Integrated Value Chain Analysis of Selected Strategic Sectors in Lao People's Democratic Republic

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1 Executive Summary

1.1 Sector Specific Findings

Five sectors were analyzed for this report. All five sectors have potential for growth, both within the domestic and global markets, but all of them are hindered from doing so as a result of a number of policy and market based distortions. A detailed summary of key barriers to competitiveness for each sector is provided in the beginning of each sector section of the report. Chart 1 below provides an abbreviated version of key distortions that emerge from the existing institutional, governance, and human resource setup, as per sector specific findings that emerge from the value chain analyses. Chart 2 provides a summary of key market based barriers and their impact on competitiveness of sectors analyzed.

Chart 1: Summary of Key Distortions in Rice, Coffee, Maize and Livestock	
Rice	• Lack of promotion, usage, and knowledge of non-glutinous rice varieties. Poor farm management skills, especially insofar as fertilizer management and application is concerned, exacerbated by absence of or weak extension services • Poor physical infrastructure, especially in terms of access roads in the uplands, as well as lack of planning and government assistance to farmers during drought and flood periods lead to considerable losses of marketable production • Lack of regulatory framework and enforcement of contracts • Significant rice milling inefficiencies that destroy value, especially related to yields of exportable unbroken head rice
Coffee	• Absence of grading system, standards and certification that potentially discourages production of quality coffee • Poor physical infrastructure limit access to agricultural inputs • High inland transportation and logistics increase cost of transporting coffee from farm to processing location • Poor productivity of smallholder farmers and processors, coupled with the lack of institutional support, all lead to poor indicators in critical areas such as pest management at farm level and high cost structure at processing level • Loss of crop and revenue stemming from poor post-harvest handling techniques, limited skills of extension workers, and other relatively poor on-farm production techniques
Maize	• Local seed varieties are not used optimally due to lack of promotion and awareness. Poor regulatory framework further weakens availability of trusted seed varieties, thus perpetuating reliance on less productive retained hybrids • Generally poor on farm management, especially in terms of poor knowledge about multiple or intercropping technique, as well about cropping options and conservation • Weak associations among farmers that reflects in failure to minimize high post harvest grain losses through creation of communal storage sheds • Excessive government interventions in market transactions • High soil erosion and increasingly dangerous landslides

Livestock	• Lack of genetic improvement support programs for the cattle industry • No cattle feed industry, with inefficiencies in the maize sector rippling through the cost of local feed • Poor disease control and response capabilities of government institutions • Poor farm management skills exacerbated by extremely poor extension service provision • High interest rates hamper the development of a nascent hog industry
Wood/Furniture	• Excessive corruption at customs clearing points and all along the documentation clearing process in the local government • A quota allocation system that is depriving the secondary processing plants from predictable and affordable supply of raw materials • Transit transportation through Thailand burdensome and discriminatory in pricing

Chart 2: Summary of Key Market Based Distortions in Rice, Coffee, Maize and Livestock	
Rice	• World markets are dominated by the non-glutinous rice, which is a segment least produced in Lao • Inefficiencies in access to finance trickle down the value chain, from farmers' use of high cost financing through brokers, most notably rice mills. • Absence of efficient market distribution channel for accessing agricultural inputs, particularly seeds • Absence of a contract mechanism to help bind relationship between farmers and their investors/sponsors • Rice milling efficiencies are low, perpetuated by in-kind milling contracts that create incentives for millers to seek higher bran yields rather than polished rice, resulting in high rate of cracked rice. • Poor road access in uplands leads to marketable surplus losses by upland farmers • Higher wages in lowlands create labor shortage in uplands during harvesting • Low price of rice
Coffee	• No access to information about variety selection • No formal and transparent means of access to finance drive farmers to use high cost financing through brokers • Absence of efficient market distribution channel for accessing agricultural inputs • Lack of market information to allow farmers to improve price discovery process and negotiation leverage with brokers and other buyers • Lack of market information about market trends and consumer preferences • Absence of a code of conduct among players in the sector to limit pirate purchasing • High cost of transporting
Maize	• Poor access to information about seed variety selection • Poor access to appropriate seed varieties • Untimely access to finance through APB drive farmers to use high cost financing through brokers • Absence of efficient market distribution channel for accessing agricultural inputs, particularly seeds • High cost of tractor hire due to high cost of fuel • Absence of a transparent market transaction mechanism for farmers to trade maize • Lack of market information to allow farmers to improve price discovery and negotiation leverage with brokers and other buyers

	• Absence of a contract mechanism to help bind relationship between farmers and their investors/sponsors • Absence of a code of conduct among players in the sector to limit pirate purchasing • No local value added to maize, thus foregoing local capital retention by at least a factor of three • High cost of transporting
Livestock	• No local cattle feed industry • Growth of hog industry hampered by high interest rates of state-run banks • Emergence of private-sector driven feed industry discouraged by monopolistic state-owned feed enterprises • Soybean imports from Thailand display a high margin variation • Local feed supplies uncompetitive vis-à-vis Thai imports
Wood Furniture	• Weak design capabilities and poor technological base • Poor technical skills • Lead times, crucially important in international markets, hampered by red-tape and inefficient export clearing procedures
Source: Global Development Solutions, LLC	

1.2 Cross-Cutting Issues

The IVCA identified a wide range of issues that hinder the competitiveness of a number of strategic sectors. Some issues identified by the analyses are sector specific and some issues are cross-cutting. Five cross-cutting issues emerge from the analysis and they are:

- Poor on-farm management;
- Poor physical infrastructure, especially in the upland and peripheral rural areas;
- Suboptimal farming in terms of crop variety/animal breed used;
- Inability to respond to/contain high risks of floods and drought;
- Absence or weak delivery of support services.

