CAPSA Working Paper No. 92

Pathways out of Poverty through Maize and Job's Tear in Lao People's Democratic Republic

Linkham Douangsavanh and
Bounthong Bouahom

United Nations
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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

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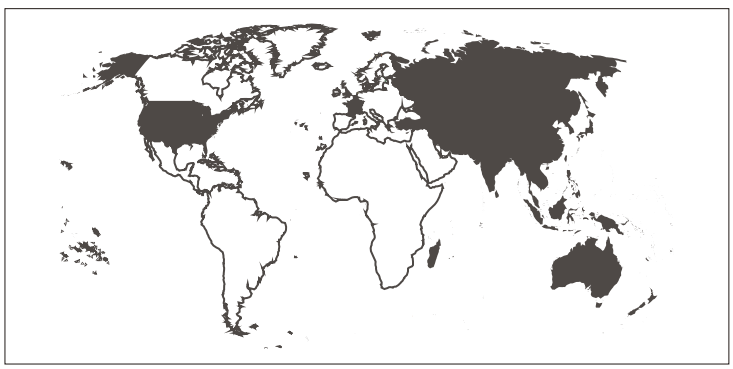

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Objectives

CAPSA promotes a more supportive policy environment in member countries to enhance the living conditions of rural poor populations in disadvantaged areas, particularly those who rely on secondary crop agriculture for their livelihood, and to promote research and development related to agriculture to alleviate poverty in the Asian and Pacific region.

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

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Foreword

Most Asian countries succeeded in multiplying major cereal production through the '*Green Revolution*'. This was made possible by the introduction of high yielding varieties and policy support which promoted the construction of irrigation facilities and the use of modern inputs such as chemical fertilizers and pesticides. However, recently the growth in productivity of major cereals has reached a plateau. Agricultural diversification has a number of positive effects, among others, food security, risk mitigation, labour absorption and conservation of biodiversity. It is crucial to be aware of the driving forces and constraints to agricultural diversification to formulate policy options which realize the coexistence of sustainable agricultural development and poverty reduction in rural areas.

Responding to this vital need, UNESCAP-CAPSA conducted a three-year research project, "Identification of Pulling Factors for Enhancing the Sustainable Development of Diverse Agriculture in Selected Asian Countries (AGRIDIV)", from April 2003, in collaboration with eight participating countries, Bangladesh, India, Indonesia, Lao People's Democratic Republic, Myanmar, Sri Lanka, Thailand and Viet Nam.

It is my pleasure to publish "**Pathways out of Poverty through Maize and Job's Tear in Lao People's Democratic Republic**" as a result of the second phase of the Lao People's Democratic Republic country study of the project. This volume presents rural surveys and case studies to collect primary data to support policy recommendations to realize poverty alleviation through agricultural diversification.

I thank Linkham Douangsavanh for his efforts. Continuous support from National Agriculture and Forestry Research Institute (NAFRI) is highly appreciated. Prof. Hitoshi Yonekura, Graduate School of Agricultural Science, Tohoku University, Mr. Tomohide Sugino and Dr. Parulian Hutagaol provided useful guidance at every stage of the study as Regional Advisor, Project Leader and Associate Project Leader respectively. I extend thanks to Mr. Matthew Burrows for his English editing.

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June 2006

Taco Bottema
Director
UNESCAP-CAPSA

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Linkham Douangsavanh and
Bounthong Bouahom
NAFRI, MAF, Lao People's Democratic Republic

Executive Summary

This working paper will provide a more in-depth study focused on specific areas in Luang Prabang and Vientiane provinces as a continuation of the first phase study, which was a review of the history of production, marketing, consumption and policy related to CGPRT (secondary) crops and non-CGPRT crops produced in Lao People's Democratic Republic. The first phase included a review and analysis of the impact of global and local trade orientation on these crops and identified the major constraints and opportunities facing the production of CGPRT and non-CGPRT crops in Lao People's Democratic Republic. Furthermore, general information for second phase activities was collected. Finally, general policy recommendations were formulated to promote future production, consumption and market oriented agriculture. The study objectives of the second phase are as follows:

- Analyse the constraints and opportunities faced by farmers to diversify production;
- Analyse the constraints and opportunities facing households and small-scale establishments to enhance diversification in production and consumption of CGPRT products;
- Investigate the industrial importance of secondary crops and products in the market and diversified ways of consuming them;
- Quantitatively analyse the impact of diversified agricultural systems on the rural economy, welfare and the environment;
- Analyse government policies, institutional arrangements and local factors that determine the use of local secondary crops for agricultural processing; and
- Formulate strategic proposals and measures to counter the constraints to secondary crop production expansion and its industrial absorption at the national and local levels.

The study was conducted in two different areas, namely Vientiane and Luang Prabang provinces. In Vientiane province, Ban Chum village was selected which is located in Thulakhom district, while in Laung Prabang province, Thapho village, Phonxay District was purposely selected.

Maize production in Ban Chum village, Vientiane province:

Almost all villagers owned two types of land; for paddy cultivation and maize. Farmers have stable food for consumption and some of them are able to sell surplus rice to augment income. Furthermore, maize is their main source of income. However, it still depends on the amount of land each farmer owns for maize cultivation and the labour contribution for on-farm activities that reduce expenses.

Although villagers in Ban Chum have an average education level of just primary school, they comprehensively understand their problems in maize growing. They also use effective traditional and modern techniques to increase yield and in labour distribution.

Ban Chum has suitable land and climate to grow maize. Growing maize is the main activity of the households and they regularly try to update their knowledge and skills to increase yields and raise profits. Potential maize production allowed villagers to set up a maize cultivation group in Ban Chum, which provides more negotiation power with the middleman and consumers. The Nam Ngum river flows from south to north and effects the water absorption of the soil. Villagers only have to plow and scatter seeds without the worry of additional fertilizer and pests because of the fertile soil and suitable climate.

Villagers manage their farms by adding expenses for labour hire. A maize growing group requires establishment to provide more power in negotiations with middlemen or consumers to respond to both the quantity and price of maize. Additionally, a group would be able to process and, therefore, create new products in the more open market.

The policy and strategy of the Government of Lao represented by the Ministry of Agriculture and Forestry aims to ensure food for consumption. However, it requires the collaboration of related sectors to address the problems associated with maize cultivation and also to increase yield. Government agencies have to emphasize quality and economies of scale based on the potentials and opportunities in each specific area.

Maize is primarily consumed as poultry and animal feed in Lao Peoples' Democratic Republic; very little is consumed as food. Maize is also consumed as green ears, baby corn and sweet corn. The high productivity of maize with wider adoptability among other cereals offer ample opportunities to increase production in Lao People's Democratic Republic. The wet season, with prolonged rains, offers a good opportunity to grow a full season of maize. The area under irrigation during the dry season will be increased due to very high productivity and without the problems of disease and insect pests. However, government

agencies need to be aware of the importance of quality, production costs and market conditions. In addition, research should address prevalent problems and increase yield. In addition, collaboration of related sectors including the agricultural extension office, agricultural promotion bank, trade office, local authority and private sectors has to be implemented through clear roles and responsibilities of each party.

Job's tear production in Thapho village, Laung Prabang province

Based on land area and market conditions, villagers generate income from Job's tear production and other kinds of crops. The price of agricultural products is rather low because the middlemen from other villages have power in the negotiations and gain more benefits from cultivation.

Laolum benefited from Job's tear production more than Khamoo according to landholdings and cultivation conditions. The provincial authority plans to invest in improving the marketing system to raise the prices of the products in terms of increasing the quantity and quality.

Job's tear is sold as a raw material and is exported for processing. Ironically, the processed product is imported, in turn, ready-to-eat with a higher price. Thus, it is clear that processing product investment should be made domestically (Luang Prabang) to increase value and raise the prices of products to help farmers generate higher incomes.

Processing and marketing of Job's tear requires more attention, including detailed agreements, through interviews with relevant companies and to understand existing internal arrangements among the companies as well as with the provincial government. The impact on the farmers who grow Job's tear must also be investigated.

Diversified agriculture is suitable in Lao People's Democratic Republic. However, it depends on the potentials and real conditions of each area. Government organizations have the responsibility to foster the adoption of modern techniques and knowledge in farming through the extension services. The government intends to develop the potential and increase the living standards of the farmers. As for the advancement of the agricultural sector, the government will increase international competitiveness through increasing efficiency and reducing production costs by opening agricultural markets, by developing a farm processing industry, and by raising the prices of farm commodities.

In reality, the government, private sector and villagers all have comprehensive understanding and decision-making skills in all areas of the production process, transportation, marketing and financing that complete the cycle from production to consumption.

1. Introduction

1.1 Main findings of the first phase study

The first phase of this study analysed secondary data and reviewed related studies on secondary crops. Agriculture is still the backbone of the economy in Lao People's Democratic Republic. It has a share of more than 50 per cent of national GDP and provides jobs for 84 per cent of the people.

As in some neighbouring countries, in Lao People's Democratic Republic the government is of the view that rice self-sufficiency is important for national food security. Accordingly, the government strongly supports rice production through various public policies. Such strong support has made the position of rice farming become quite dominant in agriculture. This domination of rice in agriculture is also reflected by the low agricultural diversification index, measured by the Simpson Index of Diversity (SID). Indeed, out of the eight countries of the AGRIDIV Project, Lao People's Democratic Republic and Bangladesh belong to the group with the lowest agricultural diversification. However, the analysis of the agricultural diversification index from 1980 to 2000 reveals that the index has increased from time to time. This fact indicates that Lao People's Democratic Republic is moving towards more diversified agriculture, yet at a very slow pace.

The government's intensive support for rice production has enabled the country to satisfy its domestic requirement for food. However, this great achievement in food production has been hitherto unable to significantly lift the economy as a whole. Lao People's Democratic Republic remains a poor country with average national income at less than US$ 350 per annum per capita. Indeed, unemployment, poverty and soil degradation/deforestation form just part of the many development problems that Lao People's Democratic Republic needs to overcome in the near future to improve economic status.

The first phase study of the AGRIDIV Project also reveals that Lao People's Democratic Republic has great potential for agricultural diversification which can be explored to lift the national economy and alleviate poverty in rural areas. To this end, a set of public policies has been recommended for the government to implement:

- Promoting commercial crop production based on market demand and comparative advantage. Basic government strategy for agricultural development is to move

rapidly towards diversification by increasing commercial crop production and to achieve poverty alleviation. Emphasis is being placed on a vigorous research and promotion programme to encourage market driven product development where there is clear demonstration of comparative advantage. The public sector is expected to work closely with the private sector in this area. The amount of maize supplied to feed mills by local farmers is insufficient. Considering the expansion of meat consumption along with economic development in the region, maize is one of the most prominent crops, within the secondary crops group, for future production.

- Increasing rice production through yield improvement.
  There would be little need for the development of new paddy fields (including irrigated paddy fields), particularly over the next 10 years, if yields could be improved. Area expansion of upland rice is extremely difficult because the government has a policy to reduce upland rice production that leads to environmental deterioration. The increase in paddy/rice consumption, which is coupled with population growth, can be met by increased unit yield. Measures to be taken to increase unit yield include: (i) identification and distribution of improved varieties of rice seed suitable for area specific conditions; (ii) strengthening extension services to improve cultivation and water management technologies; and (iii) supply of more credit for all purchases of farm inputs.

- Crop diversification in disadvantaged areas.
  Areas which are unsuitable and not used for paddy should be utilized as possible areas for diversification. Therefore, the target area for crop diversification is around 80,000 hectares (MAF and JICA, 2001). Potential crops are fruit, vegetables and industrial crops.

- Technological development.
  Previous research work on horticulture and industrial crops is very limited with the exception of that for coffee. Therefore, research outputs from the trials of new crops/varieties and the development of applicable technology on crop diversification are in rather short supply. To realize crop diversification, the development of adaptive technology is essential and urgently needed and the National Agriculture and Forestry Research Institute (NAFRI) should carry out various research programmes. Potential crops for diversification include: maize,

root crops, mung bean, soybean, peanut, tobacco, cotton, vegetable, coffee, and tea with the exception of rice. The proposed programmes include the Coffee Cultivation Technology Research Programme, and the Upland Crop Cultivation Technology Research Programme, which includes maize, mung bean, soybean, and peanuts among others.

- Extension and demonstration of new technologies.
  In parallel with technological development carried out by NAFRI, manageable and small demonstration plots using trial species and/or adaptive technology for crop diversification should be established under the full management or guidance of government extension staff. Trial species and/or adaptive technological development by NAFRI or from other neighbouring countries should be applied. The farmers could then see first hand the technical possibilities and financial attractiveness of diversification. As a result, farmers will gradually lose their risk aversion through the observation of demonstration plots. Accordingly, some farmers will adopt crop diversification practices on the basis of visual knowledge from demonstration plots. To enhance their technical level, it is recommended that these demonstration plots be used to train local extension staff and farmers on the basis of teach by showing and learn by doing.

- Establishment of an appropriate seed supply system.
  There are shortages of improved seeds and planting materials to promote crop diversification. This is caused by the absence of private seed companies and the high price of imported seeds. To resolve this seed constraint, the government may need to take responsibility for developing and supplying foundation seeds for some crops. Private seed farms should implement multiplication of these foundation seeds to minimize government interference in the market economy. In this connection the Department of Agriculture (DOA) and NAFRI will implement the project Foundation Seed Technology Development.

- Cost reduction through mechanization.
  Crop diversification and combining agriculture with livestock and fishery need more manpower to properly maintain the field. In future, on the other hand, more large-scale integrated agriculture will be introduced to enhance and stabilize farm

income. In this situation, mechanized farming will be required in order to decrease production costs and increase work efficiency.

- Research activities for income improvement in shifting cultivation areas.
  Stabilization of shifting cultivation cannot be achieved by only taking measures to increase unit yield of upland paddy. Other important measures include research and extension activities to convert shifting cultivation to permanent farmland. From this point of view, research work should be strengthened so as to identify cropping patterns and cultivation technologies that are applicable to the major shifting cultivation regions. The research work should be comprehensive, covering a wide range of products in addition to upland rice, for example other annual crops, CGPRT crops, tree crops (including fruit trees) and several kinds of livestock. Priority should be given to increasing farm income.

- Counter-measures to deforestation.
  Deforestation is a serious environmental problem in Lao People's Democratic Republic. In the context of agricultural diversification, deforestation increases soil erosion and weakens water catchments, both causing serious problems to agricultural diversification. What follows is a view from the National Agriculture and Forestry Research Institute (NAFRI) on the measures to prevent deforestation (NAFRI, 2001):
  Forest allocation, especially for production forests, has been based on the needs of wood industries, markets and the government revenue estimate. A lack of appropriate principles for sustainable forest management and codes of practices have been adopted, except in a few production areas like in Joint Forest Management (JFM) and village forestry areas where a certain amount of effort has been made towards sustainable management. Experienced forest managers are generally lacking at all levels in every aspect ranging from management planning, approval of plans, management monitoring and post-harvest management. Harvesting is thus exceeding the estimated reproductive capacity of the forests. Log production has been increasing and the concentration is quite high in certain parts of the country. However, about 60 per cent of the annual quota comes from the areas where infrastructure development has taken place. Harvesting operations have often been sub-contracted out to saw millers and traders who are only interested in short-term profits and not committed to the long-term

sustainability of forest resources. These practices have reduced the willingness of investors to invest long-term in forestry and will eventually lead to further degradation of the existing natural forests if continued. Policy review is needed and principles and practices of sustainable forest management should be introduced.

The control system is generally lax. Existing regulatory frameworks are fragmented and inadequate and cannot ensure strict enforcement. Devolution of authority has been put in place by the government. However, under the present situation where there still exists a wide gap in capacity and manpower, very little progress has been made, even with the reallocation of forestry staff to reinforce manpower at the district level. Harmonization of regulations at the implementation levels (lower levels) is needed to improve the situation.

- Other strategies for agricultural diversification include:
  - Upland rice, maize and Job's tear cultivation under the slash-and-burn system is to be decreased and stopped. Therefore, additional production has to come from irrigated, dry season crops;
  - Replacement of low potential/pest susceptible older varieties with newer, higher yielding varieties in medium and low productivity areas, especially irrigated, dry season crops are required;
  - Cultivation of hybrid varieties in high productivity areas during the wet and dry seasons should be encouraged;
  - Crops need to be better managed with popularization of line sowing through suitable seeding devices for the establishment of desired plant population levels. Other management technologies also need to be adopted;
  - Integrated pest management for the effective and timely control of pests and disease should be promoted by emphasizing the needs-based application of pesticides, especially during the wet season;
  - Timely and adequate availability of inputs, namely the seeds, fertilizers, irrigation water and credit to the farmers need to be ensured;
  - More emphasis on the development of location-specific, crop production technologies, especially the adoption of non-monetary inputs like timely sowing, method of sowing, maintaining optimum plant population, water management, efficient use of fertilizers, needs-based plant protection measures are required; and

- Increase the area under irrigation in the dry season in order to increase yields, due to less disease and pest problems for maize.

1.2 Research issues

Agricultural development has never been easy to implement. Its development is constrained not only by the limited availability of funds and qualified human resources, but also by the suitability of land for agriculture. As explained in the report of the first phase AGRIDIV study, most (80 per cent) of the land surface in Lao People's Democratic Republic consists of hills and mountains. This is not so suitable for the cultivation of rice. Cultivating rice on these types of terrain not only result in high production costs as land productivity is low, but will also cause soil degradation.

The perceived degradation of soil and the common practice of 'slash and burn' by local farmers when preparing land for rice cultivation have led the government of Lao People's Democratic Republic to take a policy of eliminating all upland rice production under slash-and-burn shifting cultivation systems and to substantially reduce the area of upland rice. Non-shifting, more ecologically stable systems with land management systems by villages and individual households are to be introduced. Ways through which the government plans to implement this dramatic transformation is documented in The Government's Strategic Vision for the Agricultural Sector (MAF, 1999).

Continuing to rely mainly on rice production to feed the rapidly growing population does not comply with this new perspective of national policy towards upland rice agriculture. The implementation of this new policy will force Lao People's Democratic Republic to rely on a limited area of flat lowlands to meet its rapidly growing domestic demand for rice. This can be possible only by the employment of intensified rice production on this limited size of lowland. Lao People's Democratic Republic will unlikely be able to do this because of the great number of improvements required, such as improvements to irrigation systems, improvements to rice varieties through research activities, and the improvement of farmers' education through training programmes to enable them to adopt the newly innovated rice technology as well as expending a great deal of funds to implement all these improvements. Accordingly, to support the new upland agricultural policy will require the government to promote food diversification among the people. This, in turn, will require diversification of food production to involve the promotion and production of non-rice food crops.

Lao People's Democratic Republic is home not only to rice but also a variety of non-rice food crops such as maize, Job's tear, mung bean, cassava, soybean and potato. Some

of these secondary crops such as maize and soybean are in high demand from neighbouring countries such as China, Viet Nam, Thailand and Indonesia. Lao People's Democratic Republic can tap this large potential market to distribute domestic production. Thus, promoting agricultural diversification based on secondary food crops will help not only to control land degradation, but also to improve income and poverty in rural areas as well as to generate foreign exchange for the government through exportation to overseas markets.

Agricultural diversification will be more effective in boosting rural employment, income and the alleviation of poverty from rural areas only if the development of secondary food agriculture is complemented with industrial processing of secondary food crops. This second phase study of AGRIDIV is designed as a field level investigation for these developmental issues.

The field investigation covers two secondary crops, namely maize and Job's tear. Cultivation of these crops is popular in rural Lao People's Democratic Republic. A significant proportion of the rural households are involved in maize production. However, production is still relatively small when compared with production potential. Meanwhile, Job's tear represents a good prospect for export. In some countries like Taiwan and China, Job's tear is used as an ingredient for traditional medicine.

