



Australian Government
Australian Centre for
International Agricultural Research

Project final report

project

Cattle and buffalo in Cambodia and Laos: The economic and policy environment for smallholders

date published

November 2007

prepared by

Matthew Harding
Centre for International Economics (CIE)

Derek Quirke
Centre for International Economics (CIE)

Robert Warner
Centre for International Economics (CIE)

project number

PLIA/2006/012 – Part 2

ISBN

978 1 921434 150

published by

ACIAR
GPO Box 1571
Canberra ACT 2601
Australia

This publication is published by ACIAR ABN XXX. Care is taken to ensure the accuracy of the information contained in this publication. However ACIAR cannot accept responsibility for the accuracy or completeness of the information or opinions contained in the publication. You should make your own enquiries before making decisions concerning your interests. Reproduction in whole or in part of this publication is prohibited without prior written consent of ACIAR.

Contents

Acknowledgements	vii
Glossary	ix
Summary	iii
1 Introduction	1
This report	2
2 Background	3
The economies are rural based...	4
...and have quite strong links with other countries in the region	5
Both countries continue to deal with the legacies of conflict and central direction of the economy	6
Constraints to growth and development are significant...	8
...they constrain development of the livestock sectors...	10
...which suffer excessive and confusing regulation	11
3 Cattle and buffalo in Laos and Cambodia	15
Cattle and buffalo in the smallholder system	16
Features of cattle production systems in Laos and Cambodia	19
Constraints imposed by these systems	23
4 Smallholder incentives	26
Integrated smallholder systems	26
Integrated systems and income security	28
Functions of large ruminants	34
5 Market analysis for beef and buffalo	38
Domestic markets	39
Regional markets	43
Export market prospects	50
6 Implications for ACIAR research	55

In-country capacity is a significant constraint...	56
...and projects need to deal with capacity and functions at all levels of government	57
Extensive donor activity in agriculture	58
Project costs and linkages to government	59
The bottom line	61
A People consulted	62
B Characteristics of rural households in Laos	66
C Large ruminants in Vietnam	70
D Donor and NGO projects	75
References	80
Boxes, charts and tables	
1.1 ACIAR's policy scoping studies	2
2.1 Economic and social indicators for Laos and Cambodia	3
2.2 Comparative crop yields (kg/ha)	4
2.3 Sectoral composition and growth in Cambodia and Laos, 1994-2004	5
2.4 Infrastructure services coverage, 2000	8
2.5 Ease of doing business — rankings in 2006	8
2.6 Summary of fees and charges on livestock in Northern Laos	14
3.1 Smallholder production systems	17
3.2 Smallholder livestock production systems	18
3.3 Examples of introducing Brahman cattle in Laos	20
3.4 Cattle production systems in Laos	21
3.5 Feeding options in lowland Cambodia	25
4.1 Food security in Laos and Cambodia	30
4.2 A health shock is often more serious than a harvest failure	33
5.1 Estimated meat production on a per person basis	39
5.2 Traditional uses for beef in Lao and Khmer food	41
5.3 Indicative prices of cattle and buffalo	42
5.4 Per person meat consumption by country	44
5.5 Meat production in Vietnam	45
5.6 Production and value of imported beef by Vietnam	46

5.7	Malaysian beef production, imports and consumption	48
5.8	Thai beef production, imports and consumption	49
5.9	CP Thailand	52
6.1	The lessons from the ADB and EU projects in Laos	60
A.1	List of people consulted	62
B.1	Income and rice consumption by Lao province – 2002-03	66
B.2	Agricultural income and expenditure per household for Lao PDR, 2002-03	67
B.3	Income generating activities in Lao PDR, 2002-03	68
B.4	Rural consumption per household, 2002-03	69
B.5	Household consumption by region and expenditure group, 2002-03	69
C.1	Vietnamese villages in livestock survey	70
C.2	Importance of large ruminant functions in Vietnam	71
C.3	Cash revenue from survey villages	72
C.4	Costs of keeping ruminants	73
C.5	Value of ruminants	73
C.6	Gross margin of keeping ruminants	74
D.1	Selected development projects in Cambodia	77
D.2	Selected development projects in Laos	79

Acknowledgements

The authors would like to acknowledge the people listed in appendix for their kind assistance during consultations for this report. In particular, we would like to acknowledge the efforts of Dr Syseng from the National Animal Health Centre in Vientiane for organising consultations in Laos and Dr Sothoeun from the Department of Animal Health and Production for organising consultations in Cambodia. They would also like thank Dr Jeff Davis for facilitating the study and his colleagues at ACIAR who provided comments the draft report. Thanks also to Dr Peter Windsor from the University of Sydney for his valuable contributions and good company during the consultations for this report.

Many thanks also to Marina Naumoska and Anna Bieler from the CIE for their valuable assistance in preparing charts and editing.

Glossary

ADB	Asian Development Bank
CIAT	International Center for Tropical Agriculture
FAO	Food and Agriculture Organization
FMD	Foot and Mouth Disease
HS	Haemorrhagic Scepticaemia
MLA	Meat and Livestock Australia
NGO	Non-government organisation
WTO	World Trade Organization

Summary

This report is concerned with the economic, policy and institutional environment that shapes decision making by households raising cattle and buffalo in Cambodia and the Lao People's Democratic Republic (referred to as Laos in this report). It was commissioned by ACIAR as part of its Policy Linkages and Impact Assessment Program, to assist in the development of relevant research projects in these countries.

Cambodia and Laos are both classified as Least Developed Countries by the United Nations, in which around a third of the population live under their national poverty lines. They remain predominantly rural economies: over 80 per cent of the population live in rural areas and agriculture, which is dominated by the production of rice, accounts for over a third of GDP. Raising livestock is an important part of the smallholder rural economy in both countries, where animals are a source of cash income, provide a subsistence source of protein, are used for draught power, and are used as an asset or savings bank.

The environment for livestock development

The World Bank and other agencies have identified a range of strongly binding constraints on agricultural growth in these countries, including insecurity of land tenure, weak infrastructure and complementary services, low human capital, high costs of and limited access to finance and a generally poor rural business climate. Both countries are dealing with the legacies of protracted periods of internal and external conflict, and the challenge of making the transition from isolationism and strong state control of economic activity towards more open, internationally integrated market economies. In both countries, the formal and informal institutions that are needed to underpin market transactions, investment and specialisation are poorly developed.

These general constraints translate into a difficult environment for the development of more intensive commercially oriented livestock sectors. Raising livestock is a high risk proposition with low returns to smallholder labour inputs. This situation is exacerbated by limited access to knowledge, underdeveloped input supply and technical support services, weak

extension services and institutional practices that compound geographical constraints on market access and development of an integrated domestic market for livestock. The current markets are characterised by factors such as:

- lack of formal marketing arrangements and infrastructure such as saleyards or mustering points;
- the black market nature of many of the transactions, including the unofficial export trade to Vietnam and avoidance of the range of official transactions costs involved in officially selling and moving cattle and buffalo;
- thin, opportunistic and erratic trading due to the nature of smallholders cash requirements (as outlined in chapter 3);
- the fact that very few cattle or buffalo are sold against an objective description of their age, weight and their condition score; and
- lack of government resources or incentives to collect and distribute livestock market information in a regular or systematic way.

There are very few specialist cattle producers in either country, and almost all cattle are raised within a complex smallholder production system. These systems are generally based around a combination of subsistence agriculture, with cash-generating agricultural activities and off-farm activities. The diversity of these ‘outputs’ are how the risk of failure of one activity — such as a poor rice crop or incapacitation of one of the heads of a household is managed. While cattle production systems vary across both countries, they typically involve free range grazing on common land; limited hand feeding, primarily using cut and carry forages; and virtually no selective breeding.

Market prospects

Consumption of meat in Laos and Cambodia is low by broad regional standards but is probably equivalent to that observed in areas of neighbouring countries with similar income levels, household structures and ethnicity. Seafood, freshwater fish and aquaculture products also play a significant role in protein consumption by households in certain regions. Domestic demand for protein derived from meat products is growing as incomes rise, and this will continue.

Therefore there is significant potential to increase meat consumption in these and ‘catch-up’ to consumption levels observed in adjacent countries — especially Thailand and Vietnam. Per person meat consumption

(excluding seafood) in Thailand is presently around 24 kg per year compared with around 14 kg for Laos and 16 kg for Cambodia.

A recent driver of demand for the livestock industries of Laos and Cambodia has been demand for meat from neighbouring countries. This effect has been particularly significant in areas with good access to these markets. Income and population growth in Thailand, Southern China and Vietnam are driving strong demands for meat, which are expected to continue to grow quite rapidly over the coming decades.

While the prospects of live cattle and buffalo exports to Vietnam from both Laos and Cambodia look strong for the short to medium term, there are risks to the longer term viability of the trade. Within the region, it is likely that Vietnam and Southern China will be the dominant sources of demand for cattle and buffalo. As these countries develop, it is also inevitable that the markets for cattle and buffalo will become more sophisticated. To meet the increased demand for beef, there are two possible scenarios:

- imports of beef will expand significantly as the infrastructure develops, replacing live cattle imports; or
- an intensive feedlot industry will develop with imported feeder cattle and grain supplying the market.

Under both these scenarios, there are long-term risks for Laos and Cambodia. If Vietnam and China become significant importers of meat, it is unlikely that Laos and Cambodia will have developed a beef industry competitive with major low-cost suppliers such as Brazil and the United States. However, large-scale imports of beef into Vietnam and China are likely to be relatively long-term outcomes. Over the shorter and medium term, it is likely that there will continue to be strong demand for live cattle for slaughter in the local wet market system.

If Vietnam or China were to develop an intensive feedlot industry, demand for high quality feeder cattle would be significant. For Laos and Cambodia to successfully supply such cattle would require significant intensification and the development of a cattle industry. The present demand for cattle from Vietnam is being supplied by what are effectively cull animals from Laos and Cambodia. To supply a feeder market would require a consistent supply of feeders at the correct specification. It is likely that this would require a reconfiguration of the gene pool in Laos and Cambodia to supply appropriate animals into a feedlot system. In addition to this, competition from other suppliers — primarily Australia — would also be significant under this scenario.

Implications for adoption of new technology and ACIAR research

The risk aversion of smallholders in Laos and Cambodia is a rational response to experience, and the limited availability of mechanisms to manage risk and cope with adverse developments. There are no state-provided security systems, and the financial sectors have limited reach and functionality for rural people. This means that smallholders are reluctant to specialise, and to allocate scarce cash and time to investments that may or may not yield benefits in the future. The poor state of market, transport and communication infrastructure, and the often counter-productive impact of government regulation work against the development of production and processing chains for livestock that smallholders can easily fit into. These all translate into a decided reluctance for smallholders to move to more intensive livestock production systems and adopt new technologies.

Uptake of the outcomes of technical research in these countries is also affected by the serious capacity constraints in key parts of the agricultural research, extension and policy systems:

- government extension systems are very weak, and have very limited ability to effectively translate research finding into practical advice relevant to producers and to transmit this advice;
- research institutions have limited technical skills; and
- there is a very limited pool of people who are qualified, technically and managerially, to lead collaboration with Australian researchers.

For animal health and disease projects — such as those funded by ACIAR — the number of people with sufficient capacity to work in laboratories or in the field is very limited:

- in both countries, there is no capacity to train veterinarians through the university system. Very few in livestock-related government departments have a science background; and
- most of those in-country with such capacity were trained in the Soviet bloc in the 1970s and 1980s.

The absence of this basic infrastructure of technical skill, poses real challenges for projects aiming to transfer technology and know-how to the smallholder. What it suggests is that technical research projects probably need to be embedded in larger initiatives that are attempting to deal with these constraints. To have an impact, projects dealing with ACIAR's focal area have to be integrated into a whole-of-system approach — otherwise it is impossible to address the complex web of incentives that shape smallholders' interest in adopting project outputs.

These suggestions are in broad conformance with the observations and recommendations of ACIAR's recent review of its role in animal health research (ACIAR 2006). This review observed that in the past, many research projects had no means of implementing the results in the communities for which they were developed. It recommended that ACIAR should work more closely with bilateral and multilateral agencies to plan for the implementation of the outcomes of its research projects, arguing that impacting community welfare in a sustainable way at the smallholder level is extremely difficult without institutional support throughout the government animal production and health service. Given the significant disincentives that the current economic environment in these countries creates for further investment in livestock activities — by smallholders and agribusinesses — it makes sense for ACIAR to collaborate with agencies that are helping to address the policy, institutional and infrastructural constraints that create these disincentives.

1

Introduction

ACIAR is interested in undertaking research related to raising cattle and buffalo in Cambodia and Laos. A number of projects dealing with this activity have recently been started, and an older project dealing with, among other things, foot and mouth disease has recently been extended.

The projects are:

- AH/2005/086: *Best practice health and husbandry of cattle, Cambodia;*
- ASEM/2005/124: *Extension approaches to scaling out livestock production in northern Lao PDR;*
- AH/2006/155: *Vaccine business development in Lao PDR;* and
- AH/2003/001: *Management of CSF and FMD at the village level in Lao PDR*

Raising cattle and buffalo in Cambodia and Laos are predominantly smallholder activities, frequently part of largely subsistence, multi-activity livelihoods. Their willingness to undertake the investment of resources and time required in adopting the results of technical research, and to incur the associated risks, is shaped by a range of factors, including the stance of government policies and the quality of formal and informal institutions affecting economic transactions. Recognising the importance of these economic, policy and institutional factors, and consistent with its strategy regarding policy scoping studies (box 1.1), ACIAR commissioned the Centre for International Economics (CIE) to conduct a review of the policy and economic environment facing the cattle/buffalo sector in these countries and its likely impact on the adoption of new technology. This report presents the findings of the review.

1.1 ACIAR's policy scoping studies

In May 2004, ACIAR's Board of Management approved a strategy where the Centre would make greater use of pilot or scoping studies that assess policy and institutional issues before making major technical research investments. The Board felt that it may be important to have research on important policy issues and their economic implications undertaken alongside or integrated with the technical research.

Understanding the policy environment is important to ensure that technical research takes the impact of policy into account or endeavours to change policies that act as constraints. The logic of this decision was reinforced in a recent review of ACIAR's research on agricultural policy (Pearce 2005), which argued that policy settings have the potential to be a major influence on the effectiveness and impacts of particular technical research projects. The review pointed out that policy settings could negatively affect the incentives that shape the willingness of producers to undertake the investments associated with adopting the results of technical research.

Policy distortions can also lead to situations where the introduction of new techniques that have counter-intuitive and sometimes counter-productive effects. Undertaking policy and related economic assessments at the same time as the technical research can therefore be important to ensure maximum uptake and adoption of the technical results.

This report

This report draws upon an analysis of the available literature on the livestock sector in Cambodia and Laos, the CIE's work on development issues in these countries and the CIE's previous work on world meat markets. It also draws on findings from field visits to the Cambodia, Laos and Thailand. The CIE team visited Laos and Thailand with David Kennedy from AusVet Animal Health Services in July 2006, looking mainly at animal health diseases and the market for vaccines in the Laos.

In a second visit to Cambodia and Laos in October 2006 with Dr Peter Windsor from the Faculty of Veterinary Science at the University of Sydney, the team consulted with national provincial and district level officials and village leaders, smallholders and experts working on relevant livestock and rural development projects. During this visit, workshops were held in Vientiane and Phnom Penh to gather information on what animal health related projects and programs were underway, identify opportunities for collaboration, explore approaches to promote adoption of research results and ensure sustainability of project outcomes. Appendix A lists the people consulted during the course of the study.

2

Background

Cambodia and Laos are home to 20 million people, and while in the past 15 years there have been significant inroads into poverty, around a third of their populations live below the national poverty lines (table 2.1). And social indicators in Laos and Cambodia remain very low, consistent with their classification as Least Developed Countries.

Gross domestic product (GDP) growth in both countries has been strong. Cambodia averaged 6.9 per cent GDP growth in the decade to 2004 and Laos around 6.3 per cent, and growth in both countries accelerated in the last couple of years (reaching 13.4 per cent in 2005 in Cambodia and 7.0 per cent in Laos). But population growth rates remain high (over 2 per cent annually) so the growth has not translated into a rapid expansion of per person incomes. Further, with labour forces growing more rapidly than population, there is pressure on the economies' ability to generate adequate employment opportunities.

2.1 Economic and social indicators for Laos and Cambodia

		<i>Cambodia</i>	<i>Laos</i>
People			
Population 2005	m	14.1	5.9
Population growth rate	% pa	2.0	2.3
Rural population 2005	%	80.0	79.0
Labour force growth rate 2005	%	3.1	3.0
People below national poverty line 2004	%	34.7	32.7
Economy			
GDP 2005	US\$b	5.4	2.9
GDP growth rate last decade	% pa	6.9	6.3
GNI per person 2005	US\$	380	440
Agriculture share of GDP 2004	%	32.9	47.1
Manufacturing share of GDP 2004	%	21.5	20.4
Investment/GDP 2004	%	21.5	na
Exports/GDP 2004	%	64.7	27.6
M2/GDP	%	20.8	18.8
Social indicators			
Life expectancy at birth	yrs	53.4	59.0
Infant mortality rate (per '000 live births)		167	106
Adult literacy rate	%	73.6	68.7
Rural access to safe water	%	8	19
Urban access to safe water	%	81	67

Source: World Bank World Development Indicators 2006a, ADB Key Indicators 2006b

The economies are rural based...

Despite some recent industrialisation, the bulk of the countries' population lives in rural areas, and Cambodia and Laos remain primarily agrarian economies. Agriculture accounts for over a third of GDP (table 2.1), with much of this being subsistence production. Subsistence consumption is estimated to absorb 60-65 per cent of agricultural production in Cambodia (FAO 2003). The labour forces in both countries are growing much faster than population, and agriculture is absorbing most of the new entrants to the workforce. However, agricultural productivity is low, as evidenced by low crop yields (table 2.2) and recent GDP growth in both countries has been driven largely by urban activities or natural resource development projects.

2.2 Comparative crop yields (kg/ha)

<i>Indicator</i>	<i>Cambodia</i>	<i>Laos</i>	<i>China</i>	<i>Thailand</i>	<i>Vietnam</i>
Rice	2 150	3 316	3 849	2 455	4 634
Maize	2 111	2 333	3 485	3 913	3 225
Cassava	6 318	19 762	16 249	17 552	14 066

Source: World Bank 2005.

As table 2.3 shows, agriculture grew by only 2.7 per cent a year in Cambodia, and accounted for just 16 per cent of growth in the decade to 2004. In Laos, agricultural growth was much faster, and the sector accounted for over a third of total GDP growth in the decade.

Both countries' agricultural sectors are strikingly undiversified: more than 90 per cent of the land under cultivation in Cambodia is planted to rice: the proportion for Laos is 80 per cent, whereas for neighbouring countries Vietnam and Thailand the proportion is 62 per cent and 57 per cent respectively (World Bank 2005).

Laos' exports are now dominated by copper and gold from two (Australian invested) mines: these minerals have overtaken hydro-electricity, garments and timber as the main non-aid sources of foreign exchange revenues. Textiles and garments have been an important source of manufacturing employment and exports from both countries: but Cambodia has been much more dependent on this sector for export earnings and industrial employment. The termination of the Multi-Fibre Arrangement, which gave both countries access into the quota protected markets of the United States and Europe, poses a problem for producers in both countries. Tourism is a growing, if poorly recorded, sector in the region, based on unique cultural heritages and strong geographic advantages.

2.3 Sectoral composition and growth in Cambodia and Laos, 1994-2004

	Cambodia			Laos		
	Share of 2004 GDP	Growth rate	Share of growth	Share of 2004 GDP	Growth rate	Share of growth
	%	% pa	%	%	% pa	%
Agriculture	32.8	2.7	16.0	47.1	4.5	34.7
Mining	0.3	8.2	0.3	1.5	27.4	3.0
Manufacturing	23.2	18.8	39.0	20.4	10.5	29.2
Electricity, gas, and water	0.5	10.9	0.7	2.7	15.8	4.1
Construction	6.8	9.5	8.4	2.7	1.3	1.8
Trade	14.8	5.6	13.6	10.5	8.6	13.1
Transport and communications	7.0	7.8	7.3	6.5	8.8	8.4
Finance	6.0	5.5	5.2	0.3	-8.1	-0.6
Public administration	1.9	1.6	0.4	2.9	4.4	1.8
Others	6.8	11.7	9.2	5.4	4.3	4.5
GDP	100.0	6.9	100.0	100.0	6.3	100.0

Source: ADB Key Indicators 2006b.

