Organic Vegetable and Fruit Production in Lao PDR

A Pre-feasibility Study

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Helvetas / Department of Agriculture

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Executive Summary

The following study was conducted in late June and early July of 2008 in Champasak province in the south of Lao PDR. The study area focused on vegetable production in Paksong, Thateng and Bachieng districts east of Pakse, the largest city in southern Lao PDR. Bachieng district is located on the western slope of the Boloven Plateau, while Paksong district is located at the top of the plateau and Thateng is on the eastern slope. This area is one of the most important agricultural zones in Laos, with coffee, vegetables and fruits produced for domestic consumption and export.

The pre-feasibility study plan was originally intended to cover both fruits and vegetables, but early in the process it was decided to limit the study to vegetable production. Certified organic production in the area is dominated by coffee and tea, although a small number of investors are starting organic vegetable farms in the area. The study therefore examined conventional vegetable production as a model for future organic vegetable value chains and as a tool to identify potential constraints and possible project interventions for organic vegetable development.

In the study region, four main production systems were visited: a four year rain fed rotation with cabbage or Chinese cabbage, potatoes, peanut and two years of fallow, a semi-permanent irrigated system that includes cabbage, Chinese cabbage and occasionally potatoes, a transitional system where cabbage, potato, ginger, cucumber and/or sweet corn are grown between coffee seedlings, and large scale, mechanized and permanently cultivated intensive production for export. In almost all cases, large amounts of fertilizer and pesticide are being used to produce vegetables, except for some small scale intercropping of vegetables with organic coffee.

The vegetable trade in the region is very diverse with a market channels that range from fully integrated companies producing and selling products internationally to small informal traders operating from the back of Hyundai trucks. In most cases, producers have little knowledge about market demand or the price of their goods in central markets, and the price of vegetables at the market is often many times more than the price at farm-gate. Additional constraints include a lack of infrastructure to store and pack vegetables, uncoordinated production using primitive techniques and a poorly planned and executed price stabilization plan that disrupts normal market operations.

Successful development of organic vegetables should focus on two separate value chains. Long-distance domestic trade will allow small producers, traders and domestic companies to develop experience in organic vegetable production, certification and marketing. Larger companies with integrated supply chains will be able to produce organic products for international markets that require higher levels of quality, packing and handling.

PROFIL will play a key role in the development of an organic vegetable sector in Champasak province. The project’s main focus will be to facilitate linkages between value chain actors and to provide targeted marketing and technical support when necessary. PROFIL’s initial activities will include follow-up research and planning in late 2008 with a focus on preparing local partners to implement project interventions. In 2009, the project should start providing technical and training assistance and will begin to strengthen value chain links domestically and internationally.

Groundwork completed in 2008-9 will allow the project to work towards larger scale exports of organic projects in 2010-11. Exports will be encouraged through increasingly sophisticated, efficient value chains managed by the private sector. Organic vegetable production and trade will benefit Lao producers, local companies and Lao consumers through increased business opportunities, access to reliable supplies of healthy organic vegetables and sustainable rural livelihoods in rural areas of Champasak province.
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♦ Thongsett Village Vegetable Farmers’ Group, Paksong District, Champasak Province, Lao PDR
♦ Kongtoum Village Farmers’ Group, Paksong District, Champasak Province, Lao PDR
♦ Champasak Fruit Tree Propagation Farm, Bachieng District, Champasak Province, Lao PDR
♦ Sixiengngaam Village Fruit Farmers’ Group, Bachieng District, Champasak Province, Lao PDR
♦ Taniyama Siam Corporation, That Eng District, Xekong Province, Lao PDR
♦ Lao-China Research Farm, Paksong District, Paksong District, Lao PDR
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♦ Ms. Dam, Vegetable wholesaler, Paksong market, Paksong District, Champasak Province
♦ Mrs. Tick, Vegetable wholesaler, Pakse market, Pakse, Champasak Province
♦ Ms Phim, Vegetable wholesaler, Pakse market, Pakse, Champasak Province

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Introduction: Promoting Organic Farming and Marketing in Lao PDR

The Promoting Organic Farming and Marketing in Lao PDR project, also known as PROFIL, is an international cooperation project involving the Department of Agriculture and Helvetas. The objectives of PROFIL Phase 1 included improving living conditions in rural areas of Lao PDR, ensuring the good health of consumers, encouraging the sustainable use of natural resources, and promoting economic growth through organic agriculture. The first phase of the project began in mid-2004 and ended in December 2007, with a focus on legal and institutional issues and on the value chain for organic vegetables in the Vientiane Capital region.

While the first phase of the project had many successes, a second phase of the project was planned to expand on and consolidate its results. The second phase of the project will include more work on the legal and institutional aspects of organic production, and will develop multiple value chains using the Participatory Market Chain Approach (PMCA). One of the first steps for the project is to select appropriate value chains for further development. Commercial vegetable and fruit production on the Boloven Plateau of southern Lao PDR was identified for further study and possible implementation during Phase II of the project.

Objectives of the pre-feasibility study

The objectives of the pre-feasibility study were defined as follows:

- Assess the agro-ecological and economical competitiveness of organic vegetables on the Boloven Plateau
- Identify stakeholders involved in the existing vegetable value chain, and explore the experience and interest of producers, traders, processors and government officials in organic vegetable production
- Briefly assess the national and international market potential of organic vegetables from the Boloven Plateau.
- Assess necessary resources required to develop an organic vegetable value chain.
- Write a report with recommendations on whether Profil should invest in the development of an organic vegetable value chain on the Boloven Plateau.
- Provide initial suggestions about possible project interventions.
Methodology

At the beginning of the study, the study team identified the main elements and key questions for setting up a possible organic vegetable value chain, given in Table 1.

| Fields | • Are the agro-ecological conditions suitable for producing organic vegetables? (climate, soil, pest and disease, temperatures)  
| | • Are suitable vegetable varieties available? (yield, disease susceptibility, shipping and eating quality, where do you get seeds)  
| | • What crops are suitable at this elevation? (types of crop, potential alternatives, crops that failed in the past, reasons for crop failures)  
| | • Can suitable crop rotations be established? (current rotations, past rotations, what are the characteristics of a good rotation crop?)  
| Farms | • Do farmers have sufficient know-how for producing organic vegetables? (how did they learn about vegetable/fruit growing, what do they know about organic agriculture)  
| | • Is vegetable/fruit production profitable compared to other crops (production costs, gross margins, historic prices, seasonality of prices)?  
| | • Are vegetables competitive concerning opportunity costs? (labour timing, other land and resource uses)  
| | • Are cash-flow issues a limiting factor in vegetable production? (how much money is invested and who invests it, do traders advance money)  
| | • How risky are vegetables to grow compared to other crops? (would organic be more risky, if so, why?)  
| | • What organic and chemical inputs are being used or are available locally? (fertility management, pest control, price, uses, effectiveness)  
| | • Do farmers have appropriate equipment for growing and selling vegetables? (hand equipment, tractors, irrigation and other)  
| | • What limits are there to all-year vegetable production? (availability of water, disease pressure, excess production, other factors)  
| | • Do farmers have access to capital? (source of capital, cost of capital, uses of capital)  
<p>| | • What are the main opportunities for the future? |</p>
<table>
<thead>
<tr>
<th><strong>Extension &amp; Facilitation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Who provides you with information when you have problems with a crop? (DAFEO? traders? companies? Other projects, other farmers?)</td>
</tr>
<tr>
<td>• Have you ever heard about organic farming from anyone before? (how useful is the information for your products)</td>
</tr>
<tr>
<td>• How can the government support organic vegetable production in the area?</td>
</tr>
<tr>
<td>• Who can facilitate the development of organic vegetable <strong>value chains</strong>? (Govt. agencies? BioGloba/Jhai Coffee Cooperative? PROFIL?)</td>
</tr>
<tr>
<td>• Who would you want to work with on certification issues if you decide to grow organic products? (ICS-SU? Lao certification body? CertAll?)</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Processing &amp; Trade</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• How do you bring your products to the market? (roads, trucks, borders)</td>
</tr>
<tr>
<td>• Are appropriate handling and storage facilities available for vegetables? (washing, grading, cold storage)</td>
</tr>
<tr>
<td>• Is there competition to buy the vegetables currently being produced? (number of traders, market power of traders vs. producers, price fixing)</td>
</tr>
<tr>
<td>• Does any processing take place in the area? (percentage of product processed, techniques, who controls processing)</td>
</tr>
<tr>
<td>• Are farmers organized into groups? (What do these groups do, how large are they, what is the purpose of the group, do they increase market power of farmers, do they engage in processing or trade?)</td>
</tr>
<tr>
<td>• Is there capital available for investment in handling, processing and trade?</td>
</tr>
<tr>
<td>• Who is involved in the vegetable trade in your area? (card map of farmers, traders, processors, exporters etc.)</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th><strong>Markets</strong></th>
</tr>
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<tbody>
<tr>
<td>• Is there a demand for organic vegetables in Lao PDR? (which vegetables, quantities, times)</td>
</tr>
<tr>
<td>• Is there a demand for organic vegetables from Lao PDR in export markets? (where, which vegetables, when, quantities)</td>
</tr>
<tr>
<td>• What market information is available for organic and conventional vegetables locally, nationally, regionally and internationally?</td>
</tr>
<tr>
<td>• History of vegetable/fruit growing in the area. (When commercial trade first began, who the main traders are, what were the reasons for growth of vegetable/fruit industry)</td>
</tr>
<tr>
<td>• What are marketing costs? (taxes, permits, operating costs, other, who pays, effects on industry)</td>
</tr>
<tr>
<td>• What are the main risk and opportunities for the future?</td>
</tr>
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*Table 1: Elements of a possible organic vegetable value chain and related questions to be addressed in the pre-feasibility study.*
Vegetable production on Boloven Plateau