1.3 Study objectives

As maize and Job's tear are the most important secondary food crops in Lao People's Democratic Republic, this study will focus on field investigations regarding the potentials and constraints in farming production, marketing and the processing industry. Findings obtained from this investigation will be synthesized to formulate policy recommendations for the development of maize and Job's tear agriculture and their respective processing industries, which are suitable for the improvement of rural income and the alleviation of rural poverty.

In order to achieve the above-mentioned goal, the following tasks will be carried out:

- Analysis of constraints and opportunities faced by farmers to diversify production;
- Analysis of constraints and opportunities facing households and small-scale establishments to enhance diversification in the production and consumption of maize and Job's tear products;
- Investigation of the industrial importance of maize and Job's tear products, other products in the market and diversified ways of consuming them;

- Analysis of the impact of a diversified agricultural system on the rural economy, welfare and the environment;
- Analysis of government policies, institutional arrangements and local factors that determine the use of local maize and Job's tear products for agricultural processing; and
- Formulation of strategic proposals and measures to counter the inhibiting factors of maize and Job's tear products in production expansion and their industrial absorption at the national and local levels.

1.4 Scope of the study

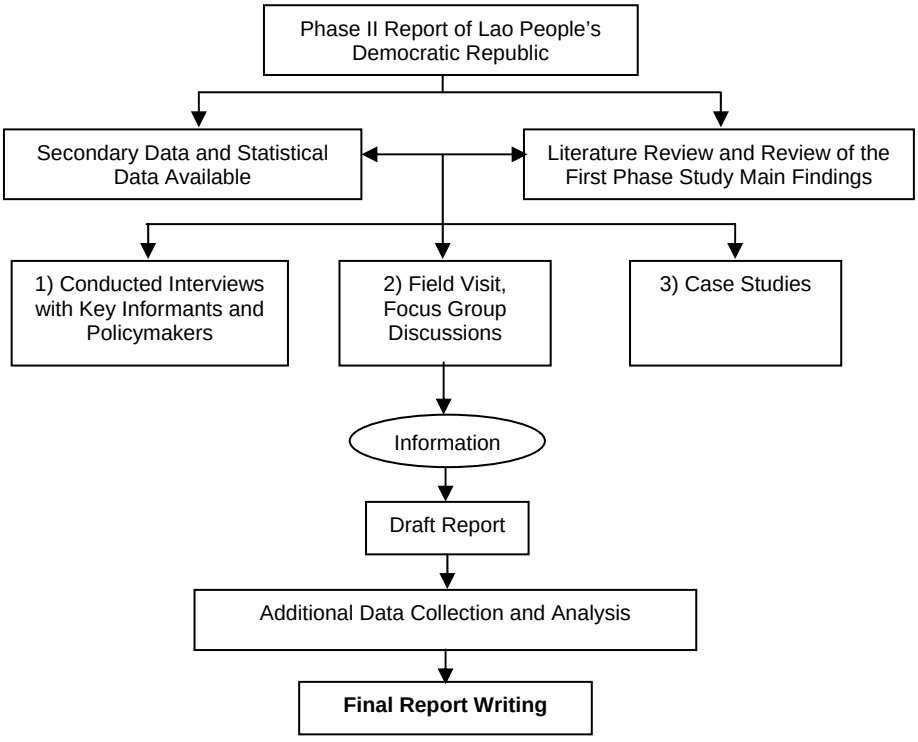
The ultimate purpose of this study is to formulate policy recommendations for the development of agriculture and industrial processing of maize and Job's tear. To this end, a field study will be conducted in two villages. Information obtained from literature, gathered from competent persons and institutions such as research centres and line departments of MAF will complement the data collected from the fieldwork. All collected information will be analyzed with appropriate tools and interpreted logically to produce useful findings and conclusions.

2. Conceptual Framework and Methodology

2.1 Conceptual framework

The steps used in conducting this second phase study of AGRIDIV is depicted in Figure 1.1. This study uses both primary data collected from field investigations and secondary data from statistical publications and literature reviews. Secondary data was gathered through three instruments, namely focus group discussions with associated stakeholders, individual interviews and case studies. The collected information was then analysed using appropriate tools of which the analytical results became inputs for writing the draft of the study report.

Figure 2.1 Logical thinking and steps in conducting the study



2.2 Research methodology

2.2.1 Selection of crops

This study covers two crops, namely maize and Job's tear. These crops have been selected because they have great potential, they are popular in rural areas and have good market prospects both domestically and overseas.

2.2.2 Selection of research sites

The field study of maize farming is located in Ban Chum village, Thulakhom district, Vientiane province. This province is situated in the central part of Lao People's Democratic Republic. Ban Chum village is a model village for maize production in the Vientiane province. This village is in the district of Thulakhom and has produced maize for more than 20 years. The scale of maize farming in Ban Chum is much larger than that of any individual village in the district. The maize production is mainly to support the animal feed factory in Vientiane municipality.

Meanwhile, for the field study of Job's tear, Thapho village was selected. In the village, Job's tear is a popular crop. In addition, Thapho village is one of the many villages in Laung Prabang province which the provincial government has awarded special attention to for forest protection, and improving the quality of life in shifting cultivation areas through environmentally sound development.

2.2.3 Time frame of the study

There are six main tasks that are required to complete this second phase of the AGRIDIV project. These tasks will be completed within ten months, starting in August 2004 and finishing in June 2005. Details of the time frame for each task are depicted in Table 2.1.

Table 2.1 Details of main tasks and time frame to conduct the tasks of the second phase study of the AGRIDIV project

Activities	2004					2005					
	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1. Secondary data collection and literature review	→	→									
2. Field survey			→	→	→	→	→				
3. To arrange and participate in the in-country interim review phase II conducted by the project leader, and revise and complete the first draft country report							→	→	→		
4. Data analysis					→	→	→	→	→		
5. Draft report writing					→	→	→	→	→	→	
6. To present and discuss the second country report											→

2.4 Method of data collection and data analysis

This study uses both primary and secondary data. Primary data is obtained from the field through a variety of means, namely (i) direct observation; (ii) in-depth interviews with key informants; and (iii) focus group discussion with local stakeholders. Meanwhile, secondary data is collected from relevant statistical publications and a review of relevant previous studies.

A variety of relevant analyses are employed to master the collected information including analyses of labour use, of land productivity, of farmer share, of marketing margins, profit R/C analysis. Tables, graphs and bar charts are used to present the results of the analyses. Microsoft Excel was used for data processing.

2.5 Presentation of the report

The remainder of this report is divided into three parts. Part 1 is about the case study of maize. Meanwhile, part 2 focuses on the study of Job's tear. Part 3 is the last part of the report and is concerned with the prospect of enhancing the sustainable development of diverse agriculture in Lao People's Democratic Republic. In this final part of the report, the study's findings are brought together for synthesis to respond to the study's objectives regarding the prospect of enhancing the sustainable development of diverse agriculture in Lao People's Democratic Republic.

Part 1: The Case of Maize in Ban Chum Village, Thulakhom District, Vientiane Province

3. Profiles of the Study Site for Maize Production, Respondents and Their Households

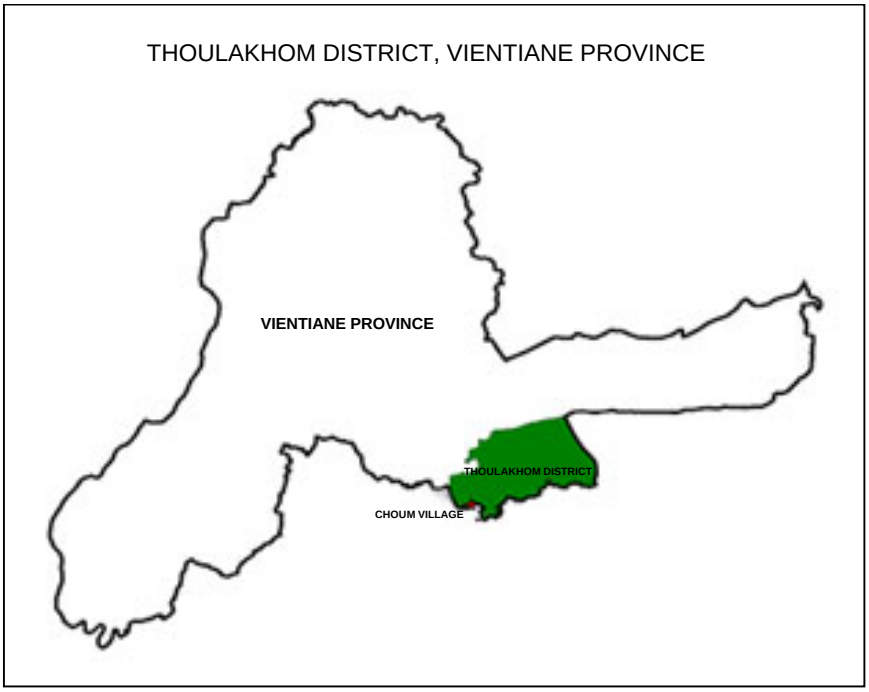
3.1 Profile of the study sites

3.1.1 Geographic and administrative setting

The village of Ban Chum is located in the district of Thulakhom. This district is situated in the province of Vientiane where the capital city, Vientiane, is located.

Ban Chum is very close to the district's capital; about 12 kilometres away. The village is also only 60 kilometres from Vientiane city. Road connections between the village and these two cities are also relatively good. The exact location of the village can be seen in Figure 3.1.

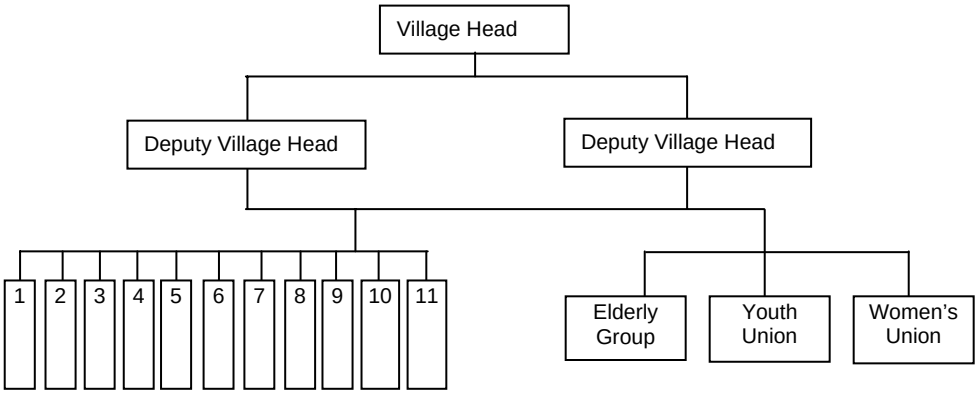
Figure 3.1 Location of the maize study



Its geographic proximity to these cities is economically beneficial for the development of agriculture in Ban Chum. This is because the capital of Thulakhom district and Vientiane city are both large markets for agricultural products and inputs. Local farmers from Ban Chum can easily reach these markets from their village to distribute their products or to purchase farming inputs.

As any village in Lao People's Democratic Republic, administratively the village authority governs Ban Chum. To simplify its administration, the village is divided into eleven units, each consisting of 8 to 15 households. At the top of this administrative authority is the village head, while lower down is the head of unit. In-between these two extremes of authority are the two deputies of the village head. Villager participation in this administrative authority is also channeled, through the involvement of a variety of mass organizations such as Youth Union, Women's Union and the Elderly Group. The structure of the administrative authority of Ban Chum village is depicted in Figure 3.2.

Figure 3.2 Administrative structure of Ban Chum's village authority



3.1.2 Demographic profiles

The population of Ban Chum is 1,248. The population consists of 148 families and 117 households. It is important to note that in Lao People's Democratic Republic one household can support more than one family. These families live together in one house and they manage their household's expenditure collectively. This practice is quite commonplace in the case of young families who stay with their parents after marriage. As income per capita is very low in Lao People's Democratic Republic, families generally cannot afford to build new houses for their newly married children. Young couples have to work hard for many years to accumulate savings to enable them to build their own houses.

Another interesting phenomenon about this village is the fact that the female population is much smaller than the male population. Of the total population, females account for only 33.9 per cent (424 persons). This is peculiar since normally the female population is larger than the male population. The reason for this peculiarity is that a lot of young local females migrate to Vientiane city. They stay there to work as labourers at garment factories. Most of their time is spent in the capital. They return to their village only temporarily for short visits.

Table 3.1 Population and its growth rate in Ban Chum village in 2004

Description	Magnitude	
Total population	1 248	(100.0 %)
Composition		
Males	825	(66.1 %)
Females	423	(33.9 %)
Annual rate of growth (%)	2.0	

Source: Ban Chum village's Authority Statistics, 2004.

By working in these factories they can earn money that they use not only to support their lives in Vientiane, but also to support their families in Ban Chum. As elsewhere in developing countries, labour-intensive factories such as garment and shoe manufactures pay their labourers very low salaries. The availability of such a cheap labour supply makes developing countries attractive for foreign direct investment in labour intensive factories.

The income of these migratory female workers is not really much, however, it is helpful. Not only is their income used to support their living in Vientiane, some of it is sent back to their village to support their families. Such economic perspectives make female migration to Vientiane commonplace in Ban Chum village.

Despite the large migration of young females to Vientiane city, population growth in the village is still relatively high. The population growth rate is 2.0 per cent per annum. High population growth is a great challenge for this village, not only in terms of increasing food production to feed the growing numbers, but also to increase the supply of available work. The current large migration of young females to Vientiane for work highlights the difficulties faced looking for work in this community.

3.1.3 Economic profile

The backbone of the economy is agriculture. Not only is agriculture the key sector of the economy; most of the rural population embrace livelihoods that are subsistence orientated. Lack of market orientation together with a lack of technological production and supporting infrastructure, like a processing industry, make the economic conditions of the rural people lack far behind farmers of neighbouring countries, especially Thailand and China. The average income per capita of farmers in Lao People's Democratic Republic is still far below that of their counterparts living in China and Thailand.

This is regrettable in view of the fact that both China and Thailand have recently proved agriculture can be a good employment opportunity for rural people when an appropriate development strategy is implemented. The government has, indeed, worked hard to develop agriculture, but still much more developmental effort is needed to enable rural people to enjoy an economic status equal to that enjoyed by farmers in China or Thailand.

The difficult economic condition faced by the average farmer is also apparent in Ban Chum. The major occupation of most villagers is farming, either as cultivators or farm labourers. According to the data in Table 3.2, 81 per cent and 8 per cent of the local families are, respectively, farm operators and farm labourers. Only a few of the local villagers (11 per cent) are employed outside farming.

Table 3.2 Distribution of families in Ban Chum village by type of occupation

Occupation	Percentage
Farm operators	81
Farm labourers	8
Non-farm worker	11
Total	100.0

Source: Ban Chum Village's Authority Statistic, 2004.

In addition to the lack of market orientation and lack of production technology, farmers in Ban Chum village operate land of relatively small size. Processing agricultural products to improve their value is not common for local farmers. Most products are sold without prior processing to improve their value. These conditions restrict farming from providing local farmers with sufficient income to support their families. As a consequence, most farming families have to seek extra work. Many of them send young family members to work in garment factories in Vientiane city. Other families, who cannot send family members to work in Vientiane, have to seek extra work around their village or in neighbouring villages. Work can be found as farm labourers or other kinds of work which require low skills.

3.1.4 Agricultural profile

The village of Ban Chum is an agricultural community. Maize and rice are the major crops in the village. The popularity of rice production has gradually declined in the village since the demand for maize from the feed industry increased recently in Lao People's Democratic Republic. In the past, rice farms occupied almost all of the village's farmland. Nowadays, the area used for maize cultivation has become almost equal to that of rice. Total area of rice farms is 187 hectares while that of maize farms is 175 hectares. Another factor behind the decline of the local farmers' interest in rice production is apparently the fact that average productivity of rice relatively low at only 3 tons/hectare/season.

Ban Chum is a model village for growing maize in Vientiane province. Local farmers have grown maize for more than two decades; from 1979. Their involvement in maize production increased after the establishment of ThaNgon Animal Feed Produce Company in 1979. The company uses maize as a basic input for the production of animal feed that it sells to market.

In the beginning maize was produced by only five local farmers. As demand from this company increased year by year, so too did the price of maize relative to that of rice. In addition, maize farm productivity in the village is relatively good; about 5 tons/hectare/season. Therefore, maize production has become economically more attractive

than rice. Recognizing such relative economic attractiveness, local farmers are bringing more and more land under maize cultivation.

As is common in Lao People's Democratic Republic, farm size in Ban Chum village is relatively small. Average farm size for maize is 1.2 hectare/family, while that of rice is 1.3 hectare/family (Table 3.3). Ban Chum village is situated in a lowland area. As explained previously, the proportion of lowland areas is relatively small in Lao People's Democratic Republic. Most of the land (80 per cent) is hilly and mountainous.

Table 3.3 Average size of farm operation in Ban Chum village

Type of farm	Total size of farm (hectare)	Average farm size (hectare/family)
Rice	187	1.3
Maize	175	1.2

Source: Households Survey in Ban Chum, 2004.

One significant constraint to the development of maize production in Lao People's Democratic Republic is the poor supply of maize seeds. Most seeds used are imported. There are two sources of maize seed varieties that local farmers use. One is from Thailand, the other from Viet Nam. Thai seeds are more expensive than Vietnamese. The price of Thai seeds is 26,000 kip/kilogram, while seeds from Viet Nam cost only 18,000 kip/kilogram.

Besides the production of these two major crops, local farmers cultivate other crops including fruit trees, tamarind, mango, jack fruit, banana, papaya, chilly and vegetables. Most of these products are for household consumption.

Villagers also raise cattle based on the convenience of each household. Villagers have animal pens for cows, buffaloes and goats. At present, raised in Ban Chum are 2,228 cows, 22 buffaloes and 29 goats. In addition, there are 11,530 poultry birds and some fishponds. Villagers earn extra income from selling the animals they raise.

3.1.5 Extent of unemployment and poverty

Open unemployment is not common in the village. Mature people generally work either as operators of farms or labourers. However, the main employment problem in the village, which is common in rural areas of all developing countries, is disguised unemployment. In Ban Chum, farming activities use more labour than the optimal level. Tradition requires farmers to employ any surplus of labour available in the village. This is one way to maintain communal solidarity.

The over use of labour in farming activities is a direct consequence of limited job availability outside of farming operations for local people. The lack of education has limited

the number and range of work opportunities available to them. Nevertheless, many local people have been lucky to find employment in garment factories in Vientiane. The supply of such low skill work is limited in Lao People's Democratic Republic. As a result, some people are actually unable to find such non-farming work for themselves. Furthermore, not all rural people are able to find such a job as they are not so young and therefore able to migrate far from their village.

Another employment problem in Ban Chum is the fact that the returns on labour are relatively low in farming activities. This is a result of complex factors of which the low physical productivity of farming and the low price that farmers receive for their agricultural products are important.

For those rural families with insufficient farmland and with no family members who work at garment factories in Vientiane, the family subsistence requirement is hard to meet. Some households in Ban Chum face such a situation. Nearly ten households reported being short of rice for 2-4 months of the year. This is because they have very limited land for cultivation. As a consequence, they have to depend on labouring for other families to meet their sustenance.

3.2 Profile of respondents

Respondents were predominantly relatively young. Of the 16 respondents, thirteen (81.2 per cent) were less than 40 years old. The respondents' average age was 40 years old. All of the respondents are of Laolum ethnicity (Table 3.4).

Table 3.4 Distribution of respondents by ethnicity and age

Ethnicity and age	Number	Percentage
Laolum	16	100.0
< 30 years old	9	56.2
30-40 years old	4	25.0
> 40 years old	3	18.2

Source: Households Survey in Ban Chum, 2004.