The IVCA found that there was one key private sector response to the cross-cutting issues highlighted above, which resulted in a wide range of outcomes that impacted the competitiveness of the five sectors analyzed. This single most important outcome was the existence of generally underinvested industries in all five sectors analyzed. The drivers of this underinvestment are many, and in some cases are sector-specific, as highlighted in the IVCA. But, by and large, the five cross cutting issues could be considered as the primary cause of underinvestment in all sectors analyzed, especially since the private sector stakeholders do not operate in a vacuum, and therefore issues that cut across not only their specific industry but also prevail in all sectors are perceived as major indicators for their investment horizons. It is therefore anticipated that by addressing the impediments that arise in the five cross cutting issues, the GOL would give a major boost to the development of the private sector along the lines of investment, followed by acquisition of expertise and access to international markets. The following chart provides a summary of the cross-cutting issues, the private sector response to these issues, and the outcome and their impact on competitiveness.

Chart 3: Cross Cutting Issues and Its Impact on Competitiveness

Cross Cutting Issues	Private Sector Response	Outcome/Impact on Competitiveness
Poor on-farm management • Lack of knowledge about fertilizer use or no fertilizer use at all • Poor pest/disease management skills • Poor farming techniques	**Under Investment in Sector Activities Leads to Major Gaps in:** • Investment/Acquisition of technology • Training and skills development • Access to and the use of information and market technology • Market and production integration • Development of local sourcing options (high reliance on access to Thai inputs, which reduces the diversification options of local buyers) • Development of experimental plots that would show benefits of use of improved varieties versus retained hybrids • Investments that create room for creation of linkages along the supply chain – existence of very few industrial players in any of the sectors makes it very difficult to pursue supply chain integration	• Inability to create a foothold in the international market in other than raw, unprocessed produce • Significant crop losses to drought and floods • Low value added production • Inferior yields in all areas, compared to regional competitors • Use of redundant and antiquated equipment • Limited ability to exploit opportunities in the international market due to suboptimal varietal choices • Very little knowledge about international market access
Poor Physical Infrastructure • High cost of accessing markets in upland and peripheral rural areas due to poor feeder roads • Poor access to water and lack of irrigation, critically increasing risks of crop/animal failure in areas outside the provincial centers		
Suboptimal seed/breed variety selection • With the exception of hog farming, where imported high-quality breeds are affordable and accessible, all other farmers used suboptimal seeds/breeds • Seed/breed selection driven by subsistence nature of farming that aims and minimizing risk of crop failure rather than profit driven goal of maximizing crop yields and profitability • Risk of crop failure already challenges by high frequency of drought incidence, significantly tilting the balance towards use of 'proven' yet suboptimal varieties		
High Risks of Floods and Droughts Left Unaddressed • Poor irrigation infrastructure • Lack of government involvement and support of projects aimed at containing flood risks • Crop loss		
Absence or Weak Delivery of Support Services • Weak technical and market support services • Poor access to financing • Poor availability of pest management/disease control extension support		

Source: Global Development Solutions, LLC

2 Introduction – The Enabling Environment in Lao PDR

Following examples from China in late 1970s and Vietnam in early 1980s, the Government of Lao PDR (GOL) committed itself to pro-market reforms under the structural New Economic Mechanism (NEM) policies in mid 1980s. The strategic objective of these policies was and remains shifting of resource allocation in the economy away from Government and towards market mechanisms, with increased reliance in international trade and foreign investment. Some so-called 'strategic sectors', most notably timber, still remain tightly controlled by GOL, but by and large, market liberalization and increased reliance on private sector for economic growth is the hallmark of the current economic structure in Lao.

The strategic shift by the GOL towards development of a market economy has resulted in an environment that is, in general, enabling private sector growth to take root. The degree of success in creating a functioning enabling environment is far from perfect, and can be characterized as work in progress. Nevertheless, in comparison with the pre-reform period, the private sector has significant room for engaging in wealth creation, as government-run monopolies have been largely dismantled (be it in terms of producing or marketing products). Furthermore, other measures such as private ownership with defined and protected property rights, privatization of state-owned enterprises, as well as opening up of the country to international trade and foreign investment, have all contributed to increased opportunities for the private sector.

Notwithstanding general improvements in the enabling environment in the country, however, the main challenge in Lao is how to translate benefits and opportunities that result from increased global trade and investment to the rural, poor farming communities. Stated in its most simple form, benefits from engaging in any form of production comes from the ability to use land, labor and capital in a manner that yields positive returns over time. Laotian farmers' potential to benefit from global trade hinges on their ability to be competitive with the existing endowments of land, labor, and capital. This competitiveness does indeed take many forms in the chain of value addition, most notably in the shape of labor productivity, yields, quality, as well as other aspects that, when combined, determine the ability of countries and their respective producers to compete on a global scale.

It is in this context of identifying key competitiveness bottlenecks along the value chain of agricultural production in Lao that this analysis in concerned with. These bottlenecks may represent issues related to markets, policy, management skills, as well as a range of other issues. Whatever their source(s), removal of impeding constraints in the five agricultural sectors analyzed (Coffee, Livestock, Maize, Rice, and Wood) could yield significant benefits to poverty alleviation in Lao, considering that 8 out of 10 people in the country live in poor, rural-based communities.

3 Sector Analysis – Rice

3.1 Summary of Findings

3.1.1 Barriers to Competitiveness

The matrix below provides a summary of key findings that impede the competitiveness of the rice sector in Lao.

