livestock production, it is desirable to establish an adequate market system which would allow fair distribution of benefit among those involved in production, marketing and consumption. Such a system should include: (i) the establishment of wholesale markets; (ii) improved collection and distribution systems for agricultural products;(iii) provision of improved marketing facilities; (iv) establishment of market information systems; (v) new and improved access roads to markets; (vi) improved retail markets; and (vii) lifting various regulations and barriers that hamper fair and competitive market activities.

(2) Agro-processing

Agricultural products collected from the growers by the SFC and individual traders are usually sold to consumers via storage and milling facilities. In the case of rice, dry season paddy is harvested at the beginning of the wet season and requires machine drying to some extent. However, almost all the storage facilities are wooden structures and not equipped with ventilation or air-conditioning. Therefore, the quality of paddy tends to deteriorate and in addition some is lost caused by insects and rats. The slaughterhouses are very primitive and poor sanitation, equipment and safety measures. Meat is not inspected sufficiently. This should be rectified quickly from a food hygienic viewpoint.

In conclusion, the post-harvest processing of agricultural and livestock products is oriented to the self-consumption, and most surplus products are sent to market without any processing, partly due to a lack of wide-spread marketing system.

There are eleven primary crop processing factories excluding breweries, seven are rice-mills and one each is for feed manufacturing, sugar manufacturing, and tobacco drying.[17/] Beside these crop processing factories, there are a lot of small scale and family based processing shops, though the actual number is unknown. The amount of agriculture processing pro-

Table 3.19 Amount of Agriculture Processing Products

(Unit: ton)

Kind of food/crop	1994	1995	1996	1997
Coffee	9	10	112	139
Meat	2,814	2,827	3,000	3,620
Fish	280	280	280	461
Rice	546	516	512	505
Vegetable & Fruit	-	-	-	335
Sugar	-	145	189	205

Source: MIH

[17/] Ministry of Industry and Handicrafts (MIH)

ducts is shown in Table 3.19.

As for the handicraft industry sector, traditional products such as silk, cotton, bamboo work, etc. enjoy increasing demand as souvenirs by tourists. Silk products, particularly dyed with natural materials, appeals to tourist with its simple but exotic design. Such silk products can be produced in slack periods and provide valuable cash income to farmers. However, the domestic production of silk yarn is in short supply, and weavers have to rely on imported material from Vietnam and Thailand, reducing their profit margin. Thus, production of sufficient raw material is a key issue for this sector.

At present, household industries predominate in the processing of agricultural, fish and livestock products. The introduction of large scale processing is constrained by difficulties of a stable supply of materials through the year. Such large scale processing industries should be considered in parallel with the development of markets for products and establishment of production areas for raw materials. For the time being, small scale and rural agro-processing industry, should be promoted.

3.2.9 Rural Finance

(1) Overall Situation

The UNDP/UNCDF Rural Household Finance Survey conducted in 1996 was the first attempt to gain an understanding of the financial practices in urban, rural and semi rural areas. It also provided a comprehensive understanding of the state of savings and loan activities throughout rural areas.

Rural households are engaged in a range of creative techniques for rural savings but were virtually uninvolved in access to formal and informal depository services. While over 9 out of 10 households had some financial savings, only one percent had depository accounts. At the same time, only 11% of rural households were engaged in any form of borrowing, despite evident needs for working capital. There is therefore a problem of the un-monetized status of the bulk of the rural poor. The large number of projects has not addressed this problem of the inability of the economy to convert the widely distributed savings into capital as they lack deposit mobilization mechanisms.

In the formal financial sector, the State Owned Commercial Banks (SOCBs) are neither extending large services to the rural areas nor providing products tailored to the needs of the farming population. While most farmers in rural areas had some level of assets for collateral, activities to convert assets into loan security remain

extremely limited, with the value of outstanding loans in rural areas averaging only 10% of household physical asset values.

Donors and NGO's are practicising a range of unsustainable financial activities. Each project has its own largely unsustainable approach to lending. Most of these programs lack monitoring and information management systems for their portfolios; introduce loan interest and deposit rates (if any) that deplete capital resources; and include only infrequent activities to generate financial resources by encouraging financial savings deposits. In addition, there is a low level of financial skills and accountability.

(2) Rural Savings and Non-Institutional Credit

The Household Finance Survey revealed that there is a very broad distribution of savings throughout the rural population. Savings strategies are both financial and non-financial and about 91% of all households had financial savings, while 92% of all households had non-financial savings (mainly in the form of non-producing livestock and precious metals). There is a very low level of depository mobilization by both formal and informal sectors and these savings are rarely converted into deposits. The survey also revealed that less than 1% of rural households held bank deposits, 1% is held in informal group deposits, 11% is held in cash, 14% as precious metals and 74% of savings was represented as the net value of livestock. The total rural savings was estimated at about US$ 55.0 million in 1996.

An informal credit market finances the rural sector, like in many other developing countries. The primary source of credit to rural households was family, friends and lending households (33%), especially for those far from roads and more remote areas. The loan size is small with many of the loans for consumption purposes between planting and harvesting and this accounted for almost one half of household debt. Many of these loans do not carry an explicit interest rate and were obtained without collateral for short-term purposes. Informal institutions accounted for only 15% of lending. Suppliers of inputs and moneylenders are an unimportant source of loans for farmers. Where they operate, interest charged range from 42-73% per annum. Farmers approach these sources mainly for household emergencies and day to day survival needs. Banks are often located in provincial capitals and are often very distant from most villages. The survey revealed a low level of debt to assets and that 11% of rural households had some form of debt and the debt to assets ratio was about 9.5%. About 8% of rural households borrowed to buy fixed assets and 13% borrowed for working capital.

Village Revolving Funds (VRFs)

Informal and semi-informal institutions also includes 'Village Revolving Fund' (VRF) and rotating fund groups. VRF are local village institutions and VRF loans cover about 15% of all rural villages and have grown rapidly in the last ten years. They operate outside the formal financial sector and are not taxed or regulated. There are about 1,640 VRFs throughout Lao PDR. In general, these locally implemented funds are rooted in some form of financial or commodity (non-financial) lending with a plan for repayment, and support either income generation, food security or improved production for consumption or sale. This is mainly in keeping with the non-monetized nature of the rural economic activity. VRFs are locally managed groups and operate between social and financial organizations. VRFs are generally financed by donors or NGO's and include over 1000 "rice banks" (mainly from World Food Program (WFP) resources channeled through international NGO's). There are also many 'livestock banks' and revolving credit funds that lend money, set up under integrated rural development projects. The Lao Women's Union is a frequently used intermediary by international donors and NGO's. Terms, conditions and other criteria and methods of loan disbursement vary widely from one scheme to another and between donor and NGO operations. Repayments are made in kind or cash, with or without interest, full or partial principal repayment etc., Credit funds or commodities are often provided by donors to Government and transferred to Provinces, then to districts and then to individual VRFs.

Shortcomings of VRFs

Although they have assisted community development, VRFs do not provide financial intermediation necessary to mobilize domestic resources. They do not have a continued existence and are normally confined to the life of the project. There is negligible financial reporting. Interest rates are well below market rates with a high subsidy element. They are not conceived of as a financial institution and lack the capacity, experience or trained personnel for financial intermediation. Often, essential structural problems make VRFs financially unsustainable. Deterioration of their financial positions result from asset atrophy, in part because interest rates are below inflation rate and do not cover all costs. Capital depreciation occurs faster if credit discipline is weak. Lack of financial reporting and monitoring means, remedial action is difficult because potential losses are not detected at an early stage. Despite these shortcomings, there are some promising VRFs that are able to reach small borrowers because of their rural location, local ownership and familiarity with village residents. There is a significant need to selectively upgrade VRFs as potential credit and savings village banks.