As is typical of rural people in developing countries, the respondents of Ban Chum village achieved only low level of formal education. None of them had completed formal education of the level higher than primary school (Table 3.5). This lack of` formal education is a constraint to the adoption of production technology as well as other kinds of technologies, which farmers need if they want to improve the income receive from their

farming operations. Nevertheless, most of them (68.8 per cent) have a lot of farming experience; more than 10 years.

Table 3.5 Distribution of respondents by education level and farming experience

	Number	Percentage
Education level		
Primary school	16	100.0
Higher than primary school	0	0.0
Farming experience		
< 10 years	5	31.2
10 - 20 years	5	31.2
> 20 years	6	37.6

Source: Households Survey in Ban Chum, 2004.

All the respondents stated that their major occupation is maize farming. In addition, the respondents mentioned extra occupations such as small rice farmer, animal husbandry, fish farmer and hired labourer. The extra work is important as the income received from maize farming is not sufficient. For them, involvement in multiple jobs is a strategy for survival, not accumulation of wealth. In addition, the multiple job strategy is not unique to rural areas of Lao People's Democratic Republic, but is very common in rural areas of developing countries where poverty exists.

3.3 Profile of the respondents' households

The average family size of respondents was relatively small. On average, a family consists of four persons. This means, in general, a family has only two children. As the size of the families is relatively small, so too is the size of the family's workforce. On average, a family has only two labourers (Table 3.6).

Table 3.6 Average size of family and average size of family labour force

	Average
Size of family	4
Size of family's labour force	2

Source: Households Survey in Ban Chum, 2004.

As maize farming is the respondents' main occupation, the size of landholding is important to them. The structure of landholdings of the respondents is depicted in Table 3.7. From this table, one can observe that most holdings belong to the class of 2.1-3.0 hectares (31.25 per cent) and that of 3.1-4.0 hectares (37.50 per cent).

Table 3.7 Structure of landholdings

Class of landholding size	Number of respondents	Percentage of the respondents
< 1.0 ha	0	0
1.0 – 2.0 ha	0	0
2.1 – 3.0 ha	5	31.25
3.1 – 4.0 ha	6	37.50
4.1 – 5.0 ha	3	18.75
5.1 – 6.0 ha	1	6.25
> 6.0 ha	1	6.25

Source: Households Survey in Ban Chum, 2004.

As in other rural parts of Lao People's Democratic Republic, the respondents' income is relatively low. In Ban Chum village, average family income is about 10,000,000 kip/family. Most income is obtained from maize farming. On average, family income from maize production accounts for 80 per cent of the total annual family income. Non-maize farming income makes up only 12 per cent, while non-farm income is only 8 per cent (Table 3.8). These facts imply that for Ban Chum farmers, maize farming is crucial for the generation of their household income.

Table 3.8 Average annual family income of the respondents

Income source	Absolute value (kip)	Percentage
Total income	10 000 000	100
Income by sources		
Maize farming	8 000 000	80
Non-maize farming	1 200 000	12
Non-farming income	800 000	8

Source: Households Survey in Ban Chum, 2004.

3.4 Concluding summary

The village of Ban Chum is located close to the capital of Lao People's Democratic Republic, only 60 kilometres away from Vientiane. Its relative proximity to the capital is advantageous for its population. The capital represents a large market for agricultural inputs and products.

The village is inhabited by 148 families totalling 1,248 persons. The population is growing quite rapidly at an annual rate of 2 per cent. Almost all of the residents rely on agriculture for their livelihood, either as farm operators or labourers. In general, local farmers earn most of their income from maize farming.

The amount of farm income is not enough that they can afford to live off farming alone. Work is needed off-farm to supplement farm income. However, non-farm activities are very limited in the village. As a consequence, a significant portion of the local labour

force, especially young female labourers, have migrated to urban areas, notably Vientiane, for low-skilled jobs in the garment industry. Their income is also not actually so great. Nevertheless, these migrating female labourers manage to send some of it back to support their family in the village.

Ban Chum is one of the maize-producing villages in Lao People's Democratic Republic. The cultivation of maize has become popular in this village since the establishment of an animal feed company about two decades ago. The company procures maize grain to be used as a basic ingredient of feed products that it produces. The growing demand for maize grain from the feed industry has made it become more profitable for the local farmers to produce maize than rice. This has made the farmers prefer to cultivate maize than rice.

Nevertheless, the farmers have not yet been able to maximize the benefits they could receive from the current market for maize grain, notably from the animal feed industry. This is because of the presence of some constraining factors including low production technology, the absence of post-harvest activities to enhance valued added, and the lack of government support.

4. Analysis of the Maize Farming System

4.1 The average size of farm operation and pattern of cultivation

Farming in Ban Chum is the most important source of income. Despite this, the average size of farming operation is relatively small, especially when compared with that of any western country, at only about 4.95 hectares per family (based on sample households).

This average size of farming operation does not reflect the real condition of farm holdings in the village. As is common in developing countries, the distribution of farming operations in Ban Chum village is uneven. As per Table 4.1 most of the respondents have a farm operation of 2.75 hectares per household (56.25 per cent), while a few operate larger farms of 4.5 hectares per household (3.25 per cent).

Table 4.1 Average size of maize farm operation and the distribution of respondents by class of farm operation in Ban Chum village

Class of farm operation	Number of respondents	Percentage of respondents	Average size (hectares)
< 1.0 ha	0	0	0
1.0 – 2.0 ha	0	0	0
2.1 – 3.0 ha	9	56.25	2.75
3.1 – 4.0 ha	0	0	0
4.1 – 5.0 ha	5	31.25	4.5
> 5.0 ha	2	12.25	16.00

Source: Households Survey in Ban Chum, 2004.

For poor farmers who operate a small size of farmland and have limited job opportunities off-farm, the maximization of income obtained from their small operation is of great concern. One strategy to pursue this crucial goal is to intensify the use of their small plot of land through the application of multiple cropping.

Multiple cropping is a common practice in the village. As Table 4.2 shows, all respondents have applied multiple cropping in the operation of their farmland. However, the cropping patterns applied are not homogeneous. There are two types of cropping pattern that the respondents implement, of which the most popular is maize-maize (Table 4.2). This cropping pattern has enabled the respondents to achieve an average cropping index of 200 per cent.

Table 4.2 Distribution of the respondents by cropping pattern in Ban Chum village

Cropping pattern	Number of respondents	Percentage of the respondents
Rice-maize	4	25
Maize-maize	12	75

Source: Households Survey in Ban Chum, 2004.

4.2 Use of labour for maize farming

Labour is one of the key inputs in maize farming. In Ban Chum, human labour is surplus. The existence of such a surplus of human labour forces local farmers to rely on human labour in operating maize farms. Indeed, the maize farmers of this village only use human labour in operating their maize farm.

Despite of the existence of surplus human labour, it appears that local maize farmers do not use labour intensively in their farming operations. On average, labour use on maize farms in the village is only 65 mandays per hectare per season. Most of the human labour (61.5 per cent) is used for land preparation. The rest of the labour is used for weeding, harvesting and drying maize seeds (Table 4.3).

Table 4.3 Use of human labour, animal power and tractor power in maize farming by the respondents in Ban Chum village

Activity	Human labour		Animal labour		Tractor	
	Mandays	%	Days	%	Days	%
Land preparation and scatter seeds	40	61.5	0	0	0	0
Weeding	10	15.4	0	0	0	0
Harvesting	10	15.4	0	0	0	0
Drying	5	7.7	0	0	0	0
Total labour uses	65	100.0	0	0	0	0

Source: Households Survey in Ban Chum, 2004.

4.3 Use of non-labour inputs

Details about the use of non-labour inputs by maize farmers in Ban Chum are supplied in Table 4.4. From the data in the table, it is clear that local maize farmers do not take much care of their maize farms. Not only is the use of labour much less intensive, they use no other inputs, except seed varieties. They use no manufactured fertilizers, such as urea, KCL and phosphate (TSP). They also use no manure or chemical herbicides and pesticides.

This low use of inputs looks peculiar. All farmers cultivate modern varieties of maize seeds (Table 4.5), with the average use of 50 kgs/ha (Table 4.4). Generally, modern varieties are very input-demanding. They can perform well only if used in high doses of

fertilizers and pesticides. Accordingly, one cannot expect maize farming in Ban Chum to be highly productive.

Table 4.4 Use of material inputs per hectare maize farm in Ban Chum village

Input	Units	Quantity
Seeds	Kg	50 kg/ha
Urea	Kg	0
KCl	Kg	0
Phospate (TSP)	Kg	0
Manure	Kg	0
Herbicides	Kg	0
Pesticides	Kg	0

Source: Households Survey in Ban Chum, 2004.

Table 4.5 Distribution of the respondents by variety of maize seed sown

Variety of maize seed	Percentage of farmers
Local varieties	100
Modern varieties	0

Source: Households Survey in Ban Chum, 2004.

4.4 Farm productivity, cost structure and profitability

Maize production in Ban Chum is not intensive farming production. Little manufactured fertilizers or other chemical inputs such as pesticides and herbicides are used. Also, no modern varieties are used, only traditional maize varieties. In short, from these characteristics, one can say that maize production technology in the village is closer to traditional rather than modern techniques. Since production technology is relatively traditional, productivity is also relatively low. On average, maize farm productivity is far below that of modern maize technology which is about 5 tons per hectare.

Table 4.6 presents information about the cost structure of maize production in Ban Chum. Production costs can be grouped into three categories, namely the cost of labour, cost of seeds, and cost of fertilizers. The cost of production can be grouped into cash costs and imputed cash. The former being those cost items that farmers buy from outside their household, and hence are paid for in cash. The latter are those cost items that farmers pay no cash for since these inputs are obtained from the farmers' own households. To estimate the magnitude of this cost is to impute market prices of the same quality of a relevant input for each individual input obtained from the farmers' own household.

Table 4.6 Cost structure of maize production and its profitability per hectare in Ban Chum village

Item	Unit	Count	Cost/unit (kip)	Total cost (kip)
Costs				
Land preparation and scattered of seeds	Hectare (ha)	1	800 000	800 000
Weeding	Daily labour/ha	10	20 000	200 000
Harvest	Daily labour/ha	10	20 000	200 000
Drying	Daily labour/ton	5	20 000	100 000
Seed varieties	Kg	50	18 000	900 000
Total cost				2 200 000
Production (revenues)	Ton/ha	5	800 000	4 000 000
Profit	Ha	1		1 800 000

Source: Households Survey in Ban Chum, 2004.

Data in Table 4.6 shows that the total cost of production per hectare in Ban Chum is 2, 200,000 kip. The cost is based on only labour and seed costs. From the table it becomes clear that the labour cost is the most significant. From the table it can also be estimated that 59 per cent of the total production cost is for labour. The remainder is for seeds.

The cost structure of maize production is quite different from that of rice production. Rice production is much more dependent on cash inputs. It uses intensive chemical inputs, such as manufactured fertilizers and pesticides. These inputs are all from the market, and hence, cash has to be expended if farmers wish to apply them on their rice farm. Labour is also used intensively on rice farms, and farmers can only meet a small part of their labour requirement. The relatively short duration of each activity in the operation of rice farming restricts farmers, in general, from meeting the labour requirement from their own household[1].

Maize farming is profitable for farmers. On average, a hectare of maize can generate a net revenue of 1,800,000 kip. This profitability is also shown by the magnitude of the R/C ratio. The R/C ratio for maize farming in Ban Chum village is 1.81; higher than that of rice. This level of profitability is much better than rice farming.

4.5 Potentials and constraints in farming operations

4.5.1 Potentials

One of the most significant factors that is conducive for the development of maize production in Ban Chum is the fact that the government has allocated farmland to the villagers for cultivation based on the land use and land allocation regulations of the

[1] This information is based on the group and focus group discussions in the village.

Government of Lao (GoL). Now, villagers have secure ownership rights of the farmland they operate. Security of landownership means that owners of the farmland have security of exclusive rights for both the benefits and the costs generated from operating their farmland. This security of exclusive rights is an incentive for the farmers to explore the best use of their farmland to maximize the profit that can be obtained from its operation. Maize farming is one of the best farming possibilities for the local farmers of this village.

Another factor conducive to the development of maize farming is that the farmland in this village is still quite fertile. Its natural fertility is owed to Nam Ngum river which passes through Ban Chum. This river is supplied with most of its water resource from the nearby mountainous area where the natural forest is still intact. The forest disposes of its rich organic materials into the river which then passes into the farmland of the village through the irrigation system. With high natural fertility, farming in the village needs little extra fertilizer, which, in turn, reduces the cost of production.

The availability of a relatively secure source of water irrigation is important for farming seasonal crops such as maize. The existence of Nam Ngum river which crosses the village of Ban Chum has allowed the people of the village to develop a good irrigation system, which is conducive for the development of maize farming in Ban Chum.

A market for products is important in the development of maize farming. Without the existence of a market as an outlet for the maize that the farmers produce, it would be impossible to ask them to grow maize intensively. Fortunately, Ban Chum is close to the district capital and Vientiane where markets for agricultural products are available. In Vientiane there are feed factories which require maize as a basic input for feed products.

It is true that the formal education of local farmers is relatively low. This lack of formal education could have been a serious hindrance for farmers to adopt new production technology. However, the fact that local farmers adopted maize farming more than 20 years ago has enabled them to accumulate a lot of knowledge regarding maize farming. This accumulation of farming knowledge has compensated their lack of formal education.

4.5.2 Constraints

One possible constraint to the development of maize farming in the village is the supply of maize seed varieties. Maize seeds used in Ban Chum come from overseas (Viet Nam and Thailand). Prices of seed varieties are also relatively expensive. Varieties imported from Thailand cost 26,000 kip/kg, while those produced in Viet Nam cost only 18,000 kip/kg.

Another problem that may constrain the development of maize farming is the adoption of new technology. The production technology used in maize farming is still traditional. This technology is incompatible with the development of commercial, intensive maize farming. Modern technology will have to be introduced into the local community. Modern technology requires not only better skilled farmers but also embodies higher production risks. As local farmers are poor farmers, they lack the ability to absorb the cost of farming failure. However, the government could help them through the provision of credit and farming education.

It is true that local farmers have access to maize markets in the district capital and in Vientiane. However, these markets are not so friendly to the local farmers. Traders and the feed industry are capable of dictating the conditions of maize transactions, especially the price of maize. Farmers need to organize themselves for collective bargaining to improve their position in these markets. The government can facilitate the development of such farmer organizations.

4.6 Concluding summary

In Ban Chum, maize is the most popular crop grown. Most local farmers cultivate maize twice a year, and most of the maize farms are 2.1-3.0 hectares per family holding. Most income is generated from maize farms.

Maize operations in the village are still quite traditional in nature. Local farmers do use modern seed varieties but apply no complementary modern inputs, such as manufactured fertilizers, pesticides and herbicides. In addition to seeds as an input, farmers also use human labour in their operations. Nevertheless, maize operations in the village are quite profitable. This is due to good, natural soil fertility and a good irrigation system.

There are some other supportive factors for maize operations in the village, apart from good natural fertility and a good irrigation system. One is that the government has granted secure land titles to local maize producers. This security provides local farmers with the ability to invest in their own land. This motivates the farmers to make the best use of their farmland.

Another factor that is conducive to the promotion of maize farming in Ban Chum is the location of the market for maize. The market for maize grain is animal feed producing factories. Most of these factories are located in Vientiane which is close to the village. Local farmers also have a lot of experience in maize cultivation.

However, there are some factors that may constrain the development of maize farming. One possible constraint is the supply of maize seed varieties. Maize seeds used in the village come from overseas (Viet Nam and Thailand) and the prices are relative expensive. Another problem is the adoption of technology. The production technology used by local farmers in maize farming is still traditional in nature. This technology does not fit well with the development of commercial, intensive maize farming.

Modern technology will have to be introduced into the local community. Modern technology requires better skilled farmers and also embodies higher production risks. As local farmers are poor, they lack the ability to absorb the cost of farming failure. The government can help, however, through the provision of credit and farming education.

It is true that local farmers can access maize markets in the capital of the district and in Vientiane. However, these markets are not so friendly to local farmers. Traders and the feed industry are capable of dictating market conditions, especially the price of maize. Farmers need to organize themselves for collective bargaining to improve their position in these markets. The government can facilitate the development of such farmer organizations.

5. Analysis of Products within the Marketing System

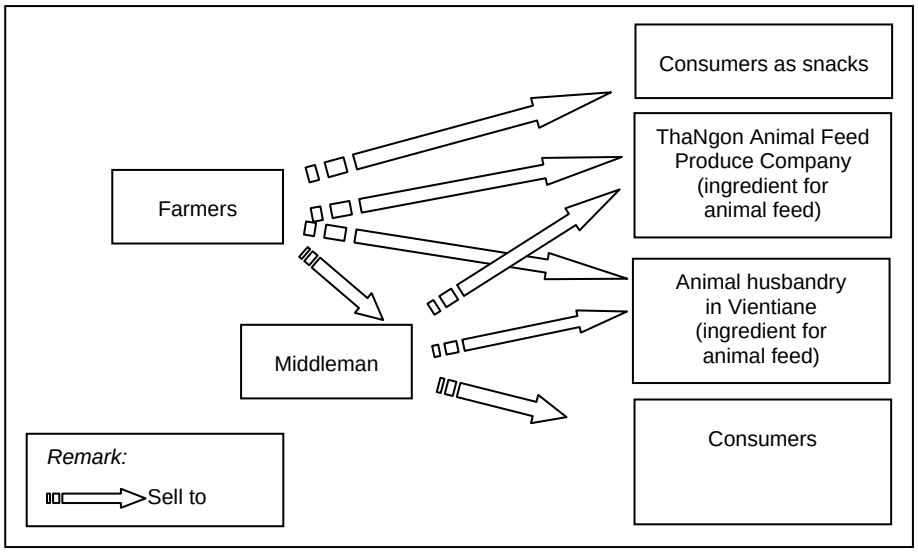
5.1 Forms of products traded and channels of distribution

Maize production in Ban Chum is mainly for market. Farmers use only a very small portion of their production for household consumption, usually as a snack with tea or coffee.

From the field interviews, it was revealed that farmers sell their maize either in the form of fresh maize on the cob or in the form of maize grains. Most maize production is in the form of maize grains. Only a small portion of the products are sold as fresh maize on the cob to consumers who consume it as a snack.

Figure 5.1 shows the marketing channels farmers use to sell their products. Farmers utilize four marketing channels to sell their maize products. The first one entails the farmers selling fresh maize to local consumers. This channel is known as 'marketing channel 1'. This channel plays only a minor role in marketing the farmers' maize production. It was estimated that this channel is equivalent to less than 5 per cent of the total maize grain that is produced.

Figure 5.1 Marketing channels of maize production in Ban Chum village



Meanwhile, to sell the maize grains, farmers can employ three marketing channels. First, they can sell directly to ThaNgon Animal Feed Produce Company. The company, located in Vientiane, specializes in the production of manufactured animal feed products. There is now a growing market for this product as small- and medium-scale commercial animal farming has grown rapidly over the last few years. This company uses maize grains as a basic ingredient to produce animal feed. This marketing channel is known as 'marketing channel 2'.

Another way that local farmers market their maize grain is to sell directly to animal rearing farms. In Lao People's Democratic Republic, animal husbandry utilizes manufactured feeds, or processes animal feed itself. At ThaNgon Animal Feed Produce Company, the farmers rearing livestock use maize grain as a basic ingredient of feed for their animals. This marketing channel is known as 'marketing channel 3'.

The farmers can sell directly to middlemen who come to their village to buy maize grain. This is known as 'marketing channel 4'. The middlemen then sell the maize grain to three end-users, namely (a) ThaNgon Animal Feed Produce Company (marketing channel 4a), (b) animal husbandry farms located in Vientiane (marketing channel 4b) and (c) consumers (marketing channel 4c).