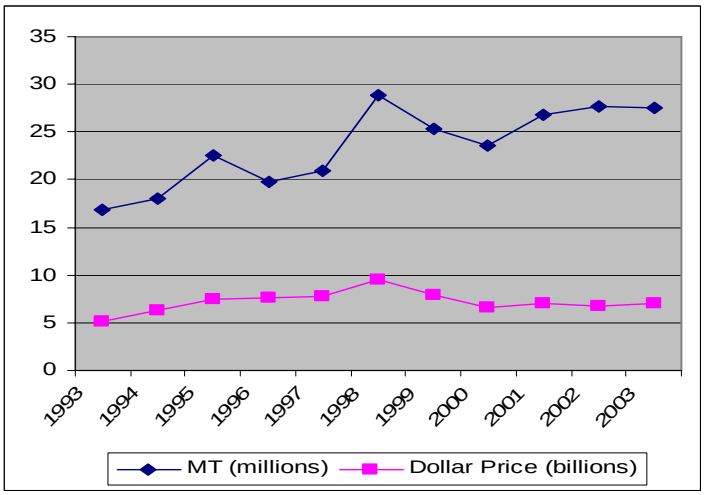
Chart 4: Summary of Key Barriers to Competitiveness in the Rice Sector in Lao
1.0 Market Constraints 1.1 Poor knowledge, availability, and promotion of non-glutinous varieties by the research and development community 1.2 Low usage rate of improved glutinous seed varieties 1.3 Inefficiencies in access to finance trickle down the value chain, from farmers' use of high cost financing through brokers, most notably rice mills. 1.4 Absence of efficient market distribution channel for accessing agricultural inputs, particularly seeds 1.5 Absence of a contract mechanism to help bind relationship between farmers and their investors/sponsors 1.6 Rice milling efficiencies are low, perpetuated by in-kind milling contracts that create incentives for millers to seek higher bran yields rather than polished rice, resulting in high rate of cracked rice. 1.7 Poor road access in uplands leads to marketable surplus losses by upland farmers 1.8 Higher wages in lowlands create labor shortage in uplands during harvesting 1.9 Low price of rice
2.0 Governance 2.1 Lack of promotion for the use of non-glutinous seed varieties 2.2 No flood management programs to limit crops loss, despite farmer initiatives at local level which are left unsupported 2.3 Lack of regulatory framework and enforcement of contracts 2.4 Marketing of rice still dominated by state run organizations such as SEFCP
3.0 Institutional 3.1 Absence of or weak extension services, particularly for farm management in terms of potassium applications and nitrogen splitting techniques 3.2 Lack of access to farming techniques, particularly for rural farming communities 3.3 Continuous threats from floods and droughts largely left unaddressed 3.4 Moisture content of rice measurement is left at the discretion of rice millers due to lack of metrological services
4.0 Human Resources 4.1 Little knowledge about farm management
Source: Global Development Solutions, LLC

3.1.2 Key Market Drivers

World rice markets are characterized by high volatility. Rice price volatility at the global level is driven by the fact that rice production is highly concentrated in Asia (over 90% of world production). Any supply shock there, such as weather or other factors, sets the pace for global rice trade. In addition, since rice is the staple food in much of the Asian

continent, it is a very 'political' commodity in the sense that excessive government policy interventions to stabilize prices (most of the time on the low end) have become common, which makes international rice prices very unstable (see Figure 1).[1] According to the FAO's June forecast for rice markets, global paddy production in the current 2005 season could increase by 2.7 percent to 621 million tons, or 16 million tons more than in 2004, as most countries are expected to react to the rise in prices witnessed in 2004 by expanding cultivation. Improved expectations for production come from Brazil, India, Myanmar, Nigeria, and Thailand.

Figure 1: Relationship between Export Quantity and Dollar Value of Rice Exports



Source: FAO

Asia is expected to be the generator of much of the expansion foreseen in 2005. China has recently started cultivating genetically modified rice on a commercial basis. If the Government of China formally authorizes the release of genetically modified rice, it would set an important precedent in the country with ramification in the wider region and globally. FAO has slightly lowered its forecast for rice trade in 2005 to 25.5 million tons, approximately 3% percent less than in 2004. This would be a third consecutive contraction from 2002, expected to result from much smaller exports by the world's leading exporter – Thailand, but also by mainland China. Policies of sustaining domestic prices to levels often exceeding those of competing countries are the hallmarks of rice trade policies of these two important rice countries.

Demand side policies, particularly from importing countries, have also influenced the market dynamics for rice. Specifically, in 2004 and 2005, some of the traditional importers succeeded in boosting production, most notably Indonesia, Nigeria, and Brazil. Indonesia had an import ban on rice until June 30 of this year, and extended it until December 31, claiming the country has enough rice to meet domestic needs. The ban is undoubtedly aimed at boosting local rice prices and spurring increased production in order to contain the country's dependence on imported rice. The ban would be reconsidered if local prices of medium-quality rice increase above US$357/MT, or if rice stocks dominated by the state logistics agency decline below 1 million MT. The case of Indonesia, world's leading rice importer, is a typical illustration of some of the most important global market drivers for rice: government intervention coupled with other distortions.

[1] Only 6-7% of rice production in the world is traded.

Another market driver in the global rice markets is the growing number of formal and informal bilateral agreements between major exporting countries. For example, an agreement between Thailand (whose government holds large 'intervention' supplies) and Viet Nam to adopt a common strategy to prevent under-cutting of each other's export prices. How these agreements influence the ability of small producers like Lao to enter the market is difficult to pinpoint with a high degree of confidence. In periods when such arrangements from major countries are basically aimed at maintaining high prices for exported rice, potential exporters from Lao stand to benefit from higher price levels. However, such arrangement can quickly become sour and turn into cut-throat competition with overall reduction in price levels, which will be detrimental to aspiring export countries.