The UNDP/CDF survey also inquired whether existing financial services met the effective demand for credit. In respect of the rural areas, only 5% indicated that it did. The primary reason for taking a loan was to cover emergencies or unforeseen expenditure, while business was the next most important reason.

(3) Institutional Credit

There is limited bank outreach in relation to the number of rural households. Banks tend to be fairly uniform in their loan terms and conditions. Interest is charged at market rates except for agricultural loans by APB that are subsidized by government. Banks generally require collateral, most often in the form of land or housing. The process of expanding credit in the rural areas is not independent of the formal banking system. Banks provide the mechanisms through which rural savings are converted into financial deposits that become the capital base for investment. This process of financial deepening and monetisation are two central components of a sustainable financial (and microfinancial) service sector that can grow independently over the long term. The SOCBs do not operate in the rural areas and have no branch network to service the farming community. Furthermore, the APB has also not successfully penetrated the rural sector as the coverage is limited. The process of mobilization and re-circulation can be met by village banks or credit unions models, but these have yet to evolve.

(4) The Banking Sector

The formal financial system consists of: (i) the Bank of Lao PDR (BOL); (ii) three State Owned Commercial Banks (SOCBs); (iii) one specialized government-owned bank (APB); (iv) two joint venture banks (Joint Development Bank & Vientiane Commercial Bank); and (v) branches of several foreign banks.

Institutional credit has a relatively recent history and is in its early development stage. Prior to 1988, the State Bank of Laos carried out both central bank and commercial bank functions. The two tier-banking system was introduced in 1988 comprising the Bank of Lao PDR (BOL) and SOCBs.

SOCBs have now been in operation since 1993 and are in a weak financial position; have limited expertise and staff; and a low level of savings and time deposits. Commercial banking capacity, in particular credit and risk assessment skills, is limited and weaknesses in central banking supervision and accounting standards imply that information on the financial system is not readily available. Lack of transparency, management deficiencies and weaknesses in corporate governance contributed to a decline in confidence. SOCBs have been provided with technical

assistance and project loans by World Bank and ADB for a number of years. While some progress has been made, fundamental changes are needed in several areas such as: (i) corporate governance of SOCBs; (ii) substantive upgrading of accounting standards and supervision capacity of the central bank; and (iii) changes in regulatory policy to increase competition.

The BOL continues to play a very close participatory role in all the decisions of the SOCBs including the appointment of managerial positions, the preparation of financial statements and the finalization of annual reports. SOCBs are given greater autonomy by Decree, however, the current status of SOCBs does not equip them to play an effective role in providing credit to the commercial sectors or act as intermediaries for a rural based micro-finance system. There are several reasons for this predicament such as high transaction costs, limited outreach, lack of service orientation, limited commercial banking skills and indirect control of interest rates, all of which limit the formal banking system's ability to support rural financial system development.

(5) Agricultural Promotion Bank (APB)

The Government set up in June, 1993 the Agricultural Promotion Bank (APB) by consolidating the agricultural loan portfolios and the staff of three of the seven commercial banks. The Bank was initially set up with capital fixed at 1.0 billion Kip with 80% held by the State and the remainder to be sold to the public. The sale has yet to take place. Its capital including reserves at the end of 1999 is estimated at 9.1 billion Kip. APB is the main provider of rural finance apart from bilateral, multilateral and international NGO funded projects. It is a specialized government-owned bank, and is reported to serve 15% of all villages (about 3000) containing 14% of all households (about 70,000).

The APB commenced lending in 1994, using group loan methodology with group guarantee as collateral, which was a significant departure from the practice of the SOCBs that required tangible assets. APB's total outstanding loans in 1999 were estimated at 92.0 billion Kip with short-term loans accounting for 60%. Of this, the short-term loans for paddy accounted for 29% benefiting 15% of all villages. Demand for cheaper loans outstrips supply and unsuccessful applicants turn to the informal market.

The depository base of the Bank is quite low (around 40 billion Kip) and most of the resources it on-lends (approximately 80%) is mainly provided by BOL and to a smaller extent by other donor credit lines. These two sources account for over 90%

of APB's liabilities and capital. The central bank refinances APB with a 5% spread. Despite a high deposit rate structure, and with 12,000 depositors accounting for 40% of all deposit accounts held in the SOCBs (as reported in the micro finance survey), APB's share of the deposit market is only 2%. APB, the bank with the greatest rural penetration has a very small deposit base comprising only 4.3% of total liabilities and capital. Expansion of the depository base is constrained by the limitations imposed through its rate structure.

The problem of low deposit mobilization among the banks is not only limited to APB. A variety of factors can explain the low deposit mobilization. These include the lack of a fully developed market infrastructure; high transaction costs for financial institutional and depositors/clients; low interest rates on savings accounts; mistrust of the formal banking sector and cultural factors such as 'mattress savings'.

Despite its rapid growth in the past nine years, APB is beset with several financial management, loan operations, loan recovery and business development problems. Resource mobilization is minimal, credit is supply driven and targeted to government-sponsored projects and loan recovery levels are low. Government subsidies to APB are large relative to expenditures on agricultural extension and research.

The APB currently provides long terms loans at 7%, medium term loans at 8% and short term loans at 6-8%, which are all well below the current market rate for these loans of around 16-20%. Subsidized interest rates make loans from other banks unattractive to agricultural borrowers and have a destructive long-term effect on both rural financial and agricultural sectors. It distorts investment decisions and promotes inefficient, non-viable agricultural enterprises. The APB is a major lender of group loans that account for about 30% of its total lending, while individual loans account for about 40%. A better and more aggressive mobilization effort is needed to increase the level of deposits. The low deposit base has increased the APB dependence on the BOL and donor credit lines for refinancing which together account for 92% of APB liabilities and capital.

Table 3.20 Coverage of APB Activities

	Country Total	APB Coverage	Coverage (%)
Districts (nos.)	139	117	84
Villages (nos.)	11,047	4,885	44
Farmer Groups (nos.)	13,861	N.A	-
Families (nos.)	775,755	130,077	17
Land (ha)	743,000	108,096	15

Source: Lao Agriculture Sector Study, WB, Oct. 1998

The APB has three branches and 18 service units, 4 in the provinces and 14 in districts. It also operates 56 sub-service

units and has a staff of about 500 located outside of Vientiane. Basic data on APB; coverage of APB activities in provinces and districts, collections, and overdue loans and the is given in Tables 3.20 and 3.21

Table 3.21 APB Annual Collections

Unit Kip million

Type of Borrowing	1994	1995	1996	1997
1. Short Term < 1year				
SOE	82	60	1,372	1,770
State-Private Joint	-	-	-	-
Private Enterprise	1,099	3,846	5,412	5,460
Individuals/Groups	3,271	4,475	7,068	7,807
Sub-Total	4,452	8,381	13,852	15,037
2. Medium & Long >1year				
SOE	2	350	46	226
Private Enterprise	347	810	756	646
Individuals/Groups	496	1,625	1,672	3,156
Sub-Total	845	2,785	2,474	4,024
3. Total	5,297	11,166	16,326	19,061
4. Overdue Loans				
SOE	84	410	1,418	1,996
State-Private Joint	63	-	-	-
Private Enterprise	1,446	4,656	6,168	6,102
Individuals/Groups	3,815	6,216	8,792	11,003
Total	5,345	11,282	16,378	19,059
5. Overdue as of Collections	101%	101%	100%	100%

Source: Lao Agriculture Sector Study, WB, Oct. 1998

Since 1998, a small-scale microfinance project (US$7.1 million) jointly financed by the UNDP and UNCDF is being implemented in three provinces (Oudomxai, Xaignabouri, and Vientiane). The project aims to develop formal sources of microfinance and supports training of staff of participating microfinance service providers.

