ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

Review of the Livestock Sector in the Lao People's Democratic Republic

Prepared for

THE ASIAN DEVELOPMENT BANK

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FUTURE HARVEST ILRI is a Future Harvest Centre (www.futureharvest.org)

ABBREVIATIONS

ADB	Asian Development Bank
AFD	Agence Francaise de Developpement
AFTA	ASEAN Free Trade Area
AHPEM	Animal Production and Health Extension Module
CIAT	Centro Internacional de Agricultura Tropical
CSF	Classical Swine Fever (or Hog Cholera)
DAFO	District Agriculture and Forestry Office
DLF	Department of Livestock and Fisheries
FLSP	Forage and Livestock Systems Project
FMD	Foot and Mouth Disease
FSP	Forages for Smallholders Project
GtZ	Gesellschaft für technische Zusammenarbeit
HS	Haemorrhagic Septicaemia
ILRI	International Livestock Research Institute
Lao PDR	The Lao People's Democratic Republic
MAF	Ministry of Agriculture and Forestry
MPM	Merchandise Price Management
NAFES	National Agriculture and Forestry Extension Services
NAFRI	National Agriculture and Forestry Research Institute
NTB	Non-tariff barriers
OIE	Office International des Epizooties (World Organization for Animal Health)
PAFO	Provincial Agriculture and Forestry Office
PEP	Pilot Extension Project
PRC	The People's Republic of China
SEFCP	State Enterprise and Food Crop Promotion
VVW	Village Veterinary Worker
WTO	World Trade Organization

CONTENTS

EXECUTIVE SUMMARY

1. The Asian Development Bank (ADB) has commissioned the International Livestock Research Institute (ILRI) to review the livestock sector in the Lao People's Democratic Republic (Lao PDR) to initiate the preparation of a participatory livestock project, which is in ADB's lending pipeline for 2004. This report describes major livestock production systems, marketing and trade policies, assesses past and on-going interventions, and proposes innovative and sustainable new interventions for consideration by ADB.

2. The Lao PDR is a predominantly rural society with 85% of the population depending on agriculture for their livelihood with most of the rural households producing food mainly for their own consumption. Agriculture accounts for 52% of GDP with livestock and fisheries contributing 18%. Culturally, the Lao PDR is immensely diverse with more than 46 officially recognized ethnic groups. Broadly, the country can be divided into lowland and upland (or Sloping Lands) zones, and these provide different challenges and opportunities for development. Lowland areas are planted to paddy rice and are the most important rice cropping areas in the Lao PDR. They occur mainly along the Mekong and its tributaries, and this area is referred to as the Mekong Corridor. Agriculture in these areas is becoming more and more market-oriented with market forces driving the process of agricultural intensification and diversification. Upland villages in the Sloping Lands zone are more remote, have poorer road and market access and villages rely predominantly on subsistence farming. While poverty has been reduced considerably in the Mekong Corridor, people in the Sloping Lands zone have been bypassed by economic growth and many are living in poverty.

3. Livestock are an important component of smallholder farms in the Lao PDR with sales of livestock accounting for more that 50% of cash income in many upland and highland areas. Over 95% of all livestock is produced by smallholders and there are only a small number of commercial pig and poultry enterprises near major urban markets. While livestock provide many benefits on farms (e.g. draft power, manure, ease of marketing, low price fluctuations), for families they are a means of accumulating capital and may be regarded as a safety net for the family which can be liquidated when cash is needed. Only when households are able to accumulate enough livestock to feel financially secure, are they able to make long-term investments in their farming and livelihood system (e.g. sending children to high school, planting fruit trees, buying a 2-wheel tractor or micro rice mill). Livestock are a crucial stepping stone for sustainable development, particularly in the Sloping Lands zone.

4. The Participatory Poverty Assessment, undertaken by ADB in 2000, clearly showed the importance of livestock for poor villages. When asked about possible solutions for overcoming poverty, villages in the northern, eastern and central parts of the Lao PDR listed improved livestock production as their highest priority. Clearly, farmers see livestock as an avenue to escape poverty.

5. The demand for meat in the Lao PDR and other Southeast Asian countries has grown consistently over the last decade and is likely to continue to do so for the foreseeable future. About 75% of cattle and buffalo produced are consumed domestically and the remaining 25% are exported. Thailand is a major market for live cattle and buffalo with the Lao PDR supplying approximately 20% of the demand, accounting for approximately 100,000 animals per year. Other major suppliers are Myanmar and Cambodia. Pigs and poultry are produced mainly for home consumption and local markets. There is strong demand pull for meat which will increase in future.

6. In 1998, there were approximately one million animals each of cattle, buffalo and pigs, and 11 million poultry. Density of cattle and buffalo is lower in the northern region than in the central and southern regions, both on a per capita and land basis. Per capita pig density is higher in the upland and highland areas than in lowland areas. Livestock are

raised in extensive, low input systems that take advantage of naturally occurring feed resources. All livestock types are native breeds and are well adapted to the extensive production systems in which they are raised.

7. There is an opportunity to considerably increase cattle and buffalo production in the Sloping Lands zone where naturally occurring feed resources are not limiting animal production. Remote upland areas are well suited to breed / supply cattle and buffalo which can then be fattened for sale closer to markets. In the Mekong Corridor, available feed resources are limiting expansion of cattle and buffalo production, particularly in areas where irrigation enables farmers to grow two rice crops. Opportunities to improve pig and poultry production clearly exist, but expansion is somewhat limited by the relatively small (albeit increasing) size of the domestic market. Farmers in the Lao PDR are unlikely to be able to produce pigs and poultry competitively for large-scale export, although some trade opportunities may develop for districts near borders with the People's Republic of China, Thailand and Viet Nam. While the Lao PDR has a comparative advantage in ruminant (cattle, buffalo and goat) production, this is not the case with pigs and poultry.

8. Livestock production in the Sloping Lands zone is currently severely constrained by animal diseases such as classical swine fever, fowl cholera, toxocariasis and haemorrhagic septicaemia. Some diseases are endemic and often present in most animals. Others are epidemic and occur sporadically. The severity and spread of all diseases are determined by many interrelated factors. These include nutritional limitations, management and husbandry practices, the movement of animals and the selling of diseased animals. Some diseases are relatively new to villages in remote areas with little local knowledge about these diseases.

9. Vaccination programs, based on cold-chain dependent vaccines, have not been successful in more remote areas and are unlikely to be a viable option for many years to come. There are, however, a large number of relatively simple animal health interventions that can reduce mortality by 50% or more and improve productivity of animals. These depend on a better understanding by farmers and villages of which diseases affect their livestock, what causes the diseases, how are they spread, and what are the options for reducing the incidence of diseases. Similarly, major improvements in animal production (and resistance to diseases) can be achieved through interventions such as improved feeding, animal management and breeding strategies. Sustainable farmer and village level interventions are discussed in the main body of this report and include:

- Deworming of buffalo calves to prevent toxocariasis.
- Control of movement of pigs at farm and village level to limit infection with Classical Swine Fever (CSF) through penning and quarantining of suspected disease carriers.
- Quarantining of all new animals (pigs, cattle, buffalo, poultry) coming into villages or on to farms and to prevent introduction of diseases, and if feasible vaccination of such animals.
- Strategic (rather than blanket) vaccination against CSF of susceptible classes of animals such as sows and piglets.
- Village-based vaccination against diseases where heat-stable vaccines (not requiring a cold chain) are available such as Fowl Cholera and New Castle Disease for poultry.
- Improved pens and clean water supply to minimize CSF in pigs, Fowl Cholera in poultry and haemorrhagic septicaemia in cattle and buffalo.
- Improved early recognition of animal diseases by farmers and villages to enable them to respond with rapid quarantining and containment measures, thus limiting the spread and impact of diseases, and enabling early treatment of infected animals (e.g. antibiotic treatment of haemorrhagic septicaemia).

- Strategic supplementary feeding of cattle and buffalo (e.g. cows with calves, young animals or fattening of bulls for sale) by planting forage grasses and tree and herbaceous legumes near pens, fields and villages; suitable varieties are available.
- Planting feed such as feed maize, cassava, sweet potatoes and forage legumes such as *Stylosanthes guianensis* CIAT 184 for pigs to reduce the labor burden for women.
- Improved bull and boar management to control breeding, improve conception rates and positive selection within local genotypes.
- Farmer recording of animal performance, management and animal health to help farmers improve animal management.

10. These are knowledge-intensive interventions that can be delivered through a participatory approach to extension, where extension workers work in partnership with villages and farmers to help them select and adapt innovations to suit their farming system. Such an approach ensures that innovations build on existing practice and knowledge, and are culturally appropriate. A participatory livestock project would need to actively encourage the local government to employ male and female extension workers who can effectively communicate with people in villages (e.g. understand the culture and can communicate in the local language), build the capacity of extension workers to use a participatory extension approach, strengthen the capacity of provincial and national extension staff to support livestock extension with extension messages (e.g. technology options) and extension material, and especially target disadvantaged groups in villages by working with them on activities which are their domain. For example, work with women or women groups on improving pig and poultry production systems.

11. The uptake of the proposed interventions will be limited if farmers do not receive a fair price for their animals in local and provincial markets. While demand for meat is strong, price controls of the retail price of meat, taxes at village, district and provincial levels and restrictions in animal movements for reasons other than the containment of animal diseases, reduce the incentive for farmers to invest time and labor in improving livestock production. Upgrading of market opportunities needs to go hand in hand with the building of farmers' capacity to improve and increase livestock production on their farms. Also, a lack of capital is likely to prevent the most disadvantaged groups within villages to participate in improved livestock development and a credit component may need to be considered to ensure that poor families are not left out of a participatory livestock project. Thus, a participatory livestock project would need multiple complimentary components including capacity building of the extension workers, technical interventions, improvements of market opportunities and credit for poor families, to ensure sustainable high impact. Geographically, the project should be located in a limited number of well-targeted districts / provinces in the Sloping Lands zone which predominates in the northern region and districts along the border with Viet Nam in the central and southern regions (see Fig. 3). A long-term commitment of 7-10 years is needed to ensure sustainable high impact. Outcomes from the project will be suitable for scaling-up to other provinces in the Lao PDR.

12. Many of the suggested technical interventions are based on results of past and on-going livestock projects in the Lao PDR such as the AusAID-funded "Forage and Livestock Systems Project" and the EU-funded "Strengthening of Livestock Service and Extension Activities". Close collaboration with these projects is needed during design and implementation to maximize synergies and complementarities between projects. A participatory livestock project would build on the experiences of these projects.

13. The interventions, approach and geographic focus identified in the report are compatible with the Agricultural Strategy of the Government of the Lao PDR and the Country Strategy and Program of ADB. Above all, they are compatible with the aspirations and needs of the poor in the Lao PDR.

I. INTRODUCTION

A. Purpose of This Study

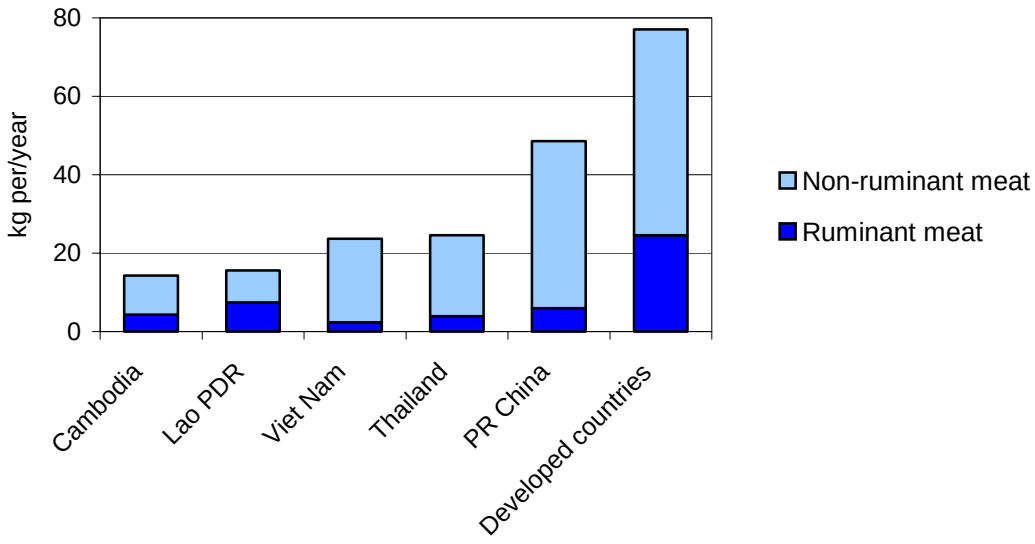
1. The Asian Development Bank (ADB) has commissioned the International Livestock Research Institute (ILRI) to review the livestock sector in the Lao People's Democratic Republic (Lao PDR) to initiate the preparation of a participatory livestock project, which is in ADB's lending pipeline for 2004. ADB asked ILRI to collect and collate available data, review past and ongoing interventions in the sector, assess the marketing and trade policies and regulations, summarize the lessons learnt, and propose innovative and sustainable new interventions. The Terms of Reference are attached in Appendix 1.

2. The review was carried out in close collaboration with Centro Internacional de Agricultura Tropical (CIAT), which has its regional office in the Lao PDR. The authors reviewed a wide range of available data and reports, and consulted with government, donor and project staff operating in the livestock and related sector. A list of people contacted during this review is attached in Appendix 2. We would like to thank them for their time and willingness to share their experiences and acknowledge their input into this report.

B. Livestock – A Growth Sector in Southeast Asia

3. In developing countries, the demand for meat increased by 4.7% per annum between 1989 and 1999[1]. This contrasted with developed countries where the demand for meat declined by 0.3% per annum over the same period. Despite this narrowing gap in meat consumption between developing and developed countries, meat consumption in countries in Southeast Asia is still only a fraction of that in developed countries (Fig. 1).

Figure 1. Per Capita Meat Consumption (kg/year) in 1999. [1]



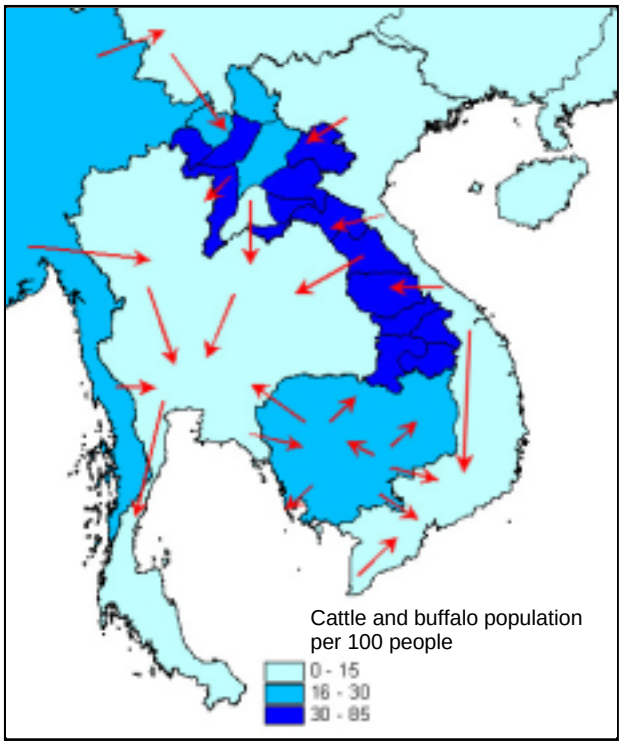
4. Demand for meat in developing countries is forecast to increase in the foreseeable future. In their vision paper 'Livestock to 2020 – The Next Food Revolution', Delgado *et al.* (1999) estimated that the demand for meat products in Southeast Asia and the People's Republic of China (PRC) would rise by 3% per annum between 1993 and 2020. The

[1] Source: FAO-STAT (www.fao.org) accessed on 1 June 2002.

demand for livestock products is driven by increasing urbanization, human population and the positive relationship between meat consumption and income.

5. For the past 30 years, Thailand has been a large importer of live cattle and buffalo with approximately 500,000 animals being imported annually from Myanmar, Lao PDR, Cambodia and, in the early 1990s, from Yunnan, PRC (Fig. 2, Chapman, 1995). The Lao PDR has the highest per capita cattle and buffalo density in the region (Fig. 2), supplying approximately 20% of the Thai market and this demand is likely to continue. Demand for meat in southern PRC has grown strongly over the last few years and may become an alternative market for livestock in the region.

Figure 2: Cattle and Buffalo Population Density and Movements in Southeast Asia (Chapman, 1995).[2]



II. THE LAO PDR – DIVERGING DEVELOPMENT

A. Diversity – Strengths and Challenges

6. The Lao PDR is a predominantly rural society with approximately 85% of the population depending on agriculture for their livelihood (ADB Asian Development Outlook, 2002). Subsistence farming is common with 94% of household producing food mainly for their own consumption (Agricultural Census, 2000). Except for some market commodities, such as coffee, market-oriented farming systems are confined to areas around major population centers.

7. Culturally, the Lao PDR is enormously diverse with more than 46 officially recognized ethnic groups. The Participatory Poverty Assessment (PPA) study (ADB PPA, 2001)

[2] Cattle and buffalo density per 100 people: Lao PDR = 41; Cambodia = 28; Myanmar = 28; PRC = 10; Thailand = 13; Viet Nam = 9 (Source: Agricultural Census, 2000; and FAO-STAT, accessed 14 June 2002).

suggested that the country can be broadly divided into lowland and highland areas. The Tai-Kadai ethnic groups occupy the lowland areas where they are cultivating paddy rice. The highlands, often rugged and remote mountainous areas, are inhabited by the Mon-Khmer, Hmong-Mien and Tibeto-Burman groups which traditionally practiced shifting cultivation (the clearing and farming of forest lands which are then left fallow until their fertility has recovered). Cultural diversity is a strength (e.g. indigenous knowledge) but also poses challenges for culturally sensitive development and practical barriers such as differing values and languages.

8. Being located at the center of an expanding regional economy, every province in the Lao PDR shares one or more borders with Cambodia, PRC, Myanmar, Thailand and/or Viet Nam. These long and often remote borders with neighboring countries provide ample opportunities for formal and informal exchange of goods but makes it difficult to enforce official trade regulations or control the movement of goods (and animals) across borders.

9. Many villages and districts are without road access which makes the marketing of crops and bulky goods difficult for farmers. This is less of an issue for livestock. Large animals, in particular, have the distinct advantage that they can be walked to the nearest road or local market for sale. In some cases, farmers walk cattle to distant markets to maximize the sale price. This also increases the options for farmers of where to sell their animals.