...and have quite strong links with other countries in the region

Laos and Cambodia are members of ASEAN and are implementing commitments of the ASEAN Free Trade Agreement, including reductions on intra-ASEAN tariffs to 0-5 per cent by 2010. Cambodia joined the World Trade Organization (WTO) in 2004, and Laos is moving slowly down the accession path.

Thailand has been a major source of investment into Laos, accounting for over 60 per cent of all recorded investment from 1993 to 2002 (CIE 2004). Thailand has also been the primary destination for Lao exports of hydro-electricity. But China and Vietnam are also pursuing economic interests in the North and East of the country. Thailand is an important destination for temporary and permanent migration from Laos and Cambodia, and hence a source of remittances. There is a tradition of informal cross-border trade among provinces in neighbouring countries and between ethnic minority groups that straddle national boundaries.

The Mekong River links the countries with its neighbours, and plays a critical role in the livelihoods of large proportions of their populations. For Cambodia, Lake Tonle Sap is a major source of livelihoods and protein for a significant share of the population, and it is dependent on backflows from a wet-season Mekong.

Transport corridors in the region are developing, mainly as a result of the Greater Mekong Subregion initiatives led by the Asian Development Bank

(ADB). Laos is highly dependent on Thailand as a link to the export markets: but other corridors to the sea through Vietnam are developing. Thailand and Vietnam, with more developed agroprocessing and export sectors, have interests in the efforts of Laos and Cambodia to deal with animal diseases.

Political and security relations reflect historical, ethnic and strategic influences. Laos and Cambodia have complicated relationships with Thailand, but commercial and cultural links are quite powerful, especially for Laos. Vietnam's past role in Cambodia and the shared legacy with Laos of the American war create quite different contexts for political and government links between these countries. The leaderships of Laos and Vietnam are very close: relations between Vietnam and Cambodia are more complex.

Both countries continue to deal with the legacies of conflict and central direction of the economy

Both countries have gone through protracted periods of internal and external conflict. Both were caught up in the regional spillovers of the war between Vietnam and the United States, and both experienced internal battles for power in the aftermath of gaining independence from France in the early 1950s. Civil war in Cambodia in the 1970s is estimated to have killed one in five Cambodians, and both countries were subject to extensive covert bombing during the war US-Vietnam war: Laos is reputed to have had more bombs dropped on it than fell on all of Europe during World War II.

Cambodia

Since the early 1990s, Cambodia has gone through a three-fold transition: from civil war to peace, from single to multi-party politics, and from an isolated, low-growth, state-managed and subsistence oriented economy to a very open market based economy. Social capital and trust are still very low, however, and the formal, impersonal institutions that underpin modern market economies are weak or non-existent. The World Bank has said that (World Bank 2006b):

Cambodia's contemporary poverty is largely a legacy of over twenty years of political conflict, which resulted in destruction of physical infrastructure, decimation of human capital and distortion of social, economic and political institutions.

The effects of conflict, which really only ceased in the early to mid 1990s, are still present, and are particularly visible in that most public institutions are still oriented primarily to sustaining the state rather than promoting the interests of the citizenry (World Bank, op cit). The Khmer Rouge reduced the country to an isolated subsistence oriented economy, and carried out a systematic process of destroying any 'social institution or form of identity — the family, Buddhism, locality or region — that might compete with the party-state for loyalty' (World Bank op cit). This eroded traditions of trust and collective identity that underpin willingness to cooperate and consider the well-being of other members of the community, and has proven to have implications for efforts to mobilise community or collective action to deal with development or resource management issues.

Laos

Laos is a sparsely populated, land-locked country, with a difficult terrain. Its geographical constraints were exacerbated by the intensive bombing it received during the war in Indochina, and significant tracts of land are still unusable because of unexploded ordinance. The country also suffered a major loss of human capital during and after the internal conflicts associated with the war: it is estimated that the population halved during the war and a further 10 to 15 per cent of the population is estimated to have left as refugees between 1975 and 1985 (CIE 2003a).

Central economic planning was introduced in 1978 based on self-sufficiency within the country's 16 provinces. The country received considerable financial and technical assistance from the Soviet Union to facilitate central planning. But because of the isolation of the various provinces, a lack of a strong pre-existing ideology and general anarchy in government at the time, Laos did not proceed as far along the central planning track as neighbouring centrally planned countries.

In the face of considerable dissatisfaction with collectivisation and general economic stagnation, and after some failed experiments with partial relaxation of controls, the government embarked on a broad-ranging program of economic renewal and renovation in the late 1980s. This program involved recasting the role of the state and 'catching up' with the rest of the world.

Constraints to growth and development are significant...

Both countries have had to address major infrastructure deficits (table 2.4), and are working slowly to develop the legal and judicial underpinnings of modern market economies. A consequence of the large role that the state has played in resource allocation, and the suppression of the formal private sector is a low level of financial sector development. In both countries, the money supply is very small compared with GDP (table 1.2), and the Thai baht and the US dollar are widely used in transactions.

2.4 Infrastructure services coverage, 2000

<i>Indicator</i>		<i>Cambodia</i>	<i>Laos</i>	<i>China</i>	<i>Thailand</i>	<i>Vietnam</i>
Percentage roads paved	%	16	44	22	97	25
Main telephone lines per 100 inhabitants	no	0.24	0.93	13.8	9.39	3.75
Percentage population with access to electricity	%	16	22	na	82	76
Percentage rural population with access to improved water source	%	26	29	66	81	72
Percentage rural population with access to improved sanitation facilities	%	10	19	24	96	38

Source: World Bank 2005

The general environment for doing business is also fairly poor in both countries. Cambodia is ranked 143 and Laos 159 (out of 175) in the World Bank's measures of the ease of doing business (table 2.5).

2.5 Ease of doing business — rankings in 2006^a

<i>Ease of...</i>	<i>Cambodia</i>	<i>Laos</i>	<i>China</i>	<i>Thailand</i>	<i>Vietnam</i>
Doing Business	143	159	93	18	104
Starting a Business	159	73	128	28	97
Dealing with Licenses	159	130	153	3	25
Employing Workers	124	71	78	46	104
Registering Property	100	148	21	18	34
Getting Credit	174	173	101	33	83
Protecting Investors	60	170	83	33	170
Paying Taxes	16	36	168	57	120
Trading Across Borders	114	161	38	103	75
Enforcing Contracts	118	146	63	44	94
Closing a Business	151	151	75	38	116

^a Rankings are for 175 countries.

Source: World Bank 2006d.

Recent diagnostic exercises for both countries have identified major institutional constraints to agricultural growth. In Cambodia, the World Bank has identified the following problems (World Bank 2006b).

- Insecurity of land tenure and uncertain access to common property resources.

- All land titles were destroyed by the Khmer Rouge, and traditional claims were also ruptured by the large population displacements occurring during the conflict period. Many small farmers work on land acquired essentially through allegiance to local commanders in peace deals brokered in the late 1990s.
- Rural livelihoods are very dependent on common property natural resources: uncertainty of access and the growing threat of appropriation by powerful interests add to the already high risks that rural households face.
- Weak infrastructure and complementary public services.
 - Transport and irrigation infrastructure and water control systems are very poor.
 - Only 46 per cent of villages have a primary school.
 - Institutions serving rural areas are ‘challenged by problems of capacity, public financial management and allocation of resources and corruption’ (World Bank 2005).
- Low human capital.
 - This is partly a legacy of the destruction of the education system under the Khmer Rouge.
- High costs of and limited access to finance.
 - Formal and informal financial services do not serve the majority of rural areas.
- Poor rural business climate.
 - Corruption is perceived as the main constraint.
 - Agribusiness development is constrained by the proliferation of informal fees.

Similar types of constraint are identified for Laos. Customary land tenure systems are not secure, and traditional swidden agriculture systems are coming into conflict with alternative demands for land and resources. Agribusiness development, so essential to the transition from quasi-subsistence agriculture, is held back by the regulatory and institutional environment. The World Bank (2006b) has characterised the business environment as one where:

The problem of high cost of critical services, such as transport or telecommunications, is exacerbated by a cumbersome regulatory environment, at the national level as well as at the provincial level. Adding to the magnitude of the challenge is relatively low level of entrepreneurial experience and know-how in Laos, which is an emerging market economy trying to compete regionally with its more developed and experienced neighbours...

...Lack of a clear and well-communicated government policy towards the business sector creates an unpredictable operating environment, undermines business confidence, and discourages investment.

Further to this, the legal and judicial underpinnings of a market economy are still in embryonic form. This impedes contracting and transactions between unrelated parties. The absence of effective mechanisms to enforce security for loans, and of an effective bankruptcy system stand in the way of the development of larger private firms that are not well-connected to government and the ruling party.

...they constrain development of the livestock sectors...

These general constraints translate into a difficult environment for development of more intensive, commercially oriented livestock sectors. In its Master Plan for National Agricultural Research, the Cambodian Ministry of Agriculture, Forestry and Fisheries (MAFF 2005) identified a list of weaknesses of the sector which reflected these broader development constraints. They included:

- poor linkages between public and private institutions;
- insufficient veterinary services and lack of recognised veterinary medicine suppliers;
- insufficient market information;
- lack of meat processors;
- low salary structure for government personnel;
- lack of government strategy and planning for research/development;
- limited extension services;
- limited research and research facilities;
- high unofficial export import charges;
- illegal trade in meat products; and
- deteriorating security.

The plan stressed the need for development of integrated agribusiness systems to address feed and processing elements of the value chain, and improvements in rural infrastructure and support services. It highlighted the limited capacity of the research institutions dealing with livestock, and the fact that nearly all research programs depended on donor funding. It also pointed out that large (donor funded) expenditures on buildings and

equipment had not translated into an efficient laboratory system for research and development, because of the lack of operational funds. The links between research institutes and the extension services provided by the Ministry's Department of Agricultural Extension are all project based.

The report presenting the design of the ADB's Participatory Livestock Development Project Report (ADB 2005a) argued that sector deficiencies underlying the main causes of high mortality, low growth rates and low fertility in the livestock sector that in turn made livestock raising such a high risk proposition generating low returns to smallholder labour inputs included:

- limited access to knowledge on disease prevention and feed requirements and weak disease reporting and diagnostic mechanisms;
- underdeveloped in supplies and technical support services;
- a technically weak and under resourced extension service that is more familiar with directives from above for developing interventions rather than understanding the process of change needed at the smallholder level; and
- institutional practices that compounded the geographical constraints on market access and development of an integrated domestic market for livestock.

The report argues that these factors leave smallholders with little incentive to increase labour inputs for animal production activities.

...which suffer excessive and confusing regulation

Livestock regulations in Cambodia and Laos have evolved largely around the needs of the state at central, provincial and district levels to generate revenue in the absence of an effective, systematic tax system. Public service wages are low and as a result, public officials rely on local, regional and provincial revenue generated from areas such as the livestock sector and trade.

The high degree of provincial autonomy in the government systems of both countries means that there is the potential for wide differences in how regulations are legislated and enforced between provinces. This has consequences for livestock management and the delivery of services to the sector.

The main effect of regulation on livestock marketing is to reduce incentives for producers to participate in the market. This has significant implications for interventions targeting animal health, as the willingness of producers to bear the costs of adopting new systems is closely related to the degree of intensity of production and marketing in the industry. In addition to regulations that directly affect livestock industries and reduces incentives to specialise and engage in intensive production, the unfriendly environment for agro-business in both countries is also a constraint on the sector. These regulations increase the cost of operating commercial livestock enterprises and discourage the private investment that is necessary to establish commercial operations. Long delays in registration and licensing for private enterprises are common and approval processes for business registration are not transparent and are often at the discretion of individual officials. As a result rent seeking throughout the approval process is commonplace. Taxes are also inconsistently applied and often negotiated individually.

Cambodia

The livestock sector in Cambodia is affected by the same exercise of informal power as the rest of agriculture. A recent paper from the FAO Pro-poor Livestock Policy Initiative (Ear 2005) describes the systematic structures of decentralised corruption and patronage that underpins extensive informal taxation of most forms of economic activity in the country. The paper reports unofficial payments that a villager must pay on selling a cow amount to between 6 and 10 per cent of the price. Sellers need a letter from the authorities proving the provenance of the cow, and giving permission for the sale. Acquiring these documents involves payments to the chief of the commune, the government veterinarian, the provincial governor, the police and the military police. Truck and barge transport of cattle to Phnom Penh for slaughter attracts further unofficial charges paid to the provincial governor's office, the veterinarian, the Livestock Office, the military police, the economic police and the district police.

Laos

Regulation in the livestock sector in Laos reflects the status of the transition from centralised planning. Official and unofficial regulation affects almost every level of economic activity. In many situations, the objectives of regulation are not clear — often merely reflecting a view that the State should regulate economic activity. Frequently, the effect of regulation is constrained by the absence of appropriate instruments and capacity for effective enforcement. While regulation in the livestock sector is often

inconsistently applied, it impacts significantly on the incentives facing industry participants to engage in intensive production and hence the demand for a range of inputs. An example of regulation at the national level is regulation No.0036/DLF was issued in 2000 and included the following regulations (ILRI 2002):

- onerous regulations surrounding the importation of livestock, feed and veterinary supplies, including application to import 15 days before scheduled importation, different application forms for different products, certification from exporting country and samples in the case of veterinary drugs;
- in addition to general certification for exports in line with import requirements, additional certification and associated paperwork is required for movement of animals within Laos;
- compulsory vaccination of cattle, pigs and poultry against major diseases; and
- comprehensive regulations surrounding the reporting of disease epidemics including provisions restricting the movement of livestock, the destruction of affected animals and vaccination of surrounding areas.

Regulation 0036/DLF is not regularly enforced, and regulations surrounding importing and exporting are regularly circumvented by importing and exporting informally (ILRI op cit). In addition to this, there are special directives imposed on livestock industries at the provincial level. During the development of the new ADB project, a detailed review of livestock marketing was undertaken (ADB 2005b). The study focused on the Northern provinces of Luang Prabang and Xieng Khouang and found a range of fees and charges are levied on livestock movement. In addition to this, it found that ‘most of these payments are aimed at generating revenue at the local level, with little practical relevance to animal health and controlling the spread of livestock diseases’ (ADB 2005b). A summary of some of these fees and charges is shown in table 2.6.

2 BACKGROUND

2.6 Summary of fees and charges on livestock in Northern Laos

Type of charge/fee/tax ⁷	Collection office	Luang Prabang Province		Xieng Khouang Province	
		Phou Khoune	Nam Bak	Nonghet	Pek
Annual livestock tax	Village headman	N/A	N/A	N/A	KN1000 per year
Certificate of sale/purchase	Village headman	KN10 000-15 000 per head	KN10 000 per head	KN5 000 per head	KN2000-50000 per head
Transit fees to collection centre	Check points	KN200 000	None	N/A	N/A
Letter of approval for internal movement of animal	District agriculture and forestry office	KN10 000 per head	KN5 000 per head	KN10 000 per head	KN10 000 per head
Veterinary certificate and registration card	District agriculture and forestry office	KN12 000 per head	KN5 000 per head	KN10 000 per head	KN13 000 per head
Letter of approval for internal movement of a commodity	District commerce office	KN10 000 per head	Included in trade license	KN3 000 per head	KN10 000 per head
Property tax	District commerce office	KN60 000 per shipment	Included in trade license	KN3 000 per head	KN10 000 per head
Tax payment for moving animal including form	District finance office	2 per cent of value of animal	KN3 000 per head	KN47 000 per head	KN3 000 per head and KN3 000 form
Revenue taxes	District finance office	KN20 000 per head	Included in trade license	<ul style="list-style-type: none"> ▪ 5 per cent ▪ 35 per cent ▪ KN5 000 per sheet 	<ul style="list-style-type: none"> ▪ 5 per cent ▪ 35 per cent ▪ KN5 000 per sheet
Trade licence	District finance office	N/A	KN5 000 per year for export, KN0.8 million for internal	N/A	N/A
Export charge	Provincial finance office	N/A	KN10 000-15 000 (unofficial)	N/A	N/A
Veterinary export certificate	Provincial agriculture and forestry office	N/A	N/A	N/A	N/A
Transit fees to market	Provincial agriculture and forestry office	KN200 000	KN40 000	N/A	N/A

Source: ADB 2005b, p4.

3

Cattle and buffalo in Laos and Cambodia

Livestock industries make an important contribution to the economy of both Laos and Cambodia, with the livestock sector (including pigs and poultry) accounting for around 10 and 6 per cent of GDP respectively. Most livestock are raised by smallholders, for whom they serve a variety of functions. Livestock are a source of cash income, provide a subsistence source of protein, are used for draught power, and are used as an asset or savings bank. It is important to note however that Laos and Cambodia remain largely subsistence based economies, and growing staple crops such as rice for human consumption is the highest priority. Indeed, the major function of large animals in some areas is as an input into the rice production process as a source of draught power and manure for fertiliser.

According to the Food and Agriculture Organization (FAO), the total population of cattle and buffalo in Laos is around 2.4 million, while in Cambodia this figure is 3.8 million. Of these, buffalo account for around 57 per cent in Laos and 17 per cent in Cambodia. Both cattle and buffalo are used for draught purposes.

Exports of live cattle are important in both countries. Estimates suggest that around 100 000 head of cattle are exported from each country each year. Complex regulation both in domestic and export markets mean that exports through formal channels represent a small proportion of total exports. In Laos for example, out of total exports of around 100 000 head, only around 10 000 are exported formally. Strong demand in the region has driven a significant increase in exports, with demand growth particularly strong in Vietnam. Up until recent years, the majority of cattle exports from Laos were to Thailand. However, evidence suggests that a significant proportion of this trade has shifted to Vietnam. This has occurred both as demand has increased in Vietnam, but also in response to increased beef imports in Malaysia and associated reduction in cattle imports. A majority of exports from Cambodia are also to Vietnam.

Broadly, cattle production systems are similar in Laos and Cambodia, but there are subtle differences. These are discussed further below.

Cattle and buffalo in the smallholder system

Smallholders overwhelmingly dominate cattle and buffalo production in both Laos and Cambodia. In this respect, it does not make much sense to look at cattle and buffalo as a standalone production system. In reality, there are very few specialist cattle producers, and almost all cattle are raised within a complex smallholder production system. These systems are generally based around a combination of subsistence agriculture, with cash-generating agricultural activities and off-farm activities. The degree to which smallholders engage in intensive cattle activities depends on a range of factors, including:

- food security
- ethnicity
- access to markets
- land availability
- road access.

Chart 3.1 illustrates a typical smallholder production system in Laos and Cambodia.

Smallholders effectively have two inputs — land and labour — at their disposal to generate a variety of outputs. Land in both Laos and Cambodia is relatively constrained. Some reports suggest that Laos has the potential to expand land area devoted to agriculture. However the land tenure issues outlined in chapter 2 mean that it is difficult for smallholders to expand their land holdings. The situation is similar in Cambodia. In both countries, feed availability is already a serious constraint on cattle productivity. Problems with growing forage to feed cattle, particularly in the dry season are common and feed shortages limit the ability to expand cattle numbers.