3.1.3 Options for Growth

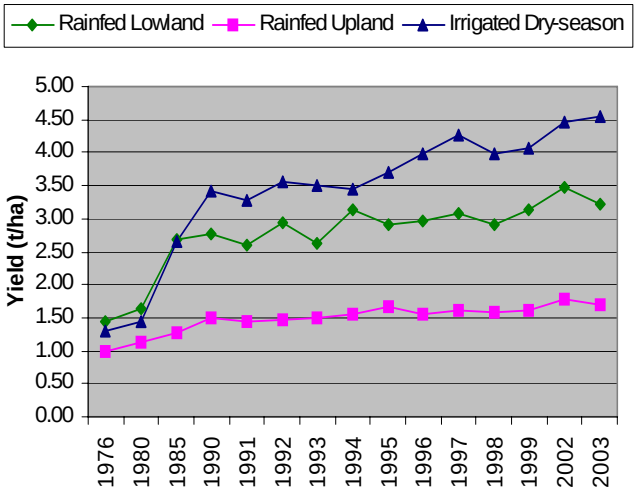
In this overall trade context, it is almost certain that international market trends will influence potential exports of rice from Lao through the mechanism of volatile prices. Readiness and potential of local producers to export may or may not coincide with high price levels globally. In this context, options for growth of the rice sector in Lao are closely related to the ability of the entire value chain from farm-to-mill to storage and distribution of rice to meet the local demand for rice and export the marketable surpluses.

After decades of rice deficits, in 199 Lao reached self-sufficiency in rice for the first time. To a large extent this is due to the rapid spread of new varieties of glutinous rice. Options for growth in the post-deficit periods are basically contingent upon the boldness of priorities and growth agendas of the stakeholders.

One set of options is to not move towards head-on competition with neighboring Thailand and Vietnam, but instead to join in the larger supply chain of inputs and expertise of these giants in terms of rice exports and seek niche markets for making breakthroughs in export markets. Another set of options is to seek more forceful economic liberalization and private-sector led growth on all fronts which could help Lao become a net exporter of rice. After all, neighboring Vietnam was a net importer of rice until fairly recently and yet instead of pursuing piecemeal approach, it pursued a robust reform and restructuring leading it to eventually become the world's second largest exporter of rice.

Considering the fact that Lao is a small economy (in fact, it is the smallest country in the region, in terms of population and economic power), it is very probable that the path of cautious, niche-market oriented growth is a relatively realistic outlook in terms of how the sector's growth will unfold in the near to medium term. Having said this, a bold agenda along the lines of Thai and Vietnamese policies for agriculture, such as relaxation of price controls and provision of market access to farming communities, could make Lao a net exporter of rice over and above just having incremental niche-market strategy. Laotian soil and climate are not inferior to those of its rice-exporting neighbors, and availability of land is abundant. Whatever intensity and market segment orientation rice sector's growth takes, however, it appears that the wet-season lowland rice growing will remain the most important source (rice producing environment) of such a growth for the short the medium term. Even though irrigated rice has shown the biggest increase in terms of yields (see Figure 2 above), lowland rain fed areas remain the driver of growth for rice production in Lao.

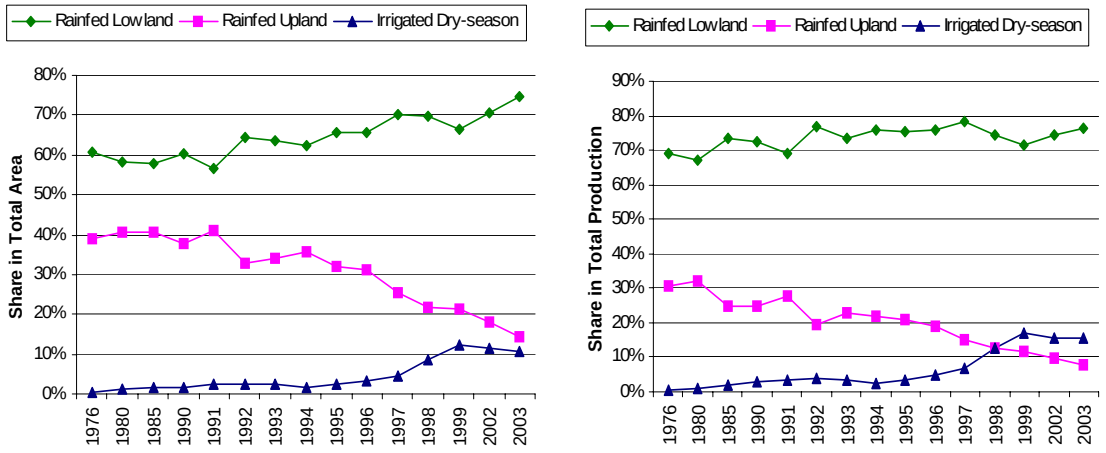
Figure 2: Rice Yields, Lao, 1976-2003



Source: MAAF, Lao PDR

As can be seen from Figure 3 below, despite the substantial increase over the years, starting in 1999, the contribution of irrigated dry-season rice in total rice area and production has given way to lowland rain fed rice, which reached 80% share in the

Figure 3: Rice Ecosystems, by Share in Total Area and Production, Lao, 1976-2003



Source: Compiled by Global Development Solutions, LLC™

country's total rice area and production (756,000 ha and 2.37 million tons respectively in 2003). Nevertheless, the dry-season, irrigated environment has shown tremendous growth over the last 30 years, and may also give a much needed boost to the overall production levels of rice in the country, and thus open up the way for exports of surpluses.