General information on Vegetable production on Boloven Plateau

Socio-economic conditions in the region
The study region is located east of the city of Pakse in Champasak province in southern Lao PDR. Three districts were visited, including Pakson and Bachieng districts in Champasak province and That Eng district in Xekong province. All three of the districts visited are populated mostly by small ethnic groups from the Mon-Khmer ethno-linguistic family, also known locally as lao theung. Of the three districts, That Eng and Pakson are officially listed as “not poor” while Bachieng district is considered one of the 46 “priority poorest districts” in Lao PDR. People living in the study area have a relatively short history of commercial agricultural production, but the local economy now depends on coffee and vegetable production. While coffee is produced in permanent plantations, vegetables are often produced using extensive techniques that include substantial periods of fallow. While unused land remains, fallow periods are increasingly short in areas with high-quality land near roads. Available farmland is also threatened by development of plantations and new industrial uses such as a proposed bauxite mine that would cover over 140 square kilometres.

Integration of local people into mainstream Lao culture has created additional economic pressure on local farmers, partly because their diet is based on rice that must be purchased from farmers in the surrounding lowlands. The need to purchase rice forces farmers to produce cash crops to meet basic dietary requirements. Declines in the price of major crops such as coffee or vegetables can dramatically reduce income, and cause food insecurity for poor small-holders.

Agro-climatic conditions
Lao PDR is characterized by a monsoon climate with strong rains from June to beginning of October, with occasional rains in the remaining period. Annual precipitation on the Boloven Plateau is much greater than most areas of Lao PDR, with annual rainfall of 3200-4000 mm reported by District Agriculture, Forestry and Extension Office (DAFEO) staff in Pakson. Despite the high total rainfall, most areas of the plateau experience a dry season lasting approximately from December to February. During the dry season, many crops require irrigation to achieve commercial yields.

The plateau rises gradually from approximately 100 m above sea level at Pakse to almost 1300 m above sea level near Pakson. The high elevation leads to lower temperatures than those in the surrounding lowlands, with temperatures seldom rising past the low 30’s or dropping below 10 degrees Celsius.

Soils in this region are volcanic in origin, and are generally well structured, less acidic than lowland areas and have good moisture retention capacity. One soil sample from the area was reported to have a pH of “2-3” but actually tested at 6.3, while another soil sample had a pH of 6.1. There are large areas of flat or gently sloping land suitable for commercial cultivation, One of the main constraints to cultivation is the presence of large amounts of volcanic rock in some areas that make mechanical cultivation almost impossible.

Due to the humid upland climate with a relatively short dry season, insect pest and disease pressure (especially fungal diseases) is medium to high. The main pests of common
vegetables are small cabbage white butterflies (*Pieris rapae*) diamondback moth (*Plutella xylosa*) and an unidentified underground pest that destroys the roots of young cabbage plants. Flea beetles, a common problem in surrounding lowlands, are present, but are not considered important. Chemical products are used almost universally to control insect pests on cabbage and Chinese cabbage. Many of the most important insect pests could be controlled using bio-agents such as *Bacillus thurgensis*.

Due to the wet climate, fungal diseases are also present, with early blight (*Alternaria solani*) causing problems in potato and tomato crops, and other fungal and bacterial pathogens causing problems in the wet season or if improper irrigation techniques are used. Farmers generally avoid problems with fungal pathogens by planting susceptible crops during the dry season.

In general, agro-climatic conditions on the plateau are favourable for production of a wide variety of vegetables, including temperate vegetables and tropical highland vegetables. Unlike the surrounding plains, the plateau is not suitable for rice production, especially at the highest elevations. This fact favours production of vegetables and other cash crops, rather than subsistence rice production, as is common in highland areas of northern Lao PDR.

**Vegetable production areas and varieties**

Vegetables are produced across the Boloven Plateau, with a focal point in Paksong district. Vegetable production also extends into highland areas of neighbouring provinces such as Xekong and Salavan, and at least one company has a farm at middle elevations (700 m) in That Eng district of Xekong province.

Commercial vegetable production in the high elevation areas of the Boloven plateau is dominated by cabbage (*galam*) and Chinese cabbage (*pak gat khao*). These two crops are grown for sale in Thailand and Lao PDR, so Thai varieties and seeds are used. All cabbage varieties observed were smaller, flat headed and less dense Asian style cabbages maturing in 50-55 days. Chinese cabbage varieties were small to medium sized with short stems.

Other vegetable crops grown in the region include (in approximately order of importance): chayote fruit (*mak server*) and tips (*pak soo*), potatoes (*man falang*), cucumber (*mak teng*), local sweet corn (*saloi*), ginger (*ging*) and okra (*mak okla*). Large amounts of chayote are grown in the area west of Paksong along the road to Pakse. Modern Thai varieties of chayote are used, and the same plants produce for a number of years. Potatoes are grown as a rotation crop on many of the same farms as cabbage. Seed potatoes are saved by farmers and new seed stock is rarely purchased from outside, so seed quality is very low. Cucumber, okra and baby corn are usually produced using modern Thai or Japanese varieties, while ginger and local sweet corn are produced using local stock.

**History of vegetable production on the Boloven Plateau**

While small scale vegetable production in “kitchen gardens” has long been common throughout Lao PDR, commercial vegetable production on the Boloven Plateau is a more recent phenomenon. Many of the ethnic groups that live on the plateau have turned to farming relatively recently. Farmers in Thongsett village report that two of their major crops, cabbage and potatoes, were introduced by the French in 1948. Since that time, villagers from Thongsett have moved to other villages in the area, such as Gongtoum village and have introduced vegetable production to new areas. Over this time, Chinese cabbage has also become an important crop, with sweet corn and cucumbers produced in smaller but still significant quantities.

Commercial production of vegetables for export to Thailand and internal trade began to increase in the late 1990s, with rapid growth in production since 2001. While cross border trade increased market opportunities, surpluses have started occur during the main cropping
season in recent years, reducing profits for farmers. These surpluses are made worse by a lack of crop diversification.

Large scale, plantation production of vegetables for export by foreign investors started in the 1990s, and has had both successes and failures. While some companies such as Taniyama Siam are successfully exporting high quality products, others such as Paksong Highland have failed due to poor planning and inappropriate agricultural techniques. Despite the failures, new companies continue to invest in vegetable production on the Plateau, including Thai companies such as Swift and River Kwai International.