The average farm size among the rural poor in Cambodia is 1.5 hectares, but 40 per cent of rural poor live off less than 0.5 hectares (World Bank 2006b). Food security for smallholders with only 0.5 hectares of land is particularly poor — only able to supply half of the average household's rice requirements annually. While there are large areas of unutilised land in Cambodia, as the World Bank (2006b) notes:

Over the past decade, the Government has constituted a system of economic concessions by providing 70-year leases covering 889 399 hectares of land to 49

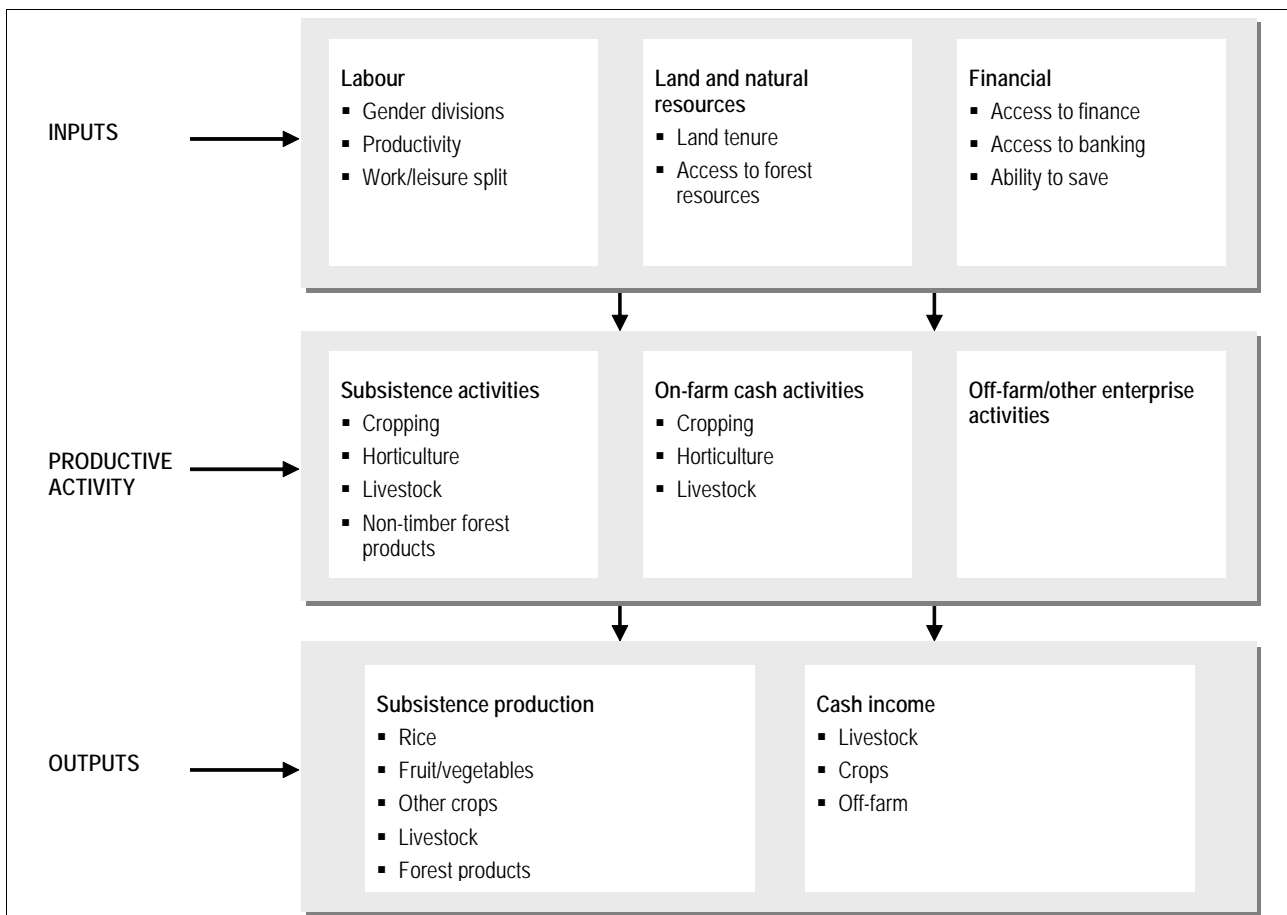
private companies. Ostensibly motivated by a perceived need to commercialise agriculture, in practice few (only about 10) are operational.... Suspicion over the motives for awarding these concessions is fuelled by the fact that 14 concessions exceeded the 10 000 hectare limit above which a special review is required — yet no review has been implemented.

A significant expansion in cattle numbers in either country is unlikely to be a viable option unless there is a significant intensification of production and a shift away from the current smallholder subsistence based production system.

The role of animal health and management in the production system

Chart 3.1 provides an illustration of the overall smallholder production system. This shows the complex array of activities that smallholders participate in, and how they effectively have just their labour with which to manage risk and achieve certain outcomes. However, in the context of

3.1 Smallholder production systems

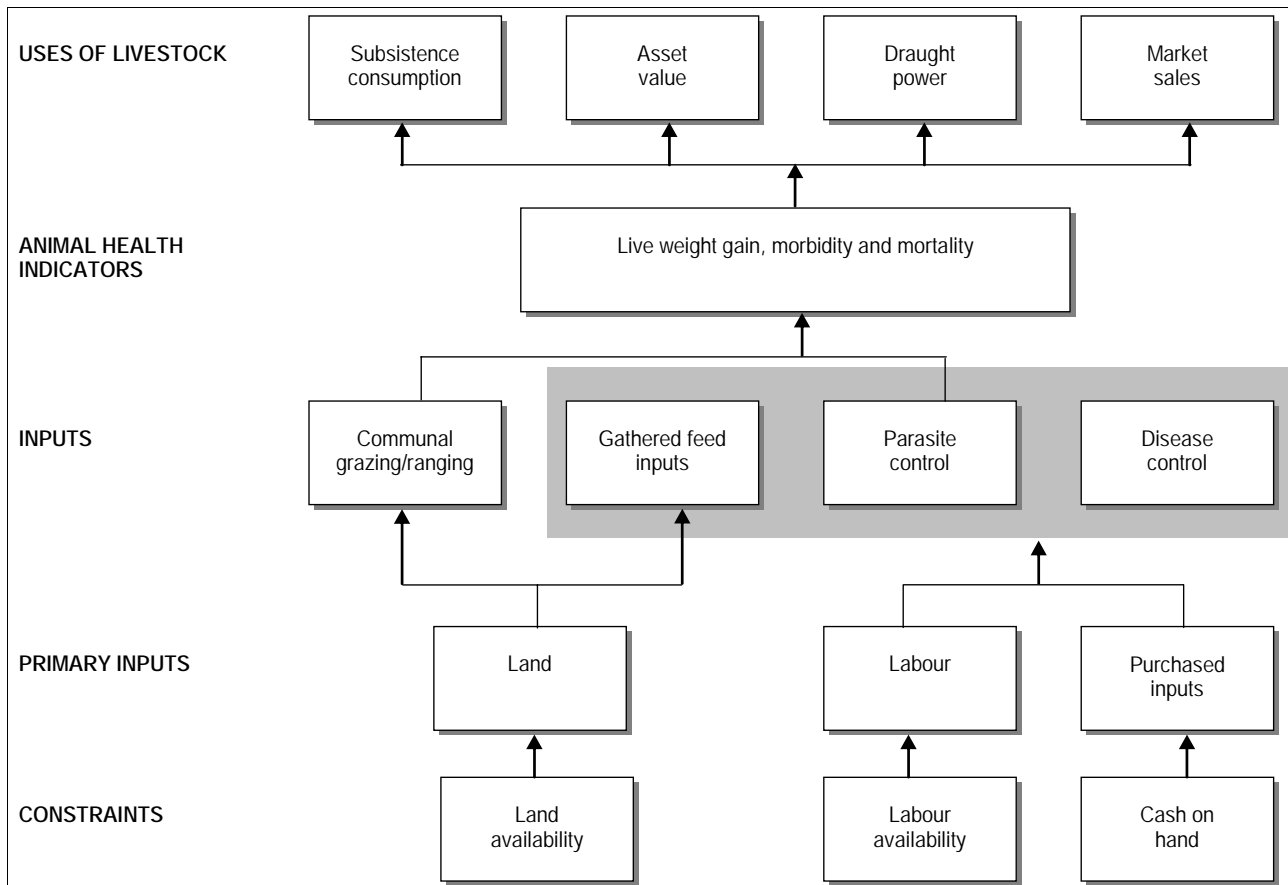


Source: The CIE.

animal health, it is useful to expand the cattle and buffalo component of the production system to look at where animal health fits in with the other inputs into cattle and buffalo and their uses (chart 3.2).

There are four basic uses of livestock in Laos and Cambodia: for subsistence consumption, as an asset or savings bank, for draught power, and market sales for cash income. In a development sense, the goal is to move more producers into market sales. However, many smallholders are still in full or quasi-subsistence, and there are limited interactions with the market economy especially on the income side of the household equation. In this system, the primary use of cattle and buffalo is as an asset, which can be liquidated when a significant cash outlay is required. This often occurs when a medical emergency arises. In a full subsistence system, draught power is important for rice production. As smallholders move out of full subsistence towards a market oriented system, the use of cattle and buffalo move towards market sales (right hand side of 3.2). This will only happen as food security improves, and the risk of intensifying and specialising in cattle production decreases. As this change occurs, more

3.2 Smallholder livestock production systems



Source: The CIE.

inputs will be required to produce cattle. The demand for animal health and management inputs such as disease and parasite control and husbandry and breeding will increase.

Chapter 4 looks in more detail at the smallholder system and the incentives and constraints that they face.

Features of cattle production systems in Laos and Cambodia

There are a variety of cattle production systems that operate in Laos and Cambodia. Whilst each system is different, there are common features. These include:

- free range grazing on common land
- limited hand feeding, primarily using cut and carry forages
- virtually no selective breeding.

These features are found to different degrees in both Laos and Cambodia, with the interaction varying mainly with geographical location and ethnic group. The following section attempts to characterise cattle production systems in both countries.

Laos production systems

The cattle herd in Laos consists of mainly of native yellow cattle, with H'mong cattle present in the H'mong areas of northern Laos. These breeds are small and well adapted to the prevailing conditions in Laos. Attempts have been made in the past to introduce exotic breeds such as Brahman for cross breeding but in most cases these have been unsuccessful. Mortality in introduced breeds is extremely high, as they are not suited to the climate and their feed requirements are much higher than native cattle. Box 3.3 discusses two examples of attempts to introduce Brahman cattle in Laos that were highlighted during consultations.

In general, cattle and buffalo are raised in extensive systems largely based around seasons and cropping cycles. During the wet season when crops are grown, animals required for draught power or manure are generally tethered in makeshift housing near the smallholder's home away from cropping areas, while others are taken into forest areas to prevent crop damage. During the dry season, cattle usually graze freely on cropping land and on communal land with feed shortages common. However, there are some variations within this system that are worth noting.

3.3 Examples of introducing Brahman cattle in Laos

Examples of problems with introduced breeds were highlighted during consultations. A farmer in Southern Laos had purchased two Brahman bulls, which subsequently died in reasonably short time (Mr Bountem, personal communication, 28 September 2006). Another example was found at the Cattle Bank in Xieng Khouang, which was set up through an IFAD project. The Cattle Bank received a donation of Brahman cattle from Vietnam. However, as the cattle arrived near the onset of the dry season, there have been significant problems with growing adequate feed supply, even though the Cattle Bank ostensibly has much greater capacity than most other areas for growing feed. There were also problems encountered in attempting to cross breed the Brahmans with the native cattle (Mr Hong Thong, personal communication, 27 September 2006). ADB (2005c) concludes that 'at this stage of the region's development, the pursuit of any genetic improvement program through introductions of exotic cattle breeds is counter productive'.

There has been some development in feeding forages to cattle in parts of Laos. But feed availability is still constrained in many areas. In southern Laos for example, there is very little feeding of cattle using forages. This is due mainly to the harsh conditions and poor land quality. The most fertile land is taken up with rice production, and while there is significant common land for grazing, overstocking and general poor land condition mean that feed for cattle is in extremely short supply. At the time of consultations for this study, pasture had already been eaten out even though it was at the end of the wet season. Growing forages is a difficult proposition in this environment, with suitable land and a lack of water in the dry season being significant constraints. Overstocking is therefore a major problem, and one that is exacerbated by the fact that there is no formal system for using common land. Cattle numbers are not limited, and since they are largely an insurance policy for smallholders, the natural inclination for smallholders is to keep more, not less cattle on the common land. This in turn puts even more pressure on the condition of the land.

In other areas, free range grazing is combined with some limited growing of forages to intensively feed cattle – the 'cut-and-carry' system. This is most notable in the parts of Central and Northern Laos, particularly among the H'mong ethnic group. The H'mong people are 'well known for their skills in raising cattle' (ADB 2005c). This capacity with cattle is attributed to the H'mong's culture of breeding fighting bulls.

The increase in forage growing for feed in some areas of Laos has been partly driven by the involvement of donor projects aimed at increasing uptake of forage systems. Key factors that affect the adoption of systems of growing forages and feeding cattle are access to markets to sell fattened cattle and good quality land to grow forages. The areas that have been

successful in moving to a more intensive system through projects in provinces such as Xieng Khouang generally exhibit these characteristics. Strong demand for live cattle, particularly from Vietnam has also played a role. Smallholders in this system typically have a number of cattle on the common land, and periodically either bring one of their own animals in to feed or buy in an animal to fatten for a period when a specific cash requirement needs to be met (Mr Chikilo, personal communication, 26 September 2006). This is the equivalent to a finishing system, but cattle are often bought in poor condition at low prices. Cattle are also fed when they become pregnant or sick in many instances. Table 3.4 outlines the key features of the major production systems in Laos.

3.4 Cattle production systems in Laos

<i>System</i>	<i>Key features</i>
Free ranging cattle on common land and forest areas	<ul style="list-style-type: none"> ▪ Periodic checking of cattle by owners ▪ No inputs aside from labour to check on animals ▪ Animals can remain in forest unchecked for lengthy periods ▪ No market orientation – animals kept as asset/bank
Free ranging with cows bought to village around calving and fed with cut and carried feed	<ul style="list-style-type: none"> ▪ Limited inputs – mainly feed for pregnant animals and labour ▪ Little market orientation – inputs focused on protecting asset
Tethered or free ranging near village by day, housed in village at night and fed cut and carry feed	<ul style="list-style-type: none"> ▪ Can be areas with limited land for free ranging ▪ More market orientation, depending on location ▪ Animal still mainly used as an asset
Free ranging with cut and carry feeding for finishing cattle	<ul style="list-style-type: none"> ▪ Several animals per household free ranging only ▪ Finishing purchased or own animal for market ▪ Finishing generally when cash required ▪ Some market orientation, but animal still largely form of savings

Source: ADB 2005c.

Selective breeding of cattle in Laos is virtually non-existent. Castration of surplus males is not practiced in Laos, and farmers have little understanding of other managed breeding practices such as segregation. As noted in ADB (2005c):

Males are left entire, cows mate with any available bull and calves are weaned naturally. Management inputs are minimal and animals are left to their own devices for much of the year.

In this system, in-breeding is a significant problem. Low body weight and poor condition reflects not just poor nutrition, but also poor breeding stock and widespread in-breeding. Farmers with animals on common land have very little control over breeding, since there are usually a large number of

bulls available and no way of selecting or controlling mating. During consultations, a farmer was visited who owned a total of 70 head of cattle had in excess of 20 bulls and little understanding of the breeding process. Other anecdotal evidence uncovered during consultations suggested that when there was any bull selection, males were selected for features such as the longest horns, particularly in H'mong areas where there bull fighting is practiced and culturally significant.

Cambodian production systems

Agriculture in Cambodia is dominated by rice production. Nationally, rice accounts for over 76 per cent of agricultural revenue and 84 per cent in poor households (World Bank 2006b). Livestock accounts for around 10 per cent of household income. Rice cultivation takes up much of the arable land, with little crop diversity and as a result, the cattle raising system is largely centred around rice.

There are several breeds of cattle in Cambodia. The native yellow cattle are the most prevalent, while the other major breeds are Haryana and Brahman. Haryana cattle were introduced from India, and are mainly concentrated along the Mekong where more forages are available. The native cattle typically reach weights of between 250-300 kg, while the Haryana and Brahman crosses reach around 400-450 kg.

There are two basic cattle production systems in Cambodia: lowland and upland. In the lowland areas, land use is dominated by rice. This creates significant constraints for feeding cattle. Unlike other systems where feed is a major problem in the dry season in particular, in the lowland areas of Cambodia the reverse is true. Because of land constraints and to avoid damaging the rice paddy, cattle spend most of the wet season tethered near the house or on the side of the roads. They are periodically taken out to graze on the paddy line, and there is some cut and carry feeding where feed is available. It is common to see children just home from school leading cattle and buffalo out for grazing along paddy lines or roads. Maintaining animals in the wet season is crucial so that animals are in reasonable condition for ploughing at the end of the wet season. Estimates of draught animal use vary, but between 60 and 80 per cent of rice is harvested using draught power. Despite the Cambodian government's policy to maintain the use of cattle for draught power, mechanised harvesting is increasing, but high diesel and maintenance costs are limiting factors (Terry O'Sullivan, personal communication, 3 October 2006). In the dry season, cattle in lowland areas graze on the rice stubble, where they actually gain condition. This is an important facet of this system, as it

allows the cattle to survive the wet season with enough condition to provide draught power.

In upland areas, there is more land available. As noted earlier, a significant proportion of this land is unavailable for cattle production because the government has conceded it to private companies. This means that in spite of the land availability, only around 10 per cent of total cattle and buffalo are in upland areas (Dr Sothoeun, personal communication, 3 October 2006). A characteristic of the upland areas is a long dry season which would naturally lend itself to a system based on moving cattle in and out in accordance to feed availability. Currently, a proposal is being developed for ACIAR which involves a forage project based on new techniques of managing the wet season pasture flush while retaining soil moisture by the maintenance of ground cover.

Constraints imposed by these systems

While a possible objective of any research in this field would be to determine the relative importance of each factor contributing to poor animal health, the single largest constraint faced by cattle and buffalo producers in Laos and Cambodia is feed availability. This is in turn linked to the labour constraint faced by smallholders and the availability of grazing land. Some areas have begun to adopt forages for feeding to cattle, mainly through aid projects, and these work partially by reducing the burden on smallholders in other areas such as time taken to gather and prepare feed for pigs. The severity of feed shortages varies between regions, but poor nutrition is a common problem. Even in areas where there is some feeding to fatten cattle, nutrition remains a problem for cattle grazing on the common land. As noted earlier, overstocking is common and the primary use of the cattle and buffalo as an asset increases the incentives for smallholders to keep cattle, which adds to the overstocking problem.

Poor nutrition also increases susceptibility to diseases and parasites. There is no doubt that the disease and parasite burden of cattle and livestock in both countries is in large-part due to poor nutrition. Virtually all smallholder cattle viewed during the consultation were significantly underweight, with a large and visible external parasite burden including ticks and mites which caused severe dermatitis and skin irritation. It would also be expected that these same livestock carried a large internal parasite burden. A key question for a possible project would be to examine the prevalence of disease and parasite in a livestock population which is on an adequate nutrition plane.

Workshops were held in Laos and Cambodia during which constraints facing cattle and buffalo producers were discussed. Animal health and disease featured heavily as a constraint, and while this is no doubt true, it is likely that the general animal health focus of the workshops contributed to this. The major diseases that affect cattle and buffalo in Laos and Cambodia are Haemorrhagic Septicaemia (HS) and Foot and Mouth Disease (FMD). The main implication from FMD is trade related — as a production disease it is relatively minor. HS is an important disease, but hard data on prevalence rates is non-existent. Estimates during consultations ranged from 2 per cent to 20 per cent. Accurate diagnosis and reporting of HS is a major contributor to these discrepancies. Vaccination for HS is widely promoted in both countries, with government driven vaccination campaigns one of the main delivery mechanisms. Estimates of vaccination coverage vary by province from 20 per cent to 80 per cent, but it is likely that these are significant overestimates in some instances. Blackleg was also mentioned during consultations, but it is not viewed as a major problem.

The other main cattle and buffalo health problems experienced in Laos and Cambodia are parasites, with toxocara and fasciola (liver fluke) being the major internal parasites, and external parasites such as ticks and flies also cause problems. Toxocara mainly affects buffalo calves, and can result in low growth rates and in some cases mortality. Treatments for parasites are available in both countries, but their use is limited by a lack of understanding and the cost of treatment.