(6) General Issues on Overall Formal Financial System

Some general issues that require to be addressed as an overall plan for restructuring the commercial banks and APB are outlined below.

- Banks are in weak financial position; have limited knowledge and experience in commercial banking operation and have low levels of savings and time deposits.
- Staff deficiencies show in poor management and accounting systems, credit risk evaluation, appraisal of borrowers, cash flow analysis.
- Savings and resource mobilization need to be improved.
- Lack of on-the-job training for bank personnel, at all levels. Retail level institutional capacity is highly inadequate to provide the necessary services to a large segment of rural households and enterprises.

- Government subsidizes agricultural credit, thus reducing budget deficits and inflation.
- Lack of an institutional framework for non-bank intermediaries.
- Reforms required to drastically change APB policies and operations.
- Legal structures for bank transactions, contracts, collateral and securities are incomplete.
- Non-performing loans are eroding the capital base of SOCBs.

(7) Previous Assistance for Reform of the Banking System

Since the introduction of the two tier banking system, the ADB has been closely associated with the reform of the financial system and has made many project loans and provided 16 financial sector related technical assistance grants. The first technical assistance grant was in 1988 and the First Financial Sector Program Loan was in 1990. Following this, there were several technical assistance programs both for the financial system in general, for reform or strengthening of SOCBs and the APB. The World Bank too, assisted in improving the operational performance of SOCBs and to improve the capacity of BOL to supervise and regulate SOCBs through the Financial Sector Reform Project in 1998.

3.2.10 Rural Development

(1) Focal Site Approach to Rural Development

The National Rural Development Program (1996-2000) is now under implementation through the focal site approach that was adopted in 1994 by the government. Focal sites can be defined as "centers of change and learning" for the rural development. The ultimate goal of rural development (through the focal site approach) is poverty alleviation in remote and isolated areas. A bottom-up participatory planning and implementation process was adopted for its development. In order to achieve coordinated and cooperative joint programs between line agencies at the national and provincial levels, a Central Leading Committee for Rural Development (CLCRD) was established under the Prime Minister's Office, and in 1994 a Provincial Leading Committee for Rural Development (PLCRD) was established in each province. The mandate and authority of PLCRD cover all aspects of rural development in each province. The PLCRD is responsible for overall rural development in the province, and in particular for the focal site areas. The PLCRD coordinates the work of line ministries, while planning and coordination outside the focal sites continue to be under the purview of the Provincial Socio-Economic Plan, administered by the SPC. A Rural Development Office at the central level and in each province has been established to assist CLCRD and PLCRD in their work.

For focal site development, provinces submitted lists of potential areas (focal sites) that were selected based on criteria proposed by the central government as follows:

(a) Urgency for poverty alleviation;
   - areas with isolated communities,
   - remote areas with difficult access,
   - presence of malnutrition and illness,
   - soil conservation problems, and
   - need to counter land degradation due to high incidence of slash-and-burn agriculture,

(b) Potential areas justifying investments in view of creation of development poles;
   - availability of land resources, and
   - possibility for irrigation accessibility,

(c) Risk areas with;
   - opium fields,
   - UXO, and
   - flood hazards.

The 1996-2000 Rural Development Program planned to establish 87 focal sites with an expected investment of kip 154 billion (kip 30.8 billion per year on average). However, it is reported that the actual expenditure was quite small. All the works for the focal site development were carried out by the CLCRD initiatives with only local funds. Due mainly to this funding shortage, the focal sites were insufficiently developed and only 59 focal sites are now operational as of February 2001. The number of villages involved in the 59 focal sites is 948 with a population of 321,800 as shown in Table 3.22.

Major works for the focal site establishment were rural infrastructure development/improvement. Based on area specific conditions, these include irrigation facilities, school buildings, health facilities, feeder roads, water supply facilities, etc. However, it is likely that the bottom up participatory planning process and capacity building of relevant staff have not been fully adopted in the implementation process.

Beside the above 59 focal sites, similar rural development activities are being carried out directly by provincial governments using their own funds or funds allocated from central government. Foreign assistance, including from NGOs, is of considerable importance in these types of rural development activities.

Table 3.22 Summary List of Focal Sites

No.	Province	Focal Site (No.)	Districts Involved (No.)	Villages (No.)	Households (No.)	Population (persons)
1	Phongsali	2	2	12	481	2,460
2	Louangnamtha	3	3	11	833	4,154
3	Oudomxai	3	3	35	2,303	12,940
4	Bokeo	3	3	53	3,330	17,897
5	Louangphrabang	3	3	79	4,600	27,742
6	Houaphan	3	2	62	1,773	13,745
7	Xaignabouri	3	3	44	2,377	17,590
8	Vientiane Mun.	3	3	28	3,101	18,511
9	Xiangkhouang	3	3	57	3,995	26,692
10	Vientiane	3	3	39	3,302	20,705
11	Borikhamxai	4	3	114	5,233	33,678
12	Khammouan	4	3	88	4,289	21,127
13	Savannakhet	4	4	65	2,959	15,934
14	Xaisomboun	4	4	38	5,404	13,917
15	Saravan	5	5	107	7,127	33,978
16	Xekong	3	4	42	1,789	11,928
17	Champasak	3	4	54	4,623	21,767
18	Attapu	3	3	20	1,325	6,992
Total		59	58	948	58,844	321,757

Source: CLCRD - Monitoring of Focal Sites - up-dated to July 2000

(4) Issue of Rural Development

On-going rural development through the focal site approach is a worthy government effort from the following viewpoints:

(a) Integrated planning and implementation of rural development that is difficult to carry out by line agencies are expected to be undertaken through this approach.

(b) The most effective use of a limited budget and of scarce local government human resource capacity are expected.

(c) The adoption of the bottom-up participatory planning and implementation process approach in the focal sites is essential for the rural development.

However, after more than five-years of operation of the focal sites, several issues remain. These are as follows:

(a) The selection of focal sites is too heavily biased toward poverty areas and politically important areas, and there is insufficient emphasis on potential areas for development. A re-examination of the selection criteria is needed.

(b) The roles and responsibilities of PLCRDs and their relationship with line agencies are unclear on matters concerning planning and coordination. These should be clarified.

(c) Although the focal sites are defined as "centers of change and learning", monitoring and evaluation systems have not yet been developed. Appropriate systems should be established.

(d) In addition, there is a need to establish clear operational targets for financial disbursement and to develop a monitoring system to track operational progress.

(e) The staff capacity in PLCRDs and PRDOs are inadequate for planning, management, coordination and supervision activities. Further strengthening of their capacity is needed.

(5) Rural Infrastructure

(a) Rural roads

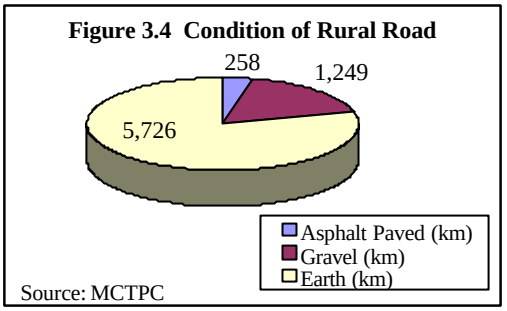


Figure 3.4 Condition of Rural Road

The GOL places a high priority on the development of rural roads that provide remote and mountainous areas with improved access to markets and social services. At present, the total length of the road network in the country is approximately 20,320 km, of which 6,190km are classified as national roads, 6,850 km are provincial roads and 7,230 km are rural roads. The inventory survey conducted by MCTPC in 1998 and the condition of rural road is summarized in Figure 3.4.

There is no accurate inventory detailing the condition of rural roads. However, it is stated that the situation is poor because of a lack of bridges, unstable shoulders, poor condition of existing bridges, no drainage etc. Most rural roads are impassable in the rainy season. Within the country, the northern mountainous areas such as Phongsali, Oudomxai, Louangphrabang, Xaignabouri and Houaphan have the severest problems.