Table 1: Market Segments, Global Rice Trade, 2004	
Type of Rice	**Global Market Share**
Long Grain	76%
Medium and Short Grain	12%
Fragrant (Aromatic)	10%
Specialty rice (including glutinous)	2%

Source: FAO, USDA, Oryza.com

Last but not least, export growth options for Laotian rice cannot be seen outside the context of the global rice market. The rice market is heavily segmented by type and quality, with little substitution among types and qualities by producers or consumers. Over 85% of rice produced in Lao is the glutinous type commonly referred to as sticky rice.[2] This type of rice accounts for less than 2% of the global market share, which is mainly traded in the Mekong belt of northeast Thailand and Lao, and serves the ethnic market in immigrant communities of Laotians and Cambodians abroad, as well as specialty product markets, such as sweets' producers.

Considering the fact that substitution among rice categories in importing countries is virtually non-existent, the options for growth of the Laotian rice exports are in either maximizing the share of specialty rice in the global trade, which currently stand at zero according to official statistics, or shifting cultivation towards other categories with higher market share in global trade.

3.2 Sector Profile

As illustrated in Table 2 below, the five largest rice producing provinces of Lao are the central and southern provinces, which produce over 80% of the country's rice. The highest rain fed rice yields are observed in Vientiane Capital, while the highest irrigated rice yields are observed in Khammuane, and the highest upland rice yields are in Saravane province.

[2] Note that 'glutinous' is slightly misleading in that glutinous rice contains no gluten. The term means 'sticky' or 'gummy'.

Table 2: Rice Production, Five Largest Producing Provinces, Lao, 2002-2003						
Province	**Harvested Area (ha)**		**Production (t)**		**Yield (t/ha)**	
	2002	**2003**	**2002**	**2003**	**2002**	**2003**
Rain fed	117,417	125,520	406,260	376,560	3.46	3.00
Irrigated	19,780	17,900	89,600	77,850	4.53	4.35
Upland	2,385	2,038	3,840	3,057	1.61	1.50
Total	139,582	145,458	499,700	457,467	3.58	3.15
Champasack						
Rain fed	80,115	87,663	248,500	260,970	3.10	2.98
Irrigated	5,200	7,000	22,050	30,050	4.24	4.29
Upland	0	1,436	0	2,154	0.00	1.50
Total	85,315	96,099	270,550	293,174	3.17	3.05
Vientiane Capital						
Rain fed	48,156	52,333	192,600	188,398	4.00	3.60
Irrigated	23,100	23,357	106,500	110,020	4.61	4.71
Upland	0	0	0	0	0.00	0.00
Total	71,256	75,690	299,100	298,418	4.20	3.94
Saravane						
Rain fed	56,300	58,330	185,770	192,489	3.30	3.30
Irrigated	4,850	5,000	20,660	22,400	4.26	4.48
Upland	6,784	7,706	13,910	15,308	2.05	1.99
Total	67,934	71,036	220,280	230,197	3.24	3.24
Khammuane						
Rain fed	42,050	48,989	128,670	153,629	3.06	3.14
Irrigated	9,440	7,800	44,800	44,200	4.75	5.67
Upland	637	603	1,030	678	1.62	1.12
Total	52,127	57,392	174,500	198,707	3.35	3.46
Other						
Rain fed	175,433	192,118	639,400	647,754	3.64	3.37
Irrigated	21,630	20,303	91,390	84,580	4.23	4.17
Upland	124,747	98,216	221,520	165,003	1.78	1.68
Total	321,810	310,637	952,370	897,137	2.96	2.89
Subtotal						
Rain fed	519,471	564,953	1,801,200	1,819,800	3.47	3.22
Irrigated	84,000	81,360	375,000	369,100	4.46	4.54
Upland	134,553	109,999	240,300	186,200	1.79	1.69
Total	**738,024**	**756,312**	**2,416,500**	**2,375,100**	**3.27**	**3.14**

Source: MAAF, Lao, 2004.

According to FAO, the total number of land holdings is about 650,000, on 615,000 (95%) of which rice is grown. Seventy-seven percent of all households in the country, that is, 85% of the total number of rice growers, plant only wet season crop. Fourteen percent of rice growers plant both wet and dry season crop, and only 1% plant dry season crop (see

Figure 4 and Figure 5 below). Any improvement in the economics of rice cultivation, therefore, is expected to make the single greatest impact in the livelihoods of Laotians.

Figure 4: Rice Cropping by Land Types, Lao, 2002

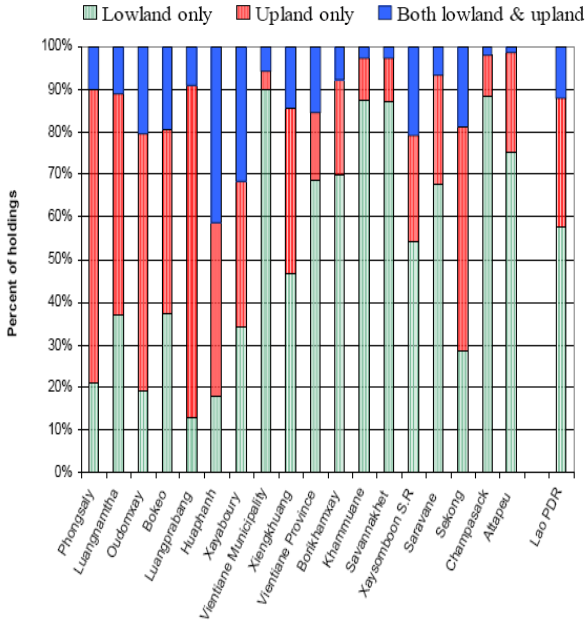
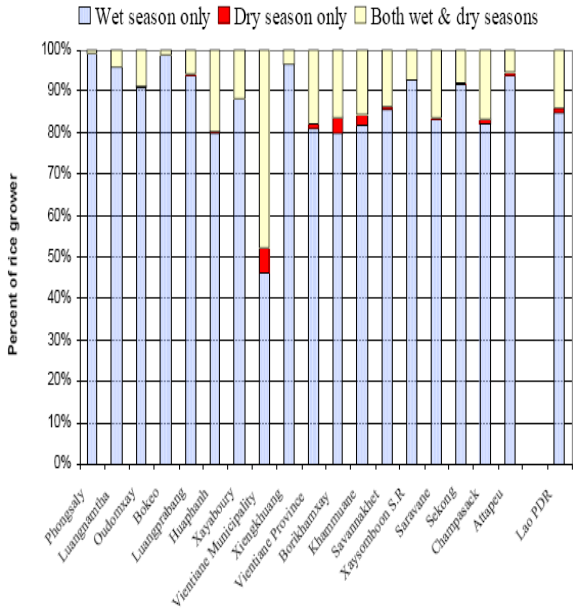