Besides animal health, the major constraints that were identified during the workshops in Laos and Cambodia in order of priority were:

1. Poor nutrition and lack of feed
2. Poor reproduction management and husbandry
3. Poor marketing
4. Breeding.

Whilst the methods for dealing with most of the constraints faced by smallholders in Laos and Cambodia are well known (see box 3.5 as an example), the environment in which smallholders operate means that adopting these methods is not simple. In the current system of subsistence farming combined with limited cash generating activities (especially in rural areas), there is limited capacity to divert labour towards animal health and management. Incentives in this system are naturally skewed towards ensuring basic food needs are met in the first instance, with other cash generating activities largely a secondary priority. In other words, the risk

adjusted returns of additional investment in livestock production are not sufficient in the current system.

3.5 Feeding options in lowland Cambodia

There are a number of options for supplementary feeding of cattle in the lowlands of Cambodia. These regions are devoted almost wholly to rice – so any supplementary feeding option involves a rice product or by-product. The options are:

- rice straw and supplemented by urea;
- a feed based on broken rice; and
- fodder or feedstuffs usually purchased from a roadside vendor - many times imported from another district.

All of these options have limitations. Urea must be purchased or diverted from rice production. When combined with rice straw, it represents only a supplement but not a long-term feed solution because it lacks nutritional balance. Broken rice is relatively high valued, between 40 and 50 per cent of the value of normal rice, and most likely has to be diverted from other uses such as feed for pigs where the weight-gain conversion performance is better than for cattle or buffalo.

Forage bunches, cut from local grasses, are available for purchase by vendors on the main feeder roads around Phnom Penh or are transported directly into the capital for sale. Again, cost and availability are key issues for this feeding option.

Any move towards better animal health and management practices will largely be predicated on a move into more intensive production system. At the present time, there isn't a 'cattle and buffalo' production system at least in a conventional sense. General economic development will, in time, reduce the risk of intensifying production. There is no real social security system in Laos or Cambodia, so spreading risk over many activities in the smallholder system makes sense. During consultations it was clear that the producers who had specialised to a degree were generally better-off, and as such the risk to them of a shock — for example a major decrease in prices — is relatively low.

During consultations, there was a consensus that each constraint related to animal health and management was related, and that the best way to address them was within a broad 'whole of system' approach. But this approach needs to work within the system that smallholders operate in and the incentives that they face. More discussion on these factors is presented in chapter 4.

4

Smallholder incentives

The previous chapter provided an overview of beef production systems in Laos and Cambodia. Smallholders keep virtually all of the cattle and buffalo in these countries, so any project or program designed to increase specialisation and productivity has to be directly targeted at that group. It also has to be recognised that production and use of cattle and buffalo:

- is *not* separable from any other household operations including production or consumption activities; and
- is directly the result of choices and tradeoffs made in a very risky environment where choices are conditioned by food and income security.

It is not relevant to consider these production systems in the same framework as production in western countries — that is a specialised cattle enterprise. Any activity designed to improve cattle and buffalo production is really about improving smallholder incomes through rural development. Because both development and risk is about change, the management of this change is very important to the outcomes of a proposed project.

Therefore, a key component of this project was to understand the incentives and constraints face by smallholders — who are the focus of any research.

Integrated smallholder systems

In a fully subsistence system smallholders have no interaction with the market economy. In such a system, staple food crops are produced in either a stationary or moving (swidden) cropping system depending on the agronomy and topography of the land. Swidden cropping, usually involving slash and burn practices, is a response to declining fertility and productivity of soils.

Around these subsistence cropping systems, smallholders are also dependent on a number of complementary activities that involve:

- livestock raising of cattle and buffalo, pigs and chickens;

- hunting and gathering from forest areas or fishing for coastal communities or those next to freshwater resources like the Mekong; and
- exchanging labour with other households within the village context.

These activities, plus family and village structures, provide mechanisms to manage the risks of adverse events such as food shortages or ill-health. Characteristics of those in full subsistence are that they:

- are located in remote areas where access is poor;
- have very poor levels of education and health; and
- often belong to small ethnic groups viewed as being significantly different from the majority of the population.

The transition from a fully subsistence system to that observed in the current quasi-subsistence system has been slow, but has forced significant changes on the way smallholders behave.

Road access is a major driver of this transition — and the distance to the nearest major town is the primary indicator of the rate of the transition. Once a locality can be accessed, then the transition generally begins quickly. This is because of access to a range of goods and services previously not available. Some of these services may not be provided through markets — such as basic health care and education.

Roads also provide access to markets for sales of cash crops and livestock. It is of little surprise that communities that are closer to a major centre are more likely to have road access and therefore will be more exposed to the market economy.

Engaging a market economy

While improved access to markets and services has played a role in the transition, many smallholders have also been brought into the market economy by their requirements to purchase goods and services for cash.

In terms of household expenditures, cash payments are now required for a range of goods. In many cases these goods and services were simply not available in the locality or were supplied free of charge by the state. These expenditures include essential needs such as:

- payments for basic health services and emergency care;
- education expenses – mainly contribution to school fees;

- requirements for festivals, weddings and funerals; and
- at the most basic level — rice and other foodstuffs for those with poor food security.

In addition, there is now a wide range of consumer goods and services that are highly desirable such as:

- building materials for home improvement
- motorbikes, radios and televisions.

Inputs into agriculture are in demand and include:

- hand tractors (rotary hoes) that not only save labour but can be attached to a trailer and used as transport; and
- fuel, fertiliser, vaccines and other chemicals to improve productivity.

While some of these expenditures are discretionary, those that are not such as health and school fees have forced most smallholders into the market system to some extent.

While the transition to the market economy has happened on the expenditure side, the production technology for the staple crop, based on low or no inputs, has changed little over the same period.

Integrated systems and income security

It is important to view smallholder activities as an integrated system where decisions on production and consumption cannot be separated. The smallholder unit is the household. In both Laos and Cambodia the average household size is 6 persons, and the key objective is to maximise firstly food security and secondly income security.

Household responses in terms of cattle and buffalo production will depend on a complex set of decisions and tradeoffs that aim to maximise food and income security while minimising risk. This is why smallholders are multi-product enterprises producing:

- rice
- other vegetable or fruit crops
- livestock including cattle and buffalo, pigs and chickens.

Smallholders will also have arrangements where they either sell or exchange their labour for cash for other goods and services. The diversity

of these ‘outputs’ are how the risk of failure of one activity — such as a poor rice crop — is managed. Another important risk is incapacitation or death of one of the heads of a household.

Virtually all smallholders in Laos and Cambodia in rural areas grow rice. Food security in rice depends on the productivity of their system — which in turn depends on:

- the size of smallholding relative to the size of their family; and
- the productivity and reliability (in terms of yield) of the smallholding.

Cash-earning opportunities available to quasi-subsistence households may include:

- the production and sale of other crops, including grains, fruits, vegetables and freshwater and marine fishing products and the proceeds of forestry and hunting;
- the sale of livestock including cattle, buffalo, pigs and poultry; and
- the sale or exchange of their own labour or that of their children.

Food security

Population pressure on limited land is becoming a large constraint to the sustainability of these smallholder systems by compromising food security. Box 4.1 illustrates how food security is a priority for many smallholders and how it affects smallholder’s decisions concerning other cash-earning opportunities.

Overall, productivity per hectare in terms of yields depends on soil fertility and climate — particularly the length and the reliability of the wet season. Much has been written about the productivity of rice production in both of these countries and steps required for improvement in yields. The System of Rice Intensification (SRI) project in Cambodia, funded by AusAID, looked at a range of interventions that centred on:

- higher-yielding varieties and moving from long season (traditional) rice varieties to newer short season cultivars with the potential for double cropping; and
- a range of management improvements including better soil cultivation and transplanting techniques to water management and weeding practices.

4.1 Food security in Laos and Cambodia

The World Bank provides the following example. The average size of a farm in Cambodia is 1.5 ha. However, 40 per cent of the rural population live off less than 0.5 ha. With average yields of 1.8 t/ha and an average size of 6.1 people, a household with 0.5 ha will produce 900 kg of paddy or 585 kg of milled rice. This represents 96 kilograms per person per year – sufficient to meet only half of the average per person milled rice requirement of 165 kilograms per year.

This example excludes the likelihood of post-harvest losses of between 10 and 15 per cent. In Laos the usual practice is to allow 180 kg of milled rice per person per year or 493 grams per person per day - which meets 75 per cent of the average energy requirement – 2 338 Kcal/day (<http://www.fao.org/docrep/004/v9479e/v9479e00.htm>).

Evidence from the consultation in Laos suggested that food security was very poor in some southern provinces in Laos. These smallholders are producing subsistence rice in a harsh savannah-like climate that is characterised by a pronounced and extended dry season. In these regions, rice is harvested at the end of the wet season around September/November. Where smallholdings are around 0.5 hectares, and accounting for variations in yields, some households are short of own-consumption rice by as early as March in the following year. These people then have to sell-off livestock, exchange their own labour or exploit local fishing and forestry resources to provide food for their families.

Source: World Bank 2006b and the CIE.

Appendix B summarises the results from the household expenditure survey from Laos that further highlight the poor food security facing many smallholders and that food availability and population pressure will vary naturally between regions within the same country (NSC 2004). This would indicate that it is not appropriate to use a blanket approach to improving smallholder's outcomes.

Income security

Better income security would generally translate to improved food security because food can be purchased when required. But this is not always the case where poor infrastructure and government regulation stifles trade in food between provinces and countries — particularly for rice.

Anecdotally, consultations revealed that both food and income security in more northern areas of Laos appear to be significantly better than in southern Laos, and indeed the provinces visited in Cambodia. This had a lot to do with the quality of the resource base (land and climate) and lower population pressure.

To assess income security more objectively, the net income-expenditure situation for average rural households in Laos was analysed from the

consumption and expenditure survey summarised in appendix B. Table B.1 shows that across rural households, total income averaged US\$632 and while expenditure was over US\$1 000. These estimates include production for own-consumption. This leaves an average cash deficit per household of around US\$395 per year. This deficit ranged from US\$350 in the northern region to US\$592 in the southern provinces.

While this data probably overstates the cash flow deficit faced by rural households because the survey does not capture all income generating activities, the picture is clearly one where smallholders are not income secure. But because the data averages over a year, it is likely to understate the cash flow difficulties faced by smallholders at certain times of the year especially when own-consumption food is short and expenditures are required.

While there is no corresponding income and expenditure data for Cambodian households, there isn't any compelling reason to believe that income security in Cambodia is any higher than Laos.

Natural resource depletion

Another factor that is threatening smallholder's livelihoods is the acceleration in the exploitation of natural resources that represent part of the safety net for villages. This is especially true for:

- logging in northern Laos which has included forced resettlement
- over-fishing in the Mekong River in southern Laos
- over-fishing in coastal Cambodia.

Development in China, including damming the Mekong, will have important impacts in reducing flows and fish availability, especially if they affect the wet season flows that fill Ton Le Sap in Cambodia.

Managing risk is the bottom line

A characteristic of smallholders in Laos and Cambodia is that they are very risk adverse. Apart from the reality of being thrust into a market economy, the history of both countries is one of war, conflict and food shortages. The experience of these times strongly conditions behaviour in the face of change. This has implications for how transition to a modern economy is best supported by government and donors.

The need for cash to pay for basic requirements is exacerbated by the absence of a state-provided security network and the limited reach and functionality of the financial sector. People cannot rely on institutional structures to deliver goods and services, even if paid for, because of corruption or incompetence.

Because of relatively poor food security and the necessity to have cash on-hand for expenses (both expected and unexpected), smallholders are largely risk adverse. This constrains much of their behaviour, with scarce resources including labour and land spread across a number of subsistence and cash-earning activities. If one activity fails, then all is not lost. That is, there is no real incentive to specialise.

In developed countries, there are a number of mechanisms to mitigate risk. These include the ability to save money in a functional financial system and, as a last resort, a social security net provided by the state including a health system. In Laos and Cambodia these mechanisms simply are not available.

Mechanisms to deal with risk

In times of financial need, smallholders have a number of contingencies that are called-on depending on the level of cash requirement. These include:

- sale of livestock;
 - poultry and pigs for small requirements;
 - cattle and buffalo for larger outlays;
- borrowing money from extended families, which may or may not be in the same village or could be in town;
- sale of labour or temporarily moving into the nearest town for employment;
 - if smallholders do not have a buffalo or steer for draught, they are most likely to exchange their own labour for the draught power;
 - this may include sending children away for work to the city or even neighbouring countries; and
- selling land is the last resort.

These findings are largely based on the consultation process and are supported by the Participatory Poverty Assessment for Attapeu Province in Laos, which reported the following (MWBP 2006):

Livestock production functions as a savings mechanism in times of need. When small amounts of cash are needed, people can sell chickens. For example, villagers of Sen Keo often sell chickens to purchase white salt, kerosene, cooking powder or paying for a boat trip to Sanamxay. However, almost all people said that when in need, they sell chickens or pigs first, cattle are last except when they require lots of money or family members fall sick.

While smallholders face many risks, the most significant one is illness or death especially of the heads of the households. This has a double impact because their labour input is lost, impacting on the household's food supplies and income, while in addition the expenditure required for medical treatment and/or for funeral arrangements can be significant (see box 4.2).

4.2 A health shock is often more serious than a harvest failure

Results from surveys in two villages south of Phnom Penh suggest that while crop failures and illnesses are both devastating experiences, entailing similar magnitudes of economic damage (averaging a few hundred thousand Riels), households find it harder to cope with illness. The negative consequences from health shocks are more damaging to both immediate and long-run livelihood because they require an immediate lump-sum of money for urgent treatment. Because most households do not have sufficient savings (and rural credit markets do not operate well), households are often forced to resort to distress sale of productive assets (including land) and/or enter long-term debt, reducing their future income streams and increasing their non consumption expenditures, respectively. This broadly confirms the findings of earlier Oxfam studies which found that half of all distress sales, or around 40 per cent of cases of once-landowning families losing land, involved health crises.

Source: World Bank 2006b.

While smallholders keep cattle and buffalo primarily to act as a bank and an insurance policy, they largely will not view large ruminants as an activity that is likely to provide a regular income. As such, there is little or no incentive to specialise and devote more scarce resources to that activity under the current system.

Resource base is highly constrained

As noted in chapter 2, a significant constraint on improving production of ruminants is the availability of land and labour. In terms of land, the system of land tenure and the sharing of communal land at the village level impacts significantly on how cattle and buffalo production could be intensified.

As already noted the production systems for smallholders are based on a plot of between 0.5 and 2 hectares. On the plot the house is sited, and rice and vegetable planted and livestock kept. In addition smallholders also have access to communal lands. In Laos, these communal lands include the transition area between the fertile flats and forest areas. In Cambodia, communal lands in the lowlands are essentially those areas that are not sufficiently flat or fertile for paddy.

While in some instances a cattle or buffalo may be fed on the house block using cut-and-carry feed, remaining cows, calves and bulls not being fed generally share the communal grazing land.

To improve the efficiency of the cow-calf segment of the production system on the communal land, smallholders within a village would have to cooperate to improve management and breeding practices. Under the communal system, choices of smallholders are highly influenced by the hierarchy within the village setting including the head man and Village Veterinary Worker. Changing practices under this system is a long-term proposition.

Our understanding of the communal grazing arrangements is that stock numbers are not actively controlled on a village basis. That is, the reality of communal lands is that all villagers have access rights to communal lands. At minimum, each household will have one animal that would be grazed on communal lands. With increasing population pressure the communal resource becomes a real constraint.

During the consultation, which was at the end of the wet season, every communal grazing area had little or no pasture — reflecting that these areas were significantly overgrazed. During the dry season, even in the more productive grazing areas, smallholders are moving their cows and calves to scavenge along roads. While cut-and-carry is easing the feed constraint for those smallholders intensively feeding cattle and buffalo in northern Laos, communal grazing remains a significant constraint throughout Laos and Cambodia.

Functions of large ruminants

One of the primary objectives of the consultation process was to identify and rank in importance the functions of large ruminants in smallholder households. In terms of their functions, they provide a number of services:

- an asset or a mechanism to manage money and deal with risk;

- source of income — cash revenue;
- meat for household consumption especially for weddings, funerals or auspicious occasions;
- draft power for cropping; and
- manure for fertiliser.

The relative importance of each function

The ranking of these functions has vital implications for the type of research that could be conducted and how this research would be delivered to smallholders.

To determine the relative importance of each of these functions in Laos and Cambodia would require a detailed study over a long period of time. This study would involve valuing each of the functions within a household budget context. Such a study would not just look at decisions at one point of time or over the period of one year — but would consider the dynamics over time between the different production seasons and account for expected and unexpected expenses.

However, we can provide an insight by using a recent report for the Vietnam livestock sector. A recently completed study by Huyen et al (2006) surveyed livestock producers in Vietnam during 2002 with the objective of providing insights into the role and importance of large ruminants to integrated smallholder systems. Key results from the study are summarised in appendix C. The functions of large ruminants depended on three main factors:

- the remoteness of the smallholders in terms of road access and distance to a major town;
- altitude of the area, which influences the production system; and
- the ethnic background of the smallholders.

Across all villages surveyed livestock contributed 12.4 per cent of total income — this being significantly higher for villages closer to town. While cropping remains a dominant source of income across all villages, off-farm employment was becoming significant for those villages near to town. This finding is supported by the household income and expenditure survey from Laos summarised in appendix B. This showed that over all rural households, sales of all livestock and their products accounted for 25 per cent of smallholders' incomes. If half of this income came from large ruminants, then it would be similar to the survey results from Vietnam.

In gross margin terms (revenue less variable costs) of the 'enterprise', cattle and buffalo provided only small or negative returns. Restocking costs were the largest single cost item indicating that cattle and buffalo were turned-over regularly.

The value of stock or asset value of large ruminants provided the largest benefit to surveyed smallholders accounting for 75 per cent of the total benefit to smallholders. This value ranged from US\$294-760 per year per household or an average of \$517 per household across the surveyed villages. Value of draft power was the next largest contributor which averaged US\$73 per household per year.

While the results for Vietnam are not perfectly applicable, due to ethnic and other environmental factors, we believe that the study gives a good representation of the current situation in Laos and Cambodia. During the consultation, even where supplementary feeding and fattening of cattle was being undertaken, smallholders were asked 'do you sell your bull when it is fat or when you need the money?' In all cases the answer was: 'when we need the money'. So even in these systems where some intensification is underway, there appears to still be a strong asset or bank function to large ruminant production.

How the asset function works

In absence of other financial instruments, smallholders have livestock and in particular large ruminants as a way of managing and accumulating large amounts of cash. As pointed out, assets or savings are required for expected expenses such as school fees or significant occasions or for unexpected expenses or emergency.

For example, assume that a smallholder needs US\$200 for an unexpected expense. The only asset that they have that can be liquidated is a bull worth US\$500. The bull is therefore sold off and after the expense is settled, the smallholder is left with US\$300. He could choose to spend it or 'bank' it by purchasing a bull worth US\$300. This animal would inevitably be inferior to the original animal as it would be younger and be in poorer condition. This animal would be most likely purchased from another smallholder forced into a distressed sale in the local area.

In a country with a functioning financial system, smallholders could choose between a number of instruments to finance large and lumpy outlays:

- drawing on savings held with a financial institution;
- borrowing the money from a financial institution; or

- taking out an insurance policy to payout the required amount of money.

With a land tenure system that offers no realisable equity in land or housing, and limited access to banks, smallholders have no choice but to rely on other mechanisms such as an asset that can be sold off as required. Large ruminants are the most effective at filling this function, particularly as they can be walked out from the village to be sold.

5

Market analysis for beef and buffalo

The prospects for the emerging cattle and buffalo industry will be an important consideration in the decision by ACIAR to contribute to these industries in Laos and Cambodia. This chapter looks at developments within each country and the region, as well as the future prospects for cattle and buffalo. Little reliable data is available for Laos and Cambodia, and data for the wider region is also patchy at best. This chapter presents available information, as well as anecdotal information and data uncovered during the consultation phase for this report.