5.2 Nature of market structure, farm gate price and marketing margins

In the previous section, it was explained that most of maize production in Ban Chum village is sold. Only a minor portion is used by farmers for home consumption. Most of the sold product is in the form of grain. In selling their production, local farmers of Ban Chum village employ four marketing channels.

The significance of each marketing channel for the farmers of Ban Chum in trading their maize product can be seen from the data in Table 5.1. From this table, it is clear the most important channel for the marketing of maize products in the village is marketing channel 2. Approximately 75 per cent of the total maize grain that the farmers produce is sold through this channel. The second most important channel is marketing channel 4. This channel is used to distribute 22 per cent of the maize grain.

Table 5.1 Relative tonnage of maize grain by marketing channel in Ban Chum

Marketing channel	Tonnage traded as a percentage of the total [a]
1	2
2	75
3	1
4	22
Total	100

Source: Households Survey in Ban Chum, 2004.
[a] Equivalent to maize grain.

Market information is really scant in Lao People's Democratic Republic. This is especially true of price information. In a market economy, price plays a pivotal role in resource allocation by producers, including farmers. Prices guide producers of goods and services in making production and marketing decisions. However, Lao People's Democratic Republic has been under a social-political system for a long time whereby a market economy is not so welcome. A market economy is only a very recent phenomenon for the people of Lao People's Democratic Republic, especially rural people. Farmers, traders and government bureaucracies are not yet accustomed to the documentation of price information and other kinds of market information. As a consequence, it is very difficult to obtain a complete set of price information regarding the marketing of maize grain from the village level up to animal feed factories. This study has failed to obtain price and margin information for maize distribution relative to the four marketing channels.

Nevertheless, this study has managed to obtain some price information regarding the marketing of maize grain produced in Ban Chum village. As depicted in Table 5.2, at the village level middlemen procure maize grain at 800 kip/kg. Meanwhile, at the ThaNgon Animal Feed Factory, the price is 1,000 kip/kg. Thus, maize farmers receive a price only about 80 per cent of that paid by the feed factory in Vientiane. Middlemen receive about 20 per cent as a gross price margin. This is not a profit margin for the middlemen since they have to bear some costs before handing the maize grain over to the factory. The cost includes transportation, handling and lost weight during transportation from the village to the capital where the factory is located. Unfortunately, the net profit of the middlemen was not calculable because information regarding marketing costs incurred was not obtainable for the study.

It is, however, strongly believed that the middlemen make a good profit in marketing maize grain in the village. Maize farmers are so poor that they are unable to bargain with the

local middlemen when negotiating the sale of their maize grain with the traders. In fact, farmers often make immediate sales because they are desperate for cash.

Table 5.2 Farm gate price, factory-level price and traders' gross price margin of maize grains produced in Ban Chum village

Item	Kip/kg	Percentage of factory-level price
Farm gate price	800	80
Factory-level price	1 000	100
Middlemen's gross price margin	200	20

Source: Households Survey in Ban Chum, 2004.

5.3 Potentials and constraints in the maize grain marketing system

5.3.1 Potentials

One of the most significant factors that provide an environment conducive for the development of domestic maize production in Lao People's Democratic Republic is the fact that demand for maize grains has recently grown. This increasing demand originates from the increase in demand for animal feed. Recently, small and medium commercial animal farms have grown quite rapidly, especially around the country's capital (Vientiane).

The growing market has led to the establishment of a new feed factory. Don Koi Animal Feed Produce Company was built recently with a large production capacity. However, the precise capacity is unknown to outsiders. Meanwhile, ThaNgon Animal Feed Produce Company has also increased its production capacity recently but the precise new capacity also remains unknown to outsiders. These are signals of the increased market demand for maize grain.

Another factor that is conducive to the development of maize agriculture in Lao People's Democratic Republic is, as mentioned in the introductory chapter, the growing demand for maize imports from neighbouring countries such as Thailand, Viet Nam and China. These countries annually import maize grain from overseas, especially the United States of America. Lao People's Democratic Republic can fill part of these markets. Geographical proximity and cheap labour are both positive factors for producers in Lao People's Democratic Republic to compete in these markets. Winning market competition will be enhanced significantly if maize production technology is improved in Lao People's Democratic Republic.

5.3.2 Constraints

The quality of production technology is one constraining factor to the development of maize agriculture in Lao People's Democratic Republic. Though the farmers of Ban Chum

village have been involved in maize production for more than two decades, their production technology is still very much behind maize farmers in Thailand. In fact, local farmers are dependent on maize seeds imported from Viet Nam and Thailand. Improving this production technology is really important if farmers want their maize to be exported into the maize markets of neighbouring countries.

The structure of the domestic maize market is another standing constraint for farmers to expand maize production. The present structure is not beneficial for the farmers. The companies and middlemen have better positions in the market. Reforming this structure to the benefit of maize farmers will play a significant role in stimulating farmers to improve and expand their farming operations.

5.4 Concluding summary

Maize production in Ban Chum is clearly for commercial purposes, not for household subsistence. Most of the maize produced is for market and only a very small part is retained for household consumption.

Even though production is for the commercial market, farmers have not made much effort to improve the value of their produce through post-harvesting processing activities. Most of the production that the farmers sell to market is in the form of maize grains.

The farmers have the choice of four marketing channels through which they can distribute their maize grain. However, the most popular marketing channel used is 'channel 2', which involves selling directly to an animal feed company, namely ThaNgon Animal Produce Company located in Vientiane. This company absorbs about 75 per cent of the farmers' marketed maize grain. This indicates that the company enjoys some degree of a monopolistic position in the local maize market.

Analysing the extent of market structure and efficiency is not an easy task in Lao People's Democratic Republic. Price information is really scant partly because the market economy is a very recent phenomenon in Lao People's Democratic Republic. Economic actors and bureaucrats are not yet so aware of the importance of market information. Therefore, it is very difficult to find accurate market information, especially price information.

If the roles of ThaNgon Animal Produce Company and middlemen are analysed in the marketing of maize grain produced in Ban Chum, one may conclude that the market structure is not yet developed to benefit local maize farmers. Being the major buyers, the company and the middlemen hold good positions in the market bargaining process when the farmers sell their maize grain. Nevertheless, the very fact that local farmers have been

involved in commercial maize grain production for more than two decades seems to imply that they also enjoy some degree of profit from maize cultivation.

In addition to the current market structure, another factor that is constraining the development of commercial maize marketing in the village is the fact that local farmers are highly dependent on seeds imported from Thailand and Viet Nam. As these two countries are importers of maize grain, they can destabilize the domestic market through the control of seed supply and price.

Against this unfavourable situation is the fact that local demand for maize grain looks to grow in the near future. This is signalled by the establishment of a new animal feed mill. Another positive factor is the growing market for maize in neighbouring countries, notably Thailand and Viet Nam. The geographical location of Lao People's Democratic Republic is advantageous if competing with other countries to export maize grains into these markets.

6. Analysis of the Industrial Processing Business of Maize Products

6.1 Processed maize products and potential industrial capacity

As in most developing countries, in Lao People's Democratic Republic rural people have consumed maize as food for generations. However, in Lao People's Democratic Republic maize has never been a major food. Rice is the major staple food, not only for those who live in urban areas, but also those living in rural areas too. Maize is consumed as a snack with coffee or tea. This is the reason why even today no one has developed an industry which specializes in processing maize for human consumption, as has happened in neighbouring countries such as Thailand. This is also the reason why maize farming is becoming popular in rural Lao People's Democratic Republic only after the establishment of a maize-based feed industry by ThaNgon Animal Feed Produce Company more than twenty years ago.

The maize-based animal feed industry is the only industry that processes maize for the commercial market in Lao People's Democratic Republic. Development of this industry was pioneered by ThaNgon Animal Feed Produce Company established more than twenty years back. This company is a foreign controlled company (FDI). The recent growing market for animal feed in Lao People's Democratic Republic has provided a good environment for entrepreneurs to invest in the animal feed industry. This has led to the establishment of another animal feed company, named Don Koi Animal Feed Produce Company. This new company was under construction at the time of this study. The new company is controlled by an overseas investor (FDI).

ThaNgon Animal Feed Produce Company still leads the feed industry. This company has a feed production capacity of 17,000-20,000 tons per annum. Meanwhile, information about the production capacity of Don Koi Animal Feed Produce Company has not yet been published. Its capacity is estimated to be no less than the first feed company.

Table 6.1 Key information regarding the animal feed industry in Lao People's Democratic Republic

Item	ThaNgon animal feed produce company	Don Koi animal feed produce company
Date of establishment (year)	1979 and different period have improved the capability of factory	2005
Location	Vientiane municipality	Vientiane municipality
Investors	Foreign Direct Investment (FDI)	Foreign Direct Investment (FDI)
Production capacity (tons/year)	17 000 – 20 000	n.a.
Feed for swine	n.a.	n.a.
Feed for chicken	n.a.	n.a.
Number of employees (persons)	n.a.	n.a.
Permanent	n.a.	n.a.
Casual	n.a.	n.a.

Source: Administrative office of Ngon Animal Feed Produce Company.
n.a. = not available.

The animal feed that these two companies produce is of two types: feed for swine and feed for chickens. Most production is for chicken feed. The emergence of avian flu in many Asian countries in recent years has adversely affected the feed industry market. Nevertheless, the industry is quite optimistic about the prospect of an end to this bird crisis in the near future. After its settlement it is expected that the industry will enjoy market prosperity leading to the expansion of production capacity in the future.

6.2 Cost production structure and business profitability

For animal feed producing companies, profit and sustainability of business growth are of great importance. In a competitive market for animal feed, like in Lao People's Democratic Republic, to achieve these company goals is not easy and requires a complex business strategy. To develop and implement business strategy effectively the company has to prevent its business rivals from having access to its strategic business information. Information about cost structure is the company's most strategic business information and accordingly, this study has been unable to obtain any information regarding the cost structure of animal feed products from these two companies.

Nevertheless, this study has made efforts to obtain information about prices of animal feed as depicted in Table 6.2. From information in this table, it is clear that prices of animal feed vary according to some specifications. There are four types of swine feed, and the price of each type is different. Meanwhile, there are only two types of chicken feed, and their prices vary too.

Table 6.2 Market prices of animal feeds in Vientiane

Type of animal feed	Quantity per unit (kg)	Price (kip per unit)
Feed for small size of swine (301)	25	125 000
Feed for medium size of swine (302)	25	78 000
Feed for medium size of swine (303)	25	70 000
Feed for big size of swine (305)	25	65 000
Feed for small size of layer chicken (203)	30	118 000
Feed for big size of layer chicken (204)	30	116 000

Source: Field interview, 2004.

Collecting information regarding the profitability of their business from the companies themselves is even more difficult. This information is very sensitive. Nevertheless, this study consulted an expert in the industry to enquire about the profitability of the commercial feed industry in Lao People's Democratic Republic. The expert's estimation of the profitability level of this industry is about 3 to 4 per cent per annum. It seems this figure is underestimated. The recent arrival of a new, large company in the industry looks to be a good signal of the existence of a higher level of profitability. With the growth in chicken and swine farms in recent years and the strong position of feed producing companies in the market for maize grain in Lao People's Democratic Republic, it is reasonable to expect much higher profit levels in the feed industry than reported.

6.3 Potentials and constraints in the processing industry of maize

6.3.1 Potentials

Commercial livestock farming has been growing rapidly in Lao People's Democratic Republic, especially in areas close to urban areas such as Vientiane. This is mainly in response to the increase in demand from urban people for meet and eggs. A similar phenomenon is being observed in rural areas, although the rate of increase is much less than that in urban areas.

Some factors behind this recent phenomenon of increased demand for meat and egg have been put forward. First, Lao People's Democratic Republic is economically a poor country; with average income per capita at less than US$ 400 per annum. For poor people, protein is an expensive food. This is one reason behind the fact that it is common in poor countries like Lao People's Democratic Republic, for the average consumption of protein per capita to be quite low. As incomes rise, however, these people increase their protein consumption. In recent years, developments have enabled people to earn higher levels of income, in general. Nevertheless, this income increase has been higher in urban areas than

in rural areas. This seems to be a key reason of why the rate of increase in demand for meat and eggs is higher in urban areas than in rural areas.

Another factor is the fact that recent developments have made a significant change in the way of life of ordinary people in Lao People's Democratic Republic. Previously, the people were generally vegetarian because of their religion. As modernization touches Lao People's Democratic Republic, however, more and more people are becoming less religious, and as a result, they no longer adhere to a vegetarian way of life.

The other factor is, perhaps, education. The illiteracy rate is declining in Lao People's Democratic Republic as development proceeds. Modern education opens the mind not only to learn science, but also to seek better understanding about healthy food for a healthy life. When educated, people hopefully become aware of the importance of consuming meat and eggs for a better life.

These three factors are all important in raising the demand for meats and eggs recently in Lao People's Democratic Republic. The government has committed to sustainable and rapid development in Lao People's Democratic Republic and is expected that this commitment will succeed in transforming the economy and bring prosperity to its people in the future. This would have a significant positive effect on the future demand for meat and eggs in Lao People's Democratic Republic.

Another conducive factor for the development of a maize processing industry in Lao People's Democratic Republic is the fact that there are still huge areas suitable for growing maize. The land can support the growth of the industry through the provision of maize grain as a basic input. Farmers could be stimulated to produce maize on their farmland through the provision of better prices for their products, suitable production technology and farm credit.

6.3.2 Constraints

One important constraint to the development of a maize processing industry is the current threat of avian flu. In Lao People's Democratic Republic, animal feeds produced by the industry are mainly for chicken and swine. Avian flu has significantly affected the prospect of poultry farming in Lao People's Democratic Republic as well as in some neighbouring countries like Thailand. If this flu problem is not solved in the near future, it will destroy the interest of farmers to raise chickens for meat and eggs.

Thailand is a leading country in producing animal feeds in ASEAN countries. Thailand's products have, in fact, penetrated the animal feed market in Lao People's Democratic Republic. Thus, domestically produced animal feeds will have to beat the

competition of imported products if the domestic feed industry is to develop in the future. Thailand's animal feed industry has been well established, while in Lao People's Democratic Republic the animal feed industry is a recent phenomenon. Given this fact, it is logical to expect the domestic feed industry will not be able to exist or develop if the government provides no support to protect this newly established industry from direct competition from animal feed imported from Thailand.

6.4 Concluding summary

In Lao People's Democratic Republic, the maize processing industry was established more than a decade ago. The industry uses maize grain as the main ingredient for animal feeds. The animal feeds produced are for swine and poultry. Poultry represents the main market segment for the animal feed industry.

The precise cost structure of animal feed within the industry as well as the extent of profit the industry has enjoyed cannot be obtained for this study. The industry is not willing to share the information because of their sensitivity to market competition. The fact the industry has lasted for so many years and the recent development of a new, large-scale animal feed factory suggests the industry is enjoying a buoyant time.

The growth in demand for chicken meat and eggs resulting from increases in per capita income and changes in lifestyles is a real stimulus for the future development of the animal feed industry in the country. However, this favourable factor is confronted by the current threat of avian flu. This flu can adversely affect the demand for chicken meat and eggs. The other factor that could hinder the development of the feed industry in Lao People's Democratic Republic is the market penetration of animal feed products from Thailand into the domestic market.

7. Analysis of Institutional Support

7.1 Economic policies

7.1.1 Price support programme

Better prices for local maize production are desirable to motivate farmers to expand maize production to support expansion of the animal feed industry in the near future. When farmers produce maize for the market, not for home consumption, the extent of profitability becomes an important factor in their farming decisions. Expectations of obtaining higher profitability is, indeed, a key factor that motivates farmers of Ban Chum village to choose to cultivate maize, instead of their traditional crop; rice. However, the extent of this profitability is highly determined by the structure of the maize market that these farmers deal with, which does not seem supportive of their business interests. Production is predominantly sold only to ThaNgon Animal Feed Produce Company (ThaNgon AFPC). Being the major source of demand for the maize that the farmers produce, the company enjoys a good position in determining the outcomes of market negotiations, especially the price of maize grain. The local farmers complain about this market situation. They are generally not so happy with the price that the company pays for their product. Even though they still can make some profit out of their maize operation, they believe that the paid price is insufficient.

One strategy to enable farmers to receive better prices for their maize produce is to implement a price support programme. With such a price support programme the government can assure the farmers will secure a certain price for their products. The assured price should, of course, be acceptable to the farmers. Through such a programme, the government will improve the market position of maize farmers during negotiations with the company to set the price that will be paid for the maize.

This strategy is commonly implemented in developing countries, especially for rice which is a basic staple food in most of these countries. However, as elsewhere in developing countries, in Lao People's Democratic Republic, a price support programme for maize has never been implemented. So far, the government is still focused on supporting the rice self-sufficiency programme. As rice self-sufficiency has been achieved in Lao People's Democratic Republic it is now possible for the government to divert some of its resources from supporting the rice programme to design and implement programmes, including price support, for the development of maize farming and its supporting industry,

namely the animal feed industry. Without a price support programme, it is likely that farmers will lose their economic incentive to improve their maize operations.

7.1.2 Credit support programme for maize farming

As mentioned above, farmers are profit-seeking. They cultivate maize instead of rice due to their expectation of obtaining better profit from producing this crop. Farm productivity is another crucial determinant of farming profitability. Better farm productivity, *ceteris paribus* generates higher farming profitability.

The quantity and quality of inputs, including crop variety, are important factors in determining farming productivity. Farmers can meet these input requirements if they have sufficient ability to finance their use. Unfortunately, farmers are not so well off. In fact, most of them are poor such that they cannot earn a sufficient level of income from their own farming. They have to work for others either as labourers in their locality or send members of their family to urban areas such as Vientiane to work in garment factories to secure a supplementary income.

Thus, one cannot expect these poor maize farmers to supply the right inputs for their maize operations. If farming productivity is to improve, the provision of farm credit to these farmers will be a necessity. Their inability to provide acceptable collateral due to their lack of funds has always prevented them from obtaining credit from formal credit channels. An alternative way to overcome this credit access problem is to design and implement a special government support credit programme. For rice production, the government has long implemented this kind of credit programme. It is evident that this programme has made significant contributions in making Lao People's Democratic Republic rice self-sufficient.

However, such a credit programme for maize production does not yet exist in Lao People's Democratic Republic. With the expectation of growing demand for maize grain, especially from the feed industry, the implementation of a credit programme to support the development of maize farming is desirable. The design of such a programme should be made to match the reality of the maize farmers, which will make its implementation effective in promoting maize farming and raising the income of the maize farmers.

7.1.3 Food diversification policies

As in most Asian countries, in Lao People's Democratic Republic rice is the most important staple food. Only a small portion of daily consumption is made up by other foods than rice. In addition, average annual consumption per capita is increasing. This has forced

Lao People's Democratic Republic to keep increasing domestic rice production to maintain rice self-sufficiency.

With the limited availability of lowland suitable for irrigated rice farming, this challenge can only be met through steady improvements in rice technology, which is not an easy task. It will require Lao People's Democratic Republic to provide massive funding to finance relevant research and promote the innovative technology to farmers as well as to supply the relevant expertise. As Lao People's Democratic Republic is underdeveloped, it will be almost impossible to meet these requirements.

Through the promotion of food diversification, the problems can be controlled and, hopefully, be eliminated in the future as people become accustomed to the consumption of other staple foods, like maize. The more food diversification is encouraged, demand for non-rice food increases. This increase in demand will stimulate farmers to expand production of non-rice foods such as maize.

The government has recognized the potential problems of over dependence on rice for food consumption. Accordingly, food diversification has been put on the national development agenda. However, this agenda is yet to be implemented consistently. The government has implemented no clear policies regarding food diversification. As a result, the people are still very much dependent on rice as their staple.