Figure 5: Rice Cropping by Season, Lao, 2002



Source: FAO

3.3 Key Policies and Institutions

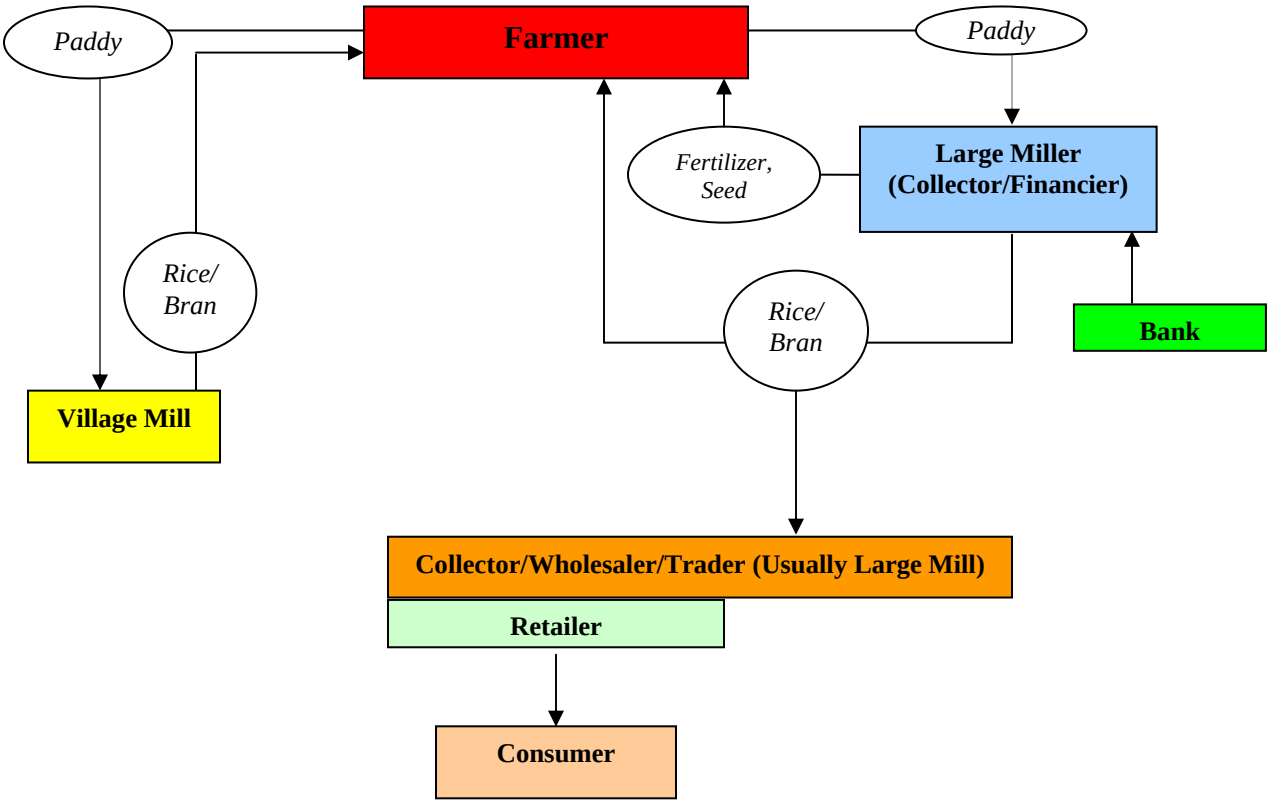
The Lao Government considers rice self-sufficiency as the highest priority with regards to its agricultural policy agenda. Under the Government's support, land area under irrigation has increased. Rice research under the International Rice Research Institute (IRRI) and the National Agriculture and Forestry Research Institute (NAFRI) is relatively extensive. Rice self-sufficiency, a major policy goal of GOL, was almost reached in 2001 when Lao imported less than 5,000 MT of milled rice. Even though imports picked up in 2002 and 2003, hitting nearly 10,000 MT in each of those years, The Government goals of being self sufficient in rice is close at hand. The present and future challenges for expansion of rice production and exports is to extend the lessons learned from increased production to as many farmers as possible, mainly through increasing the use of new high-yielding varieties and improved use fertilizer.

3.3.1 Market structure and the supply chain

A sample supply chain for rice and inputs is provided in Diagram 1 below. The most pertinent features of the rice supply chain are that farmers use small scale village millers (less than 2 tons/day milling capacity) milling the rice for their own consumption, while

large scale millers target farmers with larger land plots and higher marketable surpluses of rice. Large millers (with over 1 ton/hour milling capacity) may or may not supply inputs in the form of fertilizer and seed to farmers, but invariably most of them engage in collection and trading of rice, with varying degrees of intensity.