Thailand has traditionally been the major destination for live cattle exports from Laos and Cambodia. Much of this trade has been driven by the demand for cattle from Malaysia. Recently however, Vietnam has emerged as an important growth area in the region's livestock markets. This has coincided with increasing demand in Vietnam, as well as a shift in imports in Malaysia away from live cattle towards imported beef. In the short term, it is likely that sustained growth in demand in Vietnam will continue to drive the informal trade in live animals, and China may become a significant source of demand. However, there are some reasons to be cautious about the sustainability of this trade over the medium and longer term. Much will depend on development in neighbouring countries, including the pace of infrastructure development and income growth. Development in Laos and Cambodia will also be a factor, as they move away from a subsistence based production system to increasing intensification and specialisation.

There are several drivers that will affect the prospects for livestock industries in the region. Broadly speaking these are:

- population growth
- income growth
- productivity growth in segments of the livestock industries
- prospects for trade with adjacent countries
- the institutional environment.

Domestic markets

Whilst there are some differences in the environment and production systems for raising cattle and buffalo in Laos and Cambodia, the issues relating to domestic market opportunities and future prospects are similar.

Chapter 1 has outlined a broad picture of income and population growth in these countries. Table 5.1 outlines estimated per person meat production in Laos and Cambodia used as an indicator of per person consumption. As mentioned earlier, the only real data source is the FAO, for which production and net trade data is unreliable at best, so these figures can only be viewed as indicative.

5.1 Estimated meat production on a per person basis

	1990	1995	2000	2005
	Kg per person			
<i>Laos</i>				
Beef and buffalo	3.8	6.1	6.3	6.9
Chicken	1.5	1.9	1.8	2.7
Pigmeat	5.0	6.1	5.2	4.7
<i>Cambodia</i>				
Beef and buffalo	1.9	4.5	5.3	5.4
Chicken	1.7	1.7	2.1	1.8
Pigmeat	6.2	7.2	8.3	9.3

Source: FAO 2003.

This data suggests that total per person consumption of meat in Laos and Cambodia is low by broad regional standards but is probably equivalent to that observed in areas of neighbouring countries with similar income levels, household structures and ethnicity. However, these consumption levels are likely to be greater than those that may be observed in Myanmar. Seafood, freshwater fish and aquaculture products also have a role in protein consumption by households in certain regions. Domestic demand for protein derived from meat products is also growing as incomes rise, and this will continue.

Therefore there is significant potential to increase meat consumption in these and 'catch-up' to consumption levels observed in adjacent countries especially Thailand and Vietnam. Per person meat consumption (excluding seafood) in Thailand is presently around 24 kg per year compared with around 14 kg for Laos and 16 kg for Cambodia.

Characteristics of domestic markets

The beef supply chain, in terms of infrastructure and sophistication of processing and products produced is in its infancy in both countries.

In the provinces, smallholders selling cattle and buffalo will most likely walk the animals to a village with road access for purchase by a trader. Animals for consumption in regional markets will be trucked or walked to the point of slaughter. If the animals are destined for the respective national capitals — transport could take more than a day.

Many of the characteristics of supply are dictated by temperature and the absence of a cold chain. Cattle and buffalo arriving at an abattoir are held overnight and slaughtered very early in the morning between. The carcasses are usually broken up, at the point where killing takes place, for transport and distribution to markets. Evidence from the consultation suggests that carcasses are broken up, distributed and sold to final consumers the same day.

Post-slaughter, there appears to be little or no differentiation between cuts and offal. Also, there appears to be little or no differentiation between types of cattle on the basis of weight, age or sex of animals to be slaughtered. That is, processing does not target animals with certain characteristics for local consumption. In Laos, many of the cattle and buffalo observed being sent for slaughter were cows and bulls around 8 years of age or greater – what in Australia would be considered to be culls. Many animals are apparently slaughtered as calves — which would be significantly easier in a village context than slaughtering larger animals.

This absence of different ‘products’ is due to the logistics of the supply chain and the uses to which consumers put the beef and buffalo. Meat and offal appear to be of equal value to consumers because of their contribution to flavour in local dishes and protein value. Much of the beef and buffalo are consumed minced, shaved or cubed (see box 5.2). Meat from any part of the carcass can be used in these dishes.

In regional wet markets visited during consultations, beef sold to consumers was generally cut off in chunks from parts of carcasses — typical of South East Asia. The only cut that was readily identified was fillet — partly because of its value to local niche consumers and foreigners.

One of the strengths of the current supply chain is the speed with which product is used by final consumers. This speed is the main factor in maintenance of reasonable food safety outcomes throughout the supply chain.

5.2 Traditional uses for beef in Lao and Khmer food

In Laos, Laap is considered to be the national dish. It is made from chopped meat – and can comprise buffalo, beef, chicken or duck. The finely chopped meat, spices and broth is mixed with uncooked rice grains that have been dry-fried and crushed. Laap is eaten with a plate of raw vegetables and sticky rice.

Pho or noodle soup is another staple which can be found everywhere in Laos. It can also contain most meats – in some southern provinces it is more likely to contain shaved beef or buffalo and offal.

In Cambodia, a common use for beef or buffalo is Samlao Ko Phet or Tamarind Beef Curry using meat cut into thin strips. Loc Lac is another dish common to Cambodia and Vietnam that uses marinated cubed beef cooked on skewers. Beef is also used in noodle soup along with the other meats.

The lack of different products, refrigeration and uncertainties about food safety are all contributors to the fact that most western hotels and restaurants in both countries import frozen boneless beef.

Overall, there is not yet sufficient desire or capacity to pay for more sophisticated beef and buffalo 'products' which are sought after in western countries. But experiences in other developing countries suggest that these preferences will develop as incomes rise in these countries. For the foreseeable future, a large part of the expansion of markets for beef and buffalo will be from other countries based on the live animal trade.

Current market indicators

Analysis of livestock markets on a regular basis is simply not possible in Laos and Cambodia as it is in western countries. The concept of what constitutes a market is also quite different. There are a number of reasons for this:

- lack of formal marketing arrangements and infrastructure such as saleyards or mustering points;
- the black market nature of many of the transactions, including the unofficial export trade to Vietnam and avoidance of the range of official transactions costs involved in officially selling and moving cattle and buffalo;
- thin, opportunistic and erratic trading due to the nature of smallholders cash requirements (as outlined in chapter 3);
- the fact that very few cattle or buffalo are sold against an objective description of their age, weight and their condition score; and

- lack of government resources or incentives to collect and distribute livestock market information in a regular or systematic way.

The best information we can provide for this study is a snapshot of prices at the time of consultation to both countries in October 2005. These prices are presented in table 5.3.

5.3 Indicative prices of cattle and buffalo

	<i>US\$ per head</i>
<i>Laos</i>	
Nong Haet district (North) – into Vietnam for 400kg animal	Up to 800
Borikhamxay province (South) – local 3 year old cattle	150-250
Borikhamxay province – local 5 year old buffalo	300-350
<i>Cambodia</i>	
Kampot province – into Vietnam, native/mixed breed cattle: 200-400kg	500

Source: Personal communication, Nong Haet district office, Borikhamxay provincial office, and Thaphabat district office.

These prices are only indicative and the capacity to compare prices between countries and regions depends on what is often a purely subjective assessment of the animal sold by those supplying the information. For example, there is only a recent trend towards purchasing cattle on the basis of judgement about weight and condition. Because there is no weighing, there is no way of confirming the weights estimated in table 5.3. Indeed, some of the prices and weights quoted during consultations suggest implausible unit values, and it is highly likely that in many cases the weight estimates are inaccurate. Previously, criteria used included the size of horns, colour of the hide and the shape of the face. This is why Chinese yellow cattle maintain relative premiums over other breeds in both Laos and Cambodia. Livestock officers in Southern Cambodia suggested that there was a significant premium for native cattle over mixed breeds — as much as 50 per cent on a weight basis, but again, this assumes that the weight estimates are accurate.

The key points to arise from the consultation in Laos were:

- cattle prices between central and southern regions in Laos, including the capital district, and Thailand were similar indicating:
 - that in practice the trade across the Mekong was more or less unrestricted; and
 - the absence of a readily accessible border crossing through to Vietnam for the central region;

- prices in northern Laos were substantially higher than for central and southern Laos. This reflected:
 - the accessibility to the Vietnamese market through Nonghet District in Xieng Khouang province and similar border crossings into Vietnam and China further north; and
 - the dislocation of Vientiane and the northern provinces of Laos due to lack of road infrastructure.

Our exposure to Cambodia was heavily time constrained and we only visited Kampot province on the Vietnam border. In this province anecdotal evidence suggested that traders were purchasing slaughter cattle for export to Vietnam for strong prices.

Regional markets

One driver of demand for the livestock industries of Laos and Cambodia has been demand for meat from neighbouring countries. This effect has been particularly significant in areas with access to these markets. In turn, key drivers of the total demand for meat are population and income growth. In addition to this, changes in the composition of total meat consumption is driven by the relative prices — most often a function of relative rate of productivity growth.

Population growth

In terms of population, average annual population growth in China, Thailand and Vietnam has been around 2 per cent over the past 20 years. Forecasts for growth over the next 10 years are between 0.5 and 1 per cent per year. While this is a function of government policy in China, it is also a hallmark of economies with strong income growth.

Income changes will shape trade

Average annual income growth for these countries in the next 5 years is forecast to be robust: 5 per cent for Thailand, 7 per cent for Vietnam and 7.5 per cent annual growth for China. Malaysia is also a strong regional player in livestock markets with annual economic growth in the order of 5.5 per cent.

A key factor to consider is the substantial divergence in income prospects between rural and urban areas. This divergence has been driven by rapid industrialisation and the employment it generates. Therefore, growth tends

to occur around urban areas, and in the case of China in the coastal and southern regions. This is also the case for Vietnam where it has been estimated that one million people migrate to the major urban areas every year to take-up employment in industries located in the export processing zones. This leaves those remaining in rural areas to commence the transition from subsistence to greater specialisation. Given these trends, Laos and Cambodia appear to be centrally located in a region with potentially strong demands for meat.

One way to assess the potential demand for meat from these countries is to look at historical trends. Table 5.4 summarises readily available data of trends in per person meat consumption for the past 20 years for China, Thailand and Vietnam.

At the relatively low levels of meat consumption for the region, compared with those observed in western countries, per person meat consumption is highly correlated with income. Per person meat consumption has increased at an average annual rate of 2.6 per cent in Thailand, 7 per cent in China and 5 per cent in Vietnam.

While some of these growth rates are off a low base, it would not be difficult to extrapolate these trends into strong demands for meat over the next ten years. This growth is especially driven from the urban areas of eastern and southern China and Ho Chi Minh City in Vietnam.

5.4 Per person meat consumption by country

<i>Meat consumption by country</i>	<i>1980</i>	<i>1990</i>	<i>2000</i>
	Kg per person per year		
<i>Beef</i>			
Thailand	5.9	5.7	3.7
China	na	1.0	4.2
Vietnam	1.5	1.4	1.5
<i>Pig meat</i>			
Thailand	4.9	6.0	7.5
China	na	19.6	32.5
Vietnam	5.0	11.0	17.5
<i>Poultry meat</i>			
Thailand	4.0	9.4	14.0
China	na	2.8	10.2
Vietnam	2.0	2.5	4.0
<i>Total (excl. fish)</i>			
Thailand	14.8	21.1	25.2
China	na	23.4	37.9
Vietnam	8.5	14.9	23.0

na: Not available.

Source: GMI database and FAO 2003.

Another feature of this table is how the composition of meat demand in these countries has changed in favour of pig and poultry meats. While there may be small cultural elements to this trend, relative productivity of each meat is also a key driver. Pigs and poultry production are more amenable to intensification through the use of feed inputs — which in turn depends on access to energy-dense feeds such as grains and oilseeds. The result of this intensification is stronger production growth in pig and poultry meats and lower relative prices than for beef and buffalo.

While incomes in these countries have been growing, meat consumption is still dependent on sale through wet markets and home-consumption. This is largely because the necessary infrastructure for a cold-chain is still being developed. This fact has some important implications for how trade will satisfy future demands.

Vietnam

With Vietnam emerging as the major destination for live cattle exports from both Laos and Cambodia, it makes sense to examine the data available on recent developments in this market.

Table 5.5 shows recent production data across meats. Nearly all growth in production in volume terms has come from pork and poultry meat — which is starting off a surprisingly small base. That said, the production of beef has been growing at over 10 per cent per year but in 2007 is expected to account for just over 4 per cent of total meat production.

5.5 Meat production in Vietnam

	2004	2005	2006	2007	Growth ^a
	kt	kt	kt	kt	%
Pork	2 012	2 288	2 446	2 617	8.9
Poultry	316	322	748	894	48.5
Beef	120	142	153	164	10.7
Buffalo	57	60	62	65	4.0
Other	7	10	12	16	28.1
Total	2 513	2 821	3 421	3 755	15.0

^a Average annual growth rate 2004 to 2007.

Source: USDA 2006.

Of the total cattle and buffalo population of 5.54 million in 2005, it is estimated that 90 per cent are raised in backyards and by smallholders. The remainder are on commercial farms — some of which are located adjacent to border areas that source feeder cattle from Thailand, Laos and Cambodia.

Vietnam's government currently has policies to encourage commercial farms by tax concessions, land-use preferences, support for artificial insemination, policies to increase available grass forage and vaccine and agricultural extension training (USDA 2006). We have already noted that the government of Vietnam chooses not to recognise live imports but does little in practice to stop trade. One direct threat to the trade would be if the government chooses to practically close the trade for a variety of reasons such as disease concerns or self-sufficiency objectives.

An indirect threat to the emerging live cattle trade to Vietnam apart from booming pigmeat and poultry production are imports of beef, especially from low cost suppliers such as South America and India. The USDA (2006) reports that beef is Vietnam's largest meat import — with a total value of US\$3.3 million or 730kt at a unit value of \$US 2.20 per kg. This implies that imports account for around 84 per cent of beef consumption.

Because of data availability is very patchy in these countries, it is difficult to cross-check these data from other sources. Nevertheless this data is summarised in table 4.5. The USDA report that sources of imported beef for 2006 included Argentina, New Zealand, India and Malaysia. It is interesting to note that Vietnam is actively trading with declared FMD countries.

Due to low domestic production relative to demand, imports of beef are expected to continue especially in hotels and restaurants in the large cities. This could explain the large jumps in both fresh and frozen product shown in table 5.6.

5.6 Production and value of imported beef by Vietnam

		2004	2005	% change
Production	kt	119	142	19.0
Import volumes	kt	Na	730	na
<i>Import values^a</i>				
Fresh or chilled	US\$m	1.160	1.620	39.7
Frozen	US\$m	1.296	1.673	29.0
All beef and veal	US\$m	2.456	3.293	34.1

Na: Not available. ^a HS 0201 and 0202.

Source: USDA 2006.

Feedgrain use

Vietnamese corn production has increased significantly over the past decade, corresponding to a rapid increase in demand for animal feed.

According to government figures, corn production in 2005 was 3 730kt, an increase of 9.5 per cent from 2004.

Vietnam's corn consumption is mainly used for animal feed production including commercial feed and homemade feed. Annually, Vietnam produces about 10 million tons of feed, 33 per cent of which is commercial feed. Corn used for feed currently accounts for 75 to 80 per cent of Vietnam's total corn consumption and the majority of this would be used in the production of pigmeat and aquaculture.

The Vietnamese animal feed production sector now relies heavily on imported feed ingredients. USDA (2007) suggests that Vietnam imports 60 per cent of the materials used in feed production. In recent years, corn imports have been driven by this demand. In 2004, Vietnam imported around 53kt from Thailand. In 2005, total imports grew to 222kt of which 141kt was from Argentina and the remainder from China and Thailand. Imports for 2006 increased substantially to 660kt — an almost three-fold increase over 2005. Imports from Argentina reached over 200kt, whilst imports from Thailand were 300kt (USDA 2007).

China

China is a potentially large market for cattle. Laos presently exports a small quantity of live cattle into Southern China, but this trade is all unofficial, so precise numbers are not known.

Presently, beef consumption is relatively low at around 5 kg per person annually, but this masks large differences between urban and rural consumption. In urban areas where incomes are greater, beef consumption is higher. However, China is still a small importer of beef, with a large majority of consumption met by domestic production. The big unknown is how the Chinese market will develop as incomes continue to rise. It is clear that beef consumption will increase significantly, but how this consumption will be supplied is difficult to predict. It would seem reasonable to suggest that the market for beef in southern China would evolve in a similar way to developments in Vietnam.

There are two distinct possibilities:

- China could develop an intensive beef industry, in which case it would most likely be an importer of grain (corn) and live cattle and be potentially a beef exporter; or
- China could become a large importer of beef and divert feedgrains to pigs and poultry.

Laos and Cambodia could be in a position to take advantage of market developments in China in the future, but the uncertainty surrounding how China will develop means it would be risky to construct a strategy based solely around exporting cattle to China.

Malaysia

Within the South-East Asian market, Malaysia along with Vietnam has traditionally been a major market for live cattle. While Cambodia and Laos do not directly border Malaysia, exports to Thailand are often staged there with local cattle then moved through to Malaysia. Malaysia has also traditionally been a market for live cattle from Australia. However, trade statistics for imports of live cattle into Malaysia are unreliable.

Table 5.7 provides a summary of statistics on the Malaysian beef sector.

5.7 Malaysian beef production, imports and consumption

		2000	2001	2002	2003	2004	2005
Beef production	kt	14	15	18	19	21	23
Beef imports	kt	133	133	137	140	176	203
Live cattle imports	'000 head	65	100	107	95	62	46
Per person consumption	Kg per year	6.4	6.4	6.5	6.6	8.0	8.4

Source: GMI database and CIE estimates.

It is likely that the live cattle import figures are an underestimate, as unofficial movements across the border are not included. However, there has been a clear trend for beef imports displacing live cattle imports. This has occurred as the infrastructure for handling meat imports has developed and as such, cheap imports of beef (primarily carabeef imports from India) have become available. This is discussed further below.

The consultation process revealed that during 2006 few cattle from Cambodia and Laos had been exported to either Thailand or to Malaysia and that the focus of the export trade had switched to Vietnam. This would fit with the trends outlined above. However as mentioned before it is difficult to confirm these trends, as a large proportion of the trade is informal.

Australia currently supplies a significant amount of live cattle to Malaysia. In 2005, 36 000 cattle were exported to Malaysia at an average live weight of 330 kg. These cattle are fed for around 30 days only to achieve an average slaughter weight of 195 kg carcass weight. In 2005, we estimate that Australian live exports contributed 38 per cent of Malaysian

production. The live cattle trade into Malaysia tends to be variable, and it has slowed somewhat in recent years due to the competition from imported beef. In 2006, Australian live exports rebounded to around 55 000 head — but it is difficult to take any information from this trend as it included an exceptional export month for October of over 16 000 head. In the six months to July 2007, MLA reports that live cattle exports to Malaysia have decreased 30 per cent on the same period for 2006 (MLA 2007).

One of the strengths of the Australian suppliers to the Asian markets like Malaysia and Indonesia is the capacity to deliver large numbers of consistent cattle at target weights.

Thailand

To complete the regional picture, table 5.8 summarises available data for Thailand. Overall, beef and buffalo struggles to compete with the intensive pig and poultry industries in Thailand as well as the dominance of seafood and aquaculture in consumption (seafood consumption in Thailand is roughly the same as the combined total of beef, pork and poultry consumption). Total estimated slaughter by the FAO, well above the official slaughter, has been falling from 2003 onwards. Little is known about the supply side drivers of beef production in Thailand.

Imports of beef are negligible. Estimates of live cattle imports, mainly for Laos and Myanmar, are highly unreliable. Also, as noted earlier, Thailand has traditionally exported significant numbers of cattle to Malaysia, and imports of cattle tend to be based around this system — either passing through Thailand to Malaysia or replacing domestic Thai cattle that have been exported to Malaysia.