**Vegetable production systems**

Over the course of the study, the team came across four types of vegetable production systems:

- A three to four year rain fed system that includes cabbage or Chinese cabbage, potatoes, peanut and fallow land;
- A semi-permanent irrigated system that includes cabbage, Chinese cabbage and occasionally potatoes;
- A one to three year transitional system where cabbage, potato, ginger, cucumber and/or sweet corn are grown between newly planted coffee seedlings or stump pruned coffee bushes;
- Large scale, mechanized and permanently cultivated intensive production for export

**Cabbage/Chinese Cabbage/Potato Rotation**

Many farmers in the region practice a form of short-fallow, slash and burn agriculture to produce vegetables for market. Typically, this process begins with land clearing and burning of organic matter, although mechanical land preparation is sometimes used. In the first year of production cabbage or Chinese cabbage is usually grown, with one to three crops produced depending on market conditions, weather, access to water and the availability of labour. Peanuts and potatoes are grown after cabbage in some areas, although they are often attacked by pod borer (for peanuts) and blight (for potatoes). It is unclear whether peanuts contribute nitrogen to the soil or export it in harvested seeds.
Farmers using this production system usually have about 3 hectares of land. One hectare is used to grow crops, while the other two are left as fallow. In most cases land is prepared by cutting and burning vegetation, followed by manual cultivation. In some cases, land is prepared using tractors if the soil is not too rocky, but this costs approximately 2 million kip per hectare, compared to 0.5 to 1 million kip per hectare for manual cultivation. The first crop planted on the newly cleared land is usually cabbage or Chinese cabbage. These may be cropped one or two times, after which the land is often planted into potatoes or peanuts. Cabbage and Chinese cabbage are most popular during the wet season, while potato and peanut are mostly grown during drier parts of the year.

After one (or sometimes two) year(s) of cultivation, land is usually left fallow for two years. During this short fallow period fields are colonized by non-woody plants, shrubs and small trees that re-grow from roots and stumps. It is unclear whether this short rotation improves yields through better soil fertility, reduced pest populations (i.e. nematodes) or a combination of the two.

In contrast to what most consumers think, chemicals are widely on Boloven vegetables, including insecticides to control caterpillars on cabbage and Chinese cabbage and occasionally herbicides to help clear land. Some common insecticides used on cabbage and Chinese cabbage include Karate (lambda cyhalothrin) and Furadan (carbofuran). Both types of cabbage are usually sprayed three times before they are harvested. Potato, sweet corn and ginger crops are not usually sprayed with insecticide, and cucumber crops are sprayed occasionally if problems arise. Most pesticides used in vegetable production are broad-spectrum, although some products used in coffee production (i.e. abamectin) are more targeted.

Fertilizer was used extensively in all fields visited, with many different formulations available. One of the most popular fertilizers is 15-15-15 (which also contains 1% MgO, 0.4% CaO and 0.5% S). This fertilizer has a good reputation with farmers, probably because it solves most common nutrient and micronutrient deficiencies, but in many cases farmers are paying for nutrients they do not need. 46-0-0 is also used by vegetable farmers, especially during the rainy season when nitrogen losses are at a peak.

Some farmers use manure in their fields, although none said they collected enough from their free roaming cows to fertilize their fields adequately, and there is competition for manure for by coffee producers and mushroom farms. Neither composting nor green manure cropping are common. Farmers expressed some interest in organic fertility management, but they are also concerned about slower growth of crops and lower total yields. At least one farmer group expressed concern that slower growth would reduce the number of cropping cycles per season.

**Semi-permanent irrigated mono-cropping**

In areas with access to a reliable water supply, farmers are able to grow vegetables throughout the year. Cabbage and Chinese cabbage for export to Thailand are the most common crops, although there is potential for diversification into other crops. Land rotation in these areas is longer-term, with most fields used at least two to three years before being abandoned. Land is cleared by cutting and burning the vegetation, followed by manual or mechanized tillage, depending on the rockiness of the soil.
Vegetable production on irrigated land takes place throughout the year, although some farms reduce or stop production from January to March to cope with reduced water supplies. Irrigation water is drawn from natural ponds and streams and is moved to overhead sprinklers through a system of pumps and PVC pipes. The irrigation system is moveable, and it is often disassembled and taken to newly planted fields.

Plant protection and fertility in irrigated cabbage and Chinese cabbage fields are mostly the same as in non-irrigated mono-cropping systems. Pesticide use is quite high, although pest pressure changes between the wet and the dry seasons. Large doses of fertilizer are used, although application rates appear to be lower in the dry season due to reduced leaching of soluble nutrients. As with non-irrigated systems, farmers often over-apply specific nutrients because they do not understand the fertility needs of their soils and crops.

Transitional intercropping with coffee

The Boloven Plateau is an increasingly important coffee growing area, with large areas of Robusta at lower elevations and increasing amounts of Arabica cultivated at higher elevations. As coffee plantations expand, many farmers are intercropping vegetables between coffee seedlings or between stump-pruned coffee bushes to maintain cash-flow from their land. Coffee is grown under a range of conditions, from open fields to shaded forest gardens.
A wide variety of vegetables are grown between coffee seedlings for one year as the coffee gets established. Vegetable crops observed by the study team include cabbage, cucumber, sweet corn, and ginger, although other crops can also be grown. Vegetable production in these fields ranges from small-scale production for personal consumption to medium scale (1 ha+) commercial production for export.

Commercial production of vegetables intercropped with coffee usually uses chemical fertilizers on both the coffee seedlings and the vegetable crops, although this is less common for small scale production of vegetables for personal consumption in shaded “forest coffee” plantations. Insecticides are also used on cabbage and Chinese cabbage to control pests (mostly *Lepidoptera*).

Large areas of land are currently being intercropped as coffee production on the plateau expands. Vegetables are grown mostly to give the farmers cash flow while the coffee seedlings grow, but farmers prefer to grow coffee because it is less prone to seasonal oversupply and because coffee does not require land to be left fallow. (Many coffee farmers also choose to grow separate fields of vegetables to even out cash flow and work throughout the year.) Certified organic production of vegetables grown in transition to coffee is less attractive because the system is not permanent, and because it often takes place on freshly cleared forest land.

Intercropping of vegetables also takes place when established coffee is “stump pruned” to encourage re-growth. When this takes place in organic coffee plantations, there is potential for organic vegetable production to help preserve the organic status of the coffee fields.

**Large scale mechanized production for export**

One modern commercial farm operated by Taniyama Siam Company, Ltd. was visited by the study team. The farm is located at about 700 m elevation near Tat Eng, Xekong Province on the east slope of the Boloven plateau. This large farm grows okra on 62 hectares of land for export to Japan using hired labour. Land in this region is flat and rock free, with a loamy texture and good soil structure.

Land is prepared using rotary tillage, followed by the creation of raised planting beds. Okra seedlings are started in a nutrient enriched peat planting medium imported from Europe before they are planted into the fields. Individual fields are planted in a planned rotation to ensure consistent supply of okra for the on-site packing house, and all production follows a Japanese system for quality control.

Plant protection in the okra fields is accomplished using yellow “sticky traps” to catch insect pests and to monitor insect populations. Okra’s natural resistance to plant pests and the use of sticky traps means that pesticides are not generally needed on this farm.

Soil fertility management on the farm starts with the use of enriched potting soil for starting seedlings. Agricultural lime is used to control Ph and add calcium during the mounding process. (Farm staff stated that the Ph of the soil is 2-3 prior to amendment, but this seems highly unlikely and was proven incorrect by pH tests). Chemical fertilizer is also applied, although farm staff was not aware of the formulation.
Value Chains: Post-Harvest handling and exports

Harvesting and farm-gate sales

Except for the Japanese okra farm, post-harvest handling of vegetables observed on the plateau remains primitive, labour intensive, and wasteful. At harvest, vegetables are usually loaded into a small cart for transport from the field to the road, where the loaded cart sits to wait for a buyer. While waiting to be sold, the vegetables are subject to hot weather and heat produced by the vegetables’ natural metabolism. This causes rapid losses of weight and quality, making it necessary to sell the vegetables very quickly.

Most vegetables are not washed, trimmed or graded at this point, although chayote are usually packed into clear plastic bags for easier transportation and handling. Transportation in open carts or in the back of small trucks exposes vegetables to mud in the wet season and dust in the dry season, so there is little point in cleaning or trimming the vegetables before they are sold to traders.

Most farmers sell their products at the farm-gate to local traders, although a minority are able to transport their products to markets in Pakson, Pakse or Vang-Tao to get a better price. At least one village is able to ship its products to distant markets on the Attapeu-Vientiane bus. In most villages, farmers have access to only one or two traders, and they are “price takers” who rarely have access to market price information. For the most important vegetables (cabbage, Chinese cabbage, chayote, cucumber) farm-gate price are less than ½ of the price paid to traders at the Pakson market, and some were as little as 10% of the Vientiane market price at the time of the survey. Producers report that they get much better returns for production outside of the peak season, when they may get as much as 40% of the market price in Vientiane.