7.1.4 International trade policies

International trade is important for Lao People's Democratic Republic, both as source of foreign exchange through the exportation of domestic products; and as a source of products to be used domestically and for investments required to develop the national economy. However, as free trade has now become a global economic agenda, economic liberalization has become a popular tool for countries to embark on global free trade. This popularity is owed to the IMF, which actively encourages development to follow economic liberalization. Lao People's Democratic Republic is not exceptional in this context, though the scale of its economic liberalization is still limited.

Lao People's Democratic Republic has opened its domestic market to animal feed products from Thailand and imposed no trade barriers for feed products from Thailand. As the animal feed industry in Lao People's Democratic Republic is still small and less developed compared to that of Thailand, the imposition of free trade policies for these products may become a serious constraint to the future development of the animal feed industry. To prevent this from happening, the government should improve its international trade policies regarding animal feed imports, and implement improved policies to allow the

domestic industry to strengthen its competitive capacity. Without improvements in international trade policies, Lao People's Democratic Republic cannot expect to have a strong animal feed industry.

7.1.5 Investment policies

For a low-income country like Lao People's Democratic Republic, foreign investment and technology are important for the development of the economy. Since average income is low, the domestic saving capacity is very limited. As a consequence, one cannot expect the mobilization of domestic savings to meet domestic demand for investment. The existing gap between the two sides of the market for investment can be filled only by the mobilization of foreign investment into the domestic market.

The government has recognized this problem and has implemented investment policies conducive for foreigners to invest in Lao People's Democratic Republic, especially in the field of animal feed. The current policies have succeeded in attracting foreign investment into the economy. However, Lao People's Democratic Republic still requires a lot more foreign investment to enable the economy to generate higher growth so as to lift the present level of average income. This is not easy because neighbouring countries, such as Viet Nam and Cambodia, are also trying hard to attract international investment into their economies through the provision of favourable investment policies. The government needs to develop much more attractive investment policies to win the competition for foreign investment.

7.2 Infrastructure provision

7.2.1 Irrigation

As for other seasonal food crops, the availability of irrigation is also important for maize cultivation. Water shortages can have a serious impact on crop productivity and this leads to a deterioration in farming profitability and farmer income. Declines in farm profitability caused by water shortages adversely affect farmer motivation.

The government has long recognized the importance of providing irrigation for food production and this has been integrated into the irrigation development plan. The government has decided upon three objectives to develop the irrigation scheme. The first objective is to ensure food security through improving crop productivity under irrigated agriculture. The second objective is to improve farmer income through the introduction and promotion of crop diversification on irrigated farmland. The third objective is to assist the

Water User' Association (WUA) through training, and organizational set up under the Irrigation Management Transfer (IMT) process.

Improving the efficiency of irrigation water use is another area that the government has recently given much attention. The government seeks to achieve this through the promotion of user participation in managing and maintaining the irrigation system. This proposal is being implemented through a programme of irrigation management transfer (the IMT programme). The IMT programme tries to transfer irrigation projects to community organizations.

This programme is being implemented nationwide. With the transfer of ownership of irrigation schemes to community organizations, farmers are becoming responsible for managing and maintaining irrigation systems. As the management and maintenance becomes the responsibility of farmers through their organization (UWA), it is expected they will make better use of the irrigation facilities and water. While the intention is good, its implementation has not been smooth. One problem is the fact that farmers generally lack interest in supporting this transfer of ownership of irrigation. The underlying factor behind this lack of interest is they cannot afford to make the operational and maintenance costs. Their inability is partly due to low farm profitability that results from low market prices for their products.

7.2.2 Transportation

Transportation is another crucial issue in the development of maize production and the industry. Transportation plays a double role in this development process. On one side, transportation is needed to ship produce to markets generally located in urban areas. On the other side, it is required to transport farm inputs from the markets, which are also generally located in urban areas. Therefore, good transportation infrastructure is important in the development of agricultural production.

The government shares the view that good transportation is important not only for the development of agriculture, but also for the alleviation of rural poverty. However, limited budget capacity has become a standing block for the government to implement its view on transportation development in Lao People's Democratic Republic. As a consequence, poor road access has been blamed for being a major determinant of rural poverty in Lao People's Democratic Republic.

7.2.3 Research and development

Research and development is of vital importance in any economic development. The government has developed its research and development system in the field of agriculture. However, the present system is not only limited in capacity, but also in focus. Not much attention has been paid to the development of maize. As a result, maize farmers still rely on maize varieties imported from Thailand and Viet Nam.

To support the future prosperity of maize farming and its processing industry, it is necessary to give special attention and effort to develop a research network and facilities in the fields of maize farming, processing and marketing technology. The research activities should be focused on the following issues:

- Development of high-yielding, hybrid varieties suitable for the local climate and environment;
- Promotion of cultivation of high-yielding hybrid crops in high productivity areas during both the wet and dry seasons;
- Better crop management with popularization of line sowing in maize areas through suitable seeding devices to establish the desired level of plant population, and the adoption of other management technologies;
- Better cultivation patterns to increase the income of farmers and improve soil fertility;
- Introduce a maize seed production programme in irrigated areas during the dry season for better seed yield and without the problems of isolation, pest damage, and post-harvest losses;
- Promote integrated pest management for the effective and timely control of pests and disease by emphasizing the needs-based application of pesticides, especially in the wet season; and
- Ensure timely and adequate availability of seeds, fertilizers, irrigation water, and credit to the farmers.

Only with strong support from a research network and appropriate facilities can Lao People's Democratic Republic compete with Thailand and Viet Nam in the export as well as the domestic market. Without this support, maize production in Lao People's Democratic Republic will be uncompetitive even in the domestic market.

7.2.4 Development of an extension service network

The District Agriculture and Forestry Office (DAFO) of Thulakhom district is the main organization for rural development, especially maize growing in Ban Chum. There is the Agriculture and Forestry Extension Service of Vientiane province responsible for the villagers in the province. One of the main problems for DAFO is that they have very few extension workers to respond to the need of this area and some of the staff have limited experience.

7.3 Concluding summary

In any country, government support is essential in the development of the economy. Even in developed countries where market mechanisms have worked well in directing the economy, government support through public policies is still commonplace. This is especially true of the agricultural sector. As is widely known, one of the major standing blocks in free trade negotiations between developed and developing countries under the WTO is the unwillingness of some developed countries, notably Western Europe, to remove heavy government protection policies on the agricultural sector through a variety of means, notably high subsidization, which has been an effective constraint to developing countries to break into the developed countries' economies.

Since Lao People's Democratic Republic has only recently entered the market economy, the need for government support to develop the economy, notably the agricultural sector, is even more essential. The government has, indeed, implemented some policies to support the development of agriculture and its supporting industries. However, as far as maize farming and its supporting industry is concerned, much stronger government support is needed to promote its development. This includes economic policies such as maize price support policies, maize farm credit policies, food diversification policies, trade policies, and investment policies as well as the provision of infrastructure regarding the irrigation system, transportation, research and development and extension service networks.

Part 2: The Case of Job's Tear in Thapho Village, Phonxay District, Luang Prabang Province

8. Profiles of the Study Site for Job's Tear Production, Respondents and Their Households

8.1 Profile of the study site

8.11 Geographic and administrative setting

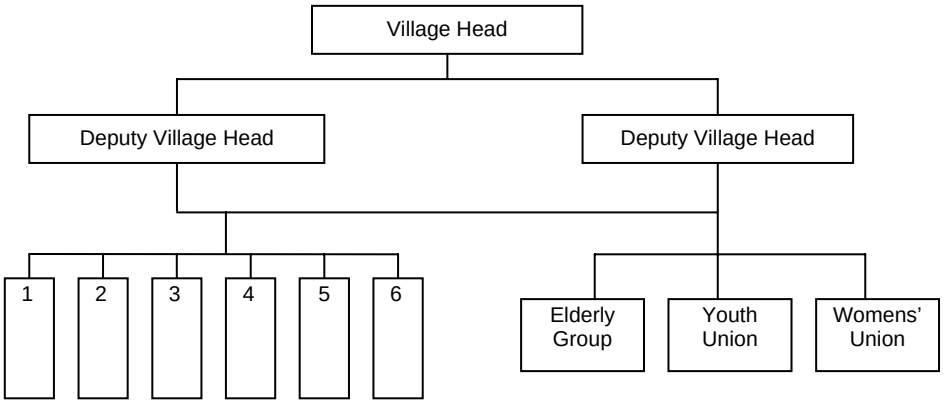
The village of Thapho is located in the district of Phonxay. The district is situated in the northeast of Luang Prabang province. The province is a part of the northern region of Lao People's Democratic Republic occupying an area of 2,001 sq km. It borders Pakxaeng to the north, Phoukhoun district to the south, Viengthong district of Hoaphan province and Phoukoud district of Xiengkhaung province to the northeast and to the west is Laungprabang and Xiengnguen district[1].

Thapho village is situated along the road that connects these two capitals. It is about 15 kilometres from the capital of Phonxay district and about 70 kilometres from the capital of Luang Prabang province. In these capitals, there are large markets for agricultural products and inputs. Local farmers of Thapho village can acquire their farming requirements as well as distribute their products in these markets. In addition, land transportation that connects the village with the two capitals is in relatively good condition. Viantiane is another market place for people of Thapho village. However, this market is far from the village and the road is currently in a bad condition. The exact location of the village of Thapho can be observed in Figure 3.1, presented in the maize section of this study.

Administratively, the village authority is appointed to govern the village of Thapho, as with any village in Lao People's Democratic Republic. The village authority consists of a village committee, organizations (youth union, womens' union, and elderly group) and the head of unit. Like Ban Chum village, Thapho is also divided into several units, each unit consisting of 8 to 12 households with heads and deputy heads responsible. The structure of the administrative authority can be observed in Figure 8.1.

[1] See Figure 3.1 for the map of the study location.

Figure 8.1 Administrative structure of Thapho village



8.1.2 Demographic profile

In Thapho village, there are 66 households with a population of 352 persons, consisting of 185 males (52.5 per cent) and 167 females (47.5 per cent) (Table 8.1). The sex ratio in the village is 90 females per 100 males. This sex ratio is not common, normally, the population of women is larger than that of the men.

The reason for this peculiarity is the fact that a significant portion of young, local females migrate to the city of Luang Prabang to work in tourist shops, restaurants and other low-skilled activities. Insufficient job opportunities at the village level have forced them to urbanize. In addition, as in Ban Chum village, these migrating workers have to send some of their remuneration to their family living in the village. Economic difficulty has also forced some male villagers to temporarily migrate to nearby small towns and villages for labouring activities.

Table 8.1 Population of Thapho village in 2005

Population structure	Magnitude
Total population (persons)	352
Number of households	66
Average size of household (persons per household)	5.33
Population composition by gender:	
Males (%)	52.5
Females (%)	47.5
Sex ratio (number females/100 males)	90
Composition of population by ethnicity:	
Khamoo	52
Laolum	48

Source: Households Survey in Thapho village, 2005.

At the village level, average family size is relatively small, consisting of 5.33 persons. This means that each family has less than three children. This low number of children is not connected to strict family planning as, in Lao People's Democratic Republic, family planning is not yet popular. It is only popular in urban areas among highly educated parents. In rural areas, the birth rate is still high. However, child mortality is also high due to the lack of public health care and a poor intake of nutrition.

The village population belongs to two ethnic groups, namely, Khamoo and Laolum. Their share of the population of the village is almost equal. Khamoo's share is about 52 per cent, while the share of Laolum is about 48 per cent. Despite differences in culture the two groups live in harmony in the same village.

8.1.3 Economic profile

As is common in rural Lao People's Democratic Republic, agriculture is the main engine of economy. Most of the households make a living from working in this sector, either as farm operators or farm labourers. Only a very few households work outside of the agricultural sector in the village economy (Table 8.2).

As is common in rural areas of Lao People's Democratic Republic, the farming operation in Thapho is still technologically underdeveloped. In fact, many farmers in this village still practice shifting cultivation, especially in hilly areas. They have been forced to move into these unsuitable farming areas because of the limited supply of flat farmland. In these areas, farmers practice shifting cultivation. This type of cultivation uses low inputs. As a result, the farming operations are generally low in productivity.

Table 8.2 Distribution of families in Thapho village by type of main occupation

Type of occupation	Percentage
Farm operator	93.55
Farm labourer	6.45
Non-farming work	0
Total	100.0

Source: Households Survey in Thapho village, 2005.

Similar to the farmers in Ban Chum, the farmers of Thapho village face difficulties obtaining sufficient income from their farms to feed their families. This is not only due to underdeveloped production technology, but also due to the smallness of farm operations. Farm holdings in Thapho are, on average, less then 2 hectares. This has forced a significant number of young men and women to migrate from their village to seek additional income to enable their family to meet their subsistence needs. In short, even though the precise average level of income of the local people is not known, one can argue that these villagers

are really poor and their economic status is not much different from the people in Ban Chum village.

8.1.4 Agricultural profile

Total farmland area in Thapho village is about 116 hectares. Upland and garden fields are the mainstay of agricultural fields. In Thapho, however, upland areas are dominant with the total area of 76.5 hectares (65.2 per cent). Lowland paddy fields make up the smallest area and are only located along riversides and stream banks. The total area of lowland paddy fields in Thapho is only 4.45 hectares (4.8 per cent). Only a few local farmers can make a living from this paddy field (Table 8.3).

Table 8.3 Types of farmland in Thapho village

Type of farmland	Area (hectares)	Percentage of total	Average size per household (hectares)
Upland	76.5	65.2	1.16
Garden	35.0	30.0	0.53
Lowland paddy	4.45	4.8	0.07
Total farmland	115.95	100.0	1.76

Source: Household Survey in Thapho village, 2005.

On average, one household has about 1.15 hectares of upland area. Previously, upland areas were cultivated with rice. Recently, however, farmers have preferred other crops since the soil quality has become increasingly less suitable for rice cultivation. As population pressure increases, the rotation involved with shifting cultivation is becoming more difficult to practice properly. Soil erosion can then become a serious problem. Due to the continual process of soil erosion, land eventually becomes very unsuitable for rice cultivation.

According to a local farmer, Job's tear and sesame are the two crops which can substitute rice when soil loses fertility. Cross-checking with 16 local farmers revealed the following facts of upland area use: First, out of the 19 hectares of upland area that the respondents hold, 12.45 hectares (65.52 per cent) are used for the cultivation of Job's tear. Only 5.5 hectares (29.21 per cent) are used for paddy and 1 hectare (5.26 per cent) for sesame. When we look at the different ethnic groups of the Laolum and the Khamoo, more Laolum prefer to grow Job's tear than Khamoo. Nearly 79 per cent of total upland area belonging to Laolum is Job's tear, and 17 per cent is for rice and around 4 per cent for sesame (Table 8.4).

The survey indicated that Laolum plant more Job's tear than Khamoo. In the past Job's tear was the main income earner for the household, also used for food consumption

when rice is insufficient. In addition, most Laolum in the area have more land than Khamoo, who migrated to the village after the Laolum. However, upland rice still continues to be planted in this area.

Table 8.4 Upland farming operations in Thapho village

Crop	Total area of crop (hectares)	Khamoo (hectares)	Laolum (hectares)
Job's tear	12.5	3.5	8.5
Rice	5.5	3.6	1.9
Sesame	1.0	0.6	0.4
Total cropped area	19.0	7.7	10.8

Source: Household Survey in Thapho village, 2005.

Part of the upland rice fields is used for garden production due to the very low fertility of the soil rendering it unsuitable for rice production. In gardens, farmers cultivate many kinds of crops. Some farmers prefer small plantations, while some others preferred annual crops. Teak is the most preferred tree of the farmers. Popular annual crops are maize, Job's tear, sesame and cabbage.

People in the area normally raise five main kinds of animal; buffalo, cattle, goat, swine and poultry. Of the total number of animals belonging to farmers in the area, cattle are the most popular with an average of 1.06 heads per household making a total of 70 heads. Buffalo is also found, but only 5 heads in Thapho. Goat and swine raising are two options of animal husbandry that farmers prefer in the area. Poultry can be found in large numbers, but have less value than large animals (Table 8.5).

Table 8.5 Animal husbandry in Thapho village, 2004

Animal	Total	Average per HH
Buffalo	5	0.08
Cattle	70	1.06
Goat	85	1.29
Swine	45	0.68
Poultry	950	14.39

Source: Household Survey in Thapho village, 2005.

8.1.5 Extent of unemployment and poverty

In rural areas of Lao People's Democratic Republic, as is common in underdeveloped areas of developing countries, open unemployment does not exist. The tradition of communal solidarity has ensured access of every mature individual in the community to local employment either through land arrangements or labour arrangements. However, most local villagers of Thapho are small-scale farmers. Their farming operation is

not only very small, but also most of their land is upland with very low crop productivity. As a result, these farmers cannot make a good living from their land.

Local farmers in Thapho need extra work outside the village to secure extra income to improve their living standard. The opportunity to secure such additional employment, however, is tiny. Phonxay district where the village of Thapho is located is one of the poorest districts of Lao People's Democratic Republic. There are still very low living standards, especially villagers living in remote areas experience poorer living standards compared to those enjoyed by villagers who live in developed areas (Douangsavanh, 2004). Poor standards of living will remain as long as the government cannot find an effective way to improve their specific agriculture.

8.2 Profile of the respondents

Most respondents were relatively very young. Of the 16 respondents, twelve (75 per cent) were less than 40 years old. Only four (25 per cent) were more than 40 years old. In addition, 50 per cent of the respondents belong to Laolum ethnicity, while the other half belong to Khamoo (Table 8.6).

Table 8.6 Distribution of respondents by ethnicity and age

Description	Number	Percentage
Ethnicity		
Laolum	8	50
Khamoo	8	50
Age structure		
< 30 years	3	18.75
30-40 years	9	56.25
> 40 years	4	25

Source: Household Survey in Thapho village, 2005.

Similar to the respondents of Ban Chum village, the respondents of Thapho village also only attained a low level of formal education. Most of them (68.75 per cent) attended primary school. Only 31.25 per cent had completed secondary school (Table 8.7).

This lack of` formal education acts as a constraint to the adoption of production technology as well as other kinds of technologies which farmers need if they wish to improve the income earned from their farming operations. Nevertheless, most of them (93.75 per cent) have relatively long farming experience of more than 10 years. Their long experience as farm operators is helpful to balance their lack of formal education.

Table 8.7 Distribution of respondents by education level and farming experience

	Number	Percentage
Education level		
Primary school	11	68.75
Secondary school	5	31.25
Farming experience		
< 10 years	1	6.25
10-20 years	11	68.75
> 20 years	4	25

Source: Household Survey in Thapho village, 2005.

8.3 Profile of the respondents' households

The average family size of the respondents is relatively large, especially when compared to that of maize farmers in Ban Chum. In Ban Chum, the average number of family members is only four persons, in Thapho, the family size is larger. The Khamoo respondents have an average family size of eight persons, while that of the Laolum is seven persons (Table 8.8).

Table 8.8 Average family size of the respondents

Ethnicity	Average family size (persons)
Khamoo	8
Laolum	7

Source: Household Survey in Thapho village, 2005.

The availability of labour is depicted in Table 8.9. Labour was categorized as on-farm activities (most farmers are concerned with on-farm activities), off-farm activities (working outside the village, such as construction workers, working in garment factories in the city) and non-farm activities (most of these people have some land but do not work as farmers, they hire labour to work on their land or they rent their land. They provide a service, with a few of them owning rice mills in the village, some have small shops and some of them collect non-timber forest products (NTFPs) for selling.

Table 8.9 Availability of the labour force

Description	Ethnicity		Total labour (people)
	Khamoo (people)	Laolum (people)	
On-farm activities:	24	20	44
Male	13	12	25
Female	11	8	19
Off-farm activities	8	4	12
Male	4	2	6
Female	4	2	6
Non-farm activities	12	10	22
Male	5	7	12
Female	7	3	10

Source: Household Survey in Thapho village, 2005.