Diagram 1: Input and Rice Supply Chain, Lao

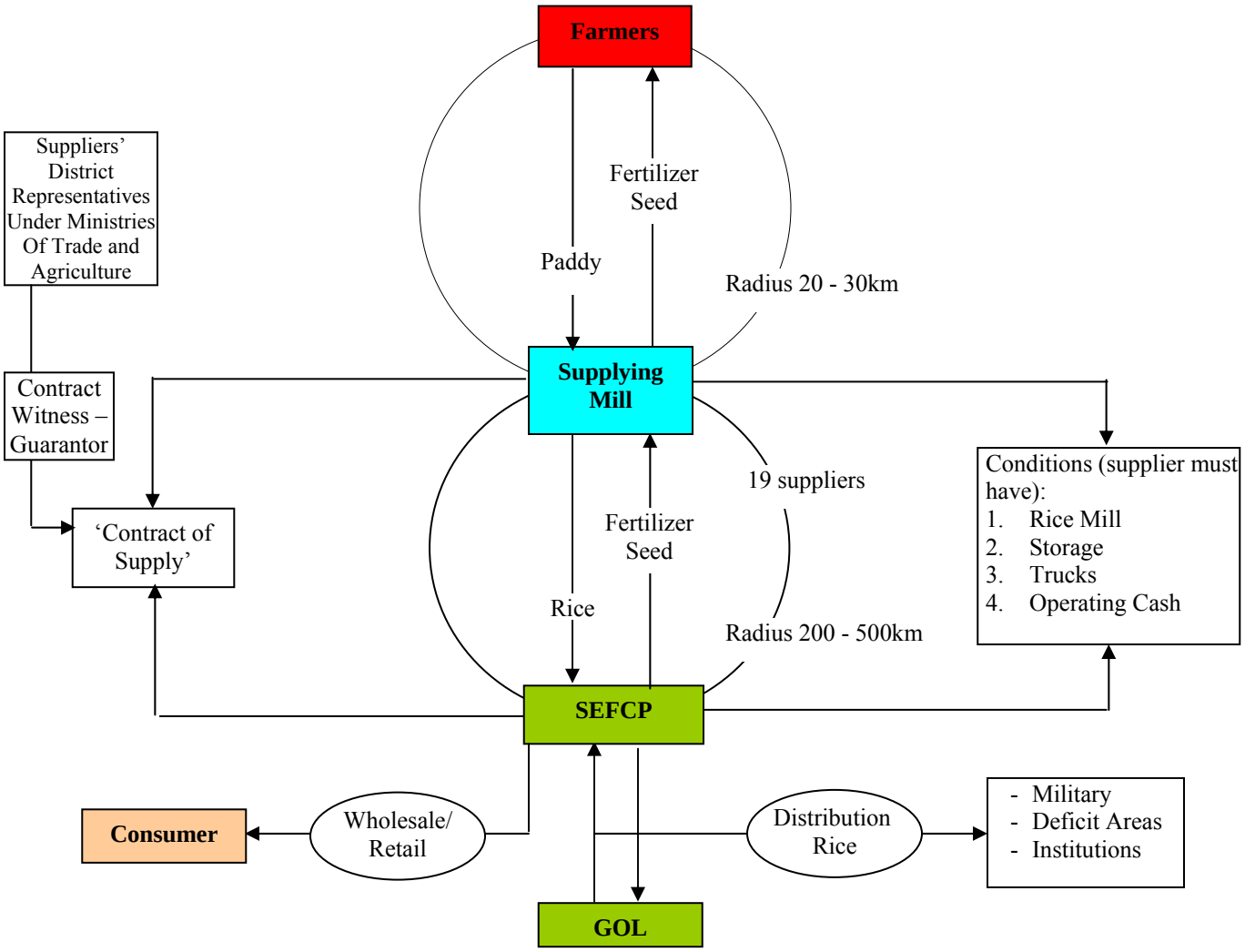


Source: Global Development Solutions, LLC™

The largest supplier of rice in the country is the State Enterprise for Food and Crop Promotion (SEFCP). Diagram 2 below illustrates its supply chain, which has features of an out-grower scheme, but in fact it is a vertically integrated marketing channel. Provision of fertilizer and seed may or may not occur at any point of the supply chain.

Another characteristic of the supply chain is that it operates at low price levels. In the example of SEFCP, with a slight variation from other marketing channels, the price of paddy from farmer to rice mill is in the range of Kip1,050 – 1,100 per kg, as observed in Khammuane and Vientiane, while the mill to final consumer price of rice is in the range of Kip2,400 – 2,600 per kg. With an average paddy to rice conversion rate of 60%, the marketing margin from farm-to-consumer is about 37.14%.

Diagram 2: State Enterprise for Food & Crop Promotion (SEFCP) Rice Supply Chain



Source: Global Development Solutions, LLC™

3.4 Integrated Value Chain Analysis

3.4.1 Product profile

The majority of varieties grown in Lao are glutinous, representing a mix of improved varieties (Thalokhham-1, 2, 3, 4, 5, 6, 7; Gor Kor 6, CR – 203) and traditional ones (Kasikam, etc), with varying duration. In areas where drought risk is significant, short-

duration varieties are grown to minimize the risk of crop loss, and long-duration varieties are grown in lowland areas with lesser drought risk. There are no varieties for (dry-season) irrigated rice, and farmers use rain fed varieties instead. Lowland (generally rain fed) rice production starts in May, and from early June until the first week of July, preparation of nursery (plowing and harrowing) and transplanting takes place. In Khammuane Province, application of fertilizer (organic and inorganic) was seen to be applied frequently to the nursery.