Small scale and informal trade

After being sold to small traders, vegetables are loaded onto an unrefrigerated truck or on top of a bus for transportation to a wholesale market market. In some cases, vegetables are loaded and unloaded by hand three to five times before they are delivered to the end market, with leading to weight loss, damage and decay. Very large quantities of product are tightly packed into trucks to reduce costs and to stop product from shifting during transport. This system also has disadvantages, however, because tight packing can lead to pressure bruising and the lack of ventilation allows heat to build up in the vegetables, increasing the rate of ageing and decay.

Small scale and informal value chains are complex and varied, with many possible routes from farm to market and many different people involved. In most cases, small scale traders buy vegetables at the farm gate and transport them to a central point for resale. Sometimes this central point may be a short distance from the farm, such as the Pakson market or one of the large markets in Pakse. In other cases vegetables are transported directly to large urban markets in Lao PDR such as Vientiane or Savannakhet. Based on limited interviews with traders, it appears that domestic trade is dominated by small traders, while large companies have a bigger role in exports.

Many traders also take their products to the border crossing at Vang Tao-Chong Mek where they are sold to Thai traders. Other small traders are occasionally involved in selling to Thai and Lao exporters in Pakson and Pakse. This value chain can include a variety of different actors, and it appears quite disorganized and chaotic. While this is certainly an effective value chain arrangement for conventional vegetables, it would be very difficult to transform this into a traceable supply chain that could serve modern export markets for organic vegetables.
One of the changes facing the small scale trade in vegetables is the new Paksong wholesale market, scheduled for completion in 2008 but likely to be opened sometime in 2009. This new marketplace is supposed to provide a sanitary and modern facility for wholesale trade of vegetables, reducing the need to trade vegetables from the back of trucks in the muddy or dusty outdoor area behind the current Paksong market. It is hoped that the new wholesale market will help improve prices for local vegetable farmers, but it is unclear how the market will solve the fundamental technical and economic issues facing the vegetable trade. It is also unclear whether the design of the market is appropriate for large-scale wholesale trade, as the buildings may not be suitable for loading and unloading trucks.

The volatile price for common export vegetables is less important for traders than they are for farmers, because traders report they can pass on costs to customers. For cabbage and Chinese cabbage, traders are supposed to be offering a guaranteed price of two baht. This pricing agreement was set by an agreement promoted by the district government. Unfortunately, this guaranteed price did not take supply considerations into account, and because it is effectively impossible for farmers to enforce. This “guaranteed” price is discussed further in following sections, but the main lesson for PROFIL is that production decisions should always anticipate demand.

A diagram of existing value chains for vegetables is provided in Annex 4 and a proposed value chain for domestic organic vegetable trading is provided in Annex 5. The number of linkages in the domestic supply chain may make it difficult to ensure traceability of certified organic products, so small scale traders are not included in the proposed organic export value chain shown in Annex 6.

**Large scale trade**

While there are a number of large scale traders operating in the study area, there is also a long history of failure by companies producing vegetables and other crops for export. Poor infrastructure, a lack of skilled human resources and the slow and opaque Lao legal system make it difficult for companies to operate. Despite these challenges, there is increasing interest in commercial agricultural production for export from the Boloven Plateau.

Larger scale trade in vegetables takes through a small number of large trading companies (i.e. Paksong Import-Export State Enterprise) or through large integrated producers such as SWIFT Company or Taniyama Siam Company Ltd. Other large companies operating in the area plan to sell organic products, including Swift and River Kwai International, although these companies are not operating yet and were not available to speak with the survey team. Large scale traders focus primarily on export markets in Thailand and other countries.

Taniyama Siam/Advanced Agriculture Company was the only large export produce and trader visited by the study team. This company controls the entire supply chain, including production, packing and handling and transportation to Thailand for air freight export to Japan. This company previously worked with small farmers in Thailand, but chose to move to Lao PDR so they could operate a plantation where they had more control over production. This company is very successful in its niche market, but they do not plan to work with small farmers or organic production in the future.

Companies involved in large scale trade are often involved in multiple value chain arrangements, depending on the crop, the company’s business plan and supply and demand conditions during specific years or seasons. Large trading companies add value through their ability to consolidate production, manage customer relations and supply chains and to often to provide credit or inputs to producers. A proposed value chain model for export vegetables is provided in Annex 6.
Potential demand for organic Vegetables from Lao PDR

While the Boloven Plateau has great potential for organic vegetable production, adequate market demand will be needed to ensure functioning value chains that contribute to environmentally and socially responsible agricultural development in Lao PDR. For the purposes of this study, market potential is considered for long-distance domestic trade and for exports to regional and international markets.

Domestic market for organic vegetables

The domestic market for organic products in Lao PDR is still in a very early stage of development, but the potential for continued growth is high. Most domestically produced organic vegetables are sold directly to consumers by producers. A small weekly market sells approximately $1500 to $2000 dollars worth of organic fruits and vegetables per week in Vientiane, primarily to rich Lao consumers. This limited marketing system has effectively introduced organic products in Lao, and can serve as a base for further expansion but it is highly dependent on outside support and may not be sustainable over the long-term.

Smaller operations in other towns such as Vang Vieng and Luang Prabang grow and market organic product through tourist oriented restaurants. Small amounts of organic products may also be imported for high end restaurants and retailers, but no information is available about the quantity. In total, these outlets may sell between $60,000 and $90,000 of “organic” vegetables in 2008, with additional organically grown products sold into the conventional market. While these outlets should continue to grow and the farmers’ market concept could be reproduced on a smaller scale in other urban centers, a localized, fragmented organic food industry is likely to remain small and economically marginal.

Linking the major agro-climatic zones of Laos would help increase product diversity and reliability of supply, attracting more consumers and wholesale buyers and boosting sales volumes. This process will also facilitate the development of additional domestic market nodes, especially in large urban areas (Luang Prabang, Pakse, Savannakhet) and in areas with large numbers of tourists (Vang Vieng).

Substantial untapped demand exists for organic products in hotels, and restaurants. Tourism and hospitality is a major economic driver in Laos, with more than 1 million tourist arrivals per year. Major areas of tourism activity include Champasak province, Vientiane Capital, Vang Vieng, and some parts of Luang Prabang, Bokeo and Luang Namtha provinces. Retail stores are also present in large urban areas, but they are especially well developed in Vientiane capital, where small high-end supermarkets and chains of mini-markets are starting to emerge. Unlike the current farmers’ market, these outlets require steady, reliable supplies of organic fruits and vegetables including non-traditional and temperate products.

Because of their need for consistent sources of high quality products, many hospitality and retail buyers prefer to deal with intermediaries such as processors and distributors. A few companies such as Xao Ban or Vieng Vone Distribution Company are able to purchase products from producers, consolidate them and deliver a wide range of organic products to their customers, but none are currently dealing with organic vegetables. These potential partners should be invited to participate in all PMCA events, as they will be critical to the sustainable growth of the organic sector. Another option to serve wholesale buyers is the creation of a wholesale organic market (possibly in an existing wet market), but this option has not yet been developed and it is unclear who would act as the main value chain partner.
Thai market for organic vegetables

The Thai market for organic vegetables is the most attractive for vegetable producers on the Boloven Plateau. The plateau is approximately 700 km from Bangkok, and there are already many established trade links in the vegetable sector. Demand for organic products in Thailand was reported to be $23 million in 2005, with an annual growth rate of 35%. Based on these forecasts, the Thai organic market should be worth more than $50 million per year in 2008, but no statistics are available to say how much of this total is organic vegetables.

Thai companies have expressed interest in organic vegetables from Lao PDR, and provided one potential exporter with a list of products.