As farming is the respondents' main occupation, the size of landholding is important for them. The structure of landholdings is depicted in Table 8.10. From this table one can observe that most holdings are of 2.1-3.0 hectares (50 per cent) and 3.1-4.0 hectares (25 per cent).

Table 8.10 Structure of landholdings

Landholding size	Number of respondents	Percentage of the respondents
< 1.0 ha	0	0
1.0 – 2.0 ha	4	25
2.1 – 3.0 ha	8	50
3.1 – 4.0 ha	4	25
4.1 – 5.0 ha	0	0
5.1 – 6.0 ha	0	0
> 6.0 ha	0	0

Source: Household Survey in Thapho village, 2005.

As in other rural parts of Lao People's Democratic Republic, the respondents' income is relatively low. In Thapho village, the average annual income is about 1,200,000 kip per family. Mostly of the income is earned from Job's tear farming. On average, family income from Job's tear production is 54.17 per cent of the total annual family income. Production of sesame is another significant source of income with a contribution of 26.67 per cent (Table 9.11).

Income from farming is not sufficient for family sustenance in Thapho village. Local villagers have to seek additional income away from their farm. One important source of extra income is the collection and selling of non-timber forest products. This activity contributes 10.83 per cent to family income. Another important source is the selling of their own labour off of their own farms. This activity's contribution to family income is about 8.33 per cent (Table 8.11).

Table 8.11 Average annual family income

Description	Absolute Value (kip)	Percentage
Total income	1 200 000	100.00
Income by source		
Rice	0	0
Job's tear	650 000	54.17
Sesame	320 000	26.67
Sell labour (in the town or other villages nearby on upland rice fields or weeding)	100 000	8.33
Sell NTFPs	130 000	10.83

Source: Household Survey in Thapho village, 2005.

8.4 Concluding summary

The village of Thapho is located in the district of Phonxay. It is geographically positioned along the road between the capital of Phonxay district and the capital of Luang Prabang province, which makes this village accessible to the markets in the capitals.

The village is occupied by a small number of households, only 66 families with a total population of 352. They are made up of two ethnic groups, namely Khamoo and Laolum. The population is growing quite rapidly. In addition, almost all of the residents rely on agriculture for their livelihood, either as farm operators or labourers. In addition, local farmers cultivate Job's tear, from which most of their income is derived.

Farm income is low and farmers cannot afford to sustain their and their family's lives on this alone. Local farmers in Thapho village require additional work outside of the village to secure extra income to improve their living standards. The opportunity to secure such extra income, however, is slim. Therefore, the people of the village will remain poor if the government cannot help them to improve their agriculture, especially Job's tear farming.

9. Analysis of the Job's Tear Farming System

9.1 Average size of farm operation and pattern of cultivation

Farming in Thapho is the most important source of income, of which, Job's tear farming is the most significant contributor to family income. However, the majority of Job's tear production in the village (about 89 per cent) is on farmland of less than 2.1 hectares (Table 9.1).

Table 9.1 Average size of Job's tear farms and the distribution of respondents by class of farm operation in Thapho village

Farm size	Number of respondents	Percentage of respondents	Average size (hectares)
< 1.0 ha	5	55.56	0.5
1.0 – 2.0 ha	3	33.33	1.4
2.1 – 3.0 ha	1	11.11	2.5
3.1 – 4.0 ha	0	0	0
4.1 – 5.0 ha	0	0	0
> 5.0 ha	0	0	0

Source: Household Survey in Thapho village, 2005.

For poor farmers who operate small-scale farms and have limited job opportunities away from farming activities, maximization of income earned from their small operation is of great concern. One strategy in pursuit of this crucial goal is to intensify the use of their small plot through the application of multi-cropping.

Multi-cropping is a common practice in the village. As per Table 9.2, all the respondents apply multi-cropping in operating their farmland. However, the cropping patterns applied are not homogeneous. There are four cropping patterns that the farmers apply, of which the most popular are Job's tear-paddy, and sesame-paddy (Table 9.2).

Table 9.2 Cropping patterns in Thapho village

Cropping pattern	Number of respondents practising	Percentage of the total respondents
Job's tear-paddy	8	50
Sesame-paddy	5	31.25
Paddy	2	12.5
Job's tear-sesame-paddy	1	6.25

Source: Household Survey in Thapho village, 2005.

9.2 Use of labour for Job's tear farming

Human labour is surplus in Thapho village. The existence of such a surplus of human labour makes it the most popular source of power for farming activities in the village. Data presented in Table 9.3 reveals that, on average, labour use per hectare of Job's tear farming is 60 mandays. This labour use consists of both female labour (36.7 per cent) and male labour (33.3 per cent).

Another important aspect of labour use for Job's tear farming in Thapho are the sources of the labour. According to data presented in Table 9.3, the main source of labour for the cultivation of Job's tear is family labour. About 73 per cent of total labour use for the production of Job's tear is family labour. Hired labour used on the farm is much less at 27 per cent of total labour use.

There are two explanations put forward as to why local farmers use more family labour than hired in their Job's tear operation. First, as employment opportunities outside farming are limited, the respondents initially maximize the use of their family labour to farm their small plot. Second, as farmers' incomes are low, they cannot afford to pay for much hired labour. As a consequence, they have to minimize the use of hired labour in operating their farm.

Table 9.3 Use of labour in Job's tear farming in Thapho village

Type of human labour	Quantity (mandays)	Percentage of the total
Family labour		
Male	25	56.82
Female	19	43.18
Sub-total	44	100.0
Hired labour		
Male	13	81.25
Female	3	18.75
Sub-total	16	100.0
Grand total of labour use	60	100.0

Source: Household Survey in Thapho village, 2005.

Farmers of Thapho village only use human labour to operate their Job's tear farms. This is not because animal power is not available, nor is it due to the surplus of human labour, it is due to the farms' location on very steep slopes that make the use of animal power unsuitable for Job's tear production.

9.3 Use of non-labour inputs

The cultivation of Job's tear in the village is traditional. Job's tear farming in Thapho is almost without any inputs, except human labour (Table 9.4). Farmers apply no fertilizers or other chemical substances, such as herbicides and pesticides, nor do they use manure fertilizer. The only additional inputs that the farmers use are seeds.

However, the farmers use only traditional seed varieties (Table 9.5). The seeds are from their own household, not from the market. There is no information available regarding the quantity of seeds that they use.

Table 9.4 Use of material inputs per hectare of Job's tear farm in Thapho village

Inputs	Units of measurement	Quantity
Seeds	Kg	324
Urea	Kg	0
KCl	Kg	0
Phospate (TSP)	Kg	0
Manure	Kg	0
Herbicides	Kg	0
Pesticides	Kg	0

Source: Household Survey in Thapho village, 2005.

Table 9.5 Variety of Job's tear seeds sown

Variety	Percentage
Local varieties	100
Modern varieties	0

Source: Household Survey in Thapho village, 2005.

9.4 Farm productivity, cost structure and profitability

Job's tear production in Thapho is very traditional and as such productivity is also low. On average, Job's tear farm productivity is only about 2 tons per hectare.

Table 9.6 presents the cost structure of Job's tear production in Thapho. Costs can be grouped into three categories, namely cost of labour, cost of seeds, and cost of fertilizer and can also be grouped into cash costs and imputed cash. The first includes those cost items that farmers buy from outside their household, and hence use cash. The other are those cost items that farmers pay no cash for since they originate from the farmers' own households. To estimate the magnitude of this cost is to impute market prices of the same quality of a relevant input for each individual input obtained from the farmers' own household.

Table 9.6 Cost structure of Job's tear production and its profitability per hectare in Thapho village

Description	Quantity in absolute terms (kip)	Quantity in relative terms (%)
Costs by types of inputs		
Labour cost	900 000	73.5
Fertilizer cost	0	0.0
Seeds	324 000	26.5
Total	1 224 000	100.0
Costs by type of expenditure		
Cash costs	240 000	19.6
Imputed costs	984 000	80.4
Total	1 224 000	100.0
Total revenue	2 000 000	
Net revenue	776 000	
R/C ratio	1.63	

Source: Household Survey in Thapho village, 2005.

From Table 9.6, it is clear that labour costs are the most significant part of the production cost of Job's tear in the village. More than 70 per cent of the total production cost is for labour. Meanwhile, fertilizers and seed represent 0 per cent and 26.5 per cent respectively. Cash costs account for only about 19.6 per cent of the total production cost.

Thus, imputed costs are the major part of production costs (80.4 per cent). This means that farmers of Job's tear are much less reliant on market inputs in operating their farm. Such low market dependence does not reflect a lack of commercial aptitude. Rather, it shows the fact that farmers of the village cannot afford to buy cash inputs since they are poor.

The cost structure of Job's tear production is quite different from that of rice production. Rice production is more dependent on cash inputs. It intensively uses chemical inputs, such as manufactured fertilizers and pesticides. These inputs are all from the market, and hence, cash has to be expended if farmers wish to apply them to their rice farm. Labour is also used quite intensively on rice farms, and farmers can meet only a small part of the labour requirement. The relatively short duration of each activity in the operation of rice farming makes farmers become, in general, unable to satisfy all the required labour from their own household.

Job's tear farming is profitable for farmers. On average, a hectare of Job's tear production can generate a net revenue of 776,000 kip. This profitability is also shown by the magnitude of the R/C ratio that is 1.63.

9.5 Potentials and constraints in farming operations

9.5.1 Potentials

As a part of the district of Phonxay, where farmland is mostly upland, in Thapho village farmland is mostly upland too. The upland area is also relatively poor in soil fertility and without irrigation. This area is not really suitable for the cultivation of rice. Farming rice actually requires much care if farmers wish to achieve good productivity. This means that rice farmers must invest more for rice farming. However, the economic condition of the local farmers, who earn a very low level of annual income, does not permit them to spend the required amount on farming.

Job's tear is very different from rice in terms of farming requirements. An important characteristic of Job's tear is its high adaptability to poor soil conditions. In contrast to rice, Job's tear can grow well in upland areas with very low soil fertility and poor irrigation. In addition, Job's tear does not require much attention of the farmers to grow well. It needs a little care after planting and weeding once or twice. Job's tear is not only more suitable for local farmland conditions, but also the expenditure for its cultivation is much more affordable for local farmers. Furthermore, the market for this crop looks prosperous, especially the export market.

9.5.2 Constraints

In farming, technology plays a crucial role in improving crop productivity. Better production technology results in better productivity. The resultant improvements in crop productivity, *ceteris paribus*, will result in the improvement of farm profitability. The level of profit that farmers obtain from their cultivation acts as a strong stimulus for them to carry out their farming operations thoroughly and to expand their farms.

However, in Lao People's Democratic Republic there has been little attention given to the development of production technology for Job's tear farming. Farmers still use the same technology as their grandparents. The technology that the local farmers currently employ is not suitable for the development of commercial Job's tear farming. Modernization of production technology that can make significant improvements to farm productivity is desirable if farmers are to expand their farm operations to support the development of industry utilizing Job's tear as a basic input.

However, local farmers will be unable to make the best use of the coming modern technology without government help to meet the cash expenditure that this new technology demands. As the farmers are relatively poor, they will not be able to meet this cash

expenditure. Therefore, the government should design a special scheme of farm credit to assist these farmers in modernizing their farming technology.

9.6 Concluding summary

In Thapho village, Job's tear is commonly cultivated. The crop is cultivated as part of a multiple crop system. The size of farm operation is normally less than 2 hectares per farm household.

Despite the existence of a commercial market for Job's tear, farm produced Job's tear has not yet been attuned to such market commercialization. The production technology is very much traditional, with no use of such modern farm inputs as fertilizers or modern seed varieties. The main inputs for this production are only family labour and traditional seed varieties. The farmers are very dependent on their own family input in their Job's tear farm operation. Therefore, farmers do not require much capital to finance the operation of this type of farming business. Such a low cash input requirement makes it attractive to local poor farmers to cultivate Job's tear. This attractiveness is enhanced by the fact that Job's tear farms are profitable, even though production technology is very much traditional.

10. Analysis of the Marketing System and Job's Tear Products

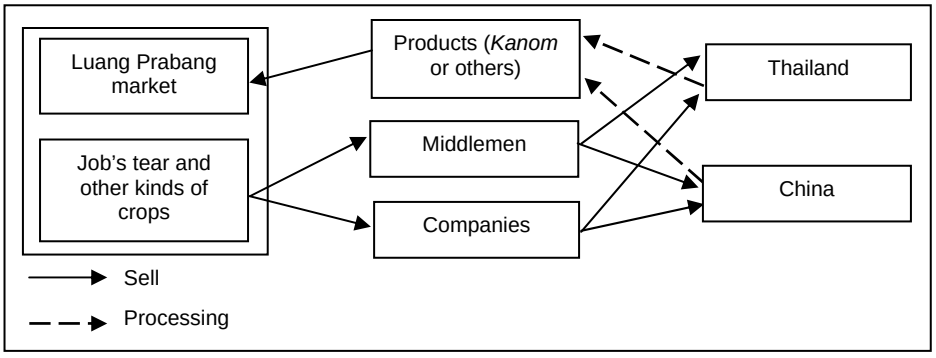
10.1 Forms of products traded and the channels of distribution

For farmers of Thapho village, Job's tear is cash crop, not for household consumption. Normally, the product is sold soon after harvest without any kind of post-harvest processing treatment.

According to interviews with some local respondents, all local farmers sell almost all the fresh Job's tear that they produce to local middlemen. As the farmers, the middlemen do not carry out any significant post-harvest treatment to improve added value. They simply transport the product that they have bought from local farmers to Luang Prabang. In this provincial capital the middlemen sell the Job's tear to private companies such as Vilaykoon Export Import Company and Phet Lama company.

These private companies are essentially traders, not processors. They collect Job's tear from the middlemen but not for further industrial processing to maximize the added value generated from processing Job's tear from a raw material to a higher valued consumer good. These companies export the collected Job's tear after drying to Thailand and China. In China and Thailand, the exported raw Job's tear is then processed by large companies to produce a sweet, known as Kanom, and health drinks. These companies export the processed products to overseas markets, including ironically to Lao People's Democratic Republic.

Figure 10.1 Marketing channel of Job's tear produced in Thapho village



10.2 Nature of market structure, farm gate price and profit margin

The extent of the marketing distribution channel for Job's tear produced in Thapho village is very simple. From field observations and discussions with some farmers and local traders, the market structure of Job's tear is far from that of the competitive markets. At the farming level, the middlemen are more powerful in determining the conditions of market transactions, most notably the price. The farmers face weaknesses when negotiating with local middlemen. The number of farmers is much larger than that of middlemen. There are some hundreds of Job's tear farmers in the village, while the middlemen are few. This would pose no serious problem if the farmers were well organized when negotiating with the few local middlemen. However, they are not only unorganized, but they also bargain individually with a middleman to whom they intend to sell their product. The position of these farmers becomes even worse when dealing with middlemen because they often bargain when they are desperate for cash. As a result, the farmers often feel unsatisfied with the price that the middlemen pay for their Job's tear.

When dealing with large, private companies in Luang Prabang, the middlemen's position in market negotiations becomes quite similar to that of the farmers. First of all, the middlemen's businesses are not really large-scale. In general, the scale of the business of an individual middleman is very small if compared to that of an individual private exporting company. Given the relative smallness of their trading business, middlemen cannot individually gain a good bargaining position in dealing with the private exporting companies. Second, as is quite common in less developed areas of developing countries, in this region middlemen often simply act as extended hands of the private companies in the rural market. The companies support the middlemen with the provision of some capital to finance their small businesses. In return, the middlemen have to sell the Job's tear they have bought to these companies on the condition that the companies are the ones that determine price.

All these phenomena are reflected by the extent of farm gate price and profit margin as Table 10.1 shows. The data shows that the farm gate price is only about 900-1,000 kip/kg, while f.o.b. price is 1,500 kip/kg. Therefore, there is a margin of about 500-600 kip/kg between the f.o.b. price and the farm gate price. Most of this large margin goes to the middlemen and exporters as profit. They do almost nothing, but simply collecting, drying and transporting the Job's tear raw materials. Allegedly, the middlemen collect about 100-200 kip/kg as profit and exporters collect even a larger sum of profit, probably around 300-400 kip/kg.

These facts do not, however, imply that the farmers receive no benefits from the production of Job's tear. If they did not make any profit out of production, they would not do it. The distribution of profit obtained from the farming and marketing of Job's tear is not fairly distributed among the business actors. The exporters benefit the most, and the farmers the least. This condition of unfair distribution is certainly not conducive to the development of Job's tear agriculture and its supporting processing industry in the future. This problem will need to be resolved if Lao People's Democratic Republic wants to develop Job's tear agribusiness.

Table 10.1 Farm gate price, f.o.b. price and profit level of Job's tear farming and trading

Description	Magnitude
f.o.b price (kip/kg)	1 500 kip/kg
Farm gate price (kip/kg)	900-1 000 kip/kg, depends on the quality of products
Middlemen's net profit (kip/kg)	100-200 kip/kg
Exporting companies's net profit (kip/kg)	300-400 kip/kg

Source: Household Survey in Thapho village, 2005.

10.3 Potentials and constraints in the marketing of Job's tear

10.3.1 Potentials

An important determinant of agricultural development is the extent of a market for agricultural products. In operating a Job's tear farm, the farmers of Thapho are motivated not by their need for household consumption subsistence. They do it in effort to improve their family's economic welfare through the selling of products that they produce from their farming operation. To the extent these farmers can achieve their economic goal is determined by the condition of market where they sell their products.

It is true that, so far, the market does not yet seem so supportive of the interests of the Job's tear farmers. One crucial factor behind this market situation is the fact that most Job's tear is exported almost exclusively to China and Thailand. Such a limited extent of export markets has often adversely affected the position of exporters when dealing with these overseas markets. As a consequence, the exporters cannot obtain very good prices for the Job's tear they export to these markets. This less satisfying price condition is then passed on to the farmers through the marketing channel.

In the very recent past there have been some changes bringing optimism about the future of the market for Job's tear in Lao People's Democratic Republic. First of all, in the past the exporters were dependent on sunshine to dry Job's tear before shipping to China and Thailand. This traditional drying method was not only inefficient, but its use also made

exporters unable to achieve good quality, dried Job's tear. This quality problem often weakened the bargaining position of the exporters in dealing with China and Thailand. Recently, exporters have controlled this quality problem by using drying machines. With the use of this new drying technology, the exporters have improved the quality of the dried Job's tear that they export, and also improved the efficiency of the drying activity.

Another step that has lead to improvements in the market condition of Job's tear is that exporters have organized themselves into an exporter association. Before, exporters negotiated individually with importers in China and Thailand. But nowadays, the exporters use their association as a tool for trade negotiations with these overseas importers. With such a collective market bargaining process, the exporters have improved their position in dealing with the importers. As a result, they have obtained more satisfying prices for their dried Job's tear.

The prospect of developing a modern processing industry for Job's tear in Lao People's Democratic Republic is another promising factor for the future development of a Job's tear market in the country. There is an officially recognized group of businessmen who have entered into an agreement with a Taiwanese company to buy $400,000 worth of Job's tear processing equipment from Thailand under a loan agreement for LPG (Luang Prabang Group). The group will sell the processed Job's tear directly to Taiwan while simultaneously paying off the loan.

If this plan is realized, it will have a major impact on the future of the Job's tear industry and market in Lao People's Democratic Republic. First, the development of this modern Job's tear processing industry will enhance the position of the exporters in dealing with the Chinese and Thai importers. The exporters will have more options either to export their dried Job's tear to China and Thailand, or to sell it to local modern processors. Second, the selling of processed Job's tear to Taiwan will expand the market for Job's tear from Lao People's Democratic Republic. Third, domestic production of processed Job's tear will enable Lao People's Democratic Republic to satisfy their own domestic market with their own production, and this will lead to reductions in imports of processed Job's tear from overseas. This will encourage expansion in the domestic market for Job's tear.