5.8 Thai beef production, imports and consumption

		2000	2001	2002	2003	2004	2005
Official production	kt	92	96	99	102	72	73
Total production ^a	kt	223	234	241	249	175	177
Beef	kt	171	176	183	190	115	115
Buffalo	kt	52	58	58	59	60	62
Beef imports	kt	2	1	2	1	1	2
Live cattle imports	'000 head	90	165	121	77	152	90
Per person consumption	Kg per year	3.7	3.8	3.9	4.0	2.8	2.8

^a Total official plus estimated unofficial.

Source: GMI database, FAO 2003 and CIE estimates.

Export market prospects

Within the South East Asian region, meat production will inevitably become more intensive with livestock operations primarily sited adjacent to urban areas based on purchased feeds. This will focus on pig and poultry production, where conversion of feed is higher than for cattle. Relative prices will put pressure on demands for cattle and buffalo meat. Without a significant policy shift by governments in favour of cattle or feedlotting, these developments should put an upper limit on demand for live cattle.

Specification of cattle becomes more important

During the consultation, we observed that the types of cattle for export to Vietnam from both Laos and Cambodia varied. It was not clear that traders were after a particular type of animal — those purchased could range from smaller cattle that could be fed-on for slaughter to older types that would be slaughtered immediately. These observations reflect both the current stage of development in the Vietnamese market and the strength of demand and relative shortage of cattle.

If livestock industries in the regions become more specialised and commercially oriented, they will demand higher quality and more consistent inputs — including both feed and cattle. Laos and Cambodia now provides Vietnam with an opportunity to purchase feeder and slaughter cattle that are cost-competitive. In addition, Vietnam does not have the infrastructure in place for importing live cattle by ship.

While price is a major factor at the moment, future demand for live cattle could depend on the availability of large numbers of consistent quality cattle at similar weight and specification for entry into feedlots. Effectively, Laos and Cambodia could be competing with Australian exporters under such a scenario. However as noted, another strong possibility for the future is that imports shift away from live cattle and towards beef with livestock production concentrated on intensive production of pig and poultry..

Trade and disease barriers

Both trade barriers and movement controls in livestock that attempt to contain the spread of diseases have the potential to shape regional markets.

Control of foot and mouth disease is a major justification for controls on trade in live animals between regions. The South East Asian FMD campaign involves the coordinated control of FMD by eight countries in

the ASEAN region including Laos. The campaign is coordinated by the World Organisation for Animal Health (OIE) Regional Coordination Unit in Bangkok.

Policies in the region can be vague, and restrictions on movement are often circumvented. However, enforced controls on cattle movement in relation to FMD could seriously affect smallholders who develop production systems geared towards exporting live cattle. This is a potential risk of increasing specialisation for smallholders in a region where regulations and enforcement are unreliable.

Laos and Cambodia are also members of ASEAN and the ASEAN Free Trade Area (AFTA), which also provides impetus to general economic and trade development. Within the region, factors such as Vietnam's accession to the WTO and Laos's own negotiations to join the WTO will also encourage more openness to trade. That said, the most significant unknown is the variation in how authorities choose to implement official policies between countries and between provinces within the same country, such as how sanitary and phytosanitary (SPS) policies are implemented and coordinated within the region.

Infrastructure and foreign ownership

Currently a significant amount of inter-regional trade (both formal and informal) is restricted to live animals due to poor transport infrastructure plus a lack of processing facilities and cold chain. The majority of the live trade is in cattle because walking the cattle out to a road is a viable option.

But over time, as incomes and road and other market infrastructure develops, these countries should follow trends in other parts of the world. These trends would comprise two developments:

- improved road access will allow more inputs to be imported, particularly feed; and
- better roads and development of a cold chain will facilitate opening-up to fresh and frozen meat imported from suppliers, most likely from outside of the region.

Intensive livestock production of pigs and poultry is already emerging in Laos and Cambodia — a significant proportion of this production is based on imported compound feeds. The commercial scale pig production now happening in Cambodia is contracted to CP Thailand using weaners and feeds imported from Thailand (see box 5.9). Also, some commercial pig production in southern Laos uses bagged imported feed from Thailand.

These linkages depend on road access and both formal and informal barriers.

5.9 CP Thailand

CP Thailand is one of the largest vertically integrated feed and livestock producers in the world producing poultry, duck and pigmeat products. Its operations include animal feed production, breeders, farming systems, meat processing, food production and value-added products, both for the export and local markets.

CP operates feedmills, producing food for poultry, swine and shrimp as well as pet food for dogs, cats and fish, in Thailand, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Singapore, Turkey, Taiwan, USA and Vietnam.

The bottom line

While the prospects of live exports to Vietnam from both Laos and Cambodia look strong for the short to medium term, there are risks to the longer term viability of the trade. Within the region, it is likely that Vietnam and Southern China will be the dominant sources of demand for cattle and buffalo. As these countries develop, it is also inevitable that the markets for cattle and buffalo will become more sophisticated. To meet the increased demand for beef, there are two possible scenarios:

- imports of beef will expand significantly as the infrastructure develops, replacing live cattle imports; or
- an intensive feedlot industry will develop with imported feeder cattle and grain supplying the market.

Of these, the first option is probably most likely, as the feed requirements of an intensive feedlot system would be high, and pigs and poultry offer better productivity in terms of feed conversion.

Under both these scenarios, there are risks for Laos and Cambodia. If Vietnam and China become significant importers of meat, it is unlikely that Laos and Cambodia will have developed a beef industry competitive with major low-cost suppliers such as Brazil and the United States. However, large-scale imports of beef into Vietnam and China are likely to be relatively long-term outcomes. Over the shorter and medium term, it is likely that there will continue to be strong demand for live cattle for slaughter in the local wet market system. A key consideration in this context is the nature of the current trade and whether it is replacing cattle in local markets across the border that are being absorbed into the major population centres. If this is the case, shift in the major cities into a supermarket system and imported beef will have a knock-on effect on

demand for live cattle in Laos and Cambodia. This shift over time is somewhat inevitable, but placing a timeframe around it is difficult.

The risk of beef imports displacing live cattle imports is highlighted by experience in Malaysia, where anecdotal evidence suggests that live cattle imports from Thailand (at least partly sourced from Laos and Cambodia) have fallen significantly in recent years. This, along with strong demand in Vietnam, has driven a switch in the focus of live cattle and buffalo exports from Laos and Cambodia. A significant driver of the lower demand for live cattle in Malaysia is an increasing emphasis on beef imports, particularly carabeef imports from India.

If Vietnam or China were to develop an intensive feedlot industry, demand for high quality feeder cattle would be significant. For Laos and Cambodia to successfully supply such cattle would require significant intensification and the development of a cattle industry. The present demand for cattle from Vietnam is being supplied by what are effectively cull animals from Laos and Cambodia. To supply a feeder market would require a consistent supply of feeders at the correct specification. It is likely that this would require a reconfiguration of the gene pool in Laos and Cambodia to supply appropriate animals into a feedlot system. In addition to this, competition from other suppliers — primarily Australia — would also be significant under this scenario.

It is also important to note however, that whilst there are reasons to be cautious about the long-term prospects of the current market situation, there are undoubtedly significant benefits of this demand even in the short and medium term. Moving towards increased specialisation and intensification in response to favourable market conditions can assist smallholders more generally in moving away from subsistence based livelihood. The most significant opportunity for cattle and buffalo producers in Laos and Cambodia should be the transition of economies within the region that drives meat demand and permits more specialisation in the livestock industries.

Another key ingredient in the future development in the cattle and buffalo supply chains in these countries is investment by large-scale commercial enterprises. Experience in other countries suggests that this involvement is critical in the development of an effective supply chain and the effective delivery of information and extension services. The experience of CP in Thailand and other countries including Vietnam is an example noted earlier. In reality, it isn't 'research' or new technology that is needed in Laos and Cambodia's cattle and buffalo sector. But commercial involvement in the supply chain could facilitate more effective transfer and communication

of information on existing technology that could allow smallholders to gain better returns from the current strong demand within the region.

To an extent, the current situation where a majority of exports are informal means that the involvement of commercial players is limited. As noted earlier, the general commercial environment in Laos and Cambodia is not conducive to doing business. However, other policies (in particular, the policy in Vietnam not to recognise imports of live cattle) further restrict the involvement of large-scale, integrated commercial players in more developed neighbouring countries from actively investing in the domestic supply chain. The informal nature of much of the trade also means that little is known of the composition and structure of the trade aside from anecdotal evidence. Ideally, a shift in policy in neighbouring countries (particularly Vietnam) towards formal recognition of trade would increase incentives for more formal participation in the supply chain by commercial players and increase the supply of information both directly to smallholders and more generally on livestock markets in the region.

6

Implications for ACIAR research

There are a number of factors emerging from the review of the policy and economic environment facing the cattle/buffalo industry in Cambodia and Laos, and the implications of these for ACIAR research. They include:

- the implications of the predominantly smallholder production systems and the weak incentives for intensification and commercialisation of cattle production;
- the uncertainty surrounding the potential demand for beef, both domestically and within the regions;
- the serious capacity constraints that pervade agricultural research and support systems;
- the extensive donor and non-government organisation (NGO) involvement in rural development in the countries; and
- the costs of running successful projects that have adoption outcomes.

Chapters 3 and 4 provided an overview of the smallholder system and the role that cattle and buffalo play in it. They noted that incentives for the adoption of technology and other outputs of research are limited in the current system, where cattle and buffalo raising occurs in a complex quasi-subsistence smallholder system aimed at minimising risk and maximising outcomes such as food and income security. This leads to a conclusion that research aimed at improving productivity of cattle and buffalo production needs to be embedded within a broader program that is dealing with the myriad of constraints faced by smallholders that affect their incentives to adopt methods that could improve cattle and buffalo productivity. Whilst the current market environment does help by creating market incentives in terms of high demand and prices, as noted in chapter 5, there are risks to the sustainability of these conditions over the longer term.

The implications for ACIAR are that research in this area inevitably needs to be linked with other donor projects that are addressing more broad issues that are generally outside ACIAR's core jurisdiction. This observation is in broad conformance with the recommendations of ACIAR's recent review of its role in animal health research (ACIAR 2006).

This review observed that in the past, many research projects had no means of implementing the results in the communities for which they were developed. It recommended that ACIAR should work more closely with bilateral and multilateral agencies to plan for the implementation of the outcomes of its research projects, arguing that impacting community welfare in a sustainable way at the smallholder level is extremely difficult without institutional support throughout the government animal production and health service. Given the significant disincentives that the current economic environment in these countries creates for further investment in livestock activities — by smallholders and agribusinesses — it makes sense for ACIAR to collaborate with agencies that are helping to address the policy, institutional and infrastructural constraints that create these disincentives.

In-country capacity is a significant constraint...

The previous section outlined a case for collaboration between ACIAR and other donors; however this raises questions about the current donor environment and capacity constraints that exist in both Laos and Cambodia. To an extent, the capacity constraint from ACIAR's point of view is linked both directly to the real constraints that are inherent in each country, but also to the activities of other (often much larger) donors, who effectively compete for available in-country capacity.

The consultation process identified that in-country capacity, both in research and extension, is probably the largest single constraint to the successful delivery of new projects in these countries. This constraint has a number of implications for potential ACIAR projects:

- government extension systems are very weak, and have very limited ability to effectively translate research findings into practical advice relevant to producers and to transmit this advice;
- research institutions have limited technical skills; and
- there is a very limited pool of people who are qualified, technically and managerially, to lead collaboration with Australian researchers.

Each project requires an in-country representative of government, typically within the agriculture portfolio, to take the lead as its interface with government at all levels and with other projects. The major role here is one of advocacy especially in the competition for scarce government resources.

For animal health and disease projects — such as those funded by ACIAR — the number of people with sufficient capacity to work in laboratories or in the field is very limited.

- in both countries, there is no capacity to train veterinarians through the university system. Very few in livestock-related government departments have a science background; and
- most of those in-country with such capacity were trained in the Soviet bloc in the 1970s and 1980s.

The absence of this basic infrastructure of technical skill, poses real challenges for projects aiming to transfer technology and know-how to the smallholder.

...and projects need to deal with capacity and functions at all levels of government

At the national level, the capacity shortage in Cambodia and Laos is illustrated by the fact that the same people often fill both administrative and technical roles. That is, the available capable and motivated people within government have been moved from the specialised technical roles to manage donor projects, thus at the same time reducing technical capacity.

At the provincial and district level, the issue shows itself in the variation in capacity and motivation of staff. This is important because the provinces and districts are the primary vehicle through which extension and vaccination and other services are delivered to smallholders, and because of the considerable autonomy exercised at provincial levels within the government systems in both countries. Provinces may choose not to enforce national level policies (for example with respect to control of stock movements) or to regulate and tax transactions through informal as well as formal means.

Whilst this appears to be a source of frustration for national level government, it may offer possibilities for projects. Having policy and extension driven largely autonomously by provinces is a way of managing risk, as opposed to centralising power within the national government. Provinces are more likely to act in the interest of smallholders because they are closer to them. Also, this autonomy allows for experimentation with a diversity of approaches.

Projects also have to deal with the decision making functions exercised at the village level. Village chiefs (assisted in Laos by representatives from

party organisations and Village Veterinary Workers) make decisions on issues such as the use of communal resources and approve sales of livestock.

Extensive donor activity in agriculture

Donor funding plays an important role both in animal health and livestock extension programs in Laos. Appendix C discusses some of the projects. The scope of this activity has implications for ACIAR, and there are important lessons from the experience of other projects.

At one level, the extent of donor activity adds to the problem of finding capable counterparts for research projects: but at another level they provide an opportunity for leverage to assist in ensuring that the proceeds of their research have a long-term, sustainable impact. ACIAR is primarily a research organisation, and in the context of the environment they operate in, a relatively small player. With a majority of development projects focusing on extension, it makes sense for ACIAR to link any research they undertake closely with an appropriate existing project.

This opportunity is important because of some of the lessons that seem to emerge from project experience within the countries. Consultations with stakeholders in country and our own assessment emphasised four key points:

- The importance of sustained in-country presence by the project leader. A continuous presence provides confidence to counterparts and project staff and also ensures that problems do not drag on too long.
- Four years appears the absolute minimum duration for a project to deliver outcomes beyond completion of research. This is especially true of a livestock based project that will be attempting to deliver not only new techniques but a quantum shift in the philosophy of livestock management. Because smallholders are risk adverse, they need to have new technology or techniques demonstrated to them repeatedly. They also need to trust the person delivering that extension.
- Projects have to find ways of dealing with the weakness of extension systems. Most successful projects have specialist extension components and that this is the main mechanism for promoting adoption of the through which the outputs of a livestock project.
- A strength of previous forage work in Laos is that the International Center for Tropical Agriculture (CIAT) — who were leading the research — are based in-country all of the time. CIAT has also

developed a strong network, with an example highlighted during consultation of a highly competent local working with CIAT maintaining links with the provincial and district governments and problem solving.

It would be strategic to utilise these types of capacities in-country by linking an ACIAR project to a larger project.

Box 6.1 summarises some important lessons that seem to emerge from the ADB-funded forage project managed by CIAT and the EU livestock project in Laos. It suggests some reasons why these projects are having some successes (albeit largely anecdotal and unquantified at this stage), and also lays out some challenges for moving towards integrated projects and promoting the development of more focused cow-calf production systems.

Project costs and linkages to government

A common perception is that operating a project in Laos and Cambodia is cheap because the cost of living is low compared with Australia and because people are paid low wages.

However, project start-up costs are likely to be significant and run over an extended period. While it is not possible to quantify these costs on the basis of the study field visits, discussions left a lasting impression of their significance, both in terms of financial cost, but more importantly the time component of administrative tasks. In particular, a number of points should be noted:

- the in-country costs of finding capacity and establishing linkages with government at all levels are significant;
- take-up of the outputs of a project often takes much longer than initially anticipated; and
- the government has little financial capacity to take over the implementation of project outputs. This is highlighted.

For these reasons it is often makes sense to extend existing projects in where there is sufficient justification.

6.1 The lessons from the ADB and EU projects in Laos

The ADB and EU projects are both extension focused. The objective of both projects is to improve smallholders' incomes through the introduction of hand feeding and fattening of cattle using forages. This cut-and-carry technique is based on native grasses grown in smallholders' blocks and collected from communal areas and specifically introduced forages grown from seed, supplied by the project, and grown instead of rice or other cash crops.

Why they work

As pointed out in chapter 3, feed is the single largest constraint to improving cattle productivity. While the impact of both projects has not been determined in a formal evaluation to our knowledge, there is broad consensus that they represent a sound first step to increasing intensification and specialisation in cattle production. Three factors have contributed to the successes that the ADB and EU feeding projects in northern Laos have managed to date:

- smallholders in this part of the country are better placed to participate in such a project because of their superior food and income security compared with those located in central and southern regions;
 - this in part explains why donors are running rural development style projects in these less productive regions rather than a livestock extension project;
- access and proximity to Vietnamese market where the price received makes the feeding enterprise more attractive;
- related to the previous factor – although cut-and-carry is a highly labour intensive activity, there is a payoff from switching labour out of cropping into growing, cut and carrying forages, and
- whilst predisposition towards increasing inputs is an important starting point for the smallholders involved, feeding cattle still complements the 'bank' function of cattle and facilitates increasing the value of the asset.

Challenges of an integrated system

Apart from the challenge of attracting more participation in the forage projects, the long term challenge for the ADB and the EU projects will be the integration of the feeding systems with the cow-calf breeding systems at a village which level based in grazing of communal lands.

Currently, these systems are quite separate. In fact, many of the cattle and buffalo that are fed are not smallholders' own calves – the obvious source of feeder cattle. As observed in chapter 3, animals that are fed are often reasonably old when they are purchased, usually from distressed sales.

To go to the next step beyond feeding, smallholders within a village context will be required to confront the communal land problem and manage the cow-calf system using a whole of system approach as would a individual owning the same area. As already identified this would involve:

- significantly reducing stocking rates on communal lands;
- restricting and improving timing of calving to match seasonal pasture availability through the use of fencing, castration and selective breeding; and
- a systematic approach to animal health more generally.

The bottom line

The practical issues raised here indicate to us the imperative of ACIAR working with an established project funded by a larger organisation. This is because of the following.

- To have an impact, projects dealing with ACIAR's focal area have to be integrated into a whole-of-system approach — otherwise it is impossible to address the complex web of incentives that shape smallholders' interest in adopting project outputs.
- ACIAR is a small player.
- In-country capacity in each country is already taken — this is especially the case in Laos.
- There are large start-up costs in finding personnel and establishing necessary relationships with stakeholders in government and in the project area. The larger projects have already made these investments, and while the structure of the linkages they have established may not perfectly fit with any particular ACIAR project, at the very least they represent a useful resource and starting point.
- These projects already have a continuous in-country presence which is desirable to achieve a sustainable outcome.

It is important to note that linking with established projects in Laos and Cambodia will by no means ensure success. The environment facing smallholders is difficult in both countries and changing their behaviour is a difficult proposition. However, given the relative size of ACIAR as a funding organisation is small, and their core business is research rather than extension and implementation, tapping into networks and establishing linkages with large-scale projects is the most obvious way of improving the likelihood of successful outcomes.

Projects should account for the high project start-up costs and be based on the assumption that government will *not* provide the required ongoing funding to continue project activities when the donor's program finishes. This is the key reason why ACIAR projects should attempt where possible to link with a broader project, which will allow the proceeds from ACIAR research to be implemented on an ongoing basis.