Provincial and district roads are developed and maintained by the Provincial and District office of Communications, Transport, Posts and Construction (PCTPC & DCTPC) with a budget allocated by the central government. However due to a lack of funds only part of the program is covered. Thus, the maintenance of the existing rural road network as well as extending the road system to areas where villages have poor access to market and social services is curtailed.

(b) Rural water supply

In the 1990s, significant progress was made to improve rural water supply conditions in the country. According to 1997 data[18/], about 77% of urban areas

[18/] State Planning Committee, National Statistical Centre (1999), The Households of Lao PDR, Social and Economic Indicators, Lao Expenditure and Consumption Survey 1997/98 (LECS 2)

and 62% of rural areas can get safe drinking water. However, it is clear that the condition of the rural water supply is inadequate in several areas. In urban and easily accessible areas the supply situation is comparatively advanced, but in such areas as the northern mountainous areas it is retarded.

The National Center for Environment Health and Water Supply (NEW), under the Ministry of Public Health, called "Nam Saat", has direct responsibility for promoting rural water supply. At present due to a weakness in the organizational structure, the practical responsibilities for rural water supply lie with each village authority and Nam Saat only provides partial assistance, when requested.

(c) Rural electrification

To achieve enhanced living conditions in remote areas through expanding electrification, the GOL has adopted a two-dimensional approach to increase distribution. One is to expand the grid to comparatively easily accessible areas and the other is providing off-grid supply to remote areas, where grid expansion is virtually impossible due to environmental or cost aspects. Presently 21 % of households are provided with electricity from the grid. Specifically 10 % in rural areas and 74% in urban areas are provided with grid electricity. A basic strategy of GOL is to prioritize district headquarters followed by prioritized rural areas for grid expansion. Much of the country's economic activities are on the grid and rural remote areas are left out. Therefore, in parallel with grid expansion, sustainable electrification by off-grid systems will be promoted to improve rural socio-economic conditions.

In 1999 a Rural Electrification Division was established under the Ministry of Industry and Handicraft (MIH) to be administratively responsible for rural electrification while Electricite du Lao (EDL) is practically in charge of rural electrification development as a national enterprise.

(d) Development constraints

As in the irrigation sector, decentralization is under way. However decision-making and budget allocations are inadequate. For instance, in the case of the rural road sector, budget allocations are made from the central government based on requests from local government for road construction, rehabilitation and maintenance. Additionally there are no taxation rights given to the PCTPC and DCTPC. Local government needs fiscal and administrative authority to allocate public expenditure for rural roads, especially for maintenance. Lack of technical staff in the rural administration is a common feature of the rural

infrastructure sector, hampering sustainable development and operations and maintenance by local government and beneficiaries.

3.2.11 Irrigation

(1) Background

The history of Lao's irrigation can be traced back some hundred years in the northern mountainous areas. These irrigation systems are based on primitive water intakes made by logs, soil and/or stones, and have been well managed by communities. From the 1960's, modern irrigation systems with concrete weirs and well designed canals have been rapidly constructed with technical and financial assistance from foreign donors. The irrigation developments in Lao PDR are regionally classified into three types: (i) community managed gravity type irrigation in northern mountainous areas with a range of service areas from 1 ha to more than 300 ha; (ii) pump irrigation in the Vientiane plain; and (iii) recently introduced pump irrigation along the Mekong River where most of the plain is flood-prone.

In the 1990s the ADB and the Government of the Netherlands played an influential role in the irrigation sector. Irrigation & water-related laws and strategy were established through a series of assistance programs, which are now being followed by GOL. Strengthening and Restructuring of Irrigation Development (SRIDP) and Sustainable Irrigated Agriculture Project (SIRAP) aided by both agencies have virtually established the present irrigation development policy. Basically, the projects aimed to develop the irrigation sector through a combination of institutional strengthening and rehabilitation of facilities by beneficiaries' participation. The conclusion of both SRIDP and SIRAP are assimilated as part of the Irrigation Management Transfer (IMT) program, which is now a key policy of GOL in the irrigation sector. IMT is to transfer ownership of irrigation schemes so that all the responsibility of operation and maintenance (O&M) activities are taken over by beneficiary farmers, reducing the Government's expenditure.

The irrigation sector has been given an important mandate to achieve national food security. In 1997, the Government initiated a drastic measure to increase rice production by distributing a number of irrigation pumps in the lowland paddy areas, called "National Pump Installation and Management Project" (NPIMP). The pumps installed by 2000 amounted to more than 7,000 units. This project boosted the paddy production remarkably, from about 1.4 million tons in 1996 to 2.2 million tons in 2000, thanks to the increased irrigated crops in the dry season. The Government declared food self-sufficiency in 2000.

(2) Current Progress of Irrigation Development

As of 1999/2000 there are 19,170 irrigation schemes with a service area of about 295,000 ha in the wet season and 197,000 ha in the dry season. The irrigation area has gradually increased as shown in Table 3.23. The regional distribution of the existing irrigation schemes by type are shown in Table 3.24 and their locations are shown in Figure 3.5. This indicates that the majority of irrigation schemes are of traditional weir type in the northern and central regions where the mountainous areas prevail, while pump irrigation is concentrated in the southern region.

Table 3.23 Irrigation Area

Unit: 1,000 ha

Year	Wet Season	Dry Season	Total
1991	136	16	152
1992	138	18	156
1993	140	20	160
1994	145	22	167
1995	150	26	176
1996	156	29	185
1997	164	44	208
1998	217	75	292
1999	255	128	383
2000	295	197	492

Source : DOI, MAF

Table 3.24 Regional Distribution of Existing Irrigation Schemes and Types

Region	Total			Irrigation Type (in number)					
	No.	Area (ha)	Ave. ha	Weir	Reser-voir	Pump	Gate & dike	Trad. weir	Gabion
Northern part	11,397	66,059	6.0	3.5%	0.4%	7.1%	0.1%	88.5%	0.4%
Central part	5,947	176,953	30.0	3.0%	1.6%	13.1%	0.7%	80.9%	0.7%
Southern part	1,826	52,523	29.0	3.5%	0.9%	94.5%	0.2%	0.9%	0.1%
Total	19,170	295,535	15.4	-	-	-	-	-	-

Source : Statistics of Irrigation 2000, DOI, MAF

An on-going major irrigation scheme is the Community Managed Irrigation Sector Project (CMISP) funded by ADB and OPEC. The CMISP is to improve more than 40 existing irrigation schemes in the central and northern regions. The communities are responsible for the management of improved facilities by organizing water users associations (WUAs). The CMISP is expected to continue the project on a phased basis. Two similar schemes are to start in 2001; one is the Decentralized Irrigation Development and Management Sector Project (DIDMP) funded by ADB and France, and the other is the Agricultural Development Project (ADP) funded by the World Bank (WB). The DIDMP is characterized as a pilot project exercising the IMT process, focussing on pump irrigation schemes in six selected provinces. The ADP, covering four southern provinces, is really a rural development project including not only improvement of irrigation systems but also market oriented community development using village investment funds.