<table>
<thead>
<tr>
<th>Thai Buyer Requirements</th>
<th>Varieties</th>
<th>Grower-Exporter Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus</td>
<td>green, white</td>
<td>Lower priority</td>
</tr>
<tr>
<td>Corn</td>
<td>Baby</td>
<td>High priority (now produced conventionally)</td>
</tr>
<tr>
<td>Brinjal</td>
<td></td>
<td>Lower Priority</td>
</tr>
<tr>
<td>Cabbage</td>
<td>Round white, Chinese white</td>
<td>High priority (now produced conventionally)</td>
</tr>
<tr>
<td>Chayote</td>
<td></td>
<td>High priority (now produced with low inputs)</td>
</tr>
<tr>
<td>Kale</td>
<td>Chinese, Hong Kong</td>
<td>Lower priority</td>
</tr>
<tr>
<td>Chinese vegetables</td>
<td>Choy sun, bok choy, ung choy</td>
<td>Lower priority</td>
</tr>
<tr>
<td>Coriander</td>
<td></td>
<td>Lower priority</td>
</tr>
<tr>
<td>Celery</td>
<td>Chinese</td>
<td>Lower priority</td>
</tr>
<tr>
<td>Chili</td>
<td></td>
<td>Lower priority</td>
</tr>
<tr>
<td>Cucumber</td>
<td></td>
<td>Lower priority (produced conventionally)</td>
</tr>
<tr>
<td>Basil</td>
<td>Holy, sweet</td>
<td>Lower priority</td>
</tr>
<tr>
<td>Lettuce</td>
<td>Green leaf, iceberg, romaine, butter head, green and red oak leaf, red leaf lettuce</td>
<td>Very high priority (not currently produced on a large scale)</td>
</tr>
<tr>
<td>Lemon grass</td>
<td></td>
<td>Lower priority</td>
</tr>
<tr>
<td>Salad greens</td>
<td>Mixed</td>
<td>Lower priority</td>
</tr>
<tr>
<td>Bean</td>
<td>Yard long</td>
<td>Lower priority</td>
</tr>
<tr>
<td>Eggplant</td>
<td>purple</td>
<td>Lower priority</td>
</tr>
</tbody>
</table>

The Thai market for organic products primarily serves a wealthier clientele, and most organic products are sold through supermarkets. Thailand is home to large retail chains such as Tesco and Metro as well as smaller organic specialty stores that serve richer clients. These retailers operate using modern supply chains, with well developed cold chains, modern handling techniques and high standards for product quality. Most supermarkets prefer to deal with large suppliers or distributors who can provide multiple commodities throughout the year.
Regional and international markets for organic vegetables

Regional and international markets for organic vegetables are attractive options for development by larger domestic and international companies. The market for organic vegetables in East and Southeast Asia are still in early stages of development, but rapid growth in demand is being driven by rising incomes and increased concern about health and the environment. Regional markets in ASEAN countries and China remain small as a percentage of total food sales, but the very large total population means that sales volumes are much higher than in Lao PDR.

Regional markets in neighbouring are much larger than the Lao market, but small by global standards. These markets primarily serve rich, urban consumers who shop in modern grocery stores served by companies with modern growing and handling practices. New entrants to these markets will require substantial expertise and capital to penetrate these markets effectively, as competition is based on quality and reliability of service as much as price.

Internationally, very large organic markets exist in developed countries, although the very large distances involved make it difficult to ship fresh vegetables to Europe or North America. In some cases this could be overcome through processing (canning or freezing), as some Thai companies such as River Kwai International are doing. Developed countries in the East Asia region (Korea, Japan, Taiwan, Singapore and China) are a more appropriate target market due to existing trade links and proximity. Recent food contamination scares in China may also convince more consumers to buy organic food, helping open the market to more imports.

International markets, especially developed country markets, have very high requirements for food imports. Product quality, reliability of supply, adequate quantities, price and SPS issues must all be dealt with for exports to succeed. In most cases, foreign investment will be required to serve these markets.
Constraints and challenges

The SWOT-Analysis in Annex 3 provides an overview of the most important Strengths, Weaknesses, Opportunities and Threats of the Lao vegetable sector, with regard to launching an organic vegetable project oriented towards exports and local trade. The constraints for farms, packing and storage and long distance trade are briefly described in the following sections.

Constraints at farm level

Vegetable farmers on the plateau have expanded production of vegetable crops such as cabbage and Chinese cabbage very rapidly since the year 2000. Over this time, there has been a steady decline in profitability (with the exception of 2007) as peak season supply has grown faster than demand. During the survey, the farm-gate price for conventional cabbage was 150 kip per kg ($0.017 per kg), a price far below the cost of production. (The reasons for this low price are discussed below). Low prices for vegetables are causing many farmers to plant most of their land in coffee, with a smaller area of vegetables to maintain cash when they do not have coffee to sell.

Product diversification is minimal in the area, especially for commercial scale production, which focuses on cabbage, Chinese cabbage, chayote and some cucumbers and ginger. These crops are easily grown, can be stored at the roadside for informal sales to itinerant traders and can be shipped relatively long distances without refrigeration.

The potential for organic vegetable production in the area is limited by farmer’s lack of technical experience (personal correspondence, Mr. Chris May, Biomays Consultancy). In most cases farmers use very simple techniques and they are not aware of organic pest control or fertility management options. For many crops, new management systems and organic inputs such as compost, guano and BT could eliminate the need for chemical inputs, but these are either not available (BT, guano), not considered to be a useful crop input (EM), are already in short supply (manure) or are not produced in sufficient quantities (compost). Improved on-farm and off-farm input supplies will be needed to ensure organic production is agronomically viable for farmers.

Fallowing, rotations and land clearing is another constraint for certified organic vegetable production. Over the long term, it may be possible to develop appropriate rotations that maintain soil fertility and low levels of pests (such as nematodes). Until research on suitable rotations is completed, farmers will need to continue fallowing their land for two years between vegetable crops. On some land, it should be possible to avoid burning the fallow vegetation by ploughing it under with a tractor, although this approximately doubles the cost of land clearance (from 0.5-1 million kip per ha to 2 million kip per ha). However, much of the land currently used for vegetable production is too rocky for mechanical tillage, and many of these fields might be better off planted with organic coffee.

Other constraints facing potential organic farmers include the poor quality of local roads, especially during the rainy season, limited access to irrigation water for dry season production, and a lack of appropriate equipment and on-farm infrastructure to cultivate and harvest the land. Of these problems, better access to irrigation is most likely to earn farmers more money over the short term.

Constraints in packing, storage and handling

Possibly the most difficult and expensive constraint in the vegetable value chain is the lack of appropriate packing storage and handling. These capital and knowledge intensive activities require strong, modern management and a great deal of coordination to align production, handling and marketing.
For all vegetables except okra, there is a lack of dry, climate controlled storage space. Small scale storage space in villages or at market collection points would help even-out short term price fluctuations caused by the irregular arrival of traders from day to day, and the urgency of selling rapidly decaying crops. High quality storage could also help reduce some of the seasonal changes in the price of semi-perishable products like potatoes and cabbage, as sales could be extended into the off-season when prices are higher. This will be particularly important for organic products, which will need to be consolidated and stored for longer periods due to lower levels of production.

The only modern packing house seen during the study was one that handles okra near Ban That Eng, Xekong Province. The lack of grading and packing increases shrinkage, reduces the quality of the end product and makes it impossible to penetrate the modern retail and wholesale markets that would be interested in organic vegetables. This could change over the next few years as large companies such as Pakson Import-Export State Enterprise and River Kwai International continue to invest in modern facilities as part of their expansion plans. It is currently unclear to what extent these companies will handle organic produce grown by small farmers.

**Constraints in internal and international trade**

At present, organic vegetables are not widely traded, although some companies such as River Kwai International have plans to export organic vegetables. Conventional vegetables are widely traded, and many of the lessons from the conventional market provide valuable lessons for future trade in organic vegetables. Some of the most important constraints include:

- As mentioned in previous sections, a “contract” price is set for some export vegetables, but these agreements are routinely ignored by both parties. This “contract” is more like a **floor price** agreement between buyers and sellers that is administered by the local DAFEO. This price setting arrangement is economically flawed because the guaranteed price gives farmers an incentive to overproduce in the peak season when the cost of production is low. When overproduction reaches a critical point, the market collapses as happened in 2008 and farmers must either destroy their crops or accept lower prices. If this arrangement is to work for vegetable producers, one or more of the following must take place:
  - A quota system could be used to plan production and maintain profitable prices. A quota system would be cumbersome to manage, and subject to collapse if prices in export markets drop below the floor price. Farmers are also likely to exceed quotas, and it would be almost impossible to enforce production limits in a system dominated by small, shifting plots and ad-hoc sales to itinerant traders.
  - A true contract system could be arranged between buyers and sellers, with terms enforced on both parties. At a minimum, contracts would need to include prices, quantities, delivery dates and quality terms. Working to contract terms would be very difficult for small, unsophisticated producers. The current legal system in Lao PDR also makes this very difficult to achieve, and it is likely that both parties would break contracts when it suited them, although well targeted interventions using a Participatory Market Chain Approach (PMCA) could help build trust over the medium term. This may be particularly useful for organic vegetables, as the “organic premium” would help ensure loyalty between buyers and sellers.
  - New market development could be an option, especially in Vietnam and Cambodia. New markets could help absorb excess production of popular vegetables such as cabbage and Chinese cabbage and maintain prices through competition between buyers. Developing a market for organic
products could be one aspect of this strategy, although the small quantity of vegetables produced and sold as organic will not increase prices for other producers by itself.