A *People consulted*

A.1 List of people consulted

Australia

Dr Axel Colling Veterinary Diagnostic Scientist	CSIRO – Livestock Industries, Australian Animal Health Laboratory	T: +61-3-5227 5255 F: + 61-3-5227 5555 axel.colling@csiro.au
Dr Stephen Page	Advanced Veterinary Therapeutics	PO Box 345 Berry NSW 2535 P: 024464 3027 M: 0418 249 469

Laos

Dr Somphanh Chanphengxay Deputy Director General	Department of Livestock and Fisheries, Ministry of Agriculture and Forestry, PO Box 811, Vientiane	T: +856 21 416 932 F: +856 21 415 674 M: +856 20 568 5248 somphana2003@yahoo.com
Dr Bounlom Douangnggeun Director	National Animal Health Centre (NAHC), Department of Livestock and Fisheries, PO Box 811, Vientiane.	T/F: +856 21 216 380 laonahc@laotel.com
Dr Syseng Khounsuy Deputy Director	National Animal Health Centre (NAHC), Department of Livestock and Fisheries, PO Box 811, Vientiane.	T: +856-21- 218367 M: +856-20-5612360 F: +856-21- 218367 ahr0301@laopdr.com
Dr Phout	National Animal Health Centre (NAHC), Department of Livestock and Fisheries, PO Box 811, Vientiane.	T: +856-21- 218367 M: +856-20-5612360 F: +856-21- 218367 ahr0301@laopdr.com
Mr Jamie Conlan Microbiologist	National Animal Health Centre (NAHC), Department of Livestock and Fisheries, PO Box 811, Vientiane.	T: +856-21- 218367 M: +856-20-5612360 F: +856-21- 218367 ahr0301@laopdr.com

(Continued on next page)

A.1 List of people consulted (continued)

Dr. Sithong Phiphakhavong Director	Vaccine Production Centre (VPC), Department of Livestock and Fisheries, PO Box 8330 Vientiane	T:+ 856 21 250 731 F:+ 856 21 217 869 M: +856 20 530 6356 SithongP@Yahoo.com
Mr Sengpheth Somsanith Deputy Director	Vaccine Production Centre (VPC), Department of Livestock and Fisheries, PO Box 8330 Vientiane	T/F:+ 856 21 612 018 M: +856 20 560 6709 sengpheth55@yahoo.com
Dr. Signa Kittiphone Director	Veterinary Supply Unit (VSU), NAHC.	
Mel Jones Rural Development Program Officer	European Union	Mel.JONES@cec.eu.int
Dr. Werner Stur Forage and Livestock Systems Specialist	International Center for Tropical Agriculture (CIAT) PO Box 783 Vientiane Lao PDR	T: +856 21 770 090 F: +856 21 770 091 M: +856 20 781 0301 w.stur@cgiar.org
Dr Rod Lefroy Regional Coordinator	CIAT in Asia, Po Box 783, Vientiane	T: +856 21 770 090 F: +856 21 770 091 M: +856 20 550 9863
Mr Keo Chanthavong President	Phonesiri Farm Company, 003/1-7 Khounboulom Road, Vientiane	T: +856 21 216 870 F: +856 21 222 413 M: +856 20 551 7214
Mr Booketh Phosnarack Managing Director	Vanith Company Limited, Societe Vanith Farm, PO Box 659, 100 Anou Road, Vientiane	T: +856 21 215 392 F: +856 21 214 322 M: +856 20 551 1803
Dr Houane Sihapanya Advisor, Societe Vanith Farm	PO Box 6274, Vientiane	T: +856 21 710 536 M: +856 20 568 2737
Provincial livestock officer	Vientiane Province, DLF	
Mr Somphon Inthalangsy Head	Livestock and Fisheries Section, Sikkothabong District Agriculture and Forestries Office, Vientiane Province.	
Mrs Bouaphaich Chansathit Technician	Livestock and Fisheries Section, Sikkothabong District Agriculture and Forestries Office, Vientiane Province.	
Mr Poun Village Veterinary Worker	Livestock and Fisheries Section, Sikkothabong District Agriculture and Forestries Office, Vientiane Province.	

(Continued on next page)

A PEOPLE CONSULTED

A.1 List of people consulted (continued)

Mr Xaykerlo Head	Nonghet Agriculture and Forestry Extension office	
Mr Chikilo Head	Sando village cattle group, Nonghet district	
Mr Sonsavak Head	Xienghoung Provincial Livestock and Fisheries Office	
Mr Phonsay Village Veterinary Worker	Na Lam village	
Mr Hong Thong Head	Xienghoung Province cattle bank	
Mr Sanhak Keomannong Head	Thaphabat District Agriculture and Forestry Extension Office	
Mr Bountem Owner	Borikhamxay cattle property	
Mr Bounpheng Chanthavongsouk Head	Borikhamxay Provincial Livestock and Fisheries Office	T: +856 54 212 445 F: +856 54 212 037 M: +856 20 233 8454
Mr Sysavath Thanthaboun Head	Borikhan District Agriculture and Forestry Extension Office	T: +856 54 212 950 M: +856 20 980 2234
Ms Nancy Bourgeois-Luthi Country representative	Veterinarians Sans-Frontier	mbourgeois@avsp.org
John Connell Extension/rural sociology	CIAT	T: +856 21 770090 F: +856 21 770 091 M: +856 20 2212 612 j.connell@cgiar.org
Cambodia		
Dr Sothoeun Deputy Director	Department of Animal Health and Production	
Dr Kao Phal Director	Department of Animal Health and Production	
Lim Pok Director	Department of Animal Health and Production	
Terry O'Sullivan Team leader	Cambodia Australia Agricultural Extension Project (CAAEP)	T: +855 23 213 001 F: +855 23 213 001 M: +855 12 903 008 tos@online.com.kh
Chan Chesda Director	Kampot Province Department of Agriculture Office	T: +855 16 722 007 F: +855 33 932 661 chesdachan@yahoo.com

(Continued on next page)

A.1 List of people consulted (continued)

Elliot Potter Team member	EU Smallholder Livestock Production Program (SLPP)	rettop29@hotmail.com
Dr Dirk Van Aken Team Leader	EU Smallholder Livestock Production Program (SLPP)	T: +855 23 223 515 F: +855 23 216 293 M: +855 12 455 331 dvanaken@loxinfo.co.th
Angus Cameron	AUSVET	angus@ausvet.com.au
Timothy Purcell	Agrifood Consulting Limited	t.purcell@agrifoodconsulting.com
Thailand		
Dr Ronello Abila Regional Coordinator	OIE SEAFMD Campaign	T: +66 2 653 4864 F: +66 2 653 4904 r.abila@oie.int
Dr Carolyn Benigno Animal Health Officer		T: +66 2 697 4330 F: +66 2 697 4445 M: +66 (0)1 684 7890 Carolyn.Benigno@fao.org
Dr Subhash Morzaria Chief Technical Adviser	FAO Regional Office for Asia and the Pacific 39 Phra Athit Road Bangkok 10200 Thailand	T: +66 2 697 4138 F: +66 2 697 4445 Subhash.Morzaria@fao.org
Animal Health Sales Section	Bettter Pharma Co Ltd, Betagro Tower, 323 Vibhavardi Rangsit Road, Laksi, Bangkok, 10210	T: +66 2 955 0555 F: +66 2 955 0312 www.betagro.com
Vietnam		
Dr Tran Xuan Hanh Deputy General Director and Director	NAVETCO Centre for Veterinary Research (CVR), Ministry of Agriculture and Rural Development, 29 Nguyen Dinh Chieu Street, District 1- HCMC, Vietnam,	T: +84 8 8225063 / 8225955. tranxuananh2002@yahoo.com

B *Characteristics of rural households in Laos*

A useful source of information is the third household income and expenditure survey for Laos. It was undertaken by the National Statistical Centre (NSC) and funded by the Swedish International Development Agency. Selected results are summarised and presented below (NSC 2004).

Food security

Table B.1 summarises the income and food security — summarised by rice consumption — dimensions of households across Laos.

B.1 Income and rice consumption by Lao province – 2002-03^a

<i>Province</i>	<i>Rice consumption</i>		
	<i>Income per household</i>	<i>With road access</i>	<i>Without road access</i>
	US\$	gram/day/person	gram/day/person
<i>Lao PDR</i>	614	595	591
<i>North</i>	739	667	635
Phongsaly	564	629	585
Luangnamtha	671	735	594
Oudomxay	586	658	666
Bokeo	719	643	521
Luangprabang	532	601	662
Huaphanh	691	634	654
Xayabury	1 191	759	645
<i>Central</i>	587	572	536
Vientiane M	401	589	NA
Xiengkhuang	771	712	637
Vientiane	671	569	599
Borikhamxay	599	542	535
Khammuane	644	733	714
Savannakhet	609	455	415
Xaysomboun SR	591	762	NA
<i>South</i>	486	535	569
Saravane	496	597	596
Sekong	591	545	495
Champasack	458	514	513
Attapeu	533	571	551

^a For rural households only.

Source: Lao consumption and expenditure survey 2002-03.

The key points from table B.1 are that:

- incomes by other developing country standards remain very low and average across Laos around US\$614 per household;
- northern provinces have significantly higher incomes than the central and southern provinces;
 - this difference would be made even larger if Xieng Khuang province was classified to the north rather than central group; and
- per person rice consumption is region and location specific but does not appear to vary considerably with road access.

Income versus outlays

Table B.2 uses income and expenditure of Lao households in 2002–03 to show the challenges facing smallholders — the majority of whom hold cattle and buffalo. The average rural household in Laos has 6.2 persons — this varies from 6.0 in the southern provinces to 6.3 persons in the north.

B.2 Agricultural income and expenditure per household for Lao PDR, 2002-03

	<i>North</i>	<i>Central</i>	<i>South</i>	<i>Total rural</i>
	US\$	US\$	US\$	US\$
<i>Income</i>				
Grain	413	275	250	360
Vegetables and fruits	87	60	66	80
Meat	150	123	85	146
Others	41	30	37	46
Total income ^a	690	487	438	632
<i>Expenditure</i>				
Cash expenditure	532	642	543	579
Own-consumption expenditure	509	437	377	447
<i>Cash deficit^b</i>	-350	-592	-483	-395

^a Includes production for own-consumption. ^b Equals total income less cash expenditure and value of own-consumption.

Source: Lao consumption and expenditure Survey 2002-03.

On average, the sale of livestock and products (meat) contributes between 20 and 25 per cent of household incomes in Laos. However, the consumption and expenditure survey does not identify the contribution of cattle and buffalo. A reasonable assumption would be that large ruminants could make up half of the total category — say 10 to 15 per cent. Rice and corn make up the majority of farm income supplemented by vegetables and fruits.

Table B.2 also shows the regional dimension of household performance. Households in the northern regions have higher agricultural production and better self-sufficiency relative to those in the central and southern regions. On a household basis, it is found that households across all regions have apparent cash deficits, which is partly a function of the survey design.

The income categories in table B.2 fails to account for a number of other income-generating opportunities outside of agriculture that are listed in table B.3. The estimate of hours per day involved in income-generating activities reported in the survey is misleading because it represents an average over all people in all regions above 10 years of age. Obviously, if children and the elderly were excluded from these figures, time spent on income-generating activities would be more meaningful.

B.3 Income generating activities in Lao PDR, 2002-03^a

<i>Activity</i>	<i>Average time spent</i>	
	hours per day	per cent of total
Work as employed	0.5	10
Own business work	0.7	15
Agriculture work	2.4	50
Collecting firewood fetching water	0.3	6
Hunting and fishing	0.5	10
Construction	0.1	2
Handicraft	0.3	6
Total	4.8	100

^a Persons greater than 10 years of age.

Source: Lao consumption and expenditure Survey 2002-03.

Road access

Tables B.4 and B.5 illustrate the impact of road access on smallholders behaviour. In table B.4 cash expenditure is an indicator of exposure to the market economy. In most regions, the cash requirement of a household with road access is twice that of one without —also an indicator that those households will be oriented to income from local markets. The table again shows the higher living standards of those households in northern regions of Laos.

These outcomes are offset by the fact that households without road access tend to be larger in the north where households without road access average 7 persons versus 6 for those with access. This contrasts with the south where there is little difference between household size with and without road access.

B CHARACTERISTICS OF RURAL HOUSEHOLDS IN LAOS

B.4 Rural consumption per household, 2002-03

	<i>North</i>	<i>Central</i>	<i>South</i>	<i>Total rural</i>
	US\$	US\$	US\$	US\$
<i>Cash expenditure</i>				
With road access	622	703	628	659
Without road access	327	370	330	341
Total rural	532	642	543	579
<i>Own-consumption expenditure</i>				
With road access	494	429	367	436
Without road access	541	470	402	482
Total rural	509	437	377	447

Source: Lao consumption and expenditure Survey 2002-03.

When considering these results, it should be noted that the quantification and valuation of own-consumption is very difficult to assess through a expenditure survey because such surveys typically do not adequately record consumption outside of formal meals within the household.

B.5 Household consumption by region and expenditure group, 2002-03

<i>Region and expenditure group</i>	<i>Urban</i>	<i>Rural with road access</i>	<i>Rural without road access</i>	<i>Total rural</i>
	US\$	US\$	US\$	US\$
<i>Cash expenditure</i>				
North	1711	622	327	532
Central	1935	703	370	642
South	1729	628	330	543
Lao PDR	1865	659	341	579
<i>Own-consumption value</i>				
North	209	494	541	509
Central	182	429	470	437
South	155	367	402	377
Lao PDR	184	436	482	447
<i>Total expenditure</i>				
North	1920	1116	868	1040
Central	2117	1133	840	1079
South	1884	995	732	920
Lao PDR	2048	1094	823	1026

Source: Lao consumption and expenditure survey 2002-03.

C

Large ruminants in Vietnam

A survey in Vietnam during 2002 provides some insights into the role and the importance of large ruminants to integrated smallholder systems. The study found that the function of ruminants varied across three main characteristics:

- the ethnic background of the smallholders;
- the remoteness of the smallholders in terms of road access and distance to a major town; and
- altitude of the area which influences the production system.

The characteristics of the survey villages are summarised in table C.1.

C.1 Vietnamese villages in livestock survey

<i>Village</i>	<i>Ethnicity</i>	<i>Distance from town</i>	<i>Altitude</i>
Ban Buon	Black Thai	Close	Lowlands
Ban Bo	Black Thai	Close	Lowlands
Na Huong	Black Thai	Intermediate	Slopes
Bo Duoi	Black Thai	Intermediate	Slopes
Tong Tao A	H'mong	Remote	Upland
Pa Dong	H'mong	Remote	Upland
Tong Tao A'	H'mong	Remote	Upland

Source: Huyen et al (2006)

The H'mong are the same ethnic group as that found in northern Laos.

Roles of large ruminants

Table C.2 summarises the ranking of ruminant functions from the study. Black Thai farmers use ruminants for draught and transport. Closer to town the use of mechanical ploughs, buses and motorbikes has led to falling buffalo numbers. Away from town, where smallholder plots are less accessible to machines, there has been less substitution away from draft

C.2 Importance of large ruminant functions in Vietnam

Function	Thai villages near town		Thai villages away from town		H'mong villages	
	Cattle	Buffalo	Cattle	Buffalo	Cattle	Buffalo
Draft and transport	✓✓	✓✓✓	✓✓✓	✓✓✓	✓	✓✓
Cash sale ^a	✓✓✓	✓✓	✓✓	✓✓	✓✓✓	✓✓✓
Payment for hired workers	✓	✓	✓	✓		
Home consumption	✓		✓			
Religion and festivities	✓	✓	✓	✓	✓✓	✓✓
Manure supply					✓✓	✓✓

^a Significant uses for cash are large unexpected outlays and for home improvements.

Source: Huyen et al 2006.

animals: however, the use of buses and motorbikes for transport as been increasing. The survey also found that:

- buffalo were viewed as superior draught animals, but with higher feed and maintenance requirements;
 - female ruminants were considered too weak for field work and were a sign of poverty;
- ruminants were sold as calves or when too old for draft work;
- there was no reporting of fattening of cattle for sale as pigs are now the major cash source; and
- festivities required either slaughter for entertaining guests and worshipping ancestors or sale of ruminants to finance these events.

As seen in table C.2, ruminants also have multiple functions in H'mong households with significant differences to the Black Thai villages due to ethnicity and remoteness. The relative importance of functions differed between surveyed villages but general findings were:

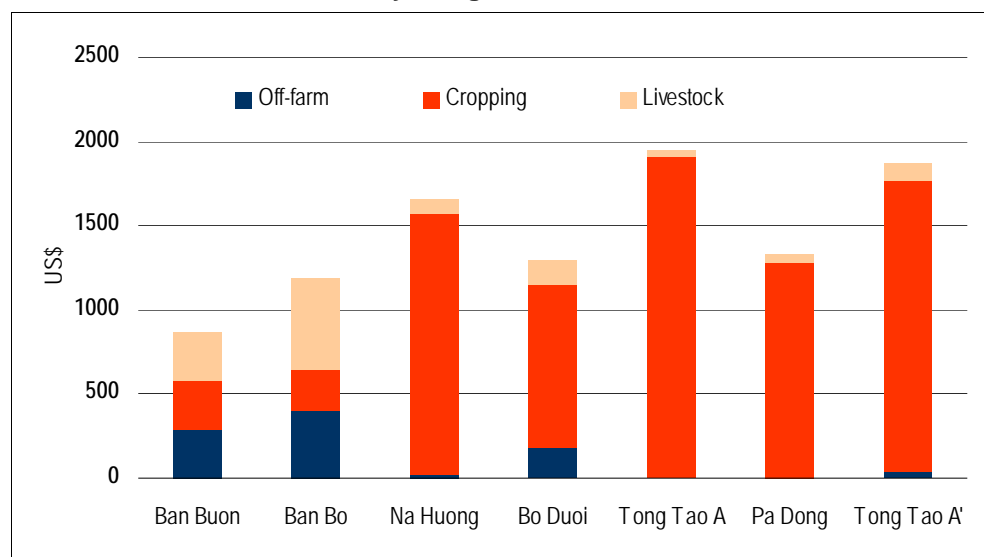
- ruminants were sold if large amounts of money were required, while pigs and chickens were sold to cope with smaller demands;
- manure was used by H'mong farmers as fertiliser, fish feed or for sale;
- buffaloes were required for funerals while offerings of a sacrificial animal is a custom of the H'mong people who invite a wizard to the house when there is disease or a newborn baby in the family;
- draught power was found of lesser importance for farmers with little land who could borrow draught animals from relatives; and
- most households had to supply ruminants with cut-and-carried roughage.

While cash income was an important function, at this stage of the survey, the use to which that cash was put was not well identified.

Economic analysis of ruminants

Chart C.3 summarises the contribution of livestock to average household income for the surveyed villages. Across all villages livestock contributed 12.4 per cent of total income — this being significantly higher for villages near town. While cropping remains a dominant source of income across all villages, off-farm employment was becoming significant for villages near to town.

C.3 Cash revenue from survey villages



Data source: Huyen et al 2006.

Chart C.4 shows the cost structure associated with keeping ruminants in each village.

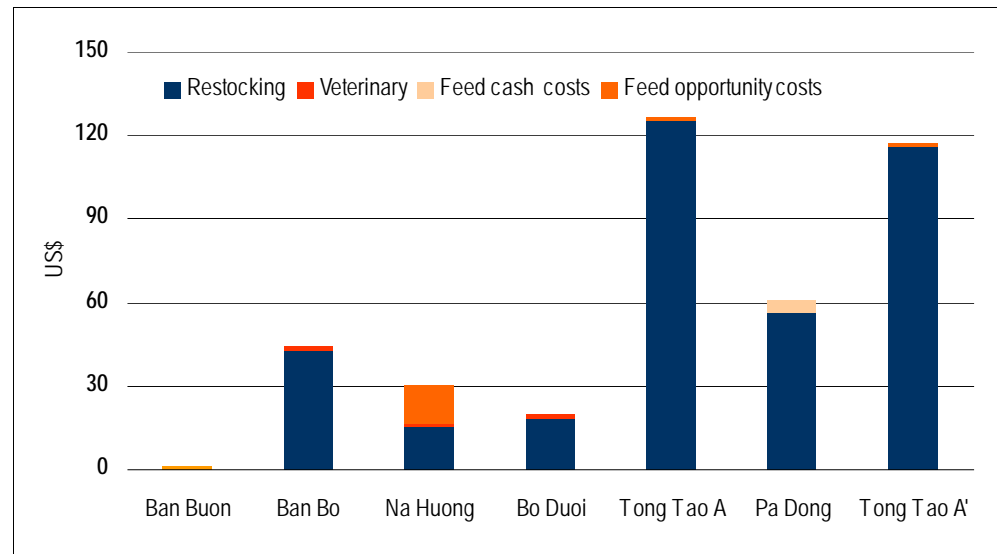
Variable costs are comprised of feed opportunity costs, feed cash costs, veterinary cash costs and restocking cash costs. Overall, the survey found that over 90 per cent of cash costs were from restocking. These costs were especially high in H'mong households.