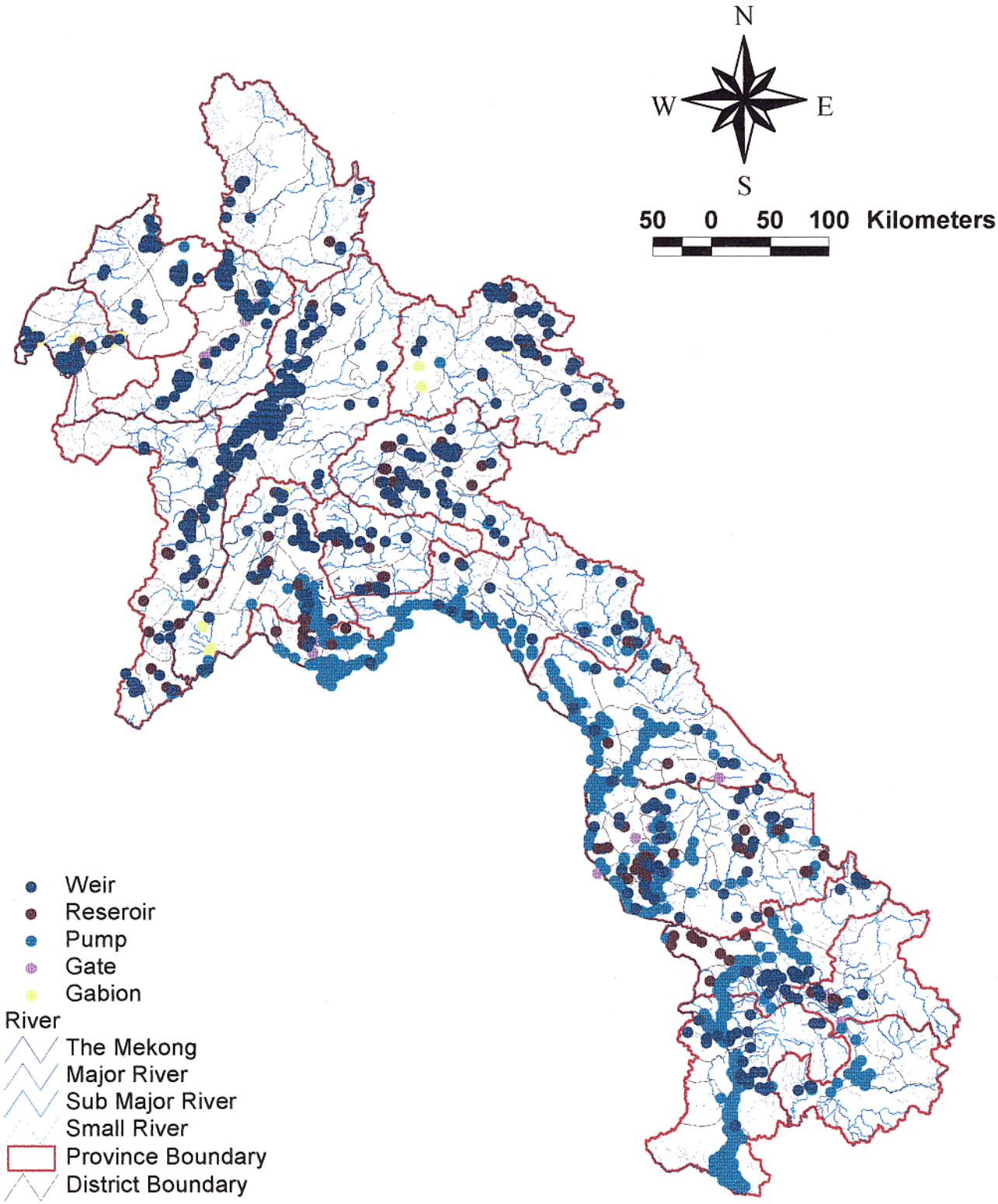


Figure 3.5 Location of Irrigation Schemes

3) Irrigation Management Transfer (IMT)

Knowing that traditional irrigation systems have been efficiently managed by farmers' communities, and also out of economic necessity that it had to reduce subsidies to the agricultural sector, the GOL established a policy to transfer the ownership and associated costs of irrigation to the farmer users. Encouraged by the SIRAP experience, the GOL issued a Prime Minister's order No. 26/PM on the full transfer of irrigation projects to community organizations dated December 18, 1998. The purposes of the decree are to: promote and support the role and responsibility of WUAs in the management of irrigation systems; assist in the reduction of the responsibilities of GOL agencies in the routine management of irrigation systems; ensure the smooth transition of the full transfer of ownership of all irrigation infrastructure to WUAs; and improve the efficiency of operations, management and water distribution of all irrigation systems.

A most important issue of IMT is cost recovery. After IMT is achieved, the WUA is responsible for O&M of the irrigation system and the collection of water fees from farmers or from other organizations. Part of the collected water fees collected has to be transferred to the Village Development Fund (VDF) as the investment cost recovered by GOL, and the remainder is kept by the WUA as an Irrigation Service Fee (ISF) to be used for operation and maintenance of the system.

The GOL's guideline indicates that the cost recovery to VDF is to be made over a 20 year period or less. Payments to the VDF are rated according to paddy yield per ha depending on the type of irrigation. The VDF is further split into two sub-funds, one remains with the VDF and is allocated to the District Finance Office and the other is paid to GOL. The unit rate and division of funds is shown in the following Table 3.25.

Table 3.25 Unit Rate and Division of VDF

Type of Irrigation	Unit Rate of VDF (Kg of paddy/ha/year)		Division of VDF	
	Production of rice crops	Production of other crops	Remain with VDF	Repayment to GOL
Reservoir, weir, and diversion boxes / turnouts without water pump	200	100	80%	20%
Electrical pump schemes	150	80	85%	15%
Diesel engine pump schemes	100	50	90%	10%
Aquaculture ponds	0	500	50%	50%
Agriculture & aquaculture receiving water indirectly or leakage water	70% above	70% above	100%	0%

Source : Prime Minister Decree No. 26/PM

The above guidelines are still in draft form and are subject to further amendment. The announcement by the Politburo in December 1999 suggested that for the time being, all VDF collected by WUAs should remain at the local level and for the exclusive use of the WUA.

ISF is to support the full funding of routine operations and maintenance costs. The amount payable to ISF will vary from system to system depending on the type of irrigation and site conditions. The WUA will set the rate of ISF on an annual basis with the assistance of DAFO. The draft final report on the DIDMP estimates that the ISF required ranges from US$25 to US$65 per ha per year, corresponding to paddy of 270 kg/ha to 700 kg/ha per year. Thus, the maximum water fee levied on a farmer is calculated to be about 1,000 kg/ha per year including VDF.

IMT is at a very initial stage at present. Considerable constraints and risks are identified in carrying out the IMT process. A recent JICA assisted field investigation on farmers' capacity for IMT also found several constraints to carrying out the IMT process. These are identified as follows:

- insufficient promulgation of IMT into local authorities as well as farmers;
- lack of accountability in management of VDF and controversial use of funds;
- inflexible rating of IMT fees;
- lack of data base on physical and institutional conditions of existing irrigation schemes that require rehabilitation and upgrading before/during the IMT process;
- delay in land tenure registration, resulting in reducing farmers' incentive to invest in farming;
- lack of design standard for construction and rehabilitation of facilities;
- slow progress in forming WUAs; and
- lack of agricultural support services (research, extension, credit, etc.) as a prerequisite for the sustainable IMT process.

(4) Flood Damages and Mitigation

The lowlying lands along the Mekong River and its tributary suffer flood and inundation damages more or less every wet season. The flood prone areas are shown in Figure 3.6. Though the floods provide positive impact to natural systems like feeding soil fertility, adverse effects are widely observed such as damage to agricultural production, housing and health, together with loss of life and infrastructure including irrigation facilities. The DOI is responsible for monitoring

flood and inundation. It gave the following information on paddy fields affected by floods in 2000 as shown in Table 3.26.