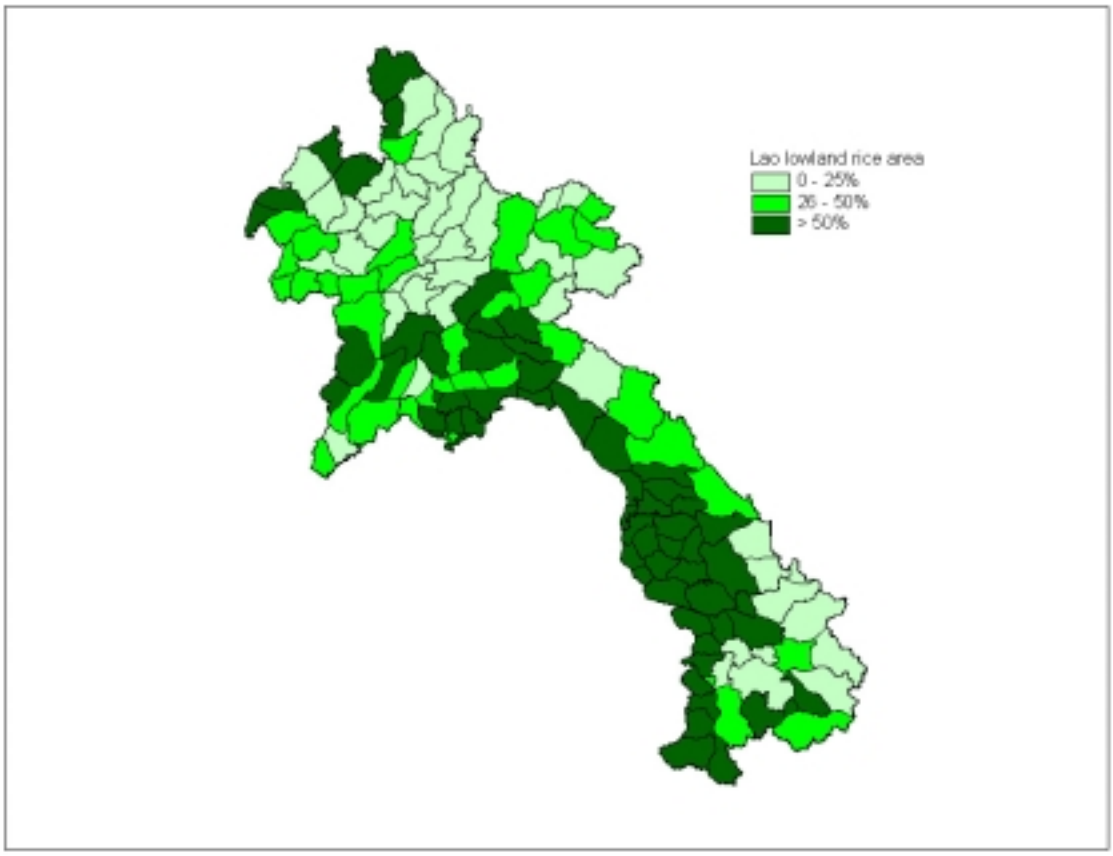
B. Diverging Development: Mekong Corridor vs. Sloping Lands Zones

10. The Government's Strategic Vision for the Agricultural Sector (GOL, 1999) recognized two distinct agro-economic zones in the Lao PDR: The Mekong Corridor and the Sloping Lands zone. The Mekong Corridor includes most of the flatland areas in the Lao PDR with paddy rice, irrigated rice, a basic road network, credit facilities, access to local and regional markets, and a flow of agricultural technology from regional markets. This zone includes districts bordering the Mekong and its tributaries in most central and southern provinces, and some valleys in the northern regions (see Fig. 3 which uses the proportion of lowland rice grown in each district as a rough indicator for the two zones). The percentage of households living below the basic necessity poverty line has been reduced from 50% in the period 1986-93 to 20% in the period 1994-1998 (GOL, 1999).

11. The Sloping Lands agro-economic zone includes the upland and mountainous areas. These are characterized by rugged mountainous terrain, poor infrastructure, very limited agricultural technology flows, poor market access, little access to credit and predominantly subsistence agriculture. This includes many districts in the northern region but also some districts in the central and southern regions bordering Viet Nam and Cambodia (Fig. 3). The percentage of households living below the basic necessity poverty line remained almost unchanged from 53% in the period 1986-93 to 52% in the period 1994-98. So far, people living in this zone have been by-passed by economic growth.

12. This analysis concurs with the results of the PPA which concluded that "poverty in the Lao PDR is inextricably related to culture and ethnicity, and that its locus is with the highlanders" (ADB PPA, 2001). However, the division between "highland" and "lowland" may not always be clear as many villages have varying degrees of access to lowland and upland cropping areas, access to markets and opportunities for development.

Figure 3: The Mekong Corridor and the Sloping Lands Zones, Based on the Extent of Lowland Rice Grown as a Percentage of Agricultural Land



III. LIVESTOCK - ITS IMPORTANCE TO COUNTRY AND PEOPLE

A. Contribution of Livestock to the National Economy

13. In 2000, agriculture accounted for 52% of GDP with crops contributing 29%, livestock and fisheries 18% and forestry 5% (ADB Country Economic Review, 2001). Live cattle and buffalo and cattle hides are exported to Thailand. Much of this export occurs substantially through unrecorded and unregulated border trade (Vannasouk, 2001). Widely differing estimates are given in various reports but a reasonable estimate of numbers of cattle and buffalo exported from the Lao PDR to Thailand is in the vicinity of 100,000 animals per annum with a farm gate value of $20m to $25m. This is approximately 20% of the total number of cattle and buffalo imported into Thailand and 20-25% of domestic consumption in the Lao PDR (Chapman, 1995; OIE/EU, 2001; Clarke, 1999). Small livestock such as pigs and poultry are produced largely for home / village consumption and local markets.

14. In 2001, the population of buffalo and cattle was approximately 2 million. Additionally, there were approximately 1.1 million pigs although this number fluctuates widely and at time, the number of pigs may be as high as 1.5 million. There is also a small number of goats, estimated at between 94,000 (Agricultural Census, 2000) and 240,000 animals (FAO-STAT, accessed 2 June 2002).

15. Large and small livestock are present in all provinces in the Lao PDR (Table 1). The number of cattle and buffalo is highest in the central region[3], with Savannakhet accounting for 20% of all animals. Other provinces with high numbers of large ruminants (cattle and buffalo) are Champassak in the southern region, and Xieng Khouang and Vientiane Province in the central region. The number of pigs is highest in the northern region. The density of large ruminants per km^2 (indicating the amount of land available per animal) is highest in provinces in the central and southern regions; except for Borikhamxai, Xaysomboun S.R., Sekong and Attapeu provinces which have a low density of large ruminants similar to those in the northern region. Provinces with a high density of large ruminants tend to be those with large areas of lowland rice (see Fig. 2), while provinces in the Sloping Lands Zone tend to have a lower cattle and buffalo density per land area. Overall, the Lao PDR (8.2 animals per km^2) has a much lower large ruminant density than Thailand (16 animals per km^2) indicating a potential to increase animal numbers in the Lao PDR. Large ruminant density per 100 people (indicating deficiency / surplus production) is higher in the central and southern regions than in the northern region, with the exception of Vientiane Municipality which clearly is a large market for meat. Overall, large ruminant density per 100 people is much higher in the Lao PDR (37 animals per 100 people) than in Thailand (13 animals per 100 people).

Table 1: Number of Livestock and Density by Province and Region

Region / Province	Number of Livestock ('000)					Large Ruminant Density	
	Cattle	Buffalo	Pigs	Goats	Poultry	Animals per km^2	Animals per 100 People
Northern region	**199**	**297**	**554**	**51**	**4,180**	**5.4**	**29**
Phongsali	14	29	49	1	248	2.7	24
Louang Namtha	14	21	40	2	223	3.5	26
Oudomxai	31	43	83	17	560	6.1	31
Bokeo	16	22	35	2	307	5.2	29
Louang Prabang	37	54	120	14	893	4.4	22
Huaphanh	39	62	138	11	783	5.6	36
Sayaburi	49	66	89	4	1,165	14.5	34
Central region	**547**	**457**	**339**	**36**	**4,962**	**9.9**	**40**
Xieng Khouang	96	46	74	7	610	10.9	62
Vientiane Municipality	48	32	15	2	1,181	21.6	13
Vientiane Province	92	59	65	2	937	11.7	46
Borikhamxai	34	35	36	2	473	4.3	37
Khammouan	48	82	35	3	355	7.6	42
Savannakhet	204	183	94	20	1,248	17.6	51
Xaysomboun S.R.	24	20	20	2	160	2.7	71
Southern region	**199**	**238**	**144**	**8**	**2,073**	**9.9**	**42**
Saravane	66	68	52	3	554	12.9	46
Sekong	8	17	23	2	128	2.9	34
Champassak	116	114	55	2	1,223	15.0	40
Attapeu	8	40	14	1	168	4.9	48
Total for Lao PDR	**944**	**992**	**1,036**	**94**	**11,215**	**8.2**	**37**

Sources: JICA-MAF (2001). Master Plan Study on Integrated Agricultural Development in Lao PDR. Agricultural Census (1999). National Statistics Center, Vientiane, Lao PDR.

16. Increases in livestock number are difficult to estimate since the first comprehensive agricultural census was conducted only in 1998/99. Before that time, estimates of livestock numbers were collated by District and Provincial Agriculture and Forestry Offices which had

[3] The study recognized three regions in the country, following the same division as used in most government documents (see Table 1 for details).

to meet specified targets. It is likely, that these figures were inflated. Conversely, data collected in the Agricultural Census may underestimate actual numbers as farmers may have under-reported livestock number for a variety of reasons such as fear of taxation. As a rough guide, average changes in livestock numbers between 1980 and 2000 were calculated based on FAO-STAT[4]. The average annual increase over this time was 0.75% for buffalo, 5% for cattle, 8% for goats and 1.2% for pigs.

B. Importance of Livestock to the Rural Economy and People

17. Livestock are found on most farms in the Lao PDR with 89% of all farm households raising one or more livestock types (Agricultural Census, 2000). Cattle density per 100 people is highest in districts in or near Vientiane, Xaysomboun S.R., Xieng Khouang, Savannakhet, Saravane and Champassak (Fig. 4.). Generally, cattle density per 100 people is lowest in districts in the northern region. Buffalo density is relatively evenly distributed throughout the country (Fig. 4). Although generally associated with lowland rice production because of the need for draft power, many upland villages breed buffalo for sale in the lowland areas. Pig density per 100 people is generally higher in districts in the Sloping Lands Zone than in the Mekong Corridor (Fig. 5).

18. Livestock production is firmly based in the smallholder sector with over 95% of all animals being raised by smallholder farmers in both the Mekong Corridor and the Sloping Lands. A small number of commercial pig and poultry enterprises (and one dairy farm) are located in lowland areas near population centers such as Vientiane, servicing the meat, egg and milk needs of people living in these areas. These commercial enterprises generally use imported animal breeds and concentrate feeds from Thailand.

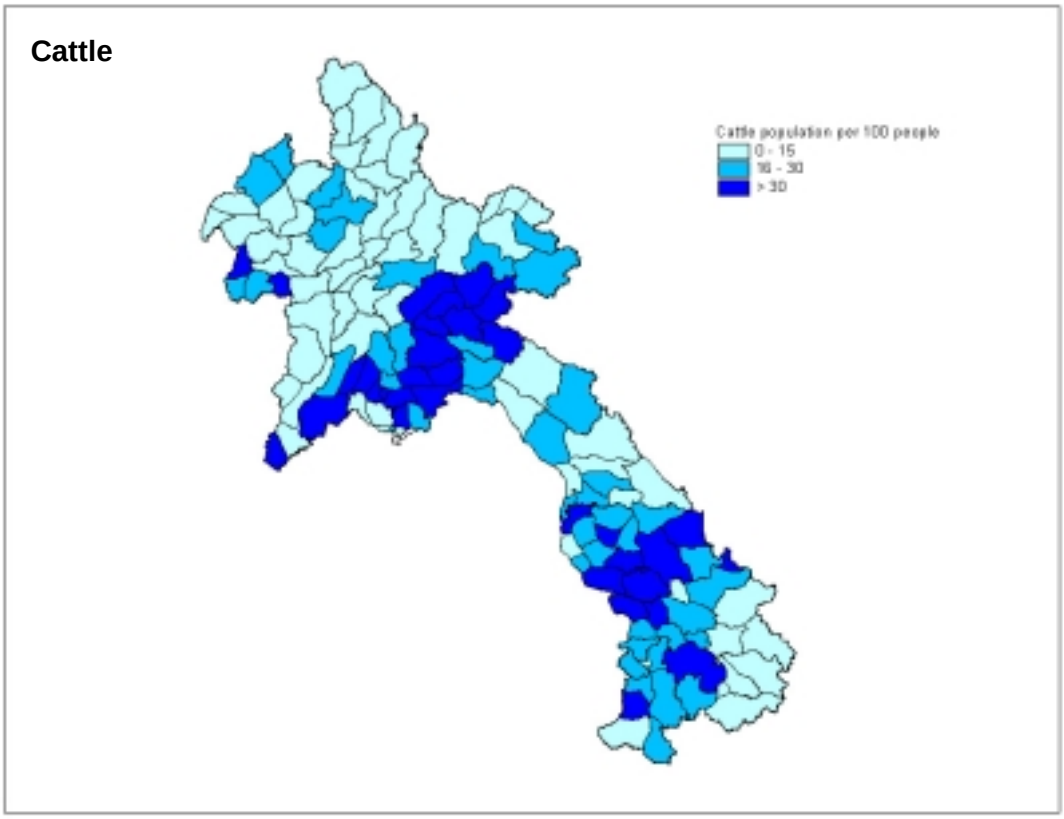
19. Livestock are the most important single source of cash income for farmers (LECS 2, 1999). Nationally, about 30% of cash income from agriculture was derived from livestock in 1997/98. This figure was more than 50% in the northern provinces of Phongsali and Huaphanh. In general, the importance of livestock as a source of cash income is highest in upland areas with poor access to markets where villages have to carry goods over long distances to markets. This limits options to crops with a high value per unit weight and livestock such as cattle and buffalo that can be walked to markets. In areas with good road and market access, usually lowland and adjacent upland areas, farmers have additional opportunities for generating cash income from agriculture and off-farm income. Agricultural opportunities include a variety of annual and perennial crops such as maize, peanuts, sesame, soybeans, vegetables and fruit.

20. Apart from being a major source of cash income, farmers keep livestock for accumulation of capital / wealth; draft power to cultivate land and transport agricultural produce; and manure for vegetable, fruit and crop production. Farmers also cite other advantages such as the relative stability of prices for livestock and livestock products, particularly when compared to price fluctuations of cash crops, the ease of liquidizing livestock at any time; the ability of ruminants (cattle, buffalo and goats) to utilize common property resources such as grasslands and fallow cropping areas; and the opportunity to diversify farm activities and reduce income variability.

[4] FAO-STAT. www.fao.org – Statistical databases - Agriculture. Accessed on 2 June 2002. Calculation based on mean data for 1980/81 and 2000/01.

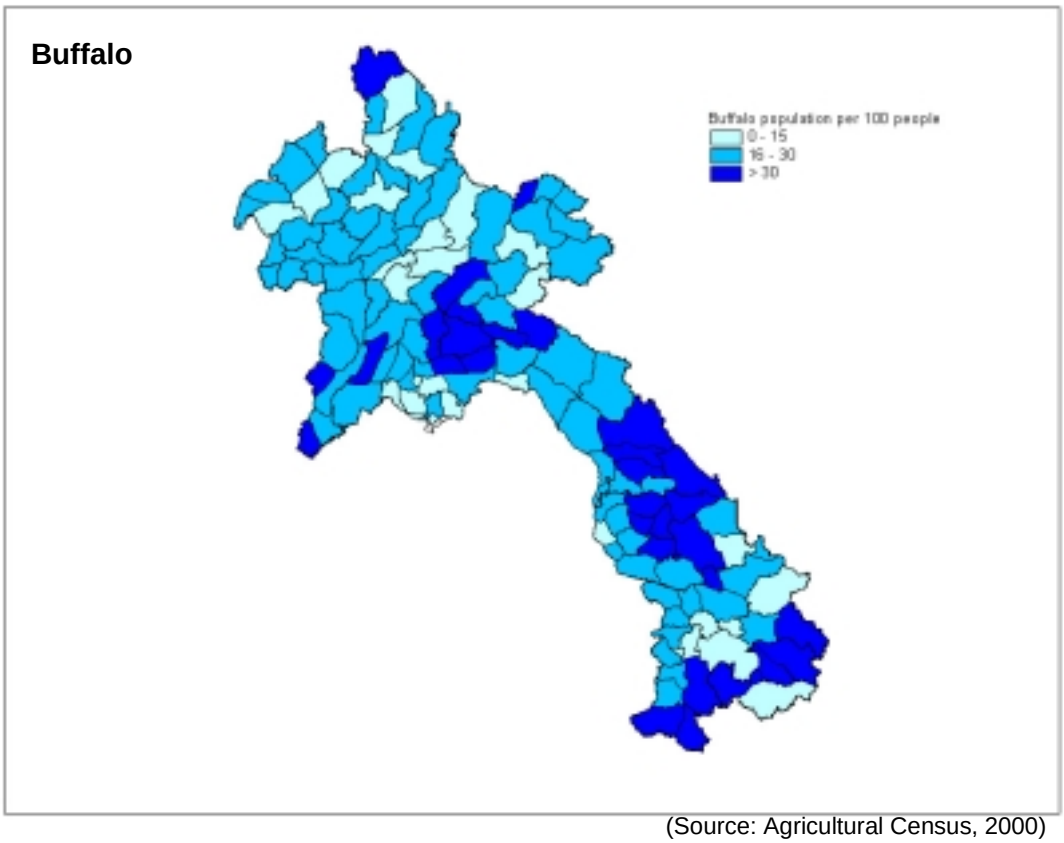
Figure 4: Cattle, Buffalo and Pig Population Density Per 100 People in 1998/99, Based on District Data