The next step was to value each of the functions of ruminants across the villages. Chart C.5 summarises the contribution of each function to the total value of keeping ruminants. The value of stock provided the largest benefit accounting for 75 per cent of the total benefit. As noted in the study (Huyen et al 2006, p46):

This amount of money would be available for families, who are forced to sell ruminants to finance a festivity, cope with a shock like accident of a family member, or e.g. build a house.

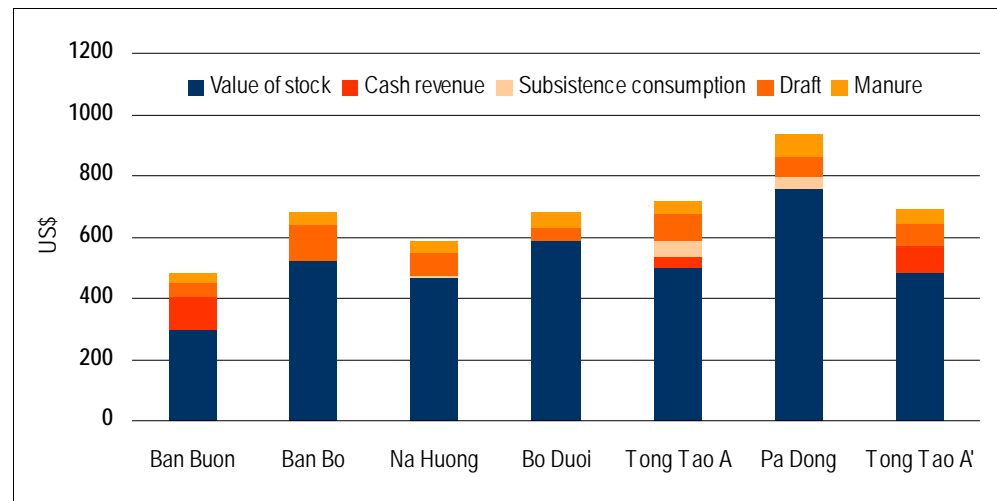
While this value was consistent between surveyed villages — the value of other functions varied significantly between villages.

C.4 Costs of keeping ruminants



Data source: Huyen et al 2006.

C.5 Value of ruminants

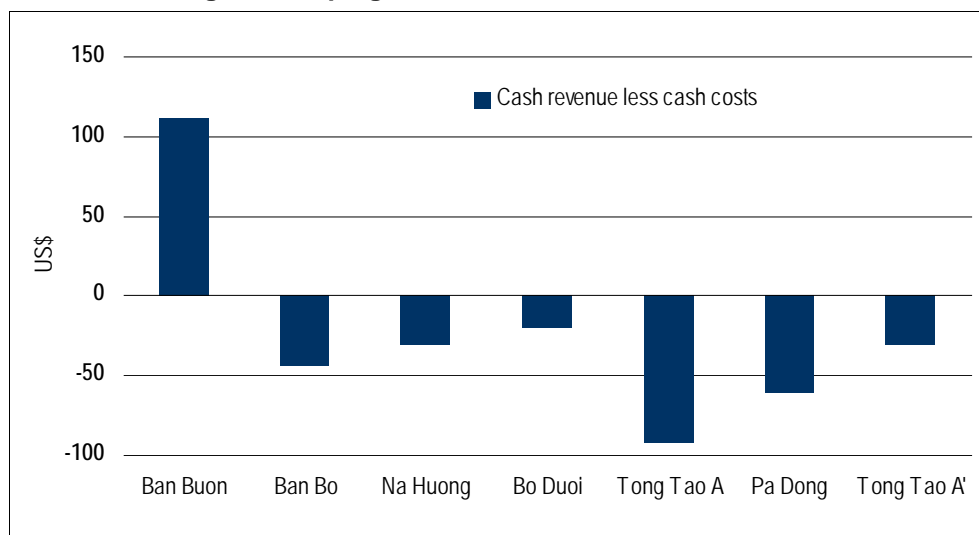


Data source: Huyen et al 2006.

Chart C.6 calculates the gross margin equal to revenue less costs of keeping ruminants. In only the village closest to town can the keeping of ruminants be considered to be a profit making enterprise. In many households, the sale and purchase of new animals happened on the same year reflecting the

fact that cattle and buffalo were being used to facilitate transactions and manage money.

C.6 Gross margin of keeping ruminants



Data source: Huyen et al 2006.

Caveats on this analysis

While this information is the best available for cattle and buffalo in the region, the reader should be cognisant of the major methodological problems in valuing many of these benefits. This is because most are unpriced because markets for them simply do not exist. This is especially true for the value of:

- manure and draught power; and
- insurance and financing functions.

D

Donor and NGO projects

There is a significant amount of donor and non-government organisation (NGO) activity targeting agricultural and rural development in Cambodia and Laos. Some of these have components addressing animal health and productivity.

In value terms, the majority of these donor activities can be classified into two ways:

- specialist livestock projects that encompasses cattle and buffalo — usually including pigs and poultry; and
- integrated rural development projects.

The specialist livestock projects have an extension focus — and attempt to improve animal health and productivity by improving feeding regimes and also by the introduction of vaccines.

- In Laos, the ADB and the EU are the major players in the livestock sector. They are funding projects for cattle and buffalo in the Northern provinces.
- In Cambodia, the only dedicated livestock project at the moment is the EU small livestock production project, which is focused on pigs and poultry.

Rural development projects involve a range of activities from public health and education and construction of infrastructure through to improving agronomic practices for rice and cash crops. Some of these projects have a component supporting a livestock vaccination program — most often for cattle, buffalo and pigs.

These projects can be further classified by the type of expenditure:

- direct aid — donors funding activities that would be funded by government or would not other happen (schools, roads, bridges); or
- extension and capacity building projects based on existing technology and information that also provide inputs such as vaccines.

Overall, the provision of aid is highly competitive, with a large number of funding agencies, such as the EU, ADB, AusAID, and UNDP. And under the current models, NGOs like Oxfam Australia and Veterinarians Sans Frontieres (VSF) are both donors and service providers — who contract to the large donors to deliver funding at ground level.

Donors have developed mechanisms to try to harmonise their activities between themselves and with government priorities and systems. (In Laos, for example, there is a steering committee at the national level for the ADB and EU livestock projects.) However, government planning and implementation systems in Laos and Cambodia are still quite limited and donors still tend to determine the aid agenda according to their own capabilities and interests.

Anecdotal evidence from the consultation suggested a degree of duplication at provincial and district level between the two livestock projects in Laos. There seemed to be a view that this is hard to avoid, and that smallholders could do with the extra help anyway.

One of the most obvious areas where the competition between donors and projects is evident is in the demand for local personnel and viable project areas. The VSF is currently undertaking a scoping process in Laos which will identify what other donors are doing and what in-country capacity is available to complete project work.

Relevant projects in Cambodia

Projects related to livestock in Cambodia are currently largely focused on pigs and poultry.

The European Union Smallholder Livestock Production Program is the most obvious example. It is operating in 4 provinces (Takeo, Kampong Speu, Kampong Chhnang and Pursat) and 18 districts. Its activities include:

- institutional capacity building for the Department of Animal and Production (DAPH);
- improved rural animal health services through training, certification, and expansion of Village Animal Health Workers (VAHWs);
- introduction and implementation of a national system of animal disease surveillance and monitoring;
- improved animal health through demonstration and extension services;
- improved livestock feed regimes;

- linking producers with local markets; and
- improved meat processing, storage and marketing.

Table D.1 summarises some donor projects with livestock components

D.1 Selected development projects in Cambodia

<i>Project</i>	<i>Funding organisation</i>	<i>Budget</i>	<i>Major objectives</i>
Rural Poverty Reduction Project in Prey Veng and Svay Rieng	IFAD and World Food Programme	US\$22.0 million	<ul style="list-style-type: none"> ▪ Increase poor household food production and incomes through intensified and diversified livestock production.
Community-based Rural Development Project in Kampong Thom and Kampot	IFAD,WFP, AusAID	\$US22.9 million	<ul style="list-style-type: none"> ▪ Sustain increased food production and improve incomes from intensified crop and livestock production.
Transboundary Animal Disease Control in the Greater Mekong Subregion	ADB/FAO	\$US2 million	<ul style="list-style-type: none"> ▪ Develop regional cooperation to control FMD, CSF and HPAI. ▪ Install regional and national disease identification systems ▪ Upgrade reference and diagnostic laboratories.
Livelihood and Livestock Systems Project	ADB/CIAT	?	<ul style="list-style-type: none"> ▪ Select improved forage species..... ▪ Assist farmers to adapt forage systems to own needs
Agricultural Productivity Improvement Program (completed)	World Bank/IFAD	US\$35.1 million	<p>Livestock component focus</p> <ul style="list-style-type: none"> ▪ Disease control and management ▪ Improving basic animal health services ▪ Promoting animal production
Cambodia-Australia Agricultural Extension Project	AusAID	\$A30 million	<ul style="list-style-type: none"> ▪ Develop sustainable district-oriented agricultural extension system
Agriculture Quality Improvement Project	AusAID	\$A20.7 million	<ul style="list-style-type: none"> ▪ Improve quality of rice production ▪ Build more robust village farming systems with improved fruit and vegetable marketing
Integrated Rural Development	AusAID	\$A7.7 million	<ul style="list-style-type: none"> ▪ Improve agricultural productivity and marketing
Cambodia Australia Program for Agriculture	AusAID	\$A30 million	<ul style="list-style-type: none"> ▪ Develop agricultural markets and agribusiness ▪ Promote research and extension services

Relevant projects in Laos

Donor funding plays an important role both in animal health and livestock extension programs in Laos.

The ADB has recently completed a design for a major Participatory Livestock Project in Laos. The project is aimed at reducing poverty through smallholder livestock development in the northern region of Laos. The project area comprises 18 districts in five Northern provinces (Bokeo, Houphanh, Luang Namtha, Luang Prabang and Xieng Khouang). It will target animal nutrition, animal health and fertility and animal management practices. Its budget is US\$18.4 million, comprising of a loan of US\$9.4 million and a US\$9 million grant. This project will initially focus on feed supply, HS vaccination, and de-worming including toxocara and then move on to animal management and husbandry.

The ADB project is scheduled to begin early next year. There is also another ADB capacity building project currently underway that attempts to build on previous forage project work undertaken by CIAT and the National Agriculture and Forestry Research Institute (NAFRI) (in particular the Forage and Livestock Systems Project (FLSP)¹ and provide a link into the new ADB project. It is focused on training extension workers.

The EU has begun to implement a follow up to the Lao-EU Livestock project, called the 'Livestock Farmer Support Project' which will operate in 6 Northern provinces (Luang Prabang, Oudomxai, Xieng Khouang, Luang Namtha, Kokeo, Xayabouri) and 33 districts. Its total budget is €5.3 million. The overall objective of the project is to 'improve rural livelihoods of poor households by increasing the value of their assets and their agricultural output' (EU 2006). To achieve this, the project will focus on improvements in four areas:

- livestock marketing system
- animal health services support
- animal nutrition
- animal husbandry.

There is significant overlap between the EU and ADB project, both in terms of content and geographical areas. Therefore it makes sense to have a high degree of collaboration and cooperation between the two projects. Significant collaboration and cooperation between donor agencies is not common, and hence there is often significant duplication and wasted effort — not just in Laos but in all countries that receive donor funding. Attempts have been made in the design of the EU and ADB projects to encourage cooperation. Firstly, the two projects share the same steering committee, which comprises national and provincial level stakeholders. Secondly, due

¹ See <http://www.ciat.cgiar.org/asia/forages.htm#flsp> for more information

to the overlap in district focus of the two projects, there is also district staff common to both projects. These moves are encouraging, but don't guarantee cooperation.

In addition to these projects, general development projects usually have a livestock component. The livestock component of these projects is usually extension focused. Table D.2 gives some examples of development and extension projects that include livestock components.

D.2 Selected development projects in Laos

<i>Project</i>	<i>Funding organisation</i>	<i>Budget</i>	<i>Major objectives</i>
Agriculture Development Project	World Bank	US\$12.21 million	<ul style="list-style-type: none"> ▪ Improving rural infrastructure ▪ Improving environmental management ▪ Improving agricultural services.
Poverty Alleviation in Remote Upland Areas	Swiss Agency for Development Cooperation (SDC)	US\$1 million approx	<ul style="list-style-type: none"> ▪ Improve the performance of agricultural livelihood systems ▪ Improve the ability of households to take advantage of market opportunities ▪ Improve access to water.
Small-Scale Agroenterprise Development in the Uplands	SDC	US\$3.3 million approx	<ul style="list-style-type: none"> ▪ Identifying and evaluating market opportunities for agrienterprise development ▪ Establishing a strategy and local capacity for promoting agrienterprises
Laos Extension for Agriculture Project	SDC	US\$5.8 million approx	<ul style="list-style-type: none"> ▪ Support the development sustainable agricultural extension system
Smallholder Development Project	ADB	US\$15.2 million approx	<ul style="list-style-type: none"> ▪ Promote small scale agriculture production to increase farming income and alleviate poverty
Special Program for Food Security and South-South Cooperation	Japanese Government	US\$3.6 million	<ul style="list-style-type: none"> ▪ Increase food production through diversification of production. ▪ Expand and develop livestock raising system. ▪ Improve agricultural product management. ▪ Build capacity for extension.
Forest Management and Community Support Project	Japan International Cooperation Agency (JICA)	N/A	<ul style="list-style-type: none"> ▪ Improve forest management, production and income generation activities, which contribute toward stabilization of shifting cultivation and poverty reduction
Xieng Khouang Agricultural Development Project Phase II	IFAD	US\$9.6 million	<ul style="list-style-type: none"> ▪ Reduce poverty, increase household food and income security and improve nutrition for the poor.

Source: <http://www.laoex.org/index.htm> accessed 16 October 2006.

References

- Australian Centre for International Agricultural Research (ACIAR) 2006, *Future Directions for ACIAR's animal health research*, Impact Assessment Series No 38, Canberra
- Agrifood International 2006, *Diagnostic Study, Phase 1 of Design, Agricultural Program, Cambodia, 2007-12*, AusAID Canberra.
- 2005a, *Improving Farm Family Incomes in Lao PDR*, UNDP Macroeconomics of Poverty Reduction Project.
- 2005b, *Final Report for the Cambodian Agrarian Structure Study*, Bethesda, Maryland.
- Asian Development Bank (ADB) 2006a, *The GMS program*, <http://www.adb.org/GMS/program.asp>, accessed 7 August 2006.
- 2006b, Key Economic Indicators, http://www.adb.org/Documents/Books/Key_Indicators/2006/default.asp, accessed 5 January 2007.
- 2005a, *Participatory Livestock Development Project*, Final Report, PPTA No. 4287-LAO.
- 2005b, *Market Analysis for Livestock and Livestock Production*, Final Report Supplementary Appendix 4, PPTA No. 4287-LAO.
- 2005c, *Large Ruminants in Northern Lao PDR*, Working paper No. 3, PPTA No. 4287-LAO
- 2005d, *Livestock Disease Management in Northern Lao PDR*, Working Paper No. 2, PPTA No. 4287-LAO
- 2005d, *Pig Raising in Northern Lao PDR*, Working Paper No. 4, PPTA No. 4287-LAO
- 2002, *Agricultural Sector Development Program*, Final Report, TA No. 3695 CAM
- AusVet Animal Health Services Limited, 2006, *Assessment of Current and Potential Animal Vaccine Use in Lao PDR*.
- Centre for International Economics (CIE) 2006, *Livestock vaccines in Laos: An economic assessment*, Canberra.
- 2004, *Transition in Lao PDR: Economic reform, growth and poverty reduction*, report prepared for the World Bank, Canberra.

- 2003a, *Transition and Private Sector Development in Lao PDR*, report prepared for the World Bank, Canberra
- 2003b, *The Benefits to Laos of the Sepon Gold and Copper Mines*, report prepared for Oxiana, Canberra.
- 2003c, *Country report: Lao PDR: Liberalization of financial services in the ASEAN region*, prepared for the ASEAN-Australia Development Cooperation Program Regional Economic Policy Support Facility, Canberra.
- Department of Livestock and Fisheries (DLF), 2002, *Vision for Livestock Development in Lao PDR to the year 2020*, Government of Lao PDR, Vientiane.
- Ear S. 2005, *The Political Economy of Pro-Poor Livestock Policy in Cambodia*, PPLI Working Paper No. 26,
<http://www.fao.org/ag/againfo/projects/en/pplpi/docarc/wp26.pdf>,
 accessed 17 January 2007.
- European Union (EU) 2002, *Strengthening of Livestock Services and Extension Activities: Report of the Vaccine Laboratory Specialist*, ALA/96/19, February-April 2002.
- 2006, *Livestock Farmer Support Project: Second Annual Workplan (AWP2)*, LAO/AIDCO/2003/4681, EU, Brussels.
- Food and Agriculture Organization (FAO) 2003, *Analysis of Sources of Growth in Rural Areas*, Rome.
- Huyen, L. T. T., Lemke, U. and Valle Zárate 2006, *Ruminant breeds and production systems in North Vietnam and their contribution to smallholder households in mountainous areas*, University of Hohenheim, Institute of Animal Production in the Tropics and Subtropics, Stuttgart.
- International Livestock Research Institute (ILRI) 2002, *Review of the Livestock Sector in the Lao People's Democratic Republic*, prepared for the Asian Development Bank by Werner Stür, Douglas Gray and Geoffrey Bastin, ILRI, Manila.
- International Monetary Fund (IMF), 2005, *Lao People's Democratic Republic: Poverty Reduction Strategy Paper*, Country Report No. 04/393.
- Meat and Livestock Australia (MLA), 2007, *Live Link Market Update*, September 2007, MLA, Sydney.
- Mekong Wetlands Biodiversity Conservation and Sustainable Use Program (MWBP) 2006, *Participatory Poverty Assessment, Attapeu Province, Lao PDR*, MWBP.L.L1.02.06, Vientiane.
- Ministry of Agriculture, Forestry and Fisheries (MAFF) Cambodia 2005, *Master Plan for National Agricultural Research Cambodia*, ADB TA 4310-CAM, Phnom Penh.

- Ministry of Commerce, Cambodia, 2001, *Integration and competitiveness study: A pilot study conducted under the Integrated Framework*, Phnom Penh.
- National Statistical Centre 2004, *The Household of Lao PDR: Social and Economic Indicators, Lao Expenditure and Consumption Survey 2002/03*, Committee for Planning and Cooperation, Vientiane.
- Pearce D. 2005, *Review of ACIAR's research on agricultural policy*, Impact Assessment Series Report No. 31, ACIAR, Canberra
- United States Department of Agriculture 2006, *Vietnam Livestock and Products Annual 2006*, USDA Foreign Agriculture Service GAIN report VM6054, Washington.
- 2007, *Vietnam Grain and Feed Annual 2007*, USDA Foreign Agriculture Service GAIN report VM7021, Washington.
- World Bank, 2005, *Cambodia Rural Sector Strategy Note: Towards a Rural Sector Strategy*, Washington.
- 2006a, *World Development Indicators 2006*, Washington.
- 2006b, *Cambodia: Halving Poverty by 2015? Poverty Assessment 2006*, Report No 35213-KH, Washington.
- 2006c, *Building Export Competitiveness in Laos. Diagnostic trade and integration study*, Washington.
- 2006d, *Doing business*, <http://www.doingbusiness.org/>, accessed 17 January 2007.