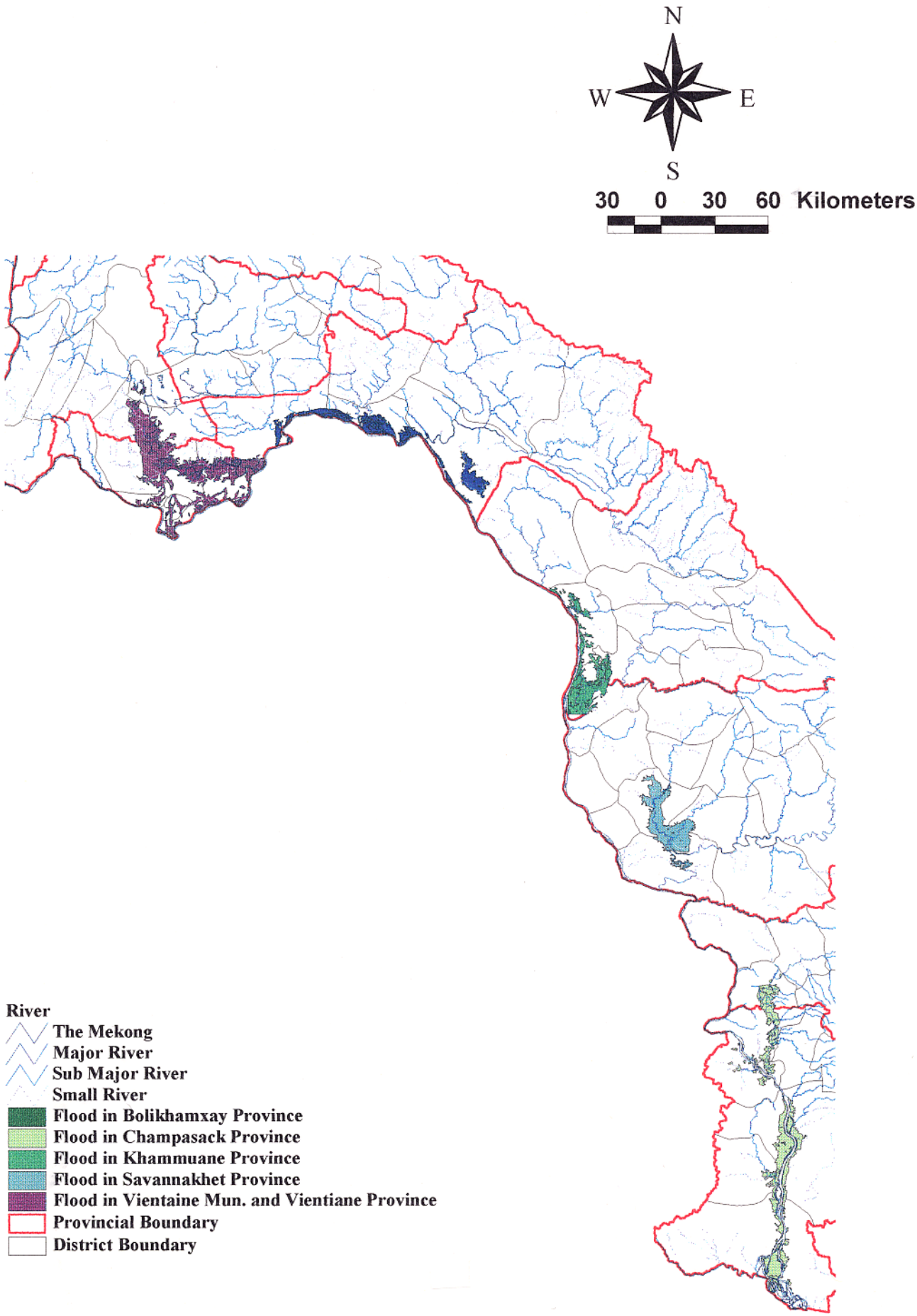
Since 1996, the Mekong River Commission Secretariat (MRC) in collaboration with FAO has been collecting flood data for the Mekong River and its tributaries as a regional cooperation program in the Mekong River Basin. Countries along the Mekong River join this program, and the DOI is the counterpart in Lao PDR. The results of flood monitoring indicate that about 300 km of river courses bring about flooding along the Mekong tributaries within Lao PDR. These are in Vientiane Municipality and seven central - southern provinces. After gathering these flood data in the lower Mekong basin, the MRC will shortly start an assistance program to prepare short, medium and long-term strategies for the flood management and mitigation including an action plan for the Mekong basin countries; Lao PDR, Cambodia, Thailand and Vietnam.

Table 3.26 Flood Area and Loss in 2000

Province	Total Area (ha)	Paddy field affected by flood (ha)	
		Affected	Lost
Vientiane province	37,500	300	150
Vientiane municipality	48,500	1,000	300
Borikhamxai	25,282	3,546	1,500
Khammouan	48,112	22,080	20,840
Savannakhet	105,000	18,920	15,000
Champasak	84,530	22,730	17,270
Saravan	47,716	4,462	1,000
Attapu	12,500	1,200	500
Total	409,140	74,238	56,560

Remarks: Area includes both irrigated and rainfed fields.
Source : DOI, MAF

The Vientiane Municipality implemented the "Vientiane Plain Flood Protection Project (Urgent Phase)" in 1995 to 1997 with assistance from EU. The project rehabilitated and strengthened the 46km long flood protection dike along the Mekong River between Kaolieo and Chinaimo. This protection dike has protected the city from floods from the Mekong River since 1997. However, areas along Mekong tributaries in other Provinces lack even primitive flood protection facilities. Actions are required for flood mitigation, damage and disaster management in these areas, following the above MRC's strategy study.



Data Source: Department of Irrigation (DOI), Ministry of Agriculture and Forestry

Figure 3.6 Flood-prone Area along Mekong River

3.3 International Partnership in Agriculture and Rural Development

3.3.1 International Cooperation and Assistance

(1) Overview of Policies and Strategies of External Donors

The total external assistance for the period 1997-2000 was US$ 1,106 million consisting of US$ 697 million in grants and US$ 409 million in loans according to data prepared by the Committee for Planning and Cooperation (CPC). This means that the annual average was around US$ 277 million. The highest share of external assistance is from Japan (US$ 367 million), followed by ADB (US$ 353 million), World Bank (US$ 120 million), EU (US$ 47 million), Australia (US$ 43 million), Germany (US$ 41 million), Sweden (US$ 41 million), and UNDP (US$ 56 million).

According to the UNDP Development Co-operation Report 1999, external assistance for the agriculture, forestry and fishery sectors in 1998 was US$ 29 million, around 10 % of the total external assistance. This amount is the third largest sector share, following transportation (24%) and human resource development (11%). The highest contributor of external assistance for agriculture, forestry and fishery sectors in 1998 was Japan (US$ 9.1 million), followed by ADB (US$ 3.3 million), EU (US$ 3.1 million), FAO (US$ 1.5 million), UNCDF (US$ 1.5 million), Sweden (US$ 3.8 million), and Germany (US$ 2.0 million).

The policies and strategies of major donors for overall assistance as well as the agriculture sector is summarized below:

Japan

Since 1991, Japan has been the top-ranking donor, cooperating mainly in the area of human resource development, basic human needs, agriculture and forestry and industrial infrastructure. Japan will continue to give priority to assistance in the same areas.

For agriculture and forest sectors, emphasis is made in the following specific agriculture-related areas: a) planning and formulation of agriculture policy, b) improvement of irrigation facilities, c) improvement of post-harvest measures, d) curbing slash-and-burn agriculture and preserving forests, and e) rural development. It is also noted that the assistance is necessary to improve Lao PDR ability to formulate development plans, propose and implement policies, and to strengthen its legal and institutional infrastructure.

ADB

ADB sets strategic directions for Lao PDR assistance, i.e. i) increasing efficiency of development activities through continued structural reforms

and enhanced governance related activities; ii) the need for greater emphasis on rural development, especially the need to increase rural productivity and to reduce poverty in remote and rural areas; iii) development of human capital through initiative in the education and health sectors; iv) sustainable natural resources management and environmental protection; v) geographical and integrated planning focus of project intervention in order to build synergies between its own activities and increase development impact; and vi) greater community participation in the selection and design of ADB interventions.