- Diversification of production is the best option, as new crops could increase farmers’ income while decreasing the area devoted to cabbage, and Chinese cabbage. Diversification will not be easy, as many of the problems causing low prices for existing crops also make it difficult to diversify. In many cases, promoting organic production through PMCA would also encourage market led diversification.

- Information about supply and demand conditions for existing or potential crops does not move easily between value chain actors. In general, farmers and small traders do not know what happens to their vegetables, and they do not know what their buyers needs are. This is especially true of export markets, where lines of communication are longer.

Except in cases where farmers produce for large vertically integrated trading companies, the lack of information makes it almost impossible to make informed decisions about which vegetables to produce, when to produce them and in what quantities to produce them. The lack of information also means that farmers are unaware of other production options that might be more profitable (such broccoli or cauliflower, or organic vegetables). Even if this information were available, the lack of technical information and support would make it very difficult for farmers to produce new types of vegetables. This problem can be reduced using PMCA techniques to bring market players together to share information and build mutually beneficial relationships.

- The complexity of vegetable trading networks makes it almost impossible to trace product from the field to the market except where there is a single, strong player coordinating production and sales. Multiple sales channels, competing interests and a lack of coordination combine with irregular availability of product from small farmers (except in vertically integrated businesses) make it very difficult for traders to make plans and to provide dependable markets for farmers. Complex supply chains will also make it difficult to ensure traceability of organic vegetables without the involvement of larger organizations to coordinate production and marketing.

- For poor farmers without trucks, the main link to markets are itinerant traders who buy at the farm gate for resale. One or two traders will visit a village on most days, giving them a monopoly and leaving farmers with almost no pricing power. Unlike the farmers, traders report that they are able to pass on price increases (such as the cost of fuel) to their buyers. As a result, low prices affect poor farmers much more than small traders. This also results in a lack of trust between the farmers and traders that will be the main constraint to implementing a PMCA approach.

- Some richer farmers who have trucks sell their vegetables at the Lao-Thai border, where Thai traders are the main customers. Wholesale prices at the border market vary wildly due to supply and demand, and Lao sellers who have invested time and money to transport their product to the border are often forced to sell at a loss when there is an oversupply of vegetables. This problem could be reduced if improved storage facilities could reduce price fluctuations at the border market, and if the vegetable value chain were better coordinated and driven by demand rather than supply.

- Large commercial traders tend to be more integrated and have more access to information, but their small size and lack of capital make it difficult for them to compete effectively in new markets. While this situation is changing, these larger players can still benefit from better links to customers inside and outside Lao PDR. These companies also require assistance to translate the information they get from
customers into actions that will help small Lao farmers benefit from better market access.

- A lack of storage, handling and other infrastructure for perishable and semi-perishable crops makes it impossible to increase economies of scale, produce and sell many types of new crop or cope with primitive transportation links. This contributes to price fluctuations as farmers are often forced to sell the perishable products at a loss or throw them away. This lack of packing, storage and grading facilities also discourages diversification into higher value but more perishable crops, as mentioned above.

While storage and packing facilities are currently very limited in the region, some larger investors are in the process of building new packing houses. These facilities could be very beneficial to large and small farmers if the new packing houses can be used as part of a larger plan to strengthen the market chain for organic vegetables.

- While no end-users were interviewed as part of this survey, experience in Vientiane shows that there is substantial demand for new types of vegetables, including organic vegetables. This demand also seems to exist outside of Lao PDR, and the lack of contact with end users is a major constraint that could be improved using a PMCA approach along with targeted marketing interventions such as study tours and trade fairs.
Possible options for developing organic vegetable trade on Bolaven Plateau

Based on the findings of the study team, three options could be considered with different requirements for project resources. They are briefly outlined in the following sections. Due to the limited financial and human resources of the project, only interventions that give the highest return on time and money invested should be take place.

Organic farmer group development and training

Formation of farmer groups and training farmers about organic production is a core function of the project, and this is normally the first step the project will take. In the past, this activity was usually delivered directly by the project, but this may not be possible during Phase II due to the large number of farmer groups and widely separated production regions. The most important topics covered by PROFIL training include compost making, use of bio-control agents, and production of locally sourced bio-pesticides. Extensive training on general organic management will also be needed to teach farmers about cultural practices such as crop rotations, companion planting, use of nitrogen fixing crops and other topics.

ICS and farmer group formation will also need to start early in the project if farmers are going to achieve certification by the end of Phase II. The most important activities will include formation and registration of farmer groups and assisting the groups to set up revolving funds. The farmer groups will need to be trained about organic agriculture systems and introduced to organic standards and certification. When the groups are functioning and have a basic understanding of organic production, ICS units will need to be set up, trained and supported.

Develop organic input value chain to serve large and small farmers

One of the advantages of organic farming is that many inputs can be sourced on-farm, especially for small scale producers. While cultural techniques and physical control of pests will be important, the larger scale and higher quality requirements of commercial vegetable production will require some outside inputs to control pests and maintain fertility. As a result, it will be very important to develop value chains for organic inputs needed by large and small scale farmers. PROFIL should encourage efficient (private sector) input value chain.

Organic pest control will be critical for the success of the organic vegetable industry, particularly if existing vegetable production is changed from conventional production to organic production. The bio-control agent *B. thurgensis* could displace chemicals used to control caterpillars on cabbage and Chinese cabbage, and sales of this product would open the path for other bio-control agents (*Beauveria bassiana*, *B. subtilis*) that can be used on cabbage or on other vegetable crops farmers choose to grow. Other effective pest control techniques such as plant extracts should also be introduced.

Fertility will also be important for new organic farms, especially for crops with high nitrogen requirements such as cabbage and Chinese cabbage, leaf vegetables, tomatoes, broccoli, cauliflower, potatoes or peppers. Rotations with nitrogen fixing crops and use of manure available on-farm should provide some of the fertility required, but these options will likely be constrained by the difficulty in obtaining enough manure (most animals are allowed to roam free and only penned at night) and the reluctance of Lao farmers to use green manure crops. Rice straw is not available on farm for composting, as rice is not easily grown at this elevation. This combination of factors means that many farmers will want to purchase organic fertility amendments.

Cow manure is available in the area, but it is expensive and supplies are limited due to competition with coffee plantations. To deal with this problem, PROFIL will need to research
and develop links with external sources of organic nutrients. Potential sources include guano (available from undeveloped deposits in nearby provinces but with an unknown nutrient profile), purchasing compost from other areas, or buying commercially prepared bio-fertilizers from neighbouring countries.

**Link organic vegetable value chains in “Pakse-Luang Prabang Corridor”**

This option would help farmers, small traders and local companies work together to develop the domestic market for organic products. Trade between major producing and consumption areas will increase the variety, reliability and supply of many organic products. These improvements should ensure the rapid growth of the Lao organic market by meeting consumer demand that is currently unmet. This approach will also give value chain members an opportunity to learn about the organic vegetable industry in a relatively sheltered environment before they start to compete internationally.

One option with good potential is to link farmers and farmer groups directly to traders in other markets by public transportation. This option allows producers to access distant markets and develop relationships with new customers, while limiting the number of middlemen. As volume expands over time, these links could develop into more formal trading links using private transportation.

New wholesale markets being created in and around Paksong may be a good place to collect and ship organic products (although it may be difficult to avoid mixing with conventional products.) If they are successful, these markets will be both an opportunity and a threat to organic vegetable production, as they are may be a useful sales venue, but they may also lure farmers away from organic production and complicate traceability.

As the project progresses, traders and local companies may also become more involved in improved packing, grading and storage for the local market. In most cases improved packing handling and storage should start with simple, low cost practices that reduce spoilage, protect products in transport and appeal to Lao consumers. This process will also be a valuable learning experience for companies that plan to export in the future.