Cattle



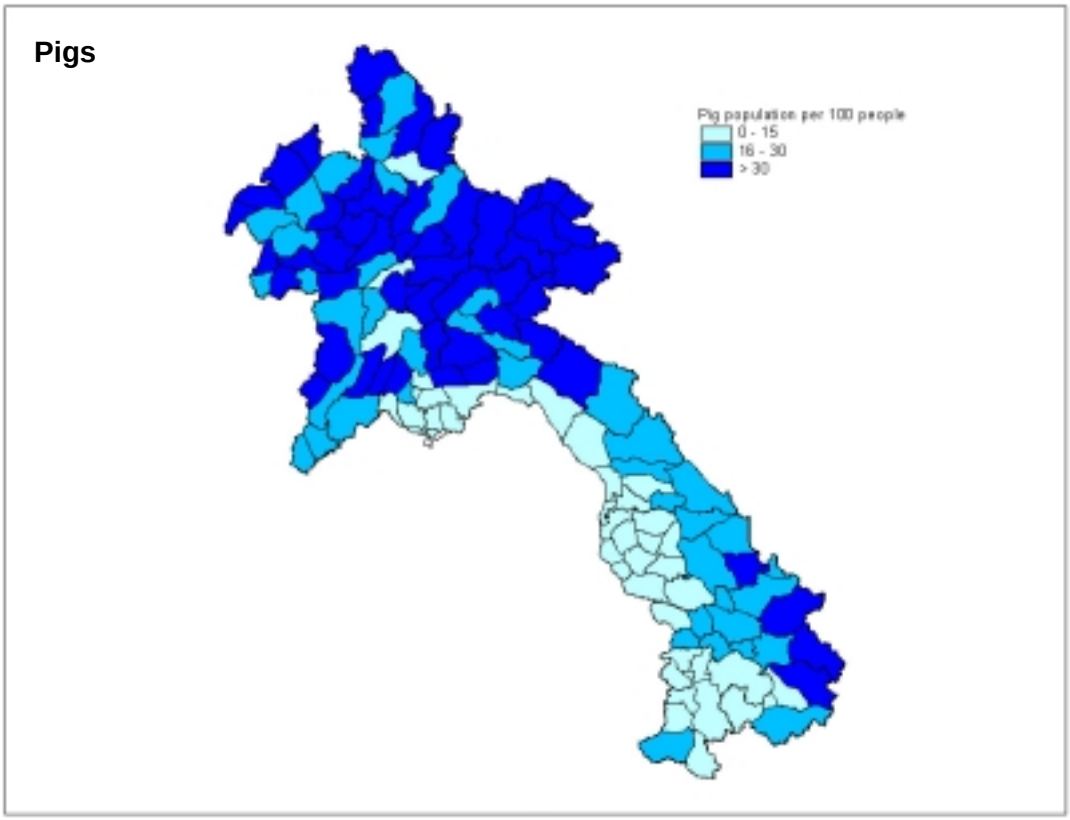
(Source: Agricultural Census, 2000)

Buffalo



(Source: Agricultural Census, 2000)

Figure 5: Pig Population Density Per 100 People in 1998/99, Based on District Data



(Source: Agricultural Census, 2000)

IV. DESCRIPTION OF LIVESTOCK PRODUCTION SYSTEMS

21. Livestock production is clearly in the hands of smallholder farmers with about 95% of all animals being reared by these producers. Smallholder farmers operate mixed farming systems, growing both crops and rearing animals. Ways of feeding and managing animals have evolved in response to the predominant cropping system and the available feed resources. These include fallow cropland, communal areas along roads, rivers, areas around fields and villages, dedicated grazing land, secondary forests and other non-cropped communal land. Additionally, crop by-products such as rice straw are also fed to ruminants. Commercial livestock production has developed only around major population centers such as Vientiane, supplying meat, eggs and milk to the urban population.

22. The greatest difference in livestock production systems is encountered between the predominantly lowland areas in the Mekong Corridor Zone and the upland areas of the Sloping Lands zones. There are also differences between ethnic groups in the type of livestock raised and animal management. Table 2 shows that about 50% of Hmong and Katang households are raising cattle while this percentage is closer to 30% for other ethnic groups. The proportion of Lao households raising pigs is considerably lower than other ethnic groups. The main differences between production systems will be discussed in the following sections for different livestock types.

Table 2: Percentage of Households Raising Different Livestock Types by Ethnicity

Livestock Types	Total	Ethnic Group of Holder								
		Lao	Phutai	Khmu	Hmong	Leu	Katang	Makong	Kor	Other
Cattle	31	31	32	22	54	27	48	30	34	25
Buffaloes	48	51	58	38	34	57	78	55	47	40
Pigs	49	38	52	64	73	54	64	55	68	54
Local chickens	73	72	73	75	80	81	78	67	74	69

Source: Agricultural Census, 2000

A. Smallholder Cattle and Buffalo Production

1. Cattle Production System

23. The main cattle breed found in the Lao PDR is closely related to the Chinese Yellow cattle. The breed is well adapted to the environment and conditions encountered on smallholder farms. They are agile and hardy, and have a good reproductive rate and few calving problems. They have a small body size with a body weight of up to 350 kg for males and 250 kg for females. Dressing percentage is about 50% (JICA - MAF, 2001, Hansen, 1997, Kennard *et al.,* 1996). Growth rates are low with animals taking 4-6 years to reach mature weights under the current extensive feeding system.

24. Farmers report that females usually produce their first calf at an age of 3 years. Ideally, they will produce a calf every year but in reality miss a breeding season once every 2-4 years. Average annual calving rate is likely to be in the vicinity of 70%. Calving tends to occur in the early part of the dry season (November to February) with joining during the latter part of the dry season or early wet season. Breeding is not controlled and is based on opportunity, usually during periods of communal herding.

25. The small bodyweight of the local breed is a major advantage in extensive management systems since the amount of feed needed to maintain (and produce) condition is relatively small and cattle can spend a lot of time looking for better-quality feed. Growth rates of native cattle are low under the current extensive management but they are genetically capable to produce high liveweight gains if fed high-quality feed (Gibson, 1997). Other breeds (such as Brahman) or crosses (such as Sindhi x local cattle) are seen occasionally but these require much higher levels of feeding management than are generally available.

26. Farmers sell more adult male than females or young animals, leaving a herd structure with a predominance of females aged 2 years or older for reproduction (Table 3). Adult males are slaughtered for domestic consumption or exported. Differences in herd structure between provinces are only small (Agricultural Census, 2000). From observations during the FLSP Baseline Study[5] it appears that some farmers keep adult females well beyond their reproductive age, and often more adult males are kept than are needed for reproduction. This is consistent with the notion that livestock are regarded as a form of saving or capital accumulation to be sold only when absolutely needed, not purely on their merits for high production.

[5] This study was conducted by the Forage and Livestock Systems Project (FLSP) in April 2002 in a sample of project target villages in Louang Prabang and Xieng Khouang provinces. Although not yet fully analysed, preliminary results have kindly been made available by the FLSP.

Table 3: Herd Structure for Cattle in the Lao PDR

Class of Animal	Percentage
Females aged >2 years	48
Males aged > 2 years	16
Females 0-2 years	18
Males 0-2 years	18

Source: Agricultural Census, 2000.

2. Buffalo Production Systems

27. The swamp water buffalo commonly seen in the Lao PDR is indigenous to Southeast Asia. The buffalo is larger than cattle with males reaching up to 450kg and females up to 350kg of bodyweight. Females tend to have their first calf at age 4-5 years and calving intervals are lower than for cattle with some reports (e.g. JICA-MAF, 2001) putting the annual calving rate at less than 50%. The herd structures, management, calving and joining periods are similar to cattle.

3. Animal Management in the Mekong Corridor

28. Cattle and buffalo density is higher than in the central and southern regions where there is a higher proportion of lowland rice (Table 1). This is the usual trend for areas in Southeast Asia where only a single crop of rice is grown each year, since cropping areas are available for grazing for most of the year.

29. In these areas, cattle and buffalo are grazed on the vacant cropping area for most of the year, utilizing rice stubble, regrowth of rice after harvest, grasses and weeds growing in and around fields and rice straw. The management system tends to be extensive, with animals being allowed to graze and mix freely in large herds. In some areas, owners only check their animals occasionally, maybe twice a week, while others return their cattle to an enclosure or pen every night. Providing salt is commonly used to entice animals back to the pens, which are usually located near the rice fields.

30. During the rice growing season, animals are grazed in upland, grazing and forest areas away from the rice fields to avoid damage to crops. The amount of available grazing and other non-cropping areas are critical for animal production since there are no other feed resources during this time of year. Most villages in the Mekong Corridor have access to such areas and these are grazed heavily during the wet season. Management inputs are minimal with animals grazing in small groups. Often, herding or close supervision is required at this time of year to avoid crop damage for which the owner would have to pay compensation. Buffaloes needed for land preparation are kept near the rice fields (often controlled by tethering) and are fed supplementary grass, rice bran and perhaps sticky rice to ensure that they are strong for land preparation.

31. In areas where irrigation enables farmers to grow two rice crops per year, cattle and buffalo can only graze cropping areas for a few months during the year and are dependent on other grazing resources for most of the year. This limits the number of animals that can be raised in these areas. Growing crops out of the normal growing season also requires more herding and supervision of animals to avoid crop damage. More and more farmers are investing in hand-tractors for land preparation and transport in intensive agricultural areas, often selling their buffaloes to finance the investment. This decline in buffalo numbers can be seen in many lowland areas.

4. Animal Management in the Sloping Lands

32. In the Sloping Lands zone, cattle and buffalo are grazed extensively in fallow upland fields, grazing areas and forests. Management inputs are minimal and animals are left to their own device for much of the year. There are differences between ethnic groups and villages in the way cattle and buffaloes are managed. The Hmong, for example, are well known for their skills in raising cattle (ADB PPA, 2001) and build extensive fences using local materials to keep animals separate from cropping areas during the wet season. Many villages herd cattle and buffalo communally in dedicated grazing areas. In other villages, households or families manage animals individually. For part of the year, animals are left to graze in very remote areas where ample feed is available and farmers check animals every few days. At other times, animals are brought back to an enclosure or pen every night.

33. Farmers in some villages provide supplementary feed to cows with newborn calves and keep sick animals in special pens where they are given cut-and-carry feed. Most farmers provide salt to animals, often as an incentive to return to the village or enclosure by themselves.

B. Smallholder Pig Production

34. Several native breeds are recognized including ‘Moo Chid’, ‘Moo Laat’, ‘Moo Daeng’ and ‘Moo Nonghaet’ (Vongthilath and Blacksell, 1999). Most local pigs are high fat, black, swaybacked Asian breeds, and can reach a mature weight of 60-100kg. They are hardy and able to scavenge at least part of their feed requirements in free-range conditions. Growth rates tend to be slow in extensive management systems and animals may take 15 months to reach a weight of 40-50kg (Kennard, 1996). Farmers report that many sows only have 1 or 2 litter per year with 6-8 piglets per litter (FLSP, 2002). Imported breeds, such as Landrace x Large White crosses are used by a small number of farmers, particularly in semi-commercial pig farms near population centers (Vongthilath and Blacksell, 1999). Gibson (1997) noted that imported breeds, introduced to smallholder farmers in Bokeo province, did not perform as well as local breeds in these conditions.

35. Pig production is an important livelihood activity of highland people. Almost invariably, pig raising is the task of women in all areas (FLSP, 2002; ADB PPA, 2001). Management of pigs tends to be extensive with pigs being allowed to roam freely and scavenge feed around houses and villages, although penning is practiced in some areas. Despite free roaming, pig production is very labor-intensive with supplementary cooked feed being provided in most cases. The type of feed given depends on farming system, the availability of labor and suitable natural vegetation. Feeds include rice bran, broken rice, banana stem, taro, yams, maize, cassava and vegetation collected in fallow fields and forests. In remote uplands, where most of the pig feed is collected this can take up as much of 2-3 hours per day in addition to preparation and cooking of the feed. In some villages, cassava and maize are specially planted for pig feed and this reduces the labor needs for feeding pigs.

36. Management systems are more intensive in villages where pigs (weaners) are fattened in pens for the local market. This occurs more often in lowland than upland areas. One or two weaners (female or castrated male piglets) are fed for 3-4 months until they reach a saleable weight of about 35-50 kg.

C. Smallholder Goat Production

37. The Katjang goats found in the Lao PDR are common throughout Southeast Asia. Goats reach a mature weight of about 40kg and are used for meat only. Farmers in Louang Prabang Province reported that goats have their first kids at age 12-18 months, usually a

single kid. Thereafter, females generally give birth twice a year with a high incidence of twins (FLSP Baseline survey, 2002). Goats are found more frequently in the upland areas with the largest concentration in Oudomxai, Louang Prabang, Huaphanh and Savannakhet (Table 3).

38. Goats are generally left to graze freely all year in small groups in forest and fallow cropland. Farmers tend to restrict the number of goats they raise to avoid excessive damage to crops for which the owner is held responsible. There usually is good local market demand for goat meat which is one of the reasons for the relatively high rate of increase in the goat population (8% per annum) over the last 20 years.

D. Smallholder Poultry Production

39. Except for some commercial chicken farms near major population centers, which supply meat and eggs to the urban centers, farmers tend to raise local chicken. These are generally preferred over improved breeds by consumers and command a higher price than imported breeds in Thailand (Gibson, 1997). Local chickens are used to scavenging, which is the pre-dominant way farmers raise chicken. Chickens are left to scavenge food around the house and village during the day, and penned at night to protect them against predators. Most farmers provide rice bran or broken rice twice per day as a supplementary feed. Growth rates are low under these management conditions and hens produce few eggs (maybe 30-50) per year.

40. Most households raise 20-30 chicken consisting of 3-5 hens, one cock and immature chickens of various ages. The EU Livestock and other projects have introduced imported chicken breeds such as Yellow Chicken from PRC and Viet Nam for distribution in a small number of villages in northern provinces. The high incidence of diseases (and the lack of control of interbreeding with local chicken), has limited the success of these introductions. Many households also raise a small number of other poultry such as ducks and turkeys. Raising poultry usually is the task of women in the household (ADB PPA, 2001; FLSP Baseline Study, 2002).

E. Commercial Production Systems

41. Commercial pig and poultry production farms are found near population centers such as Vientiane. Most of these agribusinesses are small cottage industries with few employees. In general, production costs tend to be high since semi-intensive pig and poultry production is dependent on concentrate feed which, in many cases, is imported from Thailand. Concentrate feeds are mixed with locally available feeds such as rice bran and brewers' grain to reduce production costs. In several cases, commercial pig and poultry production is attached to rice mills.

42. Commercial pig and poultry production in the Lao PDR is disadvantaged by higher feed costs for monogastric animals (pigs and poultry) than neighboring countries which have access to cheaper ingredients for concentrate feeds (e.g. by-products of industrial crops such as sugarcane, cassava and coconuts, and port access for importation) and a larger domestic market. Gold Coin, the only larger scale (150 tons per day) animal feed producer in the Lao PDR is unlikely to be able to compete with Thai feed mills given the higher cost of raw materials and transport costs.

43. One medium-scale commercial dairy farm, the Nabong Farm Company, has supplied milk and dairy products for several years to the Vientiane market, competing with imported fresh milk from Thailand (see insert).

AGRIBUSINESS PROFILE: Nabong Farm Company

- *Ownership:* Burapha Group with Swedish and Lao Investors
- *Address:* Nabong, Vientiane Municipality, Lao PDR
- *Business Activity:* Milk and dairy products
- *Capacity:* Average 11 liters/cow with 25 cows in lactation.
- *FY 2000-2001 Performance:* Sales Kip 900 million (US$ 120,000); Costs 1.2 billion Kip (US$ 160,000); Loss 300 million Kip (US$ 40,000));
- *Product Line and Markets:* Fresh milk, Yogurt and Cheese;
- *Employment*; 30 workers, one local manager, foreign investor assistance;
- *Production and Marketing Strategy:* Market milk and other dairy produce to Vientiane area and immediate surroundings.
- *Supply/Sourcing:* Farm owns fenced land for forage (various grasses including Ruzi) and buys in waste products from Lao breweries, corn (maize) and feed concentrates (from Thailand);
- *Problems/Constraints*: Company has rented Nabong Farm from Government for 20 years for a rental contract value of US$ 300,000. The yearly rent is US$ 17,000. The Company has already borrowed US$ 80,000 from a state owned commercial bank at 18% interest. The Company has to repay loans and pay land rent in US dollars while all of its income is in Kip. Kip depreciation has further eroded the enterprise's profitability. The profit and loss position has made it impossible to service the corporate debt and pay the land rent to the Government. The Company's milk cow population has dwindled from 222 in 1992 to 142 cows of which currently (June 2002) 25 animals produce milk. The main constraint on milk production is poor or limited feed. Feed also costs approximately 25 percent of the direct costs of a liter of milk (1,800 kip (US$ 0.24)). Transport costs to Vientiane are high (the farm is 30-plus km away.
- *Business Strategy*: The Company has requested the Government to reduce its annual land rent to $2,500 and has requested the bank to reduce its interest payment to 13% and has also requested the Government to provide direct financial assistance to restock its cattle herd and modernize its dairy equipment. The company has limited plans (financed by a foreign investor) to reduce the area for forage from 505 ha to 100 ha but improve the quality of the forage. Silage will be produced. A small slaughterhouse is planned for an investment of US$ 15,000. The meat from this facility (pork and beef) will be targeted at the high-end Vientiane market (restaurants) using the Nabong brand name.

V. TECHNICAL CONSTRAINTS IN LIVESTOCK PRODUCTION SYSTEMS

A. High Incidence of Diseases

44. The most important constraint limiting livestock production is animal disease. Annually, a large proportion of all poultry die in disease epidemics. In upland villages in Louang Prabang and Xieng Khouang, farmers reported that more than 80% of all chicken die every year (FLSP, 2002). Similarly, pig diseases often occur as epidemics, killing many / most pigs in a village in a single outbreak (Hansen, 1997, FLSP, 2002). The incidence of mortality caused by diseases is lower in cattle and buffalo, except for a high mortality of buffalo calves (30-40%) due to internal parasites. The financial loss of losing animals is devastating for poor families. In the PPA, 70% of villagers in the poverty assessment prioritized livestock disease as a major problem. Clearly farmers are aware of the extent of the problem but do not know how it can be overcome.

45. There are many reasons for the high incidence of livestock diseases. These include poor nutrition and sanitation, the lack of control of animals, movement of diseased animals, lack of correct disease diagnoses, poor access to information on how to control and treat diseases, restricted coverage of effectual vaccination, veterinary support and inappropriate management practices. Many of these factors are related to information about diseases and appropriate animal management.

46. Some of the diseases are relatively new to farmers, particularly those in more isolated areas. Farmers in several of the villages included in the FLSP Baseline study said that disease epidemics for pigs, likely to be classical swine fever, were unknown until a few years ago. This is likely to be related to the increased engagement of previously isolated villages with markets and other communities. Consequently, villages don't know how to cope with these new diseases and explains the frustration expressed by a Khmou Ou farmer in the PPA "We depend upon the sale of livestock when rice production is insufficient, but now we also have the problem of animals dying".