For the agriculture sector, ADB will help the Lao Government to implement the Strategic Vision for Agriculture Sector. Further agriculture market expansion and market development throughout the country will be emphasized. Crosscutting issues related to rural poverty, gender, mass organization, rural community and possible NGO involvement, and environmental protection are specifically to be addressed in ADB operations in the agriculture sector.

EU

EU initiated development projects throughout the country. The projects focus mainly on rural development, encouraging the permanent settlement of rural communities, increasing food security, improving access to safe water, providing health care services and primary education, sustainable development of forest resource, reintegration of former refugees, economic cooperation.

For rural development, EU has funded several rural development projects including activities such as irrigation development, crop production, livestock, aquaculture and household income generation. The projects will provide training and institution capacity building to encourage farmers. The majority of projects adopted an "integrated approach", combining activities in many areas in order to achieve balanced and optimum results. Moreover, all projects place emphasis on promoting farmers' organizations.

UN Group

Poverty eradication is the ultimate development objective of the entire UN system in Lao PDR. Human resource development and rural development are identified as key target areas for poverty eradication. The UN emphasis on the role of government to the development process, namely: national ownership of the development process, to ensure sustainability; aid coordination, for prompt, efficient, and effective use of external assistance; resource mobilization, to ensure adequate financing of capital and technical assistance requirements for national priority programs; the program approach, to be applied to the external feasibility; United Nations system cooperation and collaboration, to ensure complementarily and maximum development impact of assistance; and the integration of gender concerns into all programs and projects.

For rural development, UNDP assistance at the community level will focus on income generation activities and the provision of micro-finance activities. At the central level, UNDP and other UN agencies will support the Government in the formulation of a National Rural Development

Program, a national Poverty Eradication Plan and the drug eradication program. Micro-finance policy and opportunities have been identified through a UNDP/United Nations Capital Development Fund study and interministerial meetings.

Sweden

The objective for development cooperation with Lao PDR during period 1999-2003 is: i) to promote sustainable growth that can reduce poverty and counteract increasing gaps in society; ii) to develop and strengthen preconditions for democracy and human rights.

In connection with the above objective, the sustainable use of natural resources is taken as one of the priority areas for development cooperation. It is noted that the sustainable use of natural resources should focus on improving the living conditions of poor small-holders in mountain regions. It is also noted that the focus on the development of the highland region, which begin in the 1990s and is based on natural resources management rather than the reforest program, should be strengthened still further and additional cooperative partners found to work with the forest authority.

(2) Financing Available

In the RTM7, 23 donors expressed commitments and financial pledge for period 2001 totaling US$ 385 million that consists of US$ 218 million in grant aid and US$ 167 million in loans.

Table 3.27 Loan and Grant Expressed in RTM7

Unit : US$ 1,000

Donor	Grant Aid	Loan	Total
Australia	10,416	-	10,416
Belgium	7,000	-	7,000
Denmark	7,400	-	7,400
Finland	2,000	-	2,000
France	12,900	-	12,900
German	6,600	-	6,600
Japan	90,000	40,000	130,000
Luxenbourg	4,300	-	4,300
Norway	5,000	70,000	75,000
South Korea	1	-	1
Sweden	10,000	-	10,000
Switzeland	1,500	-	1,500
ADB	5,500	-	5,500
EU	8,600	-	8,600
WB	-	52,000	52,000
WHO	1,100	-	1,100
Mekong River Committee	5,000	-	5,000
Nordic Fund for Development	-	5,000	5,000
UNDCP	6,000	-	6,000
IFAD	10,000	-	10,000
UNFPA	2,300	-	2,300
FAO	2,600	-	2,600
UNDP	20,000	-	20,000
Total	218,217	167,000	385,217

Source: CPC

These commitments are slightly lower than the total commitments of US$ 400 million made in the RTM6 in 1997. Actual external assistance is US$ 284 million on average for the period 1997-2000 or 70 % of the commitment in the RTM6. If the same trend is continued, around US$ 270 million (US$ 385million x 70%) of average annual external assistance will be expected for the period 2001-2004.

(3) Aid Coordination

For prompt, efficient, and effective use of external assistance, aid coordination amongst donors and government agencies is essential. In principal, the coordination of external assistance is the responsibility of the Lao government. In this regard, the government defined the role and responsibility of CPC in August 2000 for coordination of all foreign assistance and monitoring of its progress with the principal of "one-stop-shop". The CPC is coordinating aid at both central and province levels. At the central level, the role of CPC is to: i) implement and solve all issues related to foreign and domestic investment as well as international cooperation; ii) approve foreign and domestic investment projects and all grant aid; iii) supervise and promote foreign and domestic investment projects as well as international cooperation; and iv) coordinate with all parties including ministries and local authorities. At the local level, the CPC directly manages foreign and domestic investment projects as well as international cooperation. The CPC established an aid coordination and monitoring system in May 2000 under the technical assistance of the ADB to improve aid coordination and standardize monitoring outcomes of international aid projects.

The RTM of development partners is also an important mechanism for aid coordination in Lao PDR. The sixth RTM was held in Geneva in June 1997 and the seventh RTM was held in Vientiane in November 2000. Over 250 representatives of development partner countries, the European Commission, multilateral financial institutions, UN agencies, and NGOs attended the seventh RTM. The meeting confirmed that the crucial importance of aid coordination and aid management was to enable the Government to make the best use of resources. The establishment of CPC to streamline project appraisal and approval was welcome.

The main objectives of the above system are to: i) avoid overlapping of external assistance amongst donors; and ii) monitor the progress of external assistance. It is, however, observed that the sharing of experience or lessons learned is rather weak amongst donors. For enhancement of project impact and improvement of project sustainability, a system of sharing experience or lessons learned will be required. In

this regard, FAO is scheduled to formulate a network for information and experience sharing activities on food-security and rural development.

(4) Status of 2KR

The Japanese Government has been providing Aid for Increased Food Production (known as 2KR) as part of its grant aid since 1997. In this context, monetary grants are provided for the procurement of equipment and materials such as fertilizers, agricultural chemicals and agricultural machinery to improve production yield. In case of 2KR for Least Less Development Countries (LLDCs), the government of the recipient country is obligated to set up a bank account and deposit local currency equivalent to two thirds of the FOB value as a counterpart fund. The counter fund will be used in a wide range of agricultural, fishery and forestry development programs implemented by the recipient country.

Fertilizer provided in 2KR is supplied to the APB which then supplies it to farmers. Agricultural machinery is provided for agriculture development projects and governmental organizations as well as farmers. Agro-chemicals have not been provided to Lao PDR so far through 2KR. The following fertilizers and agricultural machinery were provided in 2000 through 2KR.

Table 3.28 Fertilizer and Agricultural Machinery Provided in Year 2000

Goods	Quality
Fertilizer	
- Urea	3,000 tons
- NPK (15-15-15)	2,000 tons
- NPK (16-20-0)	4,000 tons
Agricultural Machinery	
- 4-Wheel Tractor	6 units
- Trailer for 4-Wheel Tractor	6 units
- Rotary Harrow	6 units
- Puddling Rotor	2 units
- Ditcher	2 units
- 2-Wheel Tractor	25 units
- Attachments for 2-Wheel Tractor	25 units

Source: MAF

The accumulated deposit amount of the counterpart fund is 14,165 million kip as of October 2000. Out of this accumulated deposit, 9,969 million kip was used mainly for operation and maintenance cost for irrigation schemes and, as a result, the remaining balance of counterpart fund is 4,166 million kip.