The future of Job's tear agriculture and its supporting processing industry is promising in Lao People's Democratic Republic. However, the extent to which this promising future will be realized is very much dependent on many factors. Of these factors is the ability of the government to design and implement a set of appropriate public policies to deal with

constraints that hinder the development of Job's tear farming and its supporting processing industry in the country.

10.3.2 Constraints

An important problem in the marketing of Job's tear in Lao People's Democratic Republic is the lack of market competition. In this market, the farmers' position is the weakest. If the Job's tear processing industry and related businesses are to be developed, it can only be done if the supply of raw materials is satisfactory. Satisfying the supply of Job's tear can be expected to be realized only if the producers (the farmers) can earn satisfactory profit from its production. The current condition of the market is a crucial factor that hinders the farmers from realizing a satisfactory profit from production. This means that the government should take some measures to improve the current market conditions to make it conducive for the farmers to support the development of the Job's tear industry in Lao People's Democratic Republic.

Another marketing problem that constrains the development of the Job's tear industry is that until now there has been no standardization of quality. This absence of standardization gives no financial incentive to the farmers to improve the quality of their raw material. In the future, as the industry develops, raw material quality becomes important. Industry will require quality raw materials to produce quality products. This implies that the government should standardize the quality of Job's tear to motivate the farmers to improve the quality. If implemented effectively, the designed quality standards will have a positive effect on the profit that the farmers can obtain from their farming operations. This, in turn, will improve their motivation to produce Job's tear. As a result, satisfying the supply of raw materials for industry is expected to occur in the future.

One problem for the farmers to meet the quality standards set is the lack of technology to dry fresh Job's tear. Therefore, the farmers only sell fresh Job's tear to middlemen. The farmers could benefit from any quality standards set if they sell dried, not fresh, Job's tear. However, the farmers have no technology, other than using sunshine, to dry fresh Job's tear. Sun drying fresh Job's tear does not guarantee quality dried Job's tear, as the drying process cannot be controlled. The quality standards can be met only through a controlled drying process. This will require the farmers to have drying technology. Being poor, the farmers cannot afford to obtain this technology by themselves. The government needs to make this technology available to the farmers.

10.4 Concluding summary

In terms of Job's tear, the farmers of Thapho village are motivated not by their need for household consumption, they do it in an effort to improve their family's economic welfare through the selling of products that they produce from their farming operations. To the extent these farmers can achieve their economic goal is determined by the condition of the market where their products are sold.

However, the local market where the farmers sell most of their Job's tear is not favourable. The lack of competition in this market has often put farmers in a weak position when dealing with local middlemen. Similarly, the middlemen are quite weak when dealing with exporters to whom they sell the Job's tear that they have bought from the local farmers. As a result, middlemen and exporters enjoy a relative good profit margin.

Another marketing problem that constraints the development of the Job's tear industry is the lack of quality standards. This absence of standardization provides no financial incentive for the farmers to improve the quality of their raw material. In future, as the industry develops, the quality of raw materials is important. Industry requires quality raw materials to produce quality products.

One problem for the farmers to meet the quality standards is the lack of technology to dry fresh Job's tear. The farmers can benefit from the quality standards if they sell dried, not fresh, Job's tear. But, the farmers have no technology, other than using sunshine, to dry fresh Job's tear. Being poor, the farmers cannot afford to obtain this technology by themselves, therefore, the government needs to make this technology available to these farmers.

Despite all these problems, there has been some progress made in the Job's tear market. Exporters have organized themselves into an exporter association, which can be used for trade negotiations with overseas importers. With such a collective market bargaining process, the exporters have improved their position in dealing with the importers. As a result, they can insist on more satisfying prices for their dried Job's tear.

11. Analysis of the Industrial Processing Business of Job's Tear

The cultivation of Job's tear in Thapho has generated both employment and income for local farmers, who are mostly poor. The generated economic benefit has certainly enabled them to improve their families' welfare. The welfare effect of Job's tear farming will be enhanced when the farmers can process the raw material into other products to increase its value. The farmers can do this by operating small-scale Job's tear processing businesses. Small-scale processing businesses will generate more employment and income for the poor farmers who run the businesses.

The presence of a large-scale processing industry will benefit the economy, especially the rural poor. It creates a large demand for raw materials, which generates substantial employment opportunities and income both at the farm level and off-farm. Secondly, the presence of high demand for raw materials and its growth will lead to improvements in the price of Job's tear at the farm level. This will improve farmers' income. Thirdly, it is expected that this growth and development will become stimuli for the national economy to grow. Hence, the benefits brought about by Job's tear cultivation and the processing industry will spread throughout the economy, reaching not only those directly involved in its cultivation and processing.

Despite such great potential benefits of the processing industry of Job's tear for the alleviation of rural poverty in Thapho and the nation as a whole, both small-scale and large-scale industries are absent from Lao People's Democratic Republic. Most Job's tear is exported as a raw material to other countries, notably China, Thailand and Taiwan. Large-scale industries in these countries process the exported raw material to generate high-value products, such as Kanom (a kind of sweet). Ironically, a significant amount of the processed products then re-enter Lao People's Democratic Republic. This indicates the failure of Lao People's Democratic Republic to exploit the existence of domestic demand for processed Job's tear products.

12. Analysis of Institutional Support

12.1 Economic policies

12.1.1 Price support programme

Until now the government has paid almost no attention to the development of Job's tear farming and its supporting processing industry. This is unfortunate. Their development has great potential to contribute to the economy in the future. For this to be accomplished the government has to take an active role in supporting their development through the provision of appropriate public policies.

One of type of public policy that the government is required to implement is a price support programme for Job's tear at the farm level. Better prices of local Job's tear is desirable to maintain and promote farmer motivation to expand production to meet the demand from the processing industry in the near future. The existing market structure does not satisfy the need of the farmers for a good price. It is more advantageous to the exporters and their collaborating middlemen than to the farmers. If this situation is maintained, the farmer motivation to expand operations to meet the coming demand from the processing industry will disappear.

One good strategy to enable farmers to receive better prices for their production is to implement a price support programme, which can assure farmers obtain a certain price level for their products. The government should give farmers assured prices for their Job's tear. The assured price should be, of course, one that satisfies the farmers' interests. Through this programme, the government will improve the farmers' market position in negotiations.

This strategy is commonly implemented in developing countries, especially for rice, which is a basic staple food in most of these countries. However, as in developing countries elsewhere, in Lao Peoples' Democratic Republic a price support programme for Job's tear has never been implemented. The government is still focusing on supporting the rice self-sufficiency programme. As Lao People's Democratic Republic has already achieved rice self-sufficiency, it is possible for the government to divert some of its resources from supporting the rice programme to design and implement programmes, including price support, to develop Job's tear farming and its supporting industry. Without a price support programme, it is likely the farmers will loose their economic incentive to improve operations.

12.1.2 Farm credit programme

Farmers are profit-seeking. The price level that the farmers receive for their Job's tear is one of many factors that determine profit. Farm productivity is another crucial determinant of farm profitability. Better farm productivity generates better profitability.

Quantity and quality of inputs, including crop variety are important factors in determining farm productivity. Job's tear is cultivated in upland areas with poor natural fertility. One way to improve the productivity of this farmland is to feed the land with better farming inputs, such as manufactured fertilizers. Farmers can meet these input requirements if they have sufficient funds.

Farmers do not apply these kinds of farming inputs to their Job's tear. They cannot do so because they cannot afford to do so. Accordingly, if productivity is to improve, the provision of farm credit for these farmers will be a necessity. However, they cannot meet such a credit need from the formal credit market because they cannot provide acceptable collateral. Thus, their poorness prevents them from obtaining credit from the formal credit market. An alternative way to overcome this credit access problem would be to design and implement a special government support credit programme. For rice production, the government has long implemented this kind of credit programme. It has been evident that this programme has made significant contributions in making Lao People's Democratic Republic rice self-sufficient.

However, such a credit programme for Job's tear does not exist in Lao People's Democratic Republic. The implementation of a credit programme to support the development of Job's tear farming will be desirable in the future. The design of such a programme should be made to match the reality of the farmers to make its implementation effective in promoting Job's tear to raise the income of farmers.

12.1.3 Food diversification policies

Lao People's Democratic Republic cannot continue to solely rely on rice to maintain food security. In the near future, Lao People's Democratic Republic will not be able to meet the rapid growth in domestic demand for rice resulting, notably, from rapid growth in population. This is because Lao People's Democratic Republic has no more capacity to expand domestic rice production. The limited supply of lowland areas and the limited production technology available are the two main constraints to production capacity in Lao People's Democratic Republic. The government has to opt for food diversification if it wants to maintain national food security.

As food diversification is promoted, demand for non-rice food will increase. This increase in demand will stimulate farmers to expand the production of non-rice foods. Job's tear can be processed as food, therefore, a food diversification programme could contribute to the development of Job's tear farming and processing.

The government has recognized the potential problems of high dependence on rice for food consumption. Accordingly, food diversification has been placed on the national development agenda. However, this agenda is not yet consistently implemented. The government has implemented no clear policies regarding food diversification. As a result, people in Lao People's Democratic Republic are still very much dependent on rice as the staple food. If the development of Job's tear farming and a supportive processing industry succeeds in the future, the ambiguous position of the government has to be resolved. The government has to design and implement food diversification policies effectively if it wants to maintain national food security and promote the development of Job's tear agribusiness in the country.

12.1.4 International trade policies

International trade is important to Lao People's Democratic Republic, either as a source of foreign exchange through the exportation of domestic products, or as a source of products used domestically or a source of investment funds required for the development of the national economy. In the future, Job's tear and its processed products could be a good source of foreign exchange.

However, the present trade policies that the government have implemented are not conducive for the development of agribusiness. The present policy of free trade has opened the way for processed Job's tear products made in China and Thailand to enter the domestic market. If a similar industry was developed in Lao People's Democratic Republic, it would unlikely be successful since it has to compete with similar products from mature industries in China and Thailand. This newly established industry would need some kind of public policy protection from the government. In light of this, it would be wiser if the government did not continue to implement its free trade regime. Instead, the government should implement a kind of protection policy, such as a tariff policy, in this area.

The protection of newly established domestic industries through international trade policies will also have a positive effect on attracting overseas investors to bring capital and skills into Lao People's Democratic Republic. After investors have developed a sufficient scale of industry in Lao People's Democratic Republic, no more exports of dried Job's tear will be required. Lao People's Democratic Republic will become a major exporter of

processed Job's tear products in the future. This will be beneficial for Lao People's Democratic Republic not only in terms of extra employment and income for the farmers and labourers, but also increases in revenues to the treasury in the form of taxes and foreign exchange.

12.1.5 Investment policies

As any government in developing countries, the Government of Lao does recognize the importance of foreign investment as well as foreign technology for the development of its economy. Accordingly, the government has implemented investment policies conducive for foreigners to invest in Lao People's Democratic Republic. The current policies have succeeded in attracting some foreign investment into Lao People's Democratic Republic. However, foreign investment for developing the Job's tear industry is not forthcoming.

The government needs to develop much more attractive investment policies to attract more foreign investment, especially in the Job's tear industry. This is not an easy task, since neighbouring countries, such as Viet Nam and Cambodia, are also trying hard to attract international investment into their economy through the provision of favourable investment policies.

12.2 Infrastructure provision

12.2.1 Transportation

As in the case of maize, transportation is another crucial issue in the development of Job's tear production and its supporting industry. Transportation plays a double role in the development process. On one side, transportation is needed to ship produce to markets located in urban areas. On the other side, it is needed to transport farm inputs from the markets to the farmers. Therefore, good transportation facilities are important in the development of agricultural production such as Job's tear production.

The government shares the view that good transportation is important not only for the development of agriculture, but also for the alleviation of rural poverty. But, limited budget capacity has become a hurdle for the government to implement its view on transportation development. As a consequence, poor road access has been accused of being a major determinant of rural poverty in Lao People's Democratic Republic.

12.2.2 Research and development

As with maize, the development of Job's tear and farming technology is still beyond the reach of the agricultural research and development system. Using current technology, Lao People's Democratic Republic cannot compete with China and Thailand for market in the future.

To support the future prosperity of Job's tear farming and its processing industry, it is necessary to give special attention and effort for developing its own research network and facilities dealing with Job's tear farming, processing and marketing technology.

Only with strong support from a research network can Lao People's Democratic Republic compete with China and Thailand in the export market as well as the domestic market.

12.2.3 Development of an extension service network

As new technology is developed, the next task is to bring the technology to the farmers and to teach them to use it properly. This is not an easy task as the farmers may not be convinced about the new technology's economic prospects. Often farmers conceive new technology as having a high risk of failure. As a consequence, they simply reject the technology for the sake of avoiding the perceived high risk of failure.

Such risk-averse behaviour is logical given their economic poorness. Production failure means lost income. The possibility of losing income may not have a significant effect on one's welfare if one can compensate the lost income from one's own wealth. This is only relevant, however, for those who have accumulated sufficient wealth. For poor farmers with no wealth, the loss of income from farming failure can ruin their life. Accordingly, it is logical for them to avoid the possibility of such a disaster to occur.

Extension workers have the task not only to teach the farmers how to use the new technology, but also to convince the farmers about the extent of production risk attached to it. During the era of the green revolution, the effectiveness of extension services was proven. Accordingly, it is desirable for the government to prepare the existing extension service network to support the future development of Job's tear farming.

12.3 Concluding summary

Job's tear has great potential for the development of the economy and the alleviation of rural poverty. Realizing this potential requires the government to implement a set of public policies to support the development of Job's tear farming. This set of supporting public

policies include: (a) a price support policy; (b) a farm credit policy; (c) a food diversification policy; (d) a favourable investment policy; (e) a protective international trade policy; and (f) an infrastructure development policy. The potential can be realized only if the government implements these supporting policies. Without them, it is very unlikely that Lao People's Democratic Republic can exploit the potential of Job's tear to alleviate rural poverty and promote economic growth.

Part 3: Prospects for Enhancing the Sustainable Development of Diverse Agriculture

13. A Critical Reflection of the Findings

This study has investigated the extent of cultivation of secondary food crops, namely maize and Job's tear, as well as their respective marketing and industrial processing industries. The study was conducted in Ban Chum village (maize) and Thapho village (Job's tear). The populations of these villages are very much dependent on agriculture for employment and income. Most of the villagers are poor farmers who operate small plots of land.

Since their plot of land is so small, they cannot simply depend on income generated from the land to feed their families. Most rural dwellers try hard to secure extra income by selling family labour in the labour market, either inside the village or in nearby urban areas. However, the prospect of securing such extra work is rather slim, especially for the people of Thapho. In Ban Chum, local poor farmers have, in fact, benefited from the presence of a market for low-skilled labour in and around Vientiane city. Many poor families from Ban Chum have sent their children to work in the garment industry located around the capital. Despite the fact that their waged income is relatively small, these children try hard to save some of their meagre remuneration for their families back in the village. Consequently, the extra work will not enable poor farmers from the village to escape the abject poverty they have faced for years.

This implies that poor people of Ban Chum and Thapho as well as many other poor people living in other parts of Lao People's Democratic Republic still require more work with better remuneration. This is a real challenge for the government given the fact that poverty is still prevalent. As the economy is still agriculture based, alternative agricultural development is critical to meet the identified challenges.

Lao People's Democratic Republic still places priority on maintaining rice self-sufficiency. The fact that the population is still growing at a rapid rate raises domestic demand for rice. Maintaining rice self-sufficiency requires greater commitment and more farmland as well as other resources for domestic rice production. As the availability of suitable farmland and other appropriate resources are so limited in Lao People's Democratic

Republic, maintaining rice self-sufficiency reduces the resource commitment for other segments of agriculture.

This unbalanced resource commitment within the agricultural sector is reflected by low agricultural diversification. Rice has become the single major segment of agriculture. This implies that the economy has become dependent predominantly on the rice sub-sector, not on agriculture as whole. This is a risky development strategy.

The rural poor cannot benefit from rice self-sufficiency programmes if they do not have the required resources, such as low-lying irrigated rice lands and sufficient capital, to participate in the programme. Inability to participate in the programme has, in fact, forced rural families in many developing countries to move into remote marginal uplands to seek alternate livelihoods and income. Rosegrant and Hazell (2000) noted that the majority of these rural poor people cultivate secondary crops such as maize and cassava in infertile, isolated upland areas. For them the cultivation of these secondary crops if not simply to reduce staple foods, but also to secure income to buy other necessities, such as clothes and education. While the government has concentrated on pursuing rice self-sufficiency, the development of these crops has been largely ignored in many developing countries. As a result, rural poor families have been unable to escape from poverty.

This is regrettable. Leaving secondary crop agriculture without development support from the government not only perpetuates poverty, but also leads to a rapid degradation of upland areas where they live and farm. The underlying factor leading to this is that the poor farmers have to increasingly intensively exploit their tiny plots of already marginal upland to enable them to maintain family subsistence. This will eventually destroy not only upland resources, but will also endanger the sustainability of agriculture and life in the country. Given this adverse prospect, logically, governments in developing countries should redirect their developmental efforts into the development of secondary crops. In other words, the government should promote agricultural diversification to improve rural poverty and prevent the rapid degradation of upland resources that can destroy the agriculture sector and lives.

The poor farmers of Ban Chum and Thapho have tried hard to manage their secondary crop farms. They have shown that even with very low levels of inputs and with traditional production technology, the cultivation of secondary crops can be quite profitable. This means that secondary crops have the potential to alleviate rural poverty in Lao People's Democratic Republic as well as boost the economy. This potential will grow very rapidly when the development of secondary crops is integrated with the development of industrial processing for secondary crops.

However, the government has not yet made much developmental effort to exploit this great potential. The government has made almost no effort to promote the development of Job's tear agriculture and that of its industrial processing business. Job's tear farmers receive no assistance from the government to improve their farming technology, to develop small-scale processing businesses or to improve their bargaining position when dealing with middlemen. As a consequence, the poor farmers of Thapho cannot yet make Job's tear farming an effective way to escape poverty. In contrast, middlemen and exporters have benefited far more from the Job's tear businesses.

Likewise, poor farmers from Ban Chum have received nothing from the government to enable them to better exploit the benefits of maize farming. Maize operations in the village still apply very traditional technology. Inputs are very low, mainly only labour and land. Farmers are inaffective when dealing in the market for maize grain. Middlemen and the feed processing industry gain much more than maize farmers from the market. Farmers are still unable to use this business as a way out of poverty. Indeed, similar to the farmers of Thapho village, the farmers of Ban Chum village are still poor even though they operate profitable farming businesses.

14. Designing and Implementing Public Policies for the Development of Secondary Food Crop Businesses to Alleviate Rural Poverty and Achieve National Food Security

14.1 Achieving food security through agricultural diversification

The underlying motive behind the struggle for rice self-sufficiency in many developing countries is the need for the country to take charge of food security. The essence of national food security is access for every citizen to food anywhere at any time. Given the fact that food is a basic for maintaining human life, the effort by a country to grant sufficient access to food for every citizen is well known and well documented.

However, the way through which a country attempts to realize food security deserves critical scrutiny. The reason is the fact that while many developing countries have been able to produce food surpluses, hunger is still commonplace. If, previously, hunger co-existed with shortages of food, now it co-exists with surplus food supply. Thus, hunger is no longer due to shortages of food supply. Rather, it is caused by the lack of access of the hungry people to the food surplus.

Generally, governments in developing countries, including Lao People's Democratic Republic, view national food security as simply a matter of sufficient domestic production of a single main staple food, notably rice. Accordingly, the governments of these countries have implemented single-crop based food self-sufficiency programmes, which in Lao People's Democratic Republic, is a rice self-sufficiency programme. Since the demand for rice steadily increases due mainly to high population growth, the government has to increasingly allocate national resources to increase domestic rice production to meet increasing demand.