47. Vaccination for some of the most common diseases is available but is only practiced on a regular basis in commercial livestock enterprises and the more easily accessible lowland areas in the Mekong Corridor. Singkham (1998) estimated that in 1997 vaccination coverage was 30% for large animals, 20% for poultry and 10% for pigs. This estimate was based on the number of vaccines distributed, and appropriate, on-time and effective vaccination coverage is likely to be even lower.

48. Animal health problems in young goats and potential damage to crops from free-grazing goats are constraints in goat production. High death rates of young goats has been reported (Kennard, 1996) which may be caused by internal parasites. Excessive population density of free-grazing goats could contribute to environmental degradation, and constraining goats by raising them in pens has been advocated in some projects (e.g. Gibson, 1997).

B. Poor Animal Nutrition

49. For cattle and buffalo in the Mekong Corridor, the lack of feed is a constraint at some times of the year. In lowland areas, the quantity and quality of available feed is limited towards the end of the dry season when all available feed resources have been exhausted. This is related to the relatively high animal density in lowland areas. Lack of feed at this time has many detrimental effects. Newborn calves rely heavily on milk from their mothers at that time and low milk yields restricts their development. Poor nutrition is also likely to limit the ability of cows to come into heat, resulting in long calving intervals. Feed shortages also occur towards the end of the wet season in lowland areas which have limited access to upland grazing areas.

50. In upland areas, feed supply is not seen as a major constraint by farmers (FLSP Baseline survey, 2002) but farmers do have to spend a lot of time to take (and herd) animals in distant grazing areas. Poor farmers lack rice bran and broken rice, which is used as supplementary feed for pigs, particularly in the late wet season. This the time when poor households in upland areas are lacking in rice and little broken rice or rice bran can be spared as supplementary feed for pigs. Poor nutrition results in poor animal production and contributes to poor resistance and exacerbates disease problems.

C. High Labor Demand on Women

51. A major constraint for women is the high labor requirements for raising pigs in extensive systems. The collection, preparation and cooking of feed for pigs makes up a significant proportion of the labor of women. The female head of household is often assisted in this task by a grandmother and sometimes children living in the same household. In the Sloping Lands zone, land allocation and shortened fallow periods have resulted in higher labor requirements for weeding of lower-yielding crops (ADB PPA, 2001), making it more difficult for women to find time for raising pigs.

D. High Cost of Feed for Pigs and Poultry

52. The high cost of feed for pigs and poultry, and a relatively small domestic market limits the expansion of commercial livestock production beyond the domestic demand by the urban population. Apart from production constraints, all agribusiness tend to be constrained by an uncertain legal environment and many regard the Lao PDR as a more difficult place to conduct business than other countries in the region.

53. Other issues, which may constrain livestock production are marketing, cross-border trade and policy issues. These, as well as animal health issues, are discussed in detail in the following sections.

VI. ANIMAL HEALTH ISSUES

A. Importance of Livestock Diseases in the Lao PDR

54. Many livestock diseases occur in the Lao PDR and their importance varies according to effects on trade, loss of production, mortality and ability to transmit disease to humans. This impact of livestock disease may be directly on the animals of poor livestock keepers or on the health of livestock keepers themselves. Other effects may be indirect, for example, by increasing prices or reducing the quality of livestock products.

55. The impacts of livestock diseases on poor livestock keepers of Southeast Asia have been estimated from published and unpublished data and consultation with a wide range of national and regional experts (Perry et al. 2002).[6]. The local importance of some diseases are masked by regional generalizations and data from the Lao PDR were very limited. The ten diseases most highly rnaked in that study for their impact on poor livestock keepers are listed in Table 4 along with an estimate by the authors of this report on their status and impact in the Lao PDR.

Table 4: Diseases of livestock in South East Asia of highest rank according to their impact on the poor and their status in the Lao PDR

Disease	Rank in Southeast Asia	Importance in Lao PDR	Impact		
			Lost Production	Mortality	Trade barrier
Ectoparasites	High	Medium	*	-	-
Foot and Mouth Disease	High	Medium	*	-	*
Gastrointestinal helminthes	High	Medium	*	*	-
Newcastle Disease	High	High	*	***	-
Toxacariasis	High	High	*	***	-
Haemorrhagic Septicaemia	High	High	**	**	-
Duck Virus Enteritis	High	Medium	**	**	-
Fowl Cholera	High	Medium	*	***	-
Fowl Pox	High	Medium	**	**	-
Classical Swine Fever	High	High	*	***	*

56. In a disease survey by the National Animal Health Center in 12 upland villages participating in the Forage and Livestock Systems Project (FLSP) in 2001, the three most

[6] Workshop in Southeast Asia: D. Hoffman, Thailand (FAO), R. Alders, Cambodia/ Mozambique, R. Holmes, Vietnam, F. Barwinek, Vietnam, E. Potter, Cambodia (WB), L.Thai Kin Lan, Vietnam, T. Daing, Myanmar, D. Van Aken, Lao PDR, W. Kalpravidh, L. Gleeson, Thailand (OIE), T.Vannasouk, Laos, S. San, Cambodia, P. Poomvises, Thailand, T. Hutabaret, Indonesia, M. Maclean, N. Sohkim, Cambodia.

important diseases were classical swine fever in pigs, toxocariasis infection in buffalo calves and fowl cholera in chicken and ducks. Other diseases encountered included haemorrhagic septicaemia in cattle and buffalo, external parasites in cattle and buffalo, chronic diarrhea in cattle, severe diarrhea in pigs and dermatitis in cattle (DLF NAHC, 2001).

B. Links between Human and Livestock Disease

57. Human disease and livestock disease are linked in three ways: a) transmission of infection between humans and livestock; b) poor health cause indirectly by poor livestock performance and c) better control of both human disease and livestock disease by increase understanding by communities of how infectious diseases are caused and transmitted.

58. Diseases which pass from animals to humans are known as zoonoses. There are many zoonoses. As an example, and one which may be of significance in the uplands is cysticercosis. Consumption of undercooked beef and pork allows the cysts of tapeworms to establish in the human intestine. These tapeworms rarely cause serious illness. However, the eggs from human faeces of the tapeworm (*Taenia solium*) acquired from pigs by eating undercooked pork can pass through the human intestine and form cysts, especially in the brain, causing a range of serious disorders. One abattoir survey in the Lao PDR detected this parasite in 1.5% of pig carcasses. The prevalence of this parasite in humans and pigs has not been studied but the free-range management of pigs and poor sanitation seem to provide ideal conditions for transmission.

59. The importance of livestock as a store of wealth to provide for major expenses is well described in the PPA and medical emergencies are one such expense which cannot be met if livestock are too few or in poor condition. The direct effect of livestock products on child growth are not well understood in upland Lao where there is no use of milk from bovines or goats and intake of meat products, even among the very poor, is relatively high. This intake may be sufficient to provide minimum dietary needs for protein and micronutrients.

60. There are some serious roundworm infections of adults and children which have been the subject of control programs. These (hookworm, large roundworm and pinworm) do not infect livestock but can be treated effectively by a chemical similar to that used for *Toxocara* in buffalo and roundworms in all livestock species. In 1996 a study in two districts of Vientiane province concluded that these human roundworms could be controlled and that the difference (between target and non-target villages) lies in the fact that knowledge about routes of infection improved significantly in the target village (Siharath et al. 1996, p 49). This supports the view of the FLSP project (Peter Horne, pers. comm.) that understanding by farmers and villages is the key to unlocking the benefits of all community-based interventions.

61. Zoonoses have also been considered and ranked for their impact on poor livestock keepers in Southeast Asia (Perry et al., 2002). The status of several of these diseases is unknown in the Lao PDR and it is likely that diseases more closely associated with dairy production are of low importance. The top 10 zoonotic diseases, ranked for their impact in Southeast Asia with their status in the Lao PDR are shown in Table 5.

Table 5: Diseases of livestock and diseases transmitted from livestock to humans (zoonoses) in Southeast Asia and the Lao PDR of highest rank according to their impact on the poor

Zoonotic Disease	Rank in Southeast Asia	Status in the Lao PDR
Anthrax	High	Frequent small outbreaks
Bovine tuberculosis	High	Unknown but usually associated with dairy production
Brucella abortus	High	Unknown but usually associated with dairy production
Brucella melitensis	High	Unknown
Buffalo Pox	High	Unknown
Cysticercosis	High	Present but importance unknown
Leptospirosis	High	Associated with rat populations, more likely in lowlands
Brucella suis	High	Unknown
Japanese B encephalitis	High	Unknown
Trichinellosis	High	Unknown

VII. MARKETING AND CROSS-BORDER TRADE

A. Marketing

62. There is a well-organized marketing system for cattle and buffalo. Small traders at village and district levels buy animals and move them by trekking over small roads and tracks to the nearest truck loading point; traders based in major towns organize collection by truck and supply the urban markets, as well as exports and border trade. Animals cross the Mekong into Thailand all along the Lao border, though with most movements occurring in Bokeo, Sayaburi, Vientiane Province, Borikhamxai, Savannakhet and Champassak. Traders must obtain a license to operate with the number of licenses being limited. This, together with a regulated retail price of meat which in many provinces is fixed by the provincial government, put farmers in a difficult bargaining position (Clarke, 1999).

63. Livestock movements represent the response of farmers and traders to higher relative prices of livestock and livestock products in wholesale and retail markets. Within the Lao PDR, prices are lower in the northern upland areas than in major population centers and in the areas bordering Thailand. Prices are highest in Vientiane. This is partly related to the quality of animals sold with the best quality animals being exported or sold to the urban population in Vientiane, while poorer quality animals are consumed locally. Other reasons include effective consumer demand and restrictive trade practices such as price controls of meat sold in provincial markets (see section below on taxes, duties and regulations). For example, in February 1999 the retail price for beef was Kip 8,000 per kg (US$ 2.03) in Louang Prabang and Kip 13,000 per kg (US$ 3.30) in Vientiane (Clarke, 1999). A similar 40% difference in price has been noted by Tienne Vannasouk (OIE/EU, 2001) between beef prices in Pakse, Champassak and Vientiane. Prices for live animals received by farmers in remote areas are likely to be considerably lower than those received for a comparable animal in Vientiane, but few data have been found on price differentials for live animals. In Phonsavanh, IFAD recorded a 15% price differential between villages and the provincial capital but the distance was relatively short. Data for more remote village are needed to be able to assess the mark-up by traders.

64. Transport costs, although generally high in the Lao PDR, are not likely to have a major effect on livestock sale prices since the value of animals per kg is high. Clarke (1999)

in a livestock marketing study for the EU Livestock Project reported that transport cost per animal from Phonsavanh to Vientiane was US$ 7.5 per for buffalo or US$ 5 for cattle.

65. The major urban areas of Vientiane, Louang Prabang, Phonsavanh, Savannakhet and Pakse constitute the centers of domestic demand. The main Lao market for large livestock is Vientiane. Most of the cattle and buffalo go to the Dondu Slaughterhouse owned by the local government where1,500 – 1,800 buffalo (40%) and cattle (60%) are slaughtered each month (Clarke, 1999). In addition, there are private/unofficial slaughter places. The number of cattle and buffalo slaughtered in Savannakhet at the main abattoir is approximately 300 buffalo and 200 cattle per month. In Pakse, about 210 – 240 buffalo and 270 – 300 cattle are slaughtered per month in two abattoirs located 7 and 16 km outside the city (Clarke, 1999). Based on domestic demand projections, 300,000-400,000 large ruminants are slaughtered each year. Unless the figures reported by Clarke significantly underestimate the actual number of animals slaughtered in official abattoirs, the vast majority of these animals are slaughtered in small-scale, unofficial slaughter houses or villages.

66. The SEAFMD Study (op.cit.) found that a high proportion of animals slaughtered locally are thin, unfinished and immature. A small proportion of lactating cows and young animals are also slaughtered, particularly towards the end of the dry season. The operators of the Nabong Dairy Farm (see earlier inset) say that they see good prospects for a small-scale slaughterhouse aimed at the high end of the market based on proper quality control and feeding of live animals and proper treatment (hanging and cold storage) of the meat. The market for this product would be Vientiane Municipality where it would be offered in competition with imported meat from countries such as New Zealand.

67. In general, the Vientiane market prefers cattle beef rather than buffalo beef. One of the main markets for fresh and processed meat products is Thong Khon Kham Market. About 20% of meat is processed into traditional products such as: *Some Moo* – a fermented pork product which can store for 4 – 5 days at room temperature; *Mam* – a fermented beef product that can be stored for 6 – 12 months above the fireplace; dried meat (beef jerky); smoked beef; and *Neam*.

B. Taxes, Duties and Regulations

68. The livestock market in the Lao PDR is still distorted by a number of restrictive practices (see also section on policy). Many provincial governments set maximum retail prices for meat with flow-on effects for farm gate prices. Some also establish quotas for the number of animals that can be moved from a district or restrict movement from provinces. For example, in Viangkham District which has a large buffalo population, the quota in 2001 was set at 2,000 head[7]. Obviously, some restrictions on animal movements for animal health reasons are necessary to prevent the spread of diseases, but these need to be based clearly on animal health considerations. Traders compete in a bidding process for a license to operate in a district. In Viangkham District, the winner paid 35 million Kip (US$ 4,600) for the livestock trading monopoly in 2001. Trade is also hindered by excessive paperwork for licenses, letters of approval and certificates all of which require payments (usually “tea money”) to be paid at all levels, district and provincial.

69. Despite these comments, there has been a general liberalization of livestock trade practices over the last decade and there are now many more traders operating in remote areas and there are fewer restrictions on inter-provincial trade than previously (e.g. Hansen, 1997). In fact, Clarke (1999) in his Livestock Marketing Study concluded “Observations

[7] Reported by FAO from TCP/LAO/0065 “Development of Market Information and Marketing Extension Capability” study, 2001

showed that the overall trading system from producers to consumers operates extremely efficient and effectively".

70. Official exporting of livestock attracts export duties which are levied at border checkpoints. In 2000, there were 18 spot check border check posts that recorded the small volume of official livestock trade. At these posts animals are supposed to be inspected but more often than not, papers are checked, but not the animals themselves. Checkpoint staff are poorly trained and paid. Traders prefer to minimize their contacts with officialdom to avoid rent-seeking by officials. The official export tax levied at the Wang Tao border checkpoint in Champassak is US$10/head, which amounts to 3 - 6% of farm gate value.

71. ASEAN members are committed to establishing a free trade area by 2003. Under proposed arrangements, more than 85% of all tariffs are to have been reduced to 5% or less by 2000. Under AFTA, member countries need to develop an *Inclusion List* (IL) of products for which it will reduce tariffs to 5% or less by 2003. The ASEAN Free Trade Agreement (AFTA) provides for a Temporary Exclusion List (TEL) which exempts products from tariff reduction. For the Lao PDR, items on the TEL must be moved to the Inclusion List between by 2006, after which another two years is allowed to reduce rates to at least 5%. AFTA also provides for a Sensitive List (SL) which relates to unprocessed agricultural products; these products may be removed to the Inclusion List any time within a 17-year period from 1998. There is also a General Exemptions List (GEL). This list permanently excludes products from tariff reductions on grounds of national security, moral and other similar grounds. Importantly, AFTA creates rights of access between members on a reciprocal basis which means that members are entitled to use tariff rates on other members Inclusion List when the same product is on their own Inclusion List.

C. Market Information System Development

72. All farmers, but especially those remote upland areas, have no access to up to date market information. This clearly must disadvantage them when negotiating sale prices for their animals. Currently, FAO is assisting the Ministry of Agriculture to develop a market information system for crops, livestock and fisheries products under its TCP program which it hopes to continue on a project basis. The project "Market Information and Extension" has the objective to promote market transparency to the advantage of farmers, traders and consumers. This will be achieved by collecting regularly nation-wide wholesale prices and supply information as well as access to world market prices and international supply/ demand conditions for relevant commodities. This information is to be disseminated by priority radio and TV, printed journals or bulletins. The first radio bulletin went out in April 2002.

73. ADB TA No. 3603-LAO, Smallholder Development Project has also proposed a development of the MIS that will probably be merged with the MAF/FAO project. The proposed work adds a new dimension for reporting market information from contiguous cross border markets. The system to be supported by the proposed Smallholder Development Project will be a joint and complementary system involving both the MAF and the Ministry of Commerce.

D. Cross-Border Livestock Trade

74. Cross-border movement of livestock can impact livestock development through changes in trade patterns and increase in livestock disease. Illegal and legal trade affects the value of livestock and the prices that can be obtained in local markets. Imports of diseased and carrier animals can lead to disease outbreaks. Export of diseased or carrier animals can lead to restrictions on livestock movements. Trade and disease are related in that health barriers can be used fairly or unfairly to exclude participation in lucrative markets. Tariffs on

cross-border traffic impose a further transaction cost on marketing and may encourage smuggling.

75. While cross-border trade is widely acknowledged, and in some cases officially monitored and recorded, there are few studies which provide data for the whole country or for more than a year or two. From the limited data available it seems that trade volumes and possibly the direction of trade varies between years. In all years, the Lao PDR is an exporter of live cattle and buffalo. The volume of exports greatly exceeds the volume of imports and according to Vannasouk (2001) export occurs substantially through unrecorded and unregulated border trade. Unregulated border trade benefits Thailand because it resembles import substitution and reduces the need for meat imports for which hard currency is required.

76. The most comprehensive and recent data were compiled for a meeting held in Vientiane in June 2001[8]. The overall movement of cattle and buffaloes is towards Thailand from Myanmar, PRC, Lao PDR, Cambodia and Viet Nam. Some animals continue by land to Malaysia and Singapore and others by boat from Myanmar to Malaysia. Various estimates were obtained for numbers and value of cattle and buffalo moving legally and illegally from the Lao PDR to Thailand. A reasonable estimate of numbers of cattle and buffalo is in the vicinity of 100,000 per annum with a farm gate value of US$ 20-25 million. This is approximately 20% of the total number of cattle and buffalo imported into Thailand and 20-25% of domestic consumption in the Lao PDR (Chapman, 1995; OIE/EU, 2001; Clarke; 1999).

77. Price differentials show that the demand for Lao livestock in neighboring countries is currently sufficient to take all of the good quality cattle and buffalo that the Lao PDR can produce. The potential for pig exports, on the other hand, is very limited since Thailand is the region's largest producer of commercial pigs and poultry, and clearly has a competitive advantage in this area.