Sowing takes place after harrowing, and seedlings grow for approximately 1 month. Seedlings are then transplanted immediately after the initial 1 month growth period. In upland environments, direct seeding of mounds, previously cleaned by slashing and burning, takes place generally in February - March period, to be followed by three to four months of weeding. By September (in upland environments) and October (in lowland environments), harvesting takes place. Depending on rainfall, the cropping cycle in lowland environments can be delayed by 30 - 60 days.

Inputs such as fertilizer and pesticide are usually not used in the rain fed environment. Fertilizer inputs were found to be used in irrigated environments. The most common fertilizer used is urea (46-0-0) and 16-20-0.

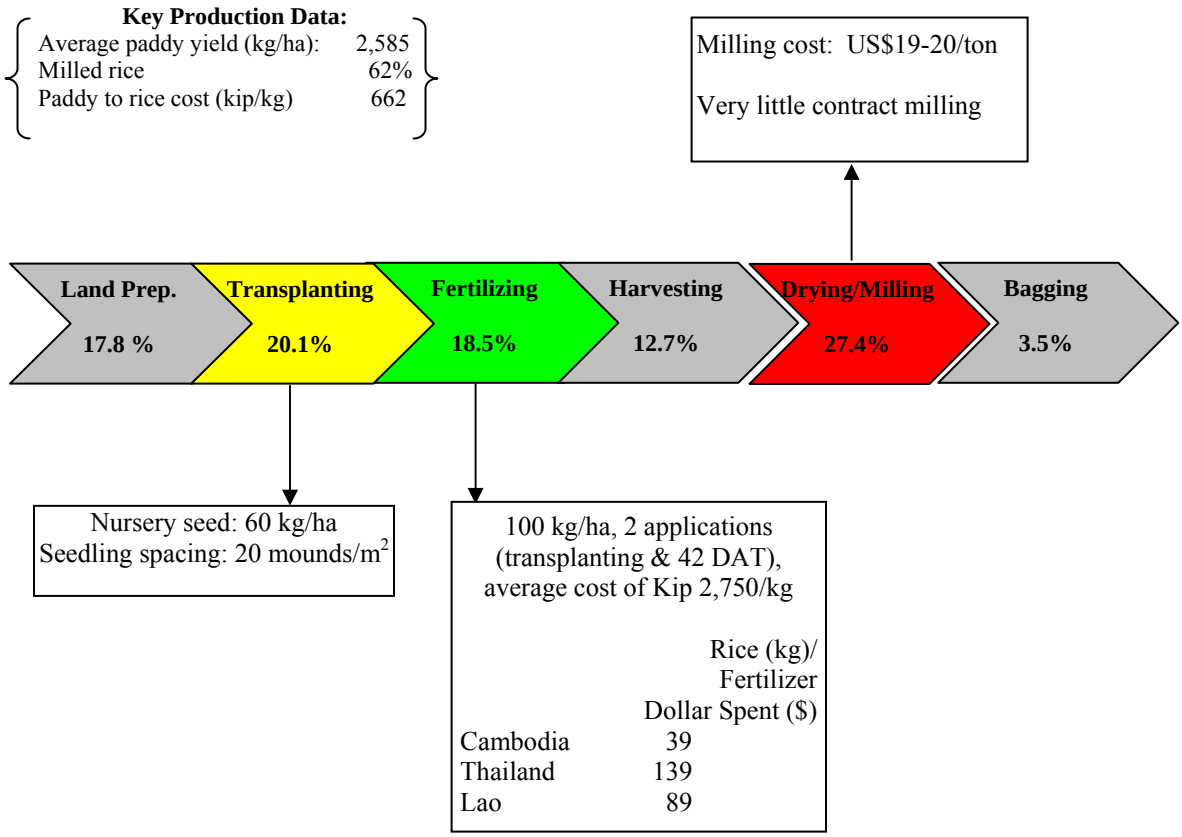
For the purposes of this analysis, lowland and upland rice production in the Province of Khammuane will be discussed.

3.4.2 Integrated Value Chain Analysis – Lowland Rice

At farm-to-rice mill production costs of US$63.71/ton, value chain analysis of a farmer in Nam Pa Village in Khammuane shows that its highest value adding component is milling and drying (27.4%), followed by transplanting (20.1%) and fertilizing (18.5%) – see Diagram 3 below. The farmer has 12 hectares of land under cultivation, and grows three different varieties: Kor Khor 6 (6 ha), Hom Mali (2 ha) and TDK1 (4 ha). Yields on Kor Khor6 and TDK1 were reported at 3,300 kg/ha, while Hom Mali yields were reported at 1,980 kg/ha. The cost of production is US$ 164.60/ha.

Milling: Because rice milling is a bulk-reduction process, transportation costs are minimized by locating processing facilities as close to production zones as possible. Unlike some manufacturing processes, where different stages of production can be located in different countries, rice milling must be located on or very near the production areas. As a result, rice milling does not face the risk of being put out of business by foreign competition as paddy rice producers in the country must use the services domestic millers. As such, any gains in rice milling efficiency would make substantial contribution to domestic value added.

Diagram 3: Value Chain – Lowland Rice Khammuane



Source: Global Development Solutions, LLC™

The milling costs observed were in the range between Kip190 – 200 per kg (US$19-20 per ton). It is estimated that there are around 18,000 rice mills in Lao. The prevalent type of mill is a small village mill that has a capacity of up to 1 ton/hour, and which serves small communities of farmers of up to 50 families. These types of mills in Khammuane report that the cost of milling is as low as US$11/ton. However, the milling conversion rates are as low as 50%, thus making it difficult to develop export capability around such types of mills. The low milling cost is mainly at the expense of quality of rice milled. For example, a typical cost saving measure is to reduce the frequency with which the drums that separate husk from head rice are changed. Generally, millers wait until holes appear in the rubber before the drum is replaced, at which point the throughput levels of the machinery are well above manufacturers' specifications.