Developing the local market has many benefits, including fewer regulatory issues (i.e. border and SPS issues), lower quality standards and developing experience dealing in trading vegetables over long distances. Lao trade channels and consumers require small quantities of products, which will be easy to supply at early stages of development. The informal nature of the Lao organic market (and Lao retail generally) should make it easier to deal with inconsistent quality and quantities and the lack of modern standards required by most foreign markets. Balancing these benefits are some drawbacks: Laos is small market with poor transportation links and few opportunities to develop economies of scale. As the local market grows, this may also attract increased competition from Thai and other imports. Despite these risks, local market development appears to be an important starting point.

**Promote exports by facilitating operations of foreign and domestic companies**

Export sale of organic products is one of the goals of PROFIL Phase 2, and organic vegetables have been identified as an appropriate crop for poor farmers with limited amounts of land. Exports of organic vegetables have much higher requirements for packing, grading, shipping, certification and reliability of supply. Export contracts also require economies of scale, the ability to communicate effectively with foreign customers and a high level of coordination. These difficult requirements make it necessary for PROFIL to engage with local and foreign companies interested in developing export markets for organic vegetables, despite the risk that the exporters will become monopolistic buyers.
PROFIL’s involvement in export value chains for organic vegetables should start by identifying appropriate partner companies who are interested in organic agriculture. These companies must be willing to engage with small, poor farmers, and should have experience coordinating and consolidating the production for export. For companies that do not already have links with small farmers, PROFIL will also need to facilitate connections between small producers and these companies.

Many companies will require training about organic production, modern packing, grading and shipping and management of organic traceability systems. PROFIL will need to locate suitable experts to deliver this training service, possibly from outside of Lao PDR.

As export oriented companies and the associated farmers become increasingly experienced with organic production, market research will be needed to find new products for export. Semi-perishable vegetables such as beets, potatoes, or onions should be considered for remote villages with poor infrastructure, while villages closer to main roads or refrigerated packing houses could consider producing perishable vegetables for the Thai or Vietnamese markets.

**Develop consumer oriented farmers’ market to serve local consumers (Pakse)**

One of the more successful aspects of the first phase of PROFIL was the creation of a weekly organic farmers market in Vientiane. This market gives farmers an opportunity to sell their products directly to consumers, and to learn what consumers want to buy. Holding a public market can also be a good way of increasing consumer awareness and making organic products available to less affluent consumers.

A successful market must be well located, have suitable facilities (tents, electricity, water and washrooms) and be well promoted. While the direct marketing model has worked well in Vientiane, it is less appropriate in Pakse where the market is smaller, where PROFIL does not have a permanent presence and where farmers are located much further from consumers. A market would require a substantial investment of financial and human resources, all of which could give bigger returns if they were invested in other activities.

Later in the project, it may be possible to create a farmers’ market in Pakse, especially if PROFIL can identify an NGO, individual or private company to operate it. If a market is created, a clear, well conceived business plan will be needed to ensure it is sustainable in the long-term.
Preliminary conclusions for PROFIL

The following conclusions are based on information gathered during the pre-feasibility study and subsequent discussions by PROFIL staff. Suggested options are more detailed for immediate and high priority actions and become progressively less detailed for long-term and low priority actions.

Immediate Action (Late 2008)

Immediate action is needed to select and orient target farmers, traders and other value chain members.

- PROFIL should conduct a workshop in Pakse to report on the findings of this pre-feasibility study. The workshop should also be used as an opportunity to introduce the Participatory Market Chain Approach, to gather additional information about relevant market chains and to build a preliminary plan for project implementation in Champasak and the surrounding region. This workshop should include members from all parts of the value chain, along with a limited number of officials and potential technical service providers.

- A core group of potential organic farmers should be selected based on existing experience with vegetable farming, potential for organic production, proximity to other target farmers/villages and potential contribution to the goals of PROFIL 2. At this stage, farmers will be introduced to the basic concepts of organic farming so they can make an informed decision about whether to work with the project or not. These meetings with farmers will also be used to gather more detailed input into the planning process.

- Potential working partners throughout the market chain should also be invited to join the follow-up planning process. Partners should include input suppliers, small and medium sized traders (farm-gate and others), transportation suppliers, wholesale buyers in Vientiane and Pakse and integrated production/trading companies.

- After value chain partners have agreed to a basic implementation plan, interested institutional partners can be selected to help deliver project activities. These partners may include some value chain actors (i.e. Paksong Import-Export), NGOS and a limited number of provincial and district agriculture officials.

- When farmers, traders, transportation providers and other partners have had time to consider their involvement, a limited group should be selected to grow and trade organic products. This core group should be limited to ensure economic viability and to match PROFIL’s capacity to deliver training and support (especially while the project is training partners in the south about how to work with organics and do training.)

- In some cases, entire villages could be considered where PROFIL works through a private sector or NGO partner such as Paksong Import-Export State Enterprise, or the Biomays organic coffee and vegetable project. In these cases, PROFIL will need to develop detailed plans outlining the roles and responsibilities of the project delivery partners.

The result of these actions is a small group of committed individuals and organizations who understand the costs and benefits of organic farming and marketing, and the working approach of PROFIL. This group will be the starting point for the project, and future project operations will grow from them.

Implementing high priority interventions (2008-2009)
After initial high priority activities have taken place, the project will be able to start working on implementation.

- Additional meetings between value chain partners will need to be organized using the Participatory Market Chain Approach. Multiple meetings will be needed during 2009 and in following years to build understanding and trust between value-chain partners. Because PMCA is a new concept, the first meetings should re-introduce what PMCA is and how it works before dealing with market chain issues.

- Based on the results of value chain meetings, preliminary marketing plan(s) should be developed. This may include plans on how to market transitional organic products produced in the first years of the project.

- A training plan should be developed to guide the training process. The training plan should describe who will be trained, how the training and extension system will work, training topics and a proposed training schedule. The plan should describe how PROFIL can train people through outside service providers from NGOS (Biomays, SAEDA) government (DAFEO) and the private sector (Pakson Import-Export) partners.

- When the training plan is complete, PROFIL should facilitate its implementation. Over the first year, PROFIL or (a service provider such as SAEDA) will need to train local service providers (such as DAFEO or another NGO) how to teach farmers about organic agriculture. PROFIL will also need procedures for monitoring and reporting training activities to ensure they are effectively delivered and to identify new training priorities and techniques.

- After training has taken place, farmers will start producing limited quantities of organic vegetables, so first steps should be taken to develop value chains in the domestic market. This includes shipping organic products to the Weekend Market in Vientiane and connecting Pakson producers to PROFIL’s existing value chain partners in Vientiane through public transportation (buses) and small traders in Pakse and Vientiane. PROFIL’s value chain officer will need to facilitate these relationships and provide backup support as required.

- As production begins, organic inputs will also be needed. Small scale “pilot” production early in the project should be able to depend on local resources (compost, manure) to maintain fertility, but pest control supplies such as Baccilus thurgensis and Beauveria bassiana or botanical pesticides will be urgently needed. An assessment of on-farm input availability and requirements for both fertility management and pest control should take place. This information should be used to help develop appropriate supply chains with interested parties.

- The process of ICS development and farmer certification will also need to begin, in anticipation of export demand. ICS and certification services should be facilitated by PROFIL but should be delivered by the ICS support unit and LCB in an increasingly independent way, and with an optimal level of cost recovery.

**Medium priority interventions and later steps (2010-11)**

- Over time, production of organic vegetables will grow as farmers become more comfortable with production techniques and gain confidence. Increased output will make it necessary to develop additional value chain connections in major domestic cities and markets with high potential such as Luang Prabang, Vang Vieng and Pakse, and for new types of markets in Vientiane (restaurants, hotels, packaged products etc.)

- Lessons learned from domestic trading of organic vegetables should be applied to the development of organic products for export. Organic exports will require
certification, along with improved packing, handling, storage, logistics and marketing. The PROFIL value chain officer and certification officer will need to work together closely to ensure that successful exports can take place.

- As organic production increases, crop diversity and rotation will become more important for agronomic reasons and to increase market opportunities. Crop diversification should be market led, although production of leguminous crops will be particularly interesting. Diversification will require technical support and investment, so service providers should be used and revolving funds should be set up with adequate capital. Possible service providers include the Paksong Lao-Chinese Research Farm, Paksong Import-Export and Biomays Consultants. Whenever possible, this process should use Participatory Technology Development methods to disseminate information about new crops and cultural techniques.

- As certified organic products for export become available, marketing will become increasingly important. Initially, marketing efforts should concentrate on the near-by cities of Bangkok and Ho Chi Minh City that can easily be reached from Laos. Other potential markets in the region include Malaysia, Singapore, Taiwan and China.