The presence of such a 'tragedy of food surplus' demonstrates fallacy in the notion underlying the self-sufficiency programmes implemented in such countries. Food security means secure access to sufficient amounts of food for every citizen. Thus, the key to food security is secure access to food. Since no nationwide social welfare systems are available in developing countries, access to food is determined by the sufficiency of income. This is

the underlying reason why poor people are hungry, despite food being surplus. Poor families have an insufficient amount of income to feed themselves.

For Lao People's Democratic Republic, there are some other good reasons not to rely on rice self-sufficiency programmes to achieve national food security. First of all, existing national poverty has made it desirable to reconsider the implementation of the rice self-sufficiency programme. It is true that this programme has enabled Lao People's Democratic Republic to become a food self-sufficient country. However, the fact that poverty remains rampant in the country has demanded a redesign of the agricultural development strategy in order to overcome this chronic social problem and avoid the possibility of 'the tragedy of food surplus'.

Another reason for Lao People's Democratic Republic not to continue with rice only food security is that in the near future it is very likely that Lao People's Democratic Republic will not be able to meet the rapid growth in domestic demand for rice resulting from rapid growth of its population. This is because Lao People's Democratic Republic has no more capacity to expand domestic rice production. The limited supply of lowland and limited production technology have become the main constraints to expand rice production. Therefore, Lao People's Democratic Republic can no longer maintain food self-sufficiency without diversifying the base of its food security to include secondary food crops.

This does not mean that the government should abandon the existing rice self-sufficiency programme to allow for the promotion of agricultural diversification. Indeed, its abandonment is not required for the promotion of agricultural diversification. Agricultural diversification can be integrated into the food self-sufficiency programme by simply relaxing the programme to not simply rely on the production of rice alone. Secondary food crops such as maize, cassava and potato should be integrated into the food self-sufficiency programme. This would make the programme become a multi-food-crops based programme.

In Lao People's Democratic Republic, as in other developing countries, over generations, people have become accustomed to the production and consumption of not only rice, but also secondary food crops. Multi-staple foods were typical of these societies. However, this characteristic almost completely disappeared after the success of rice production intensification in the region. The government policy that makes rice available at cheap prices everywhere at any time and the lack of government support for the production and distribution of non-rice food crops, to a great extent, have been the major factors behind the disappearance of multiple staple foods in developing countries. Reversing this policy

would stimulate people to return into their traditional way of life consisting of multiple staple foods. Logically, consuming various staple foods will not be a difficult transition as it was their tradition not so long ago.

By returning to multi-staple food consumption, the markets for products of secondary food crops will improve greatly in developing countries. The increasing demand for these products will, in turn, provide better monetary incentives for their producers to increase their production. This will enable Lao People's Democratic Republic to become no longer dependent on a single food crop (rice) for food self-sufficiency.

However, this does not yet mean that Lao People's Democratic Republic will have achieved national food security. National food security prevails only when every citizen has sufficient access to food, and as long as poverty exists, national food security has not been achieved. Therefore, the biggest challenge for the government is how to design agricultural diversification within the context of accomplishing food self-sufficiency that fits the promotion of the welfare of the rural poor to deliver them from poverty.

14.2 Searching for public policies to promote the development of secondary food crops and their processing industry to alleviate rural poverty and achieve national food security

Similar to other developing countries, in Lao People's Democratic Republic the development of secondary food crops has been ignored for a long time, since the government focused on the development of rice in an attempt to achieve and maintain rice self-sufficiency. Making the development of secondary crops effective for the alleviation of rural poverty and to achieve national food security will, therefore, require hard work, a complex strategy and public policy.

First of all, in a market economy, market demand is a powerful driving mechanism in fostering the production of goods and service. Expansion of market demand stimulates expansion of production, since the growth of demand offers monetary incentives to the producers to expand the production of goods whose demand is growing. Thus, in developing secondary crop agriculture, the first challenge for the government is to create an economic environment that stimulates the demand for products of secondary food crops. It is true that market demand for maize and Job's tear already exists in Lao People's Democratic Republic, however, as the study has revealed, the existing market does not provide a sufficient foundation for the achievement of national food security and effective poverty alleviation.

One way for the government to foster demand for products of secondary food crops, especially maize and Job's tear, is to implement an effective food diversification policy. Domestic demand for rice has now reached 1.8 million tons/year (FAO Statistics, 2002). If 20 per cent of the national demand can be substituted with secondary food staples there will be a reduction in demand for rice by as much as 0.36 million tons/year. The reduction of rice demand represents great scope for the farmers of secondary food crops to increase their production to satisfy the rise in demand. The fact that demand for food increases overtime, mainly due to population growth will steadily increase market demand for secondary food crops.

An effective food diversification policy will cover aspects of the price and production of rice. Since most of the population is relatively poor, one effective way to discourage the consumption of rice is to let the price increase, relative to prices of secondary food crop staples. This can be achieved by a gradual reduction in government support (input subsidy and output price) for domestic rice production together with a gradual increase in similar support for secondary food crops. Another way is for the government to actively promote the consumption of secondary food crop staples.

Another way to foster market demand for products of secondary food crops is to promote development of the processing industry for secondary food crops, especially maize and Job's tear. Development of the processing industry is important for the development of food security and the alleviation of rural poverty not only because of its great effect on demand for secondary food crops leading to rapid increases in their production, but also because of its creation of value added and industrial job opportunities that trigger rapid growth in the national economy. Indeed, development of the processing industry has a great deal of positive potential on the development of food security and the alleviation of rural poverty.

It is true that a processing industry for maize already exists in Lao People's Democratic Republic but is very limited in capacity and is also confined to the animal feed industry. The government should design and implement policy that promotes expansion of the capacity and scope of the processing industry.

Unlike maize, a processing industry for Job's tear does not yet exist in Lao People's Democratic Republic. This is really unfortunate. Neighbouring countries (Viet Nam, Thailand and China) have proved that the industrial processing of Job's tear is a lucrative business. Lao People's Democratic Republic has never gained much from this industry because it only exports raw materials. Ironically, Lao People's Democratic Republic then imports processed

Job's tear products from these importing countries. Logically, Lao People's Democratic Republic would be better off processing Job's tear products not exporting the raw material for processing.

Food diversification policies and policies fostering the development of processing industries for maize and Job's tear are important for the development of markets and value added activities. This development can be recognized as a precondition to develop national food security. The emerging question is how the government can enable poor farmers to benefit from these market developments?

Constraints to this development are present at various levels, including production, marketing and processing. Some policies have been recommended to overcome these constraints and are summarized in the concluding section of this chapter.

The development of partnerships between poor farmers and the processing industry is one solution. Processing secondary food crops increases their value to consumers and therefore processors will, in turn, benefit by receiving higher profits as the consumers pay higher prices for the processed products. This implies that the possibility of poor farmers to escape poverty will be greatly enhanced if they are involved in the processing industry.

However, the prospect of poor farmers developing their own processing business is very likely to be hindered by their lack of financial and technical capacity. In general, poor farmers are poor not only in financial capacity, but also in technical skill. The processing industry requires not only the use of intensive capital, but also greater skills. Poor farmers may not be able to meet these criteria.

One way to enable the farmers to take part in the development of the processing industry is to promote partnerships between poor farmers and the processing industry. Through this collaboration, the two sides can bring their specialized skills into synergy to develop an efficient industry. Farmers can specialize in the production of raw materials of secondary crops, while the participating businessmen can specialize in the processing and marketing of the processed products. Through this business partnership, the industry can assure the supply of raw materials, while poor farmers can assure good prices for their products.

To enhance the benefits of this partnership for both sides, the industry can provide the farmers with technical assistance as well as production credit. Also, it is important to recognize that the business partnership can be sustainable only if both sides are in mutual trust and feel satisfied with the cooperation. Without these conditions being met, the partnership will soon collapse. Thus, the government needs to design and implement public

policies that promote a favourable business environment for the development of sustainable business partnerships between poor farmers and the processing industry.

14.3 Conclusions and policy recommendations

It can be concluded that the government has taken great efforts to make the country rice self-sufficient. However, this achievement has not yet provided a strong foundation for national food security. This is because poverty is still relatively bad, albeit improved. Poverty is an avenue to hunger because insufficient income is the main cause of poor people being unable to secure sufficient food to eat. Accordingly, food security can only be assured if food self-sufficiency is not accompanied with poverty.

In other words, food security cannot be achieved or maintained simply by providing sufficient domestic production of a single food crop. This study has convincingly proved that food diversification and poverty alleviation have to be integrated into the national food self-sufficiency programme if Lao People's Democratic Republic is to achieve and maintain national food security.

To this end, maize and Job's tear have great potential. This is especially true for their potential impact on alleviating rural poverty. To realize its great potential for alleviating rural poverty and improving national food security, the government needs to develop and implement public policies favourable for the development of market demand for the products of these crops, a processing industry and participation of the poor farmers in farming these crops as well as in their processing industry. Public policies should include:

A. Public Policies Promoting Market Demand for Maize and Job's tear Products:
   (a) Food diversification policy;
   (b) Policy promoting the development of processing industries;
   (c) Conducive investment policy; and
   (d) International trade policy conducive to the development of maize and Job's tear farming and their processing industries.

B. Public Policies Promoting Maize Farming by Poor Farmers:
   (a) Price support policy;
   (b) Farm credit support policy;
   (c) Infrastructure development policy (irrigation, transportation, production technology, and extension service network); and
   (d) Business partnership policy.

C. Public Policies Promoting Job's Tear Farming by Poor Farmers:

(a) Price support policy;

(b) Farm credit support policy;

(c) Infrastructure development policy (irrigation, transportation, production technology, and extension service network); and

(d) Business partnership policy.

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Annex 1: Case Studies

1. Mr. Kham Pheuy Phommavong

Mr. Kham Pheuy Phommavong was born in Ban Chum. He is 45 years old. He is Lao Lum. He finished secondary school. His family has six members with two females. He used to grow rice but changed to maize in 1979-1980 according to the requirement for raw materials of ThaNgon Animal Feed Produce Company, which is situated in Vientiane capital, 40 kilometres to the south.

His family has 4 hectares of paddy, 3.5 hectares of maize, 0.5 hectares of fish pond and raises 20 cows. His paddy fields, maize fields and fish pond are close to the village and it takes him 25 minutes to get there. He partakes in no off-farm or non-farm activities.

His family pay for on-farm activities including: plowing and scattering seeds at a cost of 130,000 kip/rai; weeding, harvest from fields to storage area or roadside, and grain selection 20,000 kip/day/labour. Almost all of the labourers on his farm are from the same village. His family has three main labourers contributing to on-farm activities.

Last year, his family harvested only 800 kilograms of rice because of flooding and 30 tons of maize. He earned money from selling maize (25,000,000 kip), from selling cows (4,000,000 kip) and from selling fish (10,000,000 kip). There is a middleman who comes to buy maize in the village at a price of 800,000 kip/ton and 10,000 kip/kg of fish. The problems associated with cultivation include floods, droughts and the maize market. There are two sources of maize seed varieties: one is produced in Thailand with a cost of 26,000 kip/kg, while the second is produced in Viet Nam with a cost of 18,000 kip/kg.

Last year, his annual expenses for cultivation were 5,400,000 kip including plowing, and the scattering of seeds; maize seeds 800,000 kip and 4,000,000 kip for the schooling of his two children.

Mr. Kham Pheuy Phommavong feels very happy with his cultivation and his income. He tries to encourage other villagers to upgrade cultivation techniques, reduce expenses and increase income by increasing quality.

2. Mrs. Phengsy Sypaseuth

Mrs. Phengsy Sypaseuth was born in Ban Chum. She is 51 years old. She is Lao Lum. She finished primary school. Her family has seven members with four males. She has grown maize from 1979-1980.

Her family has 5 hectares for paddy, 5 hectares for maize, and 1 hectare for a tamarind plantation. It takes 40 minutes for her to get to her paddy filed, while the maize fields are close to the village. She has no off-farm or non-farm activities.

Her family pays for on-farm activities including: plowing and the scattering of seeds costing 130,000 kip/rai; weeding, harvest from fields to storage area or roadside and grain selection 20,000 kip/day/labour. Her family contributes four labourers to the on-farm activities. Last year, her family decided to construct one small drying house to dry maize to respond to the quality and increased price of maize at a cost of 20,000,000 kip. The family can now dry 1 ton of maize per day through hiring labourers from the village at 20,000 kip/day/labourer. The problems associated with cultivation are floods, draught and a lack of labour.

Last year, her family harvested 5 tons of rice and 50 tons of maize due to maize multi-cropping. Her family earned 240,000 kip from selling rice, and from selling dried maize 52,000,000 kip at a price of 1,300,000 kip/ton to market and animal raising farms in Vientiane including swine and poultry farms.

Last year, her annual expenses for cultivation of paddy were 3,000,000 kip, 7,200,000 kip for maize and 2,500,000 kip for seeds.

Mrs. Phengsy Sypaseuth said that the high quality of drying maize would enable her to demand higher prices and respond to market problems.

3. Mr. Bounthong

Mr. Bounthong is considered as a newcomer to Thapho village, his former village was Kiew Gna. He moved to Thapho village in 2002. Kiew Gna village is too far from any roads, and therefore the village of Kiew Gna was moved to a place near the road. Mr. Bouthong is 48 years old. He is Khamoo. He did not finish primary school, but his experience of upland farming stretches over 35 years. His wife also Khamoo and aged 34, she cannot read or write. His family consists of six members with three females. For a long time he was engaged in upland rice shifting cultivation in his former village. After moving to Thapho village, rice was not a suitable crop due to the soil quality, so Job's tear was

substituted for rice. Job's tear can be sold more easily due to road access. Job's tear is one option that can replace rice. The labour input is also less than for rice. The problem which his family is facing is price. In 2004 the price was between 900-1,000 kip/kg, but in 2003 is around 1,200-1,500 kip/kg.

His family now has only three main labourers who can work full time in agriculture: his wife, his eldest daughter and himself. The three remaining are too young.

His family has 0.8 hectares of paddy field, and one parcel of upland area of 1 hectare, which he divides into two parts; one for Job's tear and about 40 per cent for rice. In reply to asking him why he still cultivates rice he said that although rice does not grow as well as Job's tear in his field he has to plant it in order to overcome rice insufficiency while waiting for the major paddy crop. His upland field is mainly for Job's tear production and paddy in the wet season while in the dry season, maize. It takes nearly 30 minutes to walk to his upland fields while only 5 minutes to his paddy.

Bounthong also owns two heads of cattle and more than twenty poultry birds. He has no buffalo so for land preparation he has to hire the tractor of a neighbour.

In 2004, the yield of upland rice was 800 kg/ha and Job's tear was 900 kg/ha. Normally, Job's tear should yield more than he could harvest this year according to his experience, but this year it was affected by disease. He harvested 900 kg of rice and 420 kg of maize.

The main income of his family comes from Job's tear accounting for 1,100,000 kip. Then maize and animal husbandry account for 500,000 kip each. Finally, NTFPs earn 100,000 kip/year.

His family expenditure is grouped into four main expenses. The largest was for buying shelter, followed by medical treatment and food, and finally clothes.

Bounthong is the one of the villagers who mainly uses natural agriculture practices; he depends on nature. When the weather is good his upland and paddy crop yields are good too. Therefore, his hope lies in technologies and crop varieties suitability to the environment and soil conditions. "Marketing is one factor that is very important to support production and find out where to sell the product", he said. Last year, he sold his Job's tear to a middleman at the village nearby; the price being only 900 kip/kg and for maize grain 1,200 kip/kg.

4. Mr. Bounkhong

Mr. Bounkhong was born in Thapho village. He is 39 years old. He is Laolum, and did not finish primary school. His wife is illiterate; she is also Laolum and is 36 years of age. There are six people in his family; four male and two female. The labour force of his family is four, with the youngest two children still attending school. His son used to work in town as a construction worker.

Mr. Bounkhong has two upland plots: 1 hectare and 0.6 hectares. The first plot is a 35 minute walk, and the second a 15 minute walk. He has no paddy field or garden. In 2004, he divided the first plot into two parts, the first for rice (80 per cent) and then for Job's tear (20 per cent), the second plot was only for Job's tear.

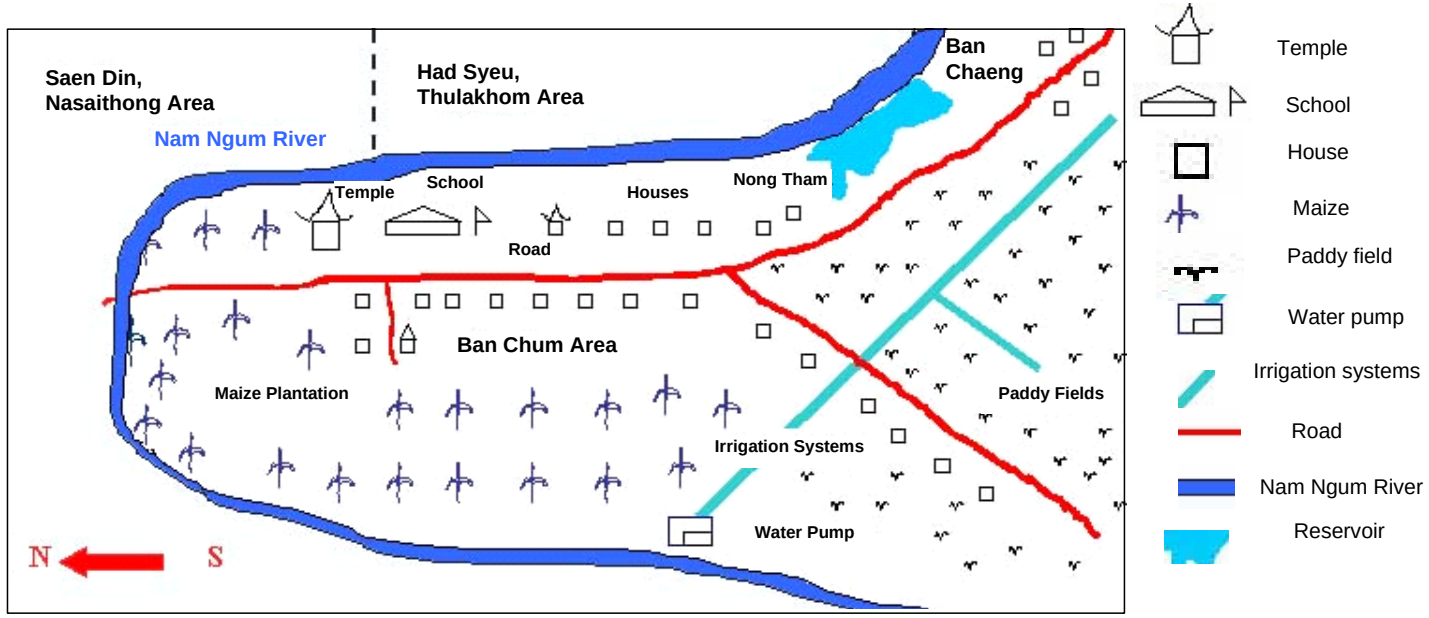
In 2004, he harvested 1,600 kg of rice and 1,875 kg of Job's tear. All of his rice is for domestic consumption, but his Job's tear he sold for 900 kip/kg to a middleman from a nearby village.

Animal raising: his family has two cattle and 65 heads of poultry. He claimed that poultry often died because of disease, especially in cold weather.

The main income of his family is from Job's tear, and then the selling of labour to work in the town is also one source. But the largest share is from Job's tear which accounts for 1,575,000 kip/year. He was unable to recall his son's wage level.

Annex 2: Village Layout

Resource map of Chum village, Vientiane province



Resource map of Thapho village, Luang Prabang province