3.3.2 Roles of NGOs in Agriculture and Rural Development

More than 60 international NGOs were active in Lao PDR in 2000. Most of them are small-scale and have specific mandates in their operations. According to the

UNDP's information for 1998[19/], NGOs contributed more than 3% (US$ 12,547,000) of the total external assistance. There are a large number of NGOs concerned with agriculture and rural development. As presented in Table 3.29, over 40% of total investment by NGOs was for agriculture and rural development in 1997.

Table 3.29 Amount of the NGO assistance by sector and its share in1997

Sector	Amount (US$ 000)	%
Agriculture, Forestry and Fisheries	1,108,000	9.0
Rural Development	3,941,000	32.0
Economic Development	99,000	0.8
Education	1,282,000	10.4
Emergency & Humanitarian Relief	1,741,000	14.1
Health	2,898,000	23.5
Natural Resources	1,024,000	8.3
Social Development	233,000	1.9
Total	**12,326,000**	**100**

Source: Summarized based on Directory of NGOs in the Lao PDR 2000

The support that NGOs are providing to the agriculture development process includes activities associated with sustainable and organic agricultural practices and systems, community based natural resource management including village land use zoning, gender equality, human resource development including participatory method training, development of social and economic infrastructure and services, and relief and reconstruction.

NGOs generally work in close collaboration with provincial and district governments. They are having an important role in community and rural development since they try to specifically target their activities to the needs of villagers and work with local people. In general, both in terms of socio-economic progress of individual households and rural development, it is critically important that local people would actively participate in development and control their livelihood and resources.

NGOs use direct grant funds from their organization or sponsors to undertake projects. At the same time, several NGOs are implementing projects or project components with financing from bilateral or multilateral agencies. In recent years, the partnership between NGOs and donors are attracting more attention, since NGOs are considered as the main thrust for encouraging area-based rural development, and donors are aiming at achieving quality aid outcomes. Some NGOs receive the budget from their home country only for office administration. The field office is required to secure budget for project implementation. At present

[19/] Development Cooperation in the Lao PDR, UNDP, 1999

it seems there are competition among NGOs to obtain project funds from donors. Australia, Canada, Denmark, Japan and Sweden are the main fund suppliers.

All NGOs are required to register with the Department of International Organizations of the Ministry of Foreign Affairs. In 1998, the Prime Minister's decree on NGOs' administration was issued in order to present the government's regulations pertaining to the NGO operations, rights and obligations. According to this decree, NGOs are required to have an operation permit, project office permit, and representative office permit from the government. To set up a representative office, the budget of minimum US$ 500,000 per project is required[20/]. NGOs are also required to submit semi-annual and annual reports on the joint implementation of assistance projects with the relevant Lao agencies to the Ministry of Foreign Affairs.

3.4 Past and Current Agriculture Development Activities

3.4.1 Agriculture Development Project under MAF

MAF prepared a list of agricultural development projects as of fiscal year 1998/99. The listed projects are categorized according to the responsible departments and institutions in MAF. The Study Team further classified them into four types:

1) on-going projects being operated beyond the year 2001, classified as 'On-going Projects';
2) projects being or having been identified for future implementation, classified as 'Planned Project';
3) projects completed or to be completed by the end of the year 2000 with an external fund amounting to more than US$ 1 million, classified as 'Major Project Completed'; and
4) project completed and regarded as strategically important, although the external fund is less than US$ 1 million, classified as "Major Project Completed".

The list of past and current agriculture development projects that were screened by the above classification is summarized in Table 3.30.

[20/] Excluding salaries, office, travel and insurance expenses.

Table 3.30 Past and Current Agriculture Development Projects by Responsible Department

Responsible Department	On-going Projects	Planned Project	Major Project Completed	Total Amount of External Fund ('000 US$)
Permanent Secretariat	4	1	1	865
Department of Forestry	37	10	20	69,246
Department of Agriculture	13	2	4	9,337
Department of Livestock and Fishery	10	10	8	7,081
Department of Irrigation	10	0	6	66,878
Department of Meteorology and Hydrology	7	0	3	2,456
National Agriculture and Forest Research Institute	1	0	0	150
Total of MAF	82	23	42	156,013

Source: DOP, MAF

The above table shows that nearly 90% of the total investment and 60% of the projects were undertaken in the forestry and irrigation sub-sectors. On the other hand, only 20% were allocated to the remaining sub-sectors of livestock, fishery and others. It is noted that some of the on-going projects under DOA, DOF and DLF are being transferred to NAFRI, since the agriculture and forestry research work is now concentrated there.

3.4.2 Lessons Learned from Past Donor-Assisted Projects

Based on existing donor reports, interviews with major donors and discussion in workshops, the following are major lessons learned from past donor-assisted projects, namely: i) a shortage of implementation capacity of executing agencies; ii) low project sustainability caused by heavy donor presence; iii) a lack of inter-agency coordination mechanism; and iv) poor coordination among donor-assisted projects.

Shortage of implementation capacity of executing agencies

For donor-assisted projects, the implementation capacity of the executing agency depends on two factors, namely: i) counterpart budget arrangement for project implementation; and ii) capacity of local project staff in terms of both quantity and quality. It is often difficult for executing agencies to arrange counterpart budgets and project staff with suitable qualifications or capability for project management. It is therefore reported that existing projects have already exceeded the implementation capacity of the Lao government, since many donors have undertaken a large number of projects. In this context, it is learned that the implementation capacity of the executing agency should be assessed carefully from

the viewpoint of financial capability and staff availability prior to project implementation.

Low project sustainability caused by heavy donor presence

In general, the sustainability of projects assisted by donors in Lao PDR is vulnerable due to the extremely high rate of dependency on external financial assistance. This is closely related to the shortage of implementation capacity mentioned above. Donors sometimes pay for most of the project operation costs, including allowances for the government staff, or even allowances for beneficiaries, during the implementation period. In other cases, donors directly or indirectly employ many local staff for project management and implementation instead of government counterpart staff. After the donor's withdrawal from the project, the executing agency or beneficiaries cannot cover the operation cost or do not continue to employ such experienced local staff. As a result of this heavy donor presence during the project implementation period, there have been many cases where projects were suspended or even stopped right after termination.

In this context, it is learned that: i) sharing the burden amongst stakeholders for project operation or project income should be assessed from the financial viewpoint; ii) capacity building of the executing agency should be prioritized; and iii) the presence of the donor should be minimized as much as possible and, accordingly, the government or people should take the ownership of the project.

Lack of inter agency coordination mechanism

Several programs/projects need to involve multiple agencies because of the target area and sequence of programs/projects. Some donors claim that if you want to implement a project successfully, multiple agencies should not be involved in the project. In workshops, many Lao agencies expressed difficulties in coordination between it and other agencies due to sectionalism amongst the concerned agencies. This is also closely related to a shortage of implementation capacity of the executing agency. In this context, it is learned that: i) establishing a working unit to coordinate activities of all agencies responsible for implementation should be considered; ii) capacity building of the executing agency for coordination should be promoted; and iii) budgetary allocations in agencies with project responsibility other than the executing agency should be secured.

Poor coordination of donor assisted projects

Donors are showing increasing concern about the overlap of projects whenever a project is formulated. At the same time, sharing of past experience or

data/information in the project has never functioned well, since no donor has taken the initiative to do so. In the agricultural sector, however, the FAO is scheduled to establish a network for information and experience sharing activities on food security and rural development amongst donors including NGOs.

It is also observed that poor coordination of donor-assisted projects results in conflicting Lao government policies being pursued in different districts and provinces. For example, the service delivery system is fragmented as shown by the fact that the service fee is different from project to project.

In this context, it is learned that: i) donors should put more resources into sharing past experience and data/information; and ii) the government should coordinate policies of donor-assisted projects carefully, including the preparation of guidelines to ensure that all donor-assisted project components are in conformity with government policies.