78. The diseases of all countries which supply bovines to Thailand are similar although some serotypes of FMD may be of special concern for importation from Myanmar. Thus it is unlikely on the grounds of disease control that the Lao PDR will be selectively excluded from Thai markets. Various sources commented that it is likely that trade with Thailand will be regularized and will continue to be an important export market for Lao livestock.

1. Location of Crossing Points and Numbers of Animals

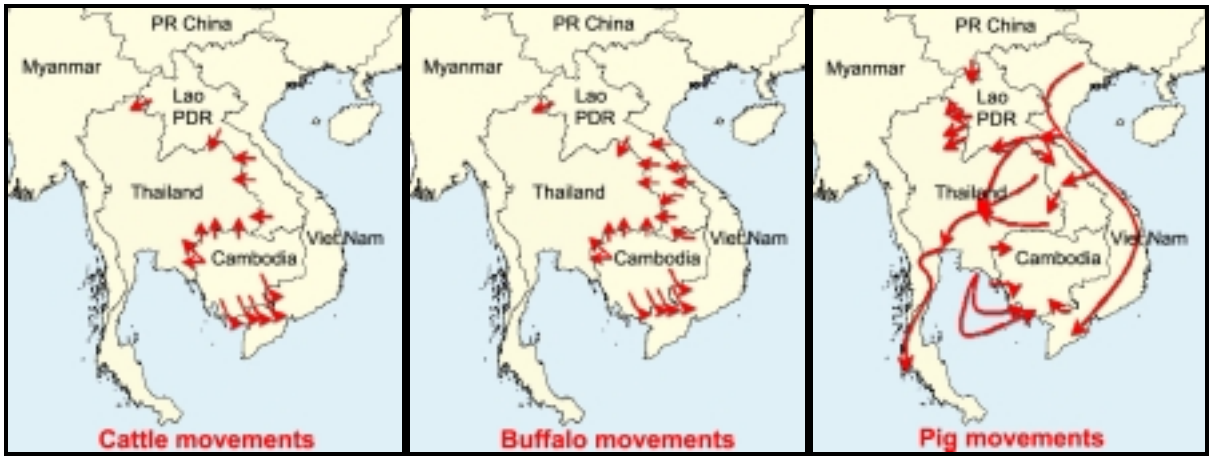
79. A detailed field study in 1993 and 1994 (Chapman, 1995) identified the routes taken by cattle and buffalo traders from Yunnan province in PRC to Thailand, and from the Lao PDR to Thailand. Approximately 31,000 buffalo and cattle passed from Yunnan to Thailand by the route west of the Mekong, 3,200 down the river itself. 13,000 traveled down the east side of the Mekong of which 8,000 passed through or originated in Louang Namtha and Bokeo provinces in the Lao PDR. About 500 originated in Louang Prabang and Sayaburi. Chapman estimated that from 1991 to 1994 the numbers of buffalo and cattle being sold to Thailand from the 5 northern provinces of the Lao PDR was relatively small, about 10,000 head. Chapman concluded that the export tariff system in the Lao PDR encouraged smuggling and that the high volume of trade into Thailand in the early 1990s was facilitated by opening of the route from PRC to Thailand west of the Mekong. Further, he suggested that the supply of older, surplus animals in PRC may dry up and that the demand from markets in PRC may increase to the extent that legal or illegal trade into Thailand would not be profitable. This prediction seems to have been borne out by maps developed at the June

[8] Regional workshop on Animal Movement Management and FMD control in the Lower Mekong Basin Jointly sponsored by OIE and the European Union, Vientiane, Laos, 4-8 June, 2001

2001 workshop on Animal Movement Management (Fig. 6). Participants mapped the border-crossing points and pathways for livestock movement among the Southeast Asian countries and the only movement noted between the Lao PDR and PRC was the importation of breeder sows to Louang Namtha province.

80. There is a trade from Thailand to the Lao PDR in pigs for breeding or fattening purposes. The main commercial route is from Nakorn Phanom but there is movement of pigs in the northwest of the country related to demand from ethnic minority groups.

Figure 6: The Movement of Cattle, Buffalo and Pigs In and Out of the Lao PDR, as Estimated by Participants at a Workshop on the Management of Animal Movement (redrawn from OIE/EU, 2001).



2. Relationship Between Cross-Border Movement and FMD

81. The FMD situation in the Lao PDR has been summarized recently (Singkham Phonvisay, paper to APHCA, 2001). An outbreak in Attapeu and Champassak along Highway 10 spread to 100 villages and appeared to have originated in Cambodia by illegal animal movement. During August 1999 a number of outbreaks were also reported in Sepon district and spread quickly from east to west along Highway No. 9, joined road 13 and moved as far as Vientiane. The source is likely to have been importation of livestock from Viet Nam. In June 2001 there was an outbreak in the Sing district of Louang Namtha and in August 2001 a further outbreak occurred in the Pek district of Xieng Khouang province. Some features of these outbreaks are summarized in Table 6. In summary, four outbreaks in the last two years have been in different provinces, have originated in different countries, have been of different serotypes and most likely have been transported by different host species.

Table 6: Recent Outbreaks of Foot and Mouth Disease

Date	Location	Source	Type
September 1998	Attapeu and Champassak	Cambodia (cattle?)	SEA strain, O type
August 1999	Savannakhet, Khammouan and Vientiane	Viet Nam? (cattle, pigs?)	SEA strain, O type, Pan Asia
June 2001	Louang Namtha	PRC? (pigs?)	SEA strain, O type, Asia 1 type
August 2001	Xieng Khouang	Thailand (dairy cattle?)	SEA strain, O type, Asia 1 type

82. The outbreak in Savannakhet has been investigated by a team of epidemiologists (Perry, Gleeson, Khounsey, Bounema and Blacksell, unpublished). The outbreak spread from close to the Viet Nam border to the Mekong, about 250 km in 3-4 months. There were mortalities and significant morbidity although the impact would have been greater had the outbreak occurred in the rice-planting season when the ability of infected buffaloes to work would have been impaired. Villagers reported that the price obtained by selling cattle and buffalo during the epidemic was about half the normal price. The authors conclude "loss of income, as a direct result of the FMD outbreak, was significant but that more detailed epidemiological and economic studies are needed". It is important that any national efforts to address the problems caused by FMD are integrated with the long-term plans of the Southeast Asia Foot-and-Mouth Disease Campaign (SEAFMD).

3. Relationship Between Cross-Border Movement and Other Diseases

83. In our opinion cross-border trade is no more significant to the epidemiology and control of parasitic and infectious disease than movement between the provinces of the Lao PDR, between districts and villages and even between households within villages. There is a risk that international boundary control becomes a focus for investment at the expense of substantial gains that could be made from simpler, more local measures.

VIII. POLICIES AND REGULATIONS AFFECTING LIVESTOCK DEVELOPMENT

A. Legal and Regulatory Framework

84. The Government of the Lao PDR is generally supportive of free market principles and the need for a regulatory and legal framework that encourages private sector investment and commercial development. The main constraints are local applications and interpretations of what are believed by local authorities to be "real" underlying policies. Local authorities impose restrictive regulations and permit "carte blanche" applications of old regulations applied under the former command economy that pre-dated the New Economic Mechanism (NEM) in 1986[9]. These instruments include Article 13, Chapter 2 of the Business Law [10] and Decree No.31/PM, January 2, 1996, Article 6. These authorize the State to control certain key business sectors including the food sector[11].

85. During the mid-1990s, the market system in the Lao PDR was freed to operate under its own informal rules, without any control. It became chaotic. The Government was concerned that it could not control markets and that there were many distortions affecting the national economy, particularly following the Asian currency crisis in 1997/98. As a measure to restore the supply of food commodities to public institutions and to control the major part of the food commodity markets, the Government reinstated the State Enterprise and Food Crop Promotion (SEFCP) that prevailed before the New Economic Mechanism.

86. The function of SEFCP is to regulate the price of food commodities and to guarantee food security at the provincial level. In practice, instead of regulating prices[12], the SEFCP fixes prices for certain commodities (paddy, milled rice and meat). These price ceilings are

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9 It should be noted that the Government has instituted a decentralized planning system that devolves considerable power to the provincial governments; provincial governors are members of the Politburo.

10 Decree 31/PM, 1/2/96. Note that the food sector is considered as an area subject to close State control.

11 This article clearly establishes the dominant hand of the State in whatever enterprises it wishes to engage. It is also not difficult to read into this provision the right of the State to assign the Government businesses control over a particular sector.

12 The concept of price regulation is to define the lowest price at the farm gate that will apply for purchases at harvest time by the SEFCP and resold at subsidized prices during the off seasons. Ministerial order No. 1021/MCT, dated 8/11/2000, fixes the floor price of paddy at 900 kip (US$ 0.12) per kilogram.

sometimes lower than production costs. The function of SEFCP is defined under guideline No. 06/PM, dated 23/3/1999 from the Prime Minister's Office:

- Implement Government policies for regulating the supply of rice and meat, controlling market prices in markets under the direction of the Provincial Department of Commerce.
- Organize cooperative groups for purchasing live animals, organize the slaughtering of animals and wholesale and retail sales of meat.
- Adjust the prices of meat and rice for each period by Government directive.
- Mobilize the population to follow government regulations and decrees.
- Coordinate with other relevant Government agencies to promote production, management and inspection of any activities under the SEFCP responsibility.
- Promote payment in local currency for animal and other commodities.
- Eliminate illegal trade, enforce slaughtering of animals in slaughterhouses and abattoirs.
- Control the trade of live animals inside and outside provincial borders.
- Control quality, scale weights and meat grading in order to protect consumers.

87. Since the SEFCP's reinstatement, wholesale markets for rice and meat have become less competitive. In the late 1990s, the Government decentralization policies gave more authority to provinces through the SEFCP and other mechanisms. Provinces took greater liberty in controlling both prices and trade. In some provinces, the SEFCP mechanism exerts a virtual monopoly over markets for food commodities and private traders are not permitted to trade beyond provincial borders without authorization. These actions limit interregional trading exchanges.

88. There are lengthy procedures (and corresponding rent seeking opportunities) for private enterprises to obtain licenses and permits to trade food commodities. For example, in Khammouan Province, any business trading in livestock and livestock products require 9 different documents (as per the notice from the Provincial Department of Commerce, dated 5/0/1999).

89. Other legal instruments authorize the State to set agricultural price ceilings. There are two recently promulgated decrees that are relevant to price controls: (i) Decree on Local Merchandise Supply, No 206/PM, dated 11 October 2001 and the Decree on Merchandise Price Management, No. 207/PM, dated 11 October 2001. The stated purpose of the Decree on Merchandise Price Management ("Decree on MPM") is to determine the strategy for merchandise management for goods which impact on the living conditions of the population, to protect consumers and users and to fairly adjust the pricing of merchandise in society (Article 3). The decree goes on to state that that certain kinds of domestic agriculture and industrial products (unspecified) are subject to merchandise pricing by the State and that merchandise pricing is to be determined by the market which is governed by the State. Article 5 of the Decree on MPM states that the Ministry of Commerce, the provinces, municipality and special zone are responsible for managing merchandise pricing. The Government is responsible for laying out price management policy.

90. Under Article 6 of the Decree on MPM the Ministry of Commerce is to:

- Take direct responsibility for merchandise price management with respect to goods, cloth, and raw materials for production.
- Determine lists of prices for certain products for specified periods of time.
- Coordinate with the concerned sectors in order to ensure that domestic production meets societal needs.
- Monitor and manage merchandise pricing of provincial, municipal and special zone commerce sections.
- Take into consideration the needs of consumers and users.

91. Article 9 of the Decree on MPM states that individuals or entities who "violate regulations on merchandise pricing, raise the price of goods, stimulate, complicate, or counterfeit goods or copyrights will be prohibited from doing business and their business registrations will be cancelled and the individual or entity will be fined or prosecuted under the law. In June 2002 the Vientiane authorities intervened in the meat market to set ceiling prices. They threatened fines and confiscation of property for traders breaking the ceiling price.

B. Livestock Regulations

92. Regulation No.0036/DLF dated January 2000 of the Department of Livestock and Fisheries is a very comprehensive set of rules governing most aspects of animal raising and management in the Lao PDR. The Regulation provides for the marking and registration of livestock, the movement of animals and their products and veterinary supplies in and out of and internally within the Lao PDR, and contains conditions relating to animal disease prevention and vaccination, the slaughter of animals and meat inspection, and the conservation of breeding stocks. Of particular relevance are the following points:

- The legal requirements to import livestock, feed and veterinary supplies are onerous: an official application has to be made 15 days before importation and should be accompanied by another form to the DLF (different forms for different products) also accompanied by a certification/license from the exporting country including, in the case of veterinary drugs, samples of the drugs. The imported goods have to be checked at border checkpoints. The regulations of the Ministry of Trade and Ministry of Finance also have to be followed.
- The legal requirements for export of animals or their products require, in addition to the equivalent requirements for importation, another set of forms and requirements for movement within the Lao PDR to the border. Thai Government regulations also have to be followed.
- Within the Lao PDR, irrespective of whether for export or not, all cattle and buffalo have to be vaccinated against HS and, in some areas, additionally for Anthrax and Black Quarter.
- Pigs must be vaccinated against CSF, chickens against NCD and Fowl Cholera, and ducks against Fowl Cholera and Duck Plague.
- There are comprehensive conditions relating to reporting of disease epidemics and the subsequent control of the epidemics including restriction on animal movements in declared epidemic zones. There are particular conditions relating to Anthrax, Black Quarter, CSF and FMD. These are all notifiable diseases. For all of these notifiable diseases, rules are given for destruction of infected animals, for disinfecting the area and vaccination of unaffected animals within the five km radius Epidemic Zone. Repeated vaccinations are not specified. Of particular interest, is the restriction of movement of livestock in Declared Anthrax and FMD Epidemic Zones which is 14 days after the day on which the last animal with symptoms is observed for Anthrax and 21 days for FMD.

93. In addition to the specific requirements of the Regulation 0036/DLF, provinces impose special directives on the livestock industries in their areas of control. Provincial directives are not consistent among provinces. In some provinces, directives regulate the importation of production animals through a restricted number of approved traders, taxes are imposed on the importation of feed and animals, and vaccine importation from Thailand is banned.

94. The conditions of Regulation No.0036/DLF are generally not enforced. However, provincial directives appear to be more consistently enforced. The livestock industry in the lowland areas adjacent to Thailand appears to be operating profitably under somewhat free-enterprise conditions in the absence of appreciable enforcement of legal regulations. A strict

enforcement of existing regulations would hamper the export of livestock production and would hamper the production of industrial animals for local consumption.

95. The Lao-EU "Strengthening of Livestock Service and Extension Activities" is assisting the DLF in revising the regulations concerning animal production with the view to submitting the revised conditions to the National Assembly this year as a Bill to be passed as a Veterinary Law. The conditions of the Bill are to remove the more restrictive practices governing the sale and transport of livestock, while maintaining regulations relating to disease control.

96. The following are specific instances of local level interference in the market.

- The license for exclusive operation of the fish market at the Nam Ngum reservoir in Vientiane province is sold by provincial authorities.
- The license for monopolistic operation the slaughterhouse in Savannakhet Province is also sold by provincial authorities; no other slaughterhouses are permitted to operate.
- Price controls and export restrictions on cattle and buffalo, beef and pork were found in some districts of Savannakhet and Champassak.
- Evidence of a Government committee established in Savannakhet to control the import of live animals into the province.
- Existence of permits and licenses issued by a DAFO in Savannakhet to move live animals across village boundaries.
- Livestock traders wanting to send animals from Champassak to Savannakhet reporting having to obtain transport authorization documents from the Provincial Commerce Department, PAFO and Provincial Tax Office. In addition to these authorizations, the trader must possess a "purchasing license/ certificate" issued by the Governor's office. It is reported that only three traders in Pakse have this license, plus one in Bachieng, three in Paksong and one in Lao Ngam.
- The GOL imposes a $20 surcharge on official cattle and buffalo exports. This tends to discourage official trade in cattle and to encourage informal trading. Reportedly, most of the cattle trade is informal. It is unlikely that the cattle export surcharge generates much revenue and likely adds further encouragement to informal trading.

C. Possible Interventions

97. Legal reform is a long-term process, but it is necessary to the functioning of a market-driven economy in the Lao PDR. The reform process is being addressed on many fronts including ADB conditions and assurances for the proposed Smallholder Development Project. However, considerable additional effort is needed to assist the Lao PDR establish an international standard legal framework needed to comply with various covenants to AFTA and WTO membership. These are long-term requirement and processes.

98. A regulatory reform advocacy for the livestock industry is summarized in Table 7 and would target the following:

- Removing restrictions on the movement and sale of livestock and related processed products other than restrictions that may be reasonable for disease control and sanitation.
- Elimination of price ceilings on livestock and meat.
- Ensuring that all economic sectors in the project area are open to competition with no businesses in the project area protected as monopolies.
- Eliminating internal customs checkpoints except those related to animal health control.
- Elimination of quotas on specified items to protect local producers.

Table 7: Summary Matrix of Needed GOL Policy and Regulatory Reforms

Issue/Practice	Description	Reform Mechanism
Trading monopolies	The Province of Vientiane has sold an exclusive trading monopoly for fish marketing from the Nam Ngum reservoir. The slaughterhouse in Savannakhet has also sold a trading monopoly.	Government assurances that monopolies with not operate.
Restrictions on internal movement of agricultural produce and livestock	Some provinces impose licensing requirements and other local levies for inter-provincial trade in cattle and buffalo, sell monopolies for exporting cattle and buffalo and buying fish products.	Government assurances that there will be no restriction on produce movement in project area except to control animal health.
Livestock and meat price ceilings	Price ceilings are imposed on meat prices, e.g., in Vientiane June 2002	Government assurances in loan agreement and BME monitoring to verify compliance in Project area.
Non tariff barriers (NTBs) and lack of border checkpoint transparency	NTBs and lack of transparency at official customs border checkpoints discourages official trade and encourages informal trading. Practices include requests for irregular payments at both Lao and Thai border customs check points. Thai customs officials are not inclined to allow the official entry of Lao produce. Tariff rates are often negotiable and arbitrarily applied and do not follow AFTA agreements	Monitor and document incidents during Project implementation. Provide documented evidence to DOCs and MOC. Publicize AFTA rates at border checkpoints. Use public media to disseminate case studies of AFTA agreement violations. Provide evidence to Ministry of Commerce for diplomatic discussions during ASEAN meetings.
Restrictions on pick up truck Imports affecting farm-to-market transport costs	Lao PDR transport costs are excessive when compared with trading partners. For example, the mean cost of domestic transport over good roads is Baht 7.5/ton-km and over poor roads, the average rate is 13.2 Baht/ton-km. (compared with average rate in Thailand of 3.3 Baht/ton-km). High transport costs severely compromise any competitive advantages for Lao products including livestock.	Policy advocacy further study of the fiscal implications of removing some of the import tariffs on one-ton pick-up trucks.
Subsidized lending to agricultural producers	The APB lends to farmers at negative interest rates of 8-12 percent. The Government's interest rate policy should be firmly anchored in the principle of allowing markets to set rates above inflation rates to encourage savings, investment and rural poverty alleviation. World experience clearly shows the importance of positive interest rates to promote competitive participation in rural financial mechanisms, conserve scarce budgetary resources and to encourage the development of economically viable, sustainable participant activity	Policy dialog and discussions during implementation of the ADB Rural Finance Project
Restrictions on the operations of private banks	The operations of non-governmental banks, including foreign branch banks are restricted geographically and in the types of services they can offer.	Policy dialog and discussions during implementation of the ADB Rural Finance Project
Uncertainties created by incompatible laws decrees, orders and other instruments, and the failure to publish most documents	Confusion caused by incompatibility of laws, decrees, decisions and orders. In Lao PDR, most texts in force and most decrees have never been published. This situation creates legal uncertainty and discourages private investment. A common opinion voiced by potential Thai investors is summed up in the phrase *"Got mai Lao mai nae nawn",* - "Lao laws are uncertain"	Long-term process of policy advocacy, technical assistance and legal reform.