**Lower priority interventions and long term activities (as time and resources permit)**

- Developing additional domestic value chain connections in Savannakhet, Thakhek and other cities on the Route 13 corridor could provide new local markets if consumer demand exists. These markets could be easily served by trucks moving organic products in between major urban centers in Laos, but their small size and distance from PROFIL’s main project areas would make them difficult to work with.

- Developing a local organic farmers market in Pakse could provide a local market and a forum for increasing consumer awareness about organic foods. This activity should take place if an appropriate independent operator is available and interested to run it as a self sustaining business.

- Marketing activities in international markets outside of the region could help grow the market for organic vegetables in Lao PDR. While these markets can offer attractive prices, they are also very difficult to service and quality requirements can be very high. PROFIL could consider marketing efforts in Japan, Korea, the United States or Europe if Lao exporters can develop sufficient skills to serve these markets or if skilled foreign investors can be attracted to invest in organic vegetable production.
## Annexes

### Annex 1: Agenda of the mission

<table>
<thead>
<tr>
<th>Date</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/06/2008</td>
<td>Introduction of mission and planning with Mr. Suphong Sibounyo, Director, Champasak PAFO</td>
</tr>
</tbody>
</table>
| 26/06/2008 | Visit to Pak song Import-Export State Enterprise, Pak song  
Visit Thaniyama Siam Company okra farm and packing plant, That Eng district, Sekong Province |
| 27/06/2008 | Discussion of study mission with Pak song District Agriculture, Forestry and Extension Office, Pak song  
Visit to Lao-China Research Station, Pak song District                                         |
| 28/06/2008 | Visit to fruit tree production station, Bachieng District, Champasak province                        |
| 29/06/2008 | Day Off                                                                                              |
| 30/06/2008 | Meeting with farmer group in Kongtun Village, Pak song District  
Meeting with organic coffee and vegetable producers in Katuat Village, Pak song District       |
| 01/07/2008 | Meeting with Thongsett Village farmer group, Pak song District  
Meeting with small producers and road-side retailers, Bachieng District                           |
| 02/07/2008 | Meetings with small traders at Pak song wholesale vegetable market  
Interviews with wholesale vegetable traders, Pakse market and bus station                        |
Annex 2: List of contacts

Mr. Thavane, Director of Paksong District Agriculture, Forestry and Extension Office, Paksong, Champasak Province

Mr. Suphany Sibounyou, Director of Champasak Provincial Agriculture and Forestry Office, Pakse, Champasak Province, tel: 031 212 259

Mr. Thongchan, Administrator, Champasak Provincial Agriculture and Forestry Office, Pakse, Champasak Province, tel: 031 212 259

Mr. Kham Phong, Head of Agriculture Section, Champasak Provincial Agriculture and Forestry Office, Pakse, Champasak Province, mob: 020 563 1408

Mr. Khamkeath, Plant Quarantine Officer, Champasak Provincial Agriculture and Forestry Office, Pakse, Champasak Province, mob: 020 564 7082

Mr. Bounhom Bebsivi, Head of Paksong District Agriculture Forestry and Extension Office, Paksong, Champasak Province

Ms. Ae, Vegetable wholesaler, Paksong market, mob: 020 543 1923

Ms. Dam, Vegetable wholesaler, Paksong market, mob: 020 583 6135

Mrs. Tick, Vegetable wholesaler, Pakse market, mob: 020 535 3870

Ms Phim, Vegetable wholesaler, Pakse market, mob: 020 573 9113

Mr. Gong Kham, Head of Sixiengngaam Fruit Farmers’ Group, Sixiengngaam Village, Bachieng District, Champasak Province

Mr. Phoukeo Wansii and Mr. Khamphoui Bonsaphan, Champasak Provincial Fruit Tree Propagation Farm, Bachieng District, Champasak Province

Ms. Impeng, Paksong Import-Export State Enterprise Inc., Paksong, Champasak Province

Ms. Tang, Lao-China Research Farm, Paksong District, Champasak Province, mob: 020 693 8988, tel: 030 534 580

Mr. Bounsouan, Nai Ban, Kongtoum village, Paksong District, Champasak Province.

Mr. Khamxay Phathamavong, Nai Ban, Thongsett village, Paksong District, Champasak Province
## Annex 3: Analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT-Analysis)

<table>
<thead>
<tr>
<th><strong>Strengths</strong></th>
<th><strong>Opportunities</strong></th>
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<tbody>
<tr>
<td>Good agro-climatic conditions for many vegetables</td>
<td>Potential for many new crops</td>
</tr>
<tr>
<td>Established vegetable trade in area</td>
<td>Provincial and District officials can contribute to extension and training</td>
</tr>
<tr>
<td>Relatively easy to convert existing production to organic</td>
<td>Synergies with organic coffee production (and other projects)</td>
</tr>
<tr>
<td>Synergies with organic coffee production (and other projects)</td>
<td>Farmer-farmer training and exchanges possible with Vientiane farmers</td>
</tr>
<tr>
<td>Farmers are experienced with vegetable growing</td>
<td>Suitable organic techniques available to control many</td>
</tr>
<tr>
<td>Boloven production complements production from existing project areas</td>
<td>Conversion of conventional farms in</td>
</tr>
<tr>
<td>Close to large markets in Thailand, Cambodia and Vietnam</td>
<td>Connect Champasak production to Vientiane markets (and beyond)</td>
</tr>
<tr>
<td>Farmers willing to convert to organic</td>
<td>Certification can improve access to export markets</td>
</tr>
<tr>
<td>Have PAFO and DAFO contribute to project activities</td>
<td>Expand production area</td>
</tr>
<tr>
<td>Connect farmers and local companies (Paksong I-E State)</td>
<td>Can grow new types of vegetables (or other crops) to diversify</td>
</tr>
<tr>
<td>Can work with Small-holder Development Project</td>
<td>Expand sales in Thailand, Cambodia and Vietnam</td>
</tr>
</tbody>
</table>

Vegetable research station operating in the area

Paksong Import-Export State Enterprise is key partner

PAFO and DAFO supportive and involved in vegetable sector

Large amount of land available
<table>
<thead>
<tr>
<th><strong>Weaknesses</strong></th>
<th><strong>Threats</strong></th>
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<tbody>
<tr>
<td>Farmers use primitive techniques which may be difficult to change</td>
<td>Contracts for vegetables unenforceable</td>
</tr>
<tr>
<td>Coffee expansion taking over land base and may displace vegetables</td>
<td>Large bauxite mining project may remove much land from production</td>
</tr>
<tr>
<td>Much land inappropriate for mechanical land preparation (non slash and burn)</td>
<td>Diversification into new types of conventional vegetable may be more attractive</td>
</tr>
<tr>
<td>May be impossible to identify appropriate traders interested in organic</td>
<td></td>
</tr>
<tr>
<td>No organic input supply chain operating</td>
<td>Overproduction for limited organic market could cause prices to collapse</td>
</tr>
<tr>
<td>Lack of diversity in vegetable production</td>
<td>May be too much paperwork to produce and ship organic products</td>
</tr>
<tr>
<td>No organic vegetable value chains operating yet</td>
<td>Cost of transportation could increase or be too high to access markets</td>
</tr>
<tr>
<td>Lack of cold-chain for perishable vegetables</td>
<td>Expanding production could cause deforestation</td>
</tr>
<tr>
<td>No central collection point yet</td>
<td>May be too difficult to work with other projects</td>
</tr>
<tr>
<td>Farmer groups not strong or not functioning</td>
<td>Expanding production could cause deforestation</td>
</tr>
<tr>
<td>Farmers do not understand organic agriculture (standards, ICS etc.)</td>
<td>Could be too difficult to work with other projects</td>
</tr>
<tr>
<td>Supply and demand imbalance makes price fluctuate</td>
<td>May be impossible to build trust (between farmer-trader-consumer)</td>
</tr>
<tr>
<td>Farmers not able to plan production</td>
<td>Difficulty to change mindset of farmers</td>
</tr>
<tr>
<td>Transportation to market can be expensive</td>
<td>Coffee may use supplies of organic inputs (manure)</td>
</tr>
</tbody>
</table>
Annex 4: Diagram of Existing Value Chains for Vegetable Trade in Boloven Plateau Area
Annex 5: Potential Value Chains for Domestic Trade
Annex 6: Potential Value Chains for Export Trade
Annex 7: Typical Calendar of Agricultural Activities for Boloven Farmers