IX. OPPORTUNITIES FOR LIVESTOCK DEVELOPMENT

A. The Potential for Livestock Development

99. The demand for meat in the domestic market and neighboring countries is likely to continue to increase in the foreseeable future. The Lao PDR apparently has a competitive advantage in supplying live cattle and buffalo to Thailand. Animals are produced in extensive production systems with low capital and labor inputs, particularly in the Sloping Lands zone where many of these animals are bred. This results in lower production costs than countries with a higher human population density and higher labor costs such as Thailand. Cattle and buffalo exported to Thailand tend to be those for the lower-quality meat market, or for use as feeder steers for fattening near urban population centers in Thailand. The extensive, low-cost system of producing cattle and buffalo in the Lao PDR is ideally suited to supply this market.

100. Domestically, the quality requirements for meat are relatively low with consumers accepting a wide range of meat quality. Domestic consumers in large urban markets, such as Vientiane, demand higher-quality meat than those in regional markets (e.g. Clarke, 1999, reported that the higher-quality animals go to the Vientiane market while poorer animals are slaughtered in the provinces). In Vientiane, there is a small restaurant market for high-quality meat which is currently imported from countries such as New Zealand but may with time be filled by local, small-scale cattle fattening enterprises. Currently, the premium paid for higher quality is only small and there is little incentive for farmers to fatten cattle with high-quality feed for the domestic market.

101. Expansion of cattle (and maybe buffalo) production is likely to occur in mixed crop-livestock farming systems in the Sloping Lands zone rather than in the Mekong Corridor. The reason is simply that current feed resources are limiting further development in the lowland areas while the Sloping Lands zone with more extensive grazing resources is ideally suited to breeding and supplying cattle and buffalo, which may then be fattened closer to the final market.

102. Natural grassland areas such as the Pek savannas in the southern region and the Plain of Jars and the Pine Tree zone in Xieng Khouang are unlikely to play a major role in the expansion of livestock production. The Pek savannas are fragile and dry season grazing pressure has to be controlled to conserve them (Novaha *et al.,* 2000), while poor soil fertility severely limits productivity of the Plain of Jars and Pine Tree zone in Xieng Khouang. Broad scale application of phosphorous fertilizer is unlikely to be economical and other forms of higher-value land use options than livestock are more are likely to be viable. Novaha *et al.* (2000) recommended that intensification of animal production in these natural grassland areas could be best achieved by growing limited areas of intensively managed, improved forages to be used as a supplement to the naturally occurring grasslands.

103. The situation is less promising for expansion of pig and poultry production. Feed costs in commercial pig and poultry production enterprises are high with much of required concentrate feed (or its ingredients) having to be imported. It seems likely that, for the foreseeable future, pig and poultry production will be limited to the domestic market in the Lao PDR. Nevertheless, domestic consumption of pig and poultry meat is likely to increase with increasing urbanization and increasing incomes and this will provide opportunities for farmers. There may also be limited opportunities for farmers raising native pigs in extensive production systems to export animals to neighboring countries but this market is likely to remain small.

B. Livestock Development – Its Impact on Women and Poverty

104. The Participatory Poverty Assessment (ADB, 2001) found that poor families in many study villages saw improvements and increases in livestock production as a major pathway for overcoming poverty. This is not entirely surprising as livestock is one of the most important sources of cash income for farmers in remote areas. Even in more accessible areas, livestock sales account for more than 50% of cash income of many upland households (e.g. Sodarak et al., 1998).

105. In poor villages, all households raise small animals such as poultry and pigs. In addition to small animals, the 'better-off' farmers in the village are likely to own a few large ruminants, such as cattle and buffalo. These animals are a way of accumulating capital which can be sold when there is a need for cash. Small animals are sold when small amounts of money are needed. Large animals are only sold when a large amount of money is needed. Examples may be medicines at times of illness or food at times of insufficient harvests. Without large animals (or many small animals) households have few cash reserves and quickly run out of options when disaster (e.g. a combination of a poor rice harvest and illness in the family) strikes.

106. As farm households are able to increase livestock production, and therefore accumulate a capital base, they are able to use these funds to improve their livelihood. They may use it to improve their house, send their children to high school, or invest in their farming system (e.g. by planting fruit trees). Thus, livestock is a crucial stepping-stone to improved and more sustainable livelihoods.

107. Poor households in a village tend to have less access to good agricultural land, with fields far from the village and of low soil fertility. They need to invest all of their labor into producing food for their family and they have few opportunities to increase their income. Ruminants such as cattle, buffalo and goats give them the opportunity to use common property resources to the same extent as 'better-off' households in the village (Delgado et al., 1999).

108. In most villages in the Lao PDR, women are responsible for raising small livestock such as pigs and poultry, while men are responsible for managing large livestock such as cattle and buffalo. Since the time needed for feeding small animals, particularly pigs, is much longer than the time needed to manage large animals, women invest a lot of their daily labor into livestock production. Unfortunately, many small animals are lost annually in disease epidemics resulting in a poor return for labor invested.

109. Any interventions that can help control diseases of small livestock would have an enormous positive impact on women's and household poverty. Similarly, interventions improving labor use efficiencies in feeding small animals would have a positive effect on women's livelihood.

110. Considering these issues, it is not surprising that 70% of villagers in the PPA stated that livestock disease was a major problem and they are in need of outside assistance.

C. Livestock and the Environment

111. In developed countries, livestock sometimes are regarded as environmental villains. Intensive animal production enterprises near urban centers produce excess waste products which cannot be absorbed by the soil and pollute ground water, making waste management is an extremely important aspect in intensive livestock systems.

112. In the Lao PDR, the vast majority of livestock production operates at the opposite end of the scale in very extensive systems, where waste products – nutrients in the form of manure and urine – are sought after highly as an important input into crop production. Historically, as Delago *et al.* (1999) pointed out, livestock have played an extremely important role in the process of agricultural intensification in many countries. In mixed crop – livestock farming systems, livestock recycle nutrients from crop residues on-farm as well as bringing additional nutrients from extensive grazing areas to the cropping areas. These nutrients are crucial for sustainable crop production and effective integration of livestock and crops is the main avenue for sustainable intensification of agriculture for the Sloping Lands zone. Manure clearly is an asset rather than a pollutant in the vast majority of farming situations in the Lao PDR.

113. In the Sloping Lands zone, farmers are asked by the government to stop shifting cultivation and practice sedentary agriculture. Having previously been able to rely on long-term, natural regeneration in swidden systems, farmers are now faced with declining soil fertility and weed invasion in short-rotation cropping systems. New knowledge and information about management of mixed crop-livestock systems is needed to help farmers manage the transition from shifting cultivation to sedentary cropping systems. Livestock and manure clearly play a crucial role in this process and intensification of livestock production is likely to help farmers to better manage this transition.

114. Intensification of cattle and buffalo production must not result in the large-scale clearing of forests to establish pastures, which have resulted in land degradation in some countries (e.g. in South America). Although excessive land clearing is seldom a problem in smallholder farming systems, any intensification of livestock production needs to be accompanied by a process of participatory land use planning at village level to ensure that land resources are utilized in a sustainable manner.

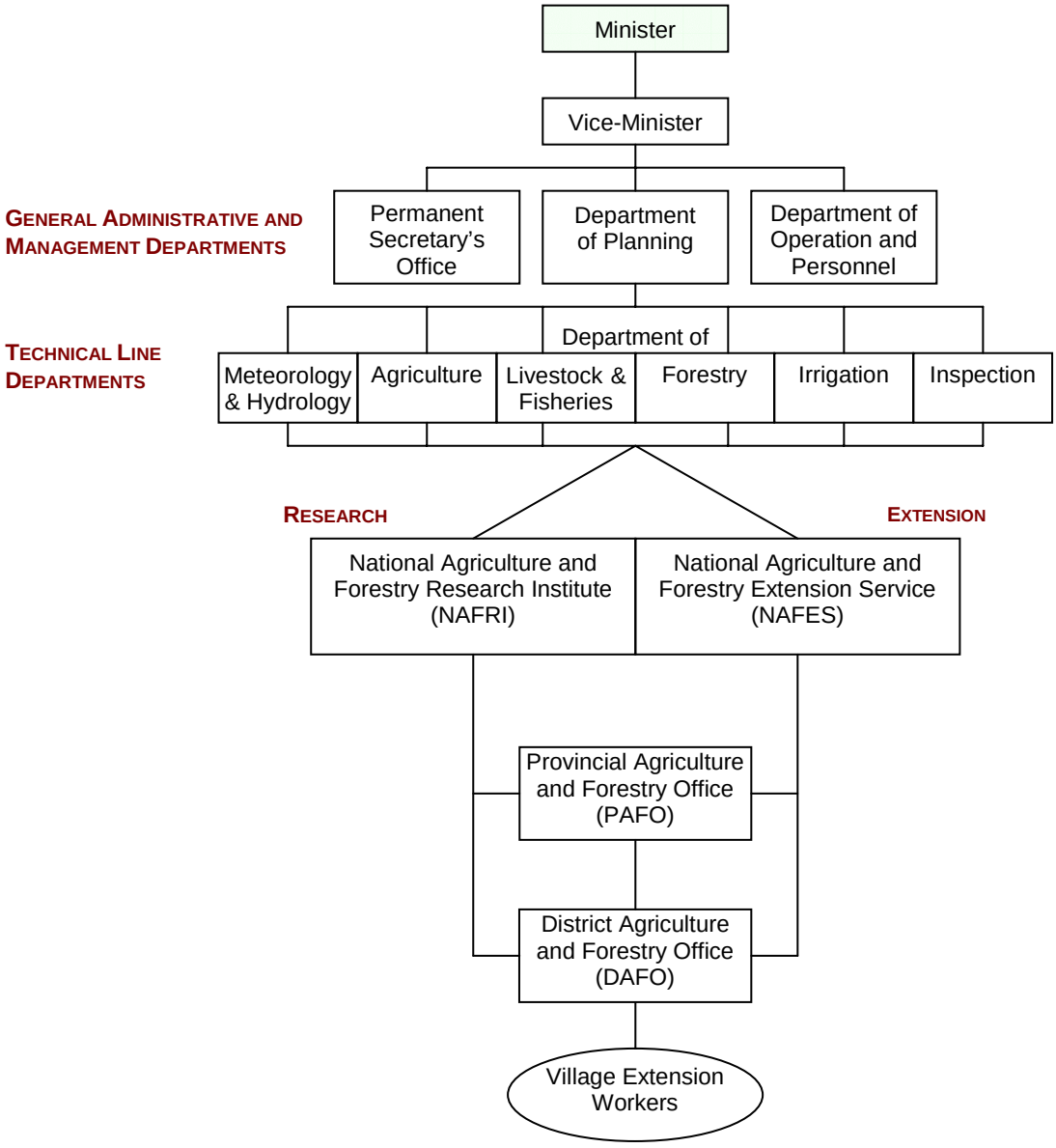
X. PAST AND PRESENT LIVESTOCK PROGRAMS AND PROJECTS – WHAT CAN WE LEARN FROM THEIR EXPERIENCES?

A. Government Programs

115. The Government of the Lao PDR supports livestock production through national, provincial and district support services. At national level, the Department of Livestock and Fisheries (DLF) provides diagnostic services through the National Animal Health Center (NAHC), produces animal vaccines, organizes vaccination programs, responds to animal disease outbreaks and formulates livestock policies and regulations.

116. Until recently, DLF was responsible for livestock research as well as extension and veterinary services through Provincial Agriculture and Forestry Offices (PAFO) and District Agriculture and Forestry Offices (DAFO) which were administratively under provincial and district governments but technically aligned with DLF. Restructuring of the Ministry of Agriculture and Forestry (MAF) resulted in the creation of the National Agriculture and Forestry Research Institute (NAFRI) which is responsible for all agricultural and forestry research including livestock (but not veterinary research which remained with DLF), and very recently the creation of the National Agriculture and Forestry Extension Service (NAFES)

which now has responsibility of agricultural and forestry extension including livestock. Livestock extension will continue to be delivered through provincial and district offices, which are primarily responsible to provincial and district governments. The actual structure and responsibilities of agricultural (including livestock) services are still evolving. In June 2002, the organogram of the Ministry of Agriculture and Forestry was as follows:



117. The capacity of the government livestock service is weak. Vaccination programs do not effectively service the majority of villages in the Sloping Lands zone and livestock extension is almost non-existent. Staff numbers and budget allocations of DLF and NAFRI have not been included in this report since the on-going reorganization of the sector would render these numbers meaningless by the time of a PPTA. An up-to-date assessment of government services, responsibilities and capacity at national, provincial and district level needs to be conducted as part of a PPTA if ADB decides to proceed with project development. In particular, this needs to include detailed staff numbers and capacity in provinces and districts which are being considered for inclusion in a livestock sector project. A number of projects are assisting the Government of the Lao PDR to strengthen their capacity to deliver such services.

B. Past and Present Livestock Projects

118. There are currently three projects directed specifically at the livestock sector in the Lao PDR (Table 8). By far the largest project is the Lao-EU "Strengthening of Livestock Service and Extension Activities" Project which has the training of Village Veterinary Workers (VVW) as a major component. Although the project has a northern region focus, VVW from the central and southern regions are also being trained. The project supports a wide range of activities of DLF such as policy development, improving laboratory and vaccine production facilities, disease control and surveillance capabilities, and studies on various aspects of livestock development. It also aims to identify technology packages for improving small animal husbandry systems (pigs and poultry), which are demonstrated as models in selected villages in the northern region. This extension component includes farmer training in pig and poultry husbandry, credit for small animals and veterinary support. The EU is planning to extend the project and has initiated project proposal development to be conducted in 2003. At this stage, the current project leaders are leaning towards a focus on capacity building of the national animal health sector for the next phase. However, a final decision on the focus of the next phase has not yet been made and any new livestock project needs to coordinate development and collaborate closely with the EU Livestock project.

119. The Forages and Livestock Systems Project (FLSP) is a participatory livestock project which works with NAFRI, NAFES, DLF and provincial and district extension workers in a small range of upland villages in Xieng Khouang and Louang Prabang provinces. The aim of the FLSP is to work with men and women farmers in these villages to develop forage, feed and animal health / management technologies for small and large animals targeted at improving animal production. The FLSP has introduced a range of promising technologies such as cassava, sweet potatoes and forage legumes for pigs (reducing women's labor), strategic feeding of cattle and buffalo by growing small plots of improved forages and tree legumes (improving nutrition), and treatment of buffalo calves for toxocara. Building capacity of government staff to work with villages in a participatory framework is a large part of the project. A mid-term review is planned for late 2002 and plans for a future phase are not expected until 2003/2004. Currently, the project is scheduled to end in 2005.

120. ACIAR has supported the development of diagnostic capabilities of the Animal Disease Laboratory, which is part of the National Animal Health Center (NAHC) in Vientiane. This is only a very small project but the capacity of the NAHC to diagnose animal diseases is critical for the development of effective control measures. Laboratory facilities are excellent (supported by the EU Livestock Project) but field capabilities are limited. ACIAR has indicated its interest in funding a new project developing a penside test for CSF and field testing of a new recombinant, heat-stable CSF vaccine with the Animal Health Laboratory of MAF. The new project is likely to start in 2003 at a similar level of funding as previously.

Table 8: List of Current Livestock Projects

Strengthening of Livestock Service and Extension Activities	
Executing agency:	Department of Livestock and Fisheries, Ministry of Agriculture and Forestry.
Funded by:	European Union.
Duration:	1 Feb 1998 to 31 Jan 2004.
Objectives:	(i) Institutional strengthening of animal health service and disease control at national, provincial and district level. (ii) Improvement of animal production at village level.
Components:	Training of Village Veterinary Workers, veterinary legislation, information systems, laboratory and vaccine production support, extension (farmer training and provision of credit).
Implementation:	Training of VVW is a major activity of the project. Broad range of support for national and provincial institutions on animal health.
Regional focus:	National focus except for on-farm activities which are limited to northern Lao, particularly Louang Prabang and Louang Namtha provinces.
Size of grant:	Euro 5.7 million.
Forage and Livestock Systems Project (FLSP)	
Executing agency:	Department of Livestock and Fisheries, NAFRI and NAFES, Ministry of Agriculture and Forestry, and PAFO and DAFO in Louang Prabang and Xieng Khouang.
Funded by:	Australian Government (AusAID).
Duration:	July 2000 – June 2005.
Objectives:	Integration of forage and improvements in animal management practices in upland farming systems.
Components:	Institutional and human capacity building, development of options for farmers to improve small and large animal production.
Implementation:	The project implements a participatory extension approach. Building capacity of DAFO and PAFO to do this is a major part of the project. Technical components target improvements in feeding and animal health practices.
Regional focus:	Louang Prabang and Xieng Khouang Provinces.
Size of grant:	AUD 3 million.
Improved Diagnostic and Control Methodologies for two Major Livestock Diseases in the Lao PDR and Yunnan Province, P.R. China	
Executing agency:	Department of Livestock and Fisheries, Ministry of Agriculture and Forestry and the CSIRO - Australian Animal Health Laboratory
Funded by:	Australian Center for International Agricultural Research (ACIAR)
Duration:	1997 – 2002
Objectives:	Improve the diagnostic and disease surveillance capability of staff and laboratory of the Animal Disease Laboratory, particularly in Classical Swine Fever and Foot-and-Mouth Diseases
Components:	Development of diagnostic methods and fieldwork to determine the epidemiological significance of major animal diseases.
Regional focus:	National
Size of grant:	AUD 0.9 million

121. There are also several regional livestock projects, which include the Lao PDR as one of their target countries (Table 9). The OIE Animal Disease Control Project facilitates regional coordination of transboundary disease control and provides training opportunities in disease surveillance and control. The other two projects aim to develop forage and animal health technologies to improve animal production on smallholder farms.

122. Many rural development projects include livestock as one component in agricultural development. These often include micro finance or revolving funds for animals and support for vaccination programs. Some of the larger projects are listed in Table 10.

Table 9: List of Regional Livestock Projects with a Lao PDR Component

Animal Disease Control in Thailand and Neighboring Countries	
Executing agency:	Overall coordination: OIE, Thailand. In the Lao PDR: Department of Livestock and Fisheries, Ministry of Agriculture and Fisheries
Funded by:	Japanese Government
Duration:	On-going
Objectives:	Improved Control of Animal Diseases in Southeast Asia
Components:	Regional coordination, capacity building, disease surveillance, vaccine production and quarantine procedures.
Implementation:	Support for annual regional meetings, regional coordination and training of livestock officers.
Developing Sustainable Forage Technologies for Resource-Poor Upland Farmers in Asia	
Executing agency:	Centro Internacional de Agricultura Tropical (CIAT)
Funded by:	ADB (RETA)
Duration:	2000-2003
Objectives:	Develop sustainable forage technologies and strengthen the capacity of NARS to deliver these technologies to farmers in 6 countries in Southeast Asia and southern PRC.
Components:	Developing new forage technologies, scaling up of successful technologies, disseminating technologies from farm to district and provincial level, develop forage multiplication systems, training of NARS and support of an information network.
Implementation:	The project uses a participatory approach to working with farmers in the development and dissemination of new technologies.
Regional focus:	Southeast Asia
Size of grant:	US$ 1.2 million
Future phases:	A new project building on the outcome of the current project has been submitted to ADB
Development and Testing of an Integrated Approach to the Control of Gastrointestinal Parasites of Small Ruminants in South and Southeast Asia	
Executing agency:	International Livestock Research Institute (ILRI)
Funded by:	IFAD
Duration:	4 years from 1998-2002
Objectives:	Integrated control of internal parasites
Components:	Improved use of chemicals, feed supplementation, upgrade housing, grazing management, and controlled breeding
Implementation:	Participatory methods supported by an extensive information system and strong links to technical specialists
Regional focus:	Philippines, Indonesia, Vietnam, and Lao PDR are the major participating countries.
Size of grant:	US$ 875,000

123. FAO supports a number of small TCP projects including ‘Development of agricultural market information and marketing extension capability’, ‘Regional training in meat inspection in Asia’, ‘Strengthening cross-border animal disease surveillance and coordination’, ‘Native chicken development’ and ‘Small-scale semi-intensive pig production’. There are also a large number of other small rural development projects, often run by non-government organizations or volunteer services, which also include livestock as one of many project components (e.g. micro-credit and VVW training).

124. Completed livestock projects include the Lao-Australia Livestock Development Project (1988-1992), the Xieng Khouang Agricultural Development Project – Phase I (1994-1999), the Forages for Smallholders Project (1995-1999) which was the predecessor of the current FLSP project, and several FAO TCP projects including ‘Promotion of smallholders participation through an animal health and production extension module (AHPEM)’ and ‘Increasing utilization of locally-available feed resources for cattle and buffalo’.

125. There are also two projects, funded by the Swiss and Swedish Governments, which support the new national extension agency NAFES. The final structure and strategic vision of NAFES are still under discussion.

Table 10: List of Rural Development Projects with a Livestock Component

Xieng Khouang Agricultural Development Project (Phase II)	
Executing agency:	Ministry of Agriculture and Forestry
Funded by:	Loan from IFAD with a TA (grant) provided by UNDCP
Duration:	1999 - 2004
Objectives:	Poverty alleviation and reduction in opium production
Components:	Develop irrigation facilities, improve crop and livestock production, including continuation of the cattle bank through the TA component (limited to redistribution of cattle), provide credit facilities, construct rural access roads, and improve drinking water supply
Regional focus:	Xieng Khouang province
Size of loan / grant:	Loan: US$ 6.9 million TA grant: US$ 0.9 million
Rural Development Project in the Province of Bokeo (Phase III)	
Executing agency:	Ministry of Agriculture and Forestry
Funded by:	Loan from IFAD and OPEC; grant TA from GtZ (German Government)
Duration:	1994 – 1998 (Phase 1); 1998 – 2001 (Phase 2); 2001 – 2004 (Phase 3)
Objectives:	Improvement of livelihood of villagers in remote areas in Bokeo
Components:	Agriculture, rural infrastructure, community development including rural finance, basic health, education and drug control. Loan components for food security and infrastructure development.
Regional focus:	Bokeo province
Size of grant:	TA grant: US$ 3.9 million (Phase 3); US$ 6.5 million (Phases 1 and 2)
Agricultural Development Project	
Executing agency:	National Agriculture and Forestry Extension Service (NAFES), Ministry of Agriculture and Forestry
Funded by:	World Bank loan
Duration:	2002 - 2006
Objectives:	Enhance agricultural productivity and crop diversity of small and low-income subsistence farmers
Components:	Irrigation rehabilitation, village access tracks, village investment for the poor, water supply, agricultural extension
Implementation:	The project has a small livestock component, including provision of credit and extension.
Regional focus:	Champassak, Khammouan, Saravane and Attapeu provinces
Size of loan:	US$ 14.3 million
Nam Ngum River Basin Development Project - planned	
Executing agency:	Water Resources Coordination Committee, Office of the Prime Minister
Funded by:	ADB loan with a grant component by Agence Francaise de Developpement (AFD)
Duration:	6 years – currently in design phase
Objectives:	Enhance government capability to manage natural resources, especially in the water sector.
Components:	Capacity building of the WRCC secretariat, crop and livestock production and fisheries improvements, and forest restoration.
Regional focus:	Xieng Khouang and Vientiane provinces, and Xaysomboun special region
Size of loan / grant:	US$ 15 million loan and US$ 3.5 million grant
Smallholder Development Project - planned	
Executing agency:	NAFES, Ministry of Agriculture and Forestry
Funded by:	ADB loan
Duration:	6 years – currently in design phase
Objectives:	Develop commercial agriculture and agribusiness.
Components:	Extension, policy reform, assistance to investors, market information, and construction of market links.
Regional focus:	Mekong Corridor
Size of loan:	US$ 13 million

C. Lessons Learnt

1. Need to be Responsive to Farmers' Needs

126. The Government of the Lao PDR has responded to the poor success of past top-down government programs (e.g. vaccination campaigns) by restructuring their research and extension service with the aim to develop a service which is participatory, responsive to farmer's needs and based on a bottom-up planning approach. NAFES has been created to promote such a responsive, participatory extension approach but realistically it will take many years and support from projects to institutionalize this new approach.

127. Most recent projects in the agricultural sector have been designed to respond to farmers' needs and are able to modify project activities to deal with constraints as these emerge during implementation. Effective monitoring and evaluation (M&E) systems, built into project designs, are an essential activity to enable projects to respond to clients' needs.

2. Animal Health Care Needs to be based on Farmer Demand

128. The top-down approach has dominated in campaigns to vaccinate livestock on a larger scale. These are the responsibility of PAFO and DAFO staff who have certain targets (number of vaccinations performed) to meet. If available, Village Veterinary Workers (VVW) are asked to arrange and carry out the vaccination. Often, vaccines are not available on time (e.g. maybe the province has not paid the vaccine laboratory on time, or vaccines were needed for an emergency in another area), the cold-chain needed to keep vaccines alive has broken down in one of the many steps needed to get them to a village, farmers were busy with other essential tasks in the village and had not time to bring animals from distant grazing area to the village for vaccination, there has been a misunderstanding about the time the 'vaccinator' was supposed to be in the village and the farmers left for their fields, or there was no transport available for the 'vaccinator' to go to the village at the right time. These are examples of problems mentioned by VVW and DAFO staff. Another basic problem is that preventative health care (e.g. vaccinations) is a difficult concept that is often confused with treatment of sick animals (e.g. antibiotics) and almost every farmer knows of a case where an animal died despite the fact that it had previously been vaccinated. Unless the farmers themselves understand the benefits of vaccinations and are willing to commit time and money towards preventative health care, any vaccination program is doomed to fail.

129. Vaccines, requiring a cold-chain to be effective, are not a viable option for farmers in many villages, particularly those located in more remote areas in the Sloping Lands zone. This has been experienced by many projects which have put a lot of effort in providing refrigerators and other equipment needed to establish a cold chain. These have almost invariably been unsuccessful. Heat-stable vaccines are available for some diseases (e.g. Fowl Cholera) and these are potentially useful for villages in more remote areas.

3. Lack of Human Resources

130. All projects report the lack of available counterpart staff as a major challenge. The Lao PDR is critically short of well-educated and trained staff, particularly at district and province level (e.g. EU Livestock Project). Many projects recruit additional personnel to overcome the shortage of staff at field level. While this solves an immediate problem, it introduces a potential conflict between government and project staff because of different salary levels. Government staff are poorly paid and every project has to find ways of compensating government staff adequately to enable them to work effectively.

131. The shortage of government staff also has serious implications for the sustainability of any project which relies on government agencies to continue delivering services after the end

of the project. There is no simple solution to this problem, except that it has to be addressed early in any project. Most projects include a large capacity building component in their design. Another approach is to build the capacity of farmers, villages and other stakeholders such as traders, rather than to rely completely on government agencies to continue delivering services to villages (e.g. FLSP).

132. The Lao PDR has few trained veterinarians and can only provide very limited veterinary services. Training of Village Veterinary Workers (VVW) has been carried out by many projects and is a large component in the current EU Livestock Project. While potentially a very useful approach, there have been many problems preventing VVW from being effective. Most projects report that only a very small proportion of VVW trained are actually active (maybe less than 10%). In most cases, training of VVW is brief (days rather than weeks) and without follow-up support once VVW return to their villages. Many VVW complain about insufficient support from the government, lack of equipment and transport and lack of support from village leadership (e.g. Gibson, 1997). These indicate confusion about the role of VVW. Are they voluntary public servants supplementing the health service delivery of DAFO or are they private sector animal health workers (NRI, 2001)? Regardless of this confusion, there is no doubt that VVW need a lot more support, follow-up training and backup from districts if they are to become effective animal health workers.

133. Capacity building is a large part of many projects and programs. With the small number of professional staff available in government agencies, training opportunities need to be carefully selected and matched with available staff. There have been many cases where staff members from one project were sent to training events arranged by other projects or offered by overseas organizations. Often, these training events were inappropriate for the staff member and jeopardized project activities. Generally, the effectiveness of isolated or single training events is very low. Training needs to be clearly targeted towards the responsibilities of staff, and continuing support provided so trainees can apply and build their new skills and knowledge in their normal work situations.

134. Participatory extension approaches (e.g. FLSP) use farmer-to-farmer extension and farmer groups as a way of facilitating learning of farmers and villages. These group methods help extension workers to reach many more farmers than the traditional way of visiting and working with individual farmers. However, extension workers need to learn new skills to be able to effectively facilitate this process. Projects need to allow sufficient resources and time to build the capacity of extension workers to acquire these skills, and support them in their work.

4. Need a Multi-Pronged Approach to Livestock Development

135. Projects approaching livestock improvements by addressing a particular constraint without also addressing other related production constraints almost invariably failed and had to change their approach to a multi-pronged approach. One example is livestock dispersal schemes (e.g. cattle or buffalo banks). Providing animals without effective support for farmers on issues such as animal health, feeding and animal management has resulted in poor animal health, high mortality, poor reproduction and consequently poor repayment rates and collapse of the scheme. Another example of narrow approaches, which have had little impact, is isolated training events without follow-up support.

5. Slow Start-Up but Potential for High Impact

136. Livestock (and agricultural) projects are invariably slow in their start-up. Projects need a reasonably long timeframe to allow for the building of capacity of district staff, villages and farmers, and the evaluation of technology options by villages and farmers before they commit themselves to adopting these on a larger scale. Once a critical mass of farmers has

experienced substantial benefits from livestock technologies, adoption accelerates with many farmers adopting beneficial technologies, resulting in high impact. An example is the ADB RETA Project "Developing Sustainable Forage Technologies for Resource-Poor Upland Farmers in Asia" (Table 8) which followed on from the AusAID-funded "Forages for Smallholder Project" in Southeast Asia. It took 5-7 years before substantial adoption of technologies commenced and the rate of adoption has since accelerated to reach thousands of farmers in Indonesia, Philippines and Viet Nam. A long-term commitment (7-10 years) is needed to ensure high impact.

6. Coping with Variation

137. Livestock production systems are enormously variable between villages and areas. This is often related to differences in access to feed resources as well as for cultural reasons. This diversity requires a range of innovations (or options) which villages can evaluate and adapt to their needs. Participatory extension approaches make villages partners in the development process and so take care of variation between needs and different situations. They also ensure that innovations build on existing practice and knowledge, and are culturally acceptable to villages.

138. The Government's Strategic Vision for the Agricultural Sector (GOL, 1999) showed that many of the poorest villages in the Lao PDR have been bypassed by development. Reasons include a lack of understanding of cultural differences, language barriers (e.g. villagers have to be able to speak Lao to be able to participate in training courses), lack of understanding of traditional practices, the introduction of technologies which ignored indigenous knowledge or rigid technology packages which did not take account of the enormous variation between villages and households. All development projects encounter one or more of these difficulties and have developed ways of addressing these issues. For example, the FLSP encouraged DAFO to employ and train native Hmong speakers (men and women) to work as extension officers in Hmong villages.

139. The PPA pointed out that women are the most disadvantaged of the poor in the Lao PDR. Reaching women with innovations to improve their livelihood is not easy, particularly when these belong to an ethnic minority group. One of the most successful ways has been to target innovations at activities that are the responsibility of women. Since women are responsible for small livestock there is an opportunity to provide benefits to women by working with them to improve small animal production. Ideally, extension staff working with women in a Hmong village should be a Hmong-speaking female extension worker. This is not often possible since there are few female extension workers and most of these belong to the Lao ethnic group. There are no simple answers to this problem. Encouraging the government to recruit female extension workers of the same ethnic group as the villages in which they are expected to work is a step in the right direction.

XI. POSSIBLE INTERVENTIONS

140. There clearly is a high potential to increase livestock production in the Sloping Lands zone of the Lao PDR. Market demand for live cattle and buffalo is strong, the zone is well placed to produce animals at a competitive price and farmers in this zone would like to increase livestock production, in fact they see livestock as an avenue to escape poverty. Farmers face many obstacles in livestock production, particularly animal diseases and low productivity. Any project that can help farmers and villages to overcome some of these problems will have a large impact on their livelihoods, the village economy and flow-on effects to district, provincial and national levels through increased livestock trade.

141. The EU Livestock Project is providing support for livestock and veterinary services at national and provincial levels, as well as VVW training, and this support is likely to continue in a second phase of the current project. Possible innovations for improving livestock production at village and farm level have been and are being identified and tested by a range of smaller projects such as the AusAID FLSP Project (see Table 9 for details of other projects) which can provide the basis for a larger participatory livestock project in the Sloping Lands zone in the Lao PDR.

142. Any project working in the Sloping Lands zone is faced with enormous environmental, economic, cultural and social variability. It is impossible to fully understand this variation before suggesting possible interventions that can build on existing livestock production systems, improve productivity and improve livelihoods of poor villages. The approach to use in such a case is a participatory approach to extension, where extension workers work in partnership with farmers and villages to help them select and adapt innovations to suit their system. Participatory approaches have been developed and proven to work successfully in the Lao PDR by the FSP Project, the Pilot Extension Project (PEP) and is currently being applied in the livestock sector by the FLSP Project.

143. While animal disease and production constraints are likely to be highest on the priority list of farmers, there are other constraints such as marketing and lack of credit that would quickly limit improvements made through technical interventions unless addressed at the same time. Although demand for meat is strong, price controls of the retail price of meat, taxes at village, district and provincial levels and restrictions in animal movements for reasons other than the containment of animal diseases, reduce the incentive for farmers to invest time and labor in improving livestock production. Upgrading of market opportunities needs to go hand in hand with the building of farmers' capacity to improve and increase livestock production on their farms. Also, a lack of capital is likely to prevent the most disadvantaged groups within villages to participate in improved livestock development and a credit component may need to be considered to ensure that poor families are not left out of a participatory livestock project. Ways for addressing these issues range from ensuring the availability of marketing information (e.g. current livestock prices at relevant district and provincial markets) to improve the bargaining power of farmers, village livestock credit schemes (e.g. managed by NGOs), organization of livestock marketing groups (e.g. marketing cooperatives), to the construction of feeder tracks to improve access for very remote villages.

144. Below, possible interventions are suggested for national, provincial, district, village and households levels, rather than by disciplines since animal diseases, feeding and management interact and cannot be addressed in isolation.

A. National Level Interventions

145. The basis of any disease prevention and control measures in villages is the capability to effectively diagnose which diseases are present and are of major concern. The National Animal Health Center (NAHC) of the Department of Livestock and Fisheries is the key to providing diagnostic services and the capacity of NAHC to provide field support for livestock projects is crucial to the success of a project. While support for the laboratory and diagnostic capability is likely to continue with assistance from ACIAR and the EU Livestock Project, the field capacity of NAHC needs to be supported by all projects requiring this services.

146. NAFES will play a key role in livestock extension, but its capability to mentor participatory extension approaches and to provide provincial and district extension workers with appropriate extension messages (e.g. technology options) and extension material is weak. Building the capacity of NAFES to develop appropriate livestock extension messages

and materials, as well as mentoring district extension workers in participatory extension approaches requires support.

147. A range of possible interventions at farmer and village level are already known (see below), however, applied field research needs to continue to improve these options and to develop new innovations, building on the experiences gathered during implementation of a project. This could be achieved by supporting the involvement of livestock researchers of NAFRI in applied field research in villages where the project is operating with the aim to develop additional animal health, management and feed technology options.

148. Vaccines, which depend on a cold-chain to be effective, are not a simple option for farmers in remote villages. If heat-stable vaccines were available (their use would not require a cold-chain), they could have a major impact on diseases such as HS and CSF. However, the development of such vaccines by the private sector is unlikely if they are for the sole use of countries where cold-chains are lacking. This could be an area for important public-private sector collaborative investment.

B. Provincial and District Level Interventions

149. It is the task of the district extension workers to deliver livestock extension services to villages. Their capacity to work effectively with farmers / villages is critical to the success of projects directed at improving livestock production. Developing this capacity through training courses, on-the-job training, exchange of experiences with other extension workers and mentoring by experienced people has to be a high priority, particularly during the first few years of a project.

150. The task of provincial livestock and extension staff is to support the district extension workers in livestock issues and mentoring of the participatory extension approach. The capacity of provincial staff to do this is weak and needs to be strengthened.

151. Encourage DAFO to employ more native-speakers of languages spoken in villages in the district and to employ more female extension workers who are willing to work in villages. Without these people, the ability of DAFO to work effectively in highland villages, particularly with women or other disadvantaged groups, is questionable. Long-term projects may be able to come to a cost-sharing arrangement with the local government for additional district staff.

C. Village and Household Level Interventions

152. There are a number of interventions that need to be implemented at village rather than individual household level to ensure their success. These include preventative health care measures such as vaccination, quarantine and animal movement strategies and land use planning for sustainable management of grazing resources and protection of forests.

153. Many simple animal health interventions depend on a better understanding by farmers and villages of which diseases affect their livestock, what causes the diseases, how are they spread, and what are the options for reducing the incidence of diseases. Relatively simple measures can reduce mortality by 50% or more and improve productivity of animals. Similarly, major improvements in animal production (and resistance to diseases) can be achieved through a better understanding of the effects of feed quality, supplementary feeding, animal management and breeding strategies on productivity. These are knowledge-intensive interventions that can be delivered through participatory approaches.

154. Target disadvantaged groups in villages by working with them on activities which are their domain. Work with women or women groups on improving pig and poultry production

systems. Ensure that the village approves of activities conducted with any subsection of the village and arrange frequent feedback to the whole village to facilitate sharing of experiences and ensure continuing support.

155. Classical swine fever (CSF), fowl cholera (FC) and toxocariasis are likely to be the three diseases of greatest importance to upland livestock keepers (DLF-NAHC, 2001). The FLSP project has generated an array of options for the control of these specific diseases as a basis for further development with households, village groups, extension workers and veterinarians (Table 11) [13]. A focus on these diseases and the range of control options would also lead to a decrease in the impact of related groups of diseases e.g. neonatal enteritis and roundworms in pigs, roundworms of cattle and buffalo (other than *Toxocara*) and coccidiosis in poultry.

Table 11: Control Options for Animal Diseases in Upland Villages

Disease	Control of Option and Likely Contribution to Successful Control [a]			
	Vaccination	Improved Pens and Clean Water Supply	Movement Control	Chemical/ Antibiotic Treatment
Classical Swine Fever (CSF)	**	*	**	-
Fowl Cholera (FC)	**	**	*	-
Toxocariasis	-	-	-	***
Haemorrhagic septicaemia (HS)	*	*	*	*

[a] *** = complete control; - = no contribution to control. Source: pers. com. Syseng Khunsi, Stuart Blacksell, Peter Horne.

156. Death of buffalo calves from toxocariasis is a major problem for farmers and can be completely prevented by a 20-cent tablet dewormer at two weeks of age. Its use is likely to depend on improved understanding of the basis for treatment by farmers and the availability of the drug in villages. This intervention is simple, effective and has immediate impact. It is therefore an ideal entry point for establishing trust with villages.

157. Vaccines can help protect against CSF (not heat-stable), but management changes can also significantly contribute to preventing outbreaks and their spread. For example, in northern Thailand spread of FMD (which is transmitted in the same way as CSF) was restricted by preventing contact between groups of cattle and buffalo and housing may have completely prevented pigs from infection (Cleland *et al.* 1996). Management options include penning of animals, strategic vaccination of susceptible classes of animals (e.g. sows and piglets after weaning), restrictions of animal movements (particularly movements into the village) and strategic quarantining of 'suspect' animals.

158. A heat-stable vaccine for Fowl Cholera (FC) is manufactured in Vientiane and could be an important intervention to reduce the incidence of FC. The challenge is to develop appropriate delivery systems to ensure effective vaccination in villages. Management options which can contribute significantly to preventing outbreaks are clean water supply and improved pens and sanitation for poultry.

159. Haemorrhagic septicaemia (HS) occurs sporadically and outbreaks are difficult to predict. The available vaccines require a cold chain and are therefore not a viable option for regular vaccination (e.g. 6-monthly vaccination is recommended for the vaccine produced in the Lao PDR) in most upland villages. Management options, such as restrictions of animal movements and quarantining at village and household level, and treatment with antibiotics

[13] Many of the following interventions are based on results of the FLSP. Other sources included the EU Livestock Project, NAHC, FSP, ADB (RETA) Project "Developing Sustainable Forage Technologies for Resource-Poor Upland Farmers in Asia" and the IFAD Project "Development and Testing of an Integrated Approach to the Control of Gastrointestinal Parasites of Small Ruminants in South and Southeast Asia".

are available to reduce the effect of HS. Strategic vaccination is practiced by government agencies in cases of outbreaks. There are few management options to prevent the disease, however, early recognition of HS outbreaks by villages can help to respond quickly and reduce the impact and spread of the disease. In general, improved nutrition, clean water and good hygiene practice for cattle and buffalo help to reduce the likelihood of HS.

160. Strategic supplementary feeding of cattle and buffalo can improve resistance to diseases, and improve growth and reproduction. Forage grasses and tree legumes can be planted near villages, animal pens or enclosures, and in cropping areas as hedgerows or small plots and are then available as supplementary feed. A broad range of adapted forage varieties and ways of integrating them into upland farming systems have been identified by the "Forages for Smallholders Project" (FSP) and its successor, the "Developing Sustainable Forage Technologies for Resource-Poor Upland Farmers in Asia" Project, and are already used in some villages in the Sloping Lands zone. Booklets describing these forage options are available from these projects in English and Lao[14]. For example, strategic feeding of cows and calves can improve growth of calves at critical times and improve their resistance to internal parasites and diseases. Fattening of cattle by feeding cut-and-carry forages before sale is another way of adding value to animals.

161. Planting feed for pigs can significantly reduce the labor burden for women. Options include cassava, sweet potatoes and maize varieties. A number of these are currently being evaluated with farmers in villages in Louang Prabang and Xieng Khouang by the FLSP project and several varieties will be available within the next two years. Forage legumes are potential high-quality protein feeds for pigs. *Stylosanthes guianensis* CIAT184 is already used by some women farmers in Xieng Khouang, who report that feeding this legume significantly reduces the time needed for feeding pigs (no cooking required) and has improved growth of the animals.

162. Breeding of all livestock is currently not controlled and is based purely on opportunity. While the control of mating can improve animal production significantly, it requires a long-term view and improvements are not immediately visible. However, many farmers interviewed in the FLSP Baseline Study reported that their cows or sows did not get pregnant in some years because of lack of suitable males in the village. Bull and boar management (e.g. at village level) can ensure that the availability of suitable males is not a constraint to reproduction and, at the same time, provide an opportunity for positive selection to improve the local genotypes.

163. A simple intervention is the recording of animal performance and treatments by farmers themselves to help them with decisions about animal management. In many cases, knowledge about animal performance, listing of problems encountered and treatments given, provides the basis for good management decisions. Recording of these events makes farmers aware of actual, rather than perceived, performance and shows patterns of diseases which they did not recognize previously. Simple record keeping can make farmers better animal managers and able to respond to disease threats.

D. Are these Interventions Compatible with GOL Strategies?

164. Thus, a participatory livestock project would need multiple complimentary components including capacity building of the extension workers, technical interventions, improvements of market opportunities and credit for poor families, to ensure sustainable high impact. This type of project is best suited to a well targeted area-based project with outcomes suitable for scaling-up to other provinces in the Lao PDR. Geographically, the

[14] Developing Forage Technologies with Smallholder Farmers: How to Select the Best Varieties to Offer Farmers in Southeast Asia. ACIAR Monograph No. 62. 80 pp.

project should be located in a limited number of districts / provinces in the Sloping Lands zone which is most of the northern region and districts along the border with Viet Nam in the central and southern regions (see Fig. 3). It has to be recognized that such a project has a slow start-up and requires a relatively long time frame (7-10 years) to be sustainable.

165. The proposed interventions are compatible with the Lao PDR Government's strategic vision for the agricultural sector (GOL, 1999, JICA – MAF, 2001) which clearly recognize the need for accelerating development in the Sloping Lands zone, the importance of livestock in the livelihood of farmers, the pivotal role of livestock in agricultural development and the need for farmer-driven extension.

166. The Master Plan Study concludes, "there is large potential to increase livestock production through improved animal health, animal nutrition and livestock breeding" (JICA – MAF, 2001, page 6-24). We conclude that animal health and nutrition are critical factors for the Sloping Lands zone and argue that the introduction of new genotypes is currently not necessary for this zone. Our view, based on a large body of scientific evidence (e.g. Ayalew, 2002), is that indigenous breeds are much more productive than may appear to outside observers and that improvements in management, feed resources and disease control alone can result in considerable benefits, without the introduction of new genotypes.

167. The proposed interventions are consistent with the strategic theme "Poverty Reduction by Broadening Community Participation and Opportunities" of the ADB Country Strategy and Program 2002-2004 (ADB Country Strategy, 2001). The participatory approach of the proposed interventions, community-based planning of sustainable use of feed resources, building the capacity of farmers and villages to improve their livestock production system, targeting improvements especially at women and disadvantaged groups within the community and increasing the capacity of the extension workers to deliver effective livestock services, are all consistent with the operational priorities of ADB's Country Strategy and Program. The geographic focus on the Sloping Lands zone is consistent with ADB's funding focus on the northern region and the East-West Corridor.

XII. WHAT FURTHER STUDIES AND ANALYSES ARE NEEDED FOR PROJECT DEVELOPMENT?

168. Agricultural extension is currently undergoing a significant change in the Lao PDR. In the new structure, livestock extension will be the responsibility of generalist district extension officers based at District Agriculture and Forestry Offices (DAFO). Each district extension officer will be responsible for all agricultural and livestock activities in a number of villages. Subject matter specialists, based at Provincial Agriculture and Forestry Offices (PAFO), are charged with supporting district extension officers with technical information and material. The National Agriculture and Forestry Extension Service (NAFES) has the overall responsibility for coordinating agricultural extension, and any project working at district level will need to work with NAFES, PAFO and DAFO, as well as the Department of Livestock and Fisheries (DLF).

169. A participatory livestock project will need to build the capacity of the generalist district extension workers at district level, the subject matter specialists at provincial level and staff of NAFES at national level. These efforts should provide villages and farmers with relevant technical information and options for improving livestock production within the context of their communities and complex agricultural systems.

170. The project development team must build partnerships with key stakeholders, and involve these stakeholders in project development to ensure ownership of the project. It needs to address key limitations such as the lack of trained manpower (e.g. the need for

recruitment of suitable district staff, considering gender and language / cultural appropriateness) and remuneration of field staff, and ensure complementarities with other livestock and agricultural extension projects in the Lao PDR. Project areas need to represent a broad range of livestock production systems in the Sloping Lands Zone to ensure that lessons learnt can be applied to other areas in the Lao PDR.

171. Project design needs to

- incorporate a large capacity building component,
- be based on a participatory extension approach,
- develop partnerships with farmers and their communities,
- be flexible to cope with variation and emerging constraints,
- be responsive to farmers' needs and aspirations,
- accept a long-term commitment to ensure sustainable development and flow-on effects to other areas in the livestock sector,
- include a slow start-up phase to allow sufficient time to build partnerships and consensus at local level and commence training of staff, and
- include an effective M&E system.

172. In partnership with key stakeholders, a project development team needs to

- undertake a problem analysis;
- design a project framework including overall goals, project purpose, project outputs and project inputs;
- undertake a stakeholder analysis to identify the most suitable executing / implementing agencies and partners of a participatory livestock project, and develop an organizational structure;
- determine the geographic focus and proposed future spread of the outputs of the project (using secondary information, RRA and selective PRA);
- agree on detailed project objectives, inputs, outputs, outcomes and impacts with stakeholders;
- calculate financial and economic costs using COSTAB, returns benefits and viability of the project and produce a financing plan by individual project component;
- undertake sensitivity and risk analyses;
- provide details of other rural development and related projects, and lessons learnt from relevant projects;
- undertake an assessment of the institutional capacity of the proposed EA to undertake the project based on ADB Guidelines for the Management of Executing Agencies;
- develop a strategy to develop the financial management capacity of the executing agency to administer the project;
- develop strategies to ensure that disadvantaged groups such as women and the poorest households can participate and benefit from the project (using gender and social analysis);
- develop a M&E system;
- liaise with, and involve where possible third-party donor agencies and the Japan Fund for Poverty Reduction;
- prepare detailed lists of possible interventions and provide a detailed analysis of the suitability, benefits and limitations of each intervention;
- based on the problem analysis, conduct a detailed study of livestock marketing from producers to consumers and review the policies, regulations and limitations to fair trading in selected project provinces; discuss policy implications and suggest improvements;
- for project planning purposes, conduct a detailed study of livestock production and marketing systems, and determine credit needs in a range of representative districts;

- for project planning purposes, match possible interventions with villages (i.e. not all interventions are needed or appropriate in all villages), and initiate disease surveys in selected villages.

173. The process of project development needs to allow ample time for discussions and agreements with key stakeholders to ensure consensus and ownership of the project. Project development may be divided into several phases, each accomplishing major milestones and concluding with workshops or meetings to finalize decisions.

A. Project Development Phases

1. Phase 1: Logistics of TA, stakeholder analysis to determine EA and key partners, and consultative process with stakeholders to derive overall project objectives, outcomes and basic project design parameters.

174. Phase 1 is a preparatory phase to determine the basic framework and design parameters of the project, reach agreement on the executing agency (EA) and other key partners in the project and a process for project development with the Government of the Lao PDR. At this early stage, the capacity of likely national partners such as NAFES, DLF and NAFRI to support and administer a participatory livestock project needs to be assessed. Ideally, this phase should be conducted well in advance of the arrival of the main group of project development consultants to allow ample time for discussions, negotiations and consensus within the Lao PDR Government. This phase concludes with an Inception Meeting of stakeholders and an Inception Report.

2. Phase 2: Determine the geographical focus, and develop detailed project objectives, project outputs and operational principles with the EA and key stakeholders.

175. Phase 2 is the first part of detailed project development, identifying project areas, working out project parameters with project partners, leveling expectations, assessing capabilities of project partners and developing strategies to overcome identified limitations. This includes evaluating the suitability of provinces, districts and villages for participation in the project using secondary information on livestock production and marketing, agricultural systems and poverty, RRAs in potential districts, PRAs (needs assessment) in selected villages to confirm the importance of livestock and willingness of farmers to participate in a participatory livestock project. Discussion of possible interventions with selected villages to understand the importance of these interventions for farmers, and evaluate the suitability and potential impact of possible interventions for each proposed district (including potential constraints for each district). Assessment of the capabilities of NAFES, DLF and NAFRI at national level to support a participatory livestock project, and in particular the capability of provinces and districts to support a participatory livestock project, and agreement on realistic project outputs and inputs provided by the project, by the provinces and the districts. Develop strategies and obtain agreements on ways to overcome key limitations to implementation of a successful project (e.g. district governments agree to hire suitable extension staff). The emphasis of this phase is on achieving consensus and agreements on key issues.

176. At the same time, field studies need to be conducted which provide the basis for subsequent detailed project development. These include RRA, baseline studies on livestock systems, animal health, marketing and credits. This phase concludes with an Interim Workshop and Report.

3. Phase 3: Detailed project design and Draft Final Report.

177. Phase 3 follows agreement on project design by key stakeholders. This phase includes calculation of detailed project inputs, outputs and outcomes using tools such as COSTAB, social, sensitivity and risk analyses. Development of the M&E system, implementation schedules and strategies for developing financial management capabilities and for dealing with other identified limitations. This phase concludes with a Tripartite Meeting (ADB, Consultants and GOL) and the presentation of the Draft Final Report.

4. Phase 4: Finalization of project development.

178. Revision of the Draft Final Report based on comments received from ADB and the Lao PDR Government. Final negotiations on outstanding issues and submission of the Final Report.

B. Competence Areas Needed for Project Development

179. Together the team should have a high level of skills and experiences in

- Integrated approaches to agricultural development and natural resource management;
- Participatory approaches to agricultural extension (and research) with field expertise in PRA and RRA methods;
- Building partnerships with key stakeholders, including planning and implementation of stakeholder consultations;
- System approaches to smallholder livestock development;
- Integrated approaches to animal disease control in smallholder farming systems;
- Economic and risk analyses, and financial and administrative procedures of ADB and the Lao PDR government;
- Development of participatory M&E systems;
- Past, current and planned rural development activities in the Lao PDR and neighboring countries.

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APPENDIX 1: TERMS OF REFERENCE

1. A participatory livestock project is in ADB's 2004 lending pipeline. To initiate the preparation of this project, as a first step, ADB would like to carry out a livestock sector review to collect and collate the available data, review the past and ongoing interventions in the sector, assess the marketing and trade policies and regulations, summarize the lessons learned, and propose innovative and sustainable new interventions.

2. To carry out this review, ADB would like to engage a small team of livestock specialists for a total of about 30 person-days' input in May-June 2002. The specialists would assist ADB to review the livestock sector and prepare a report accomplishing the following specific tasks:

i. review the overall state of affairs in the livestock sector and report data on livestock population by category, region, and province from the secondary sources,
ii. describe the role and importance of livestock and its contribution to the overall economy of the country,
iii. describe the role and importance of livestock and its contribution in the rural economy and for the average farm household,
iv. assess the impact of livestock development on poverty reduction among the poorer households encompassing the gender issues,
v. review the previous and ongoing livestock interventions assisted by GOL programs and donor-funded projects and describe best practices and lessons learned,
vi. propose interventions that would have immediate impact on livestock health and productivity and would be sustainable in the long-run,
vii. describe differences in livestock rearing and marketing practices in different regions for in-country as well as cross-border trade,
viii. review the livestock development and trade policies and regulations, identify the constraining factors, and propose further studies to prepare requisite recommendations,
ix. review GOL's *Master Plan Study for Integrated Agricultural Development* (October 2001) and ensure that proposed livestock development interventions comply to its overall policy framework,
x. provide recommendations for further detailed studies and analyses of future interventions, and
xi. based on the above review and assessment, prepare a report for submission to ADB along with detailed TOR for a follow-on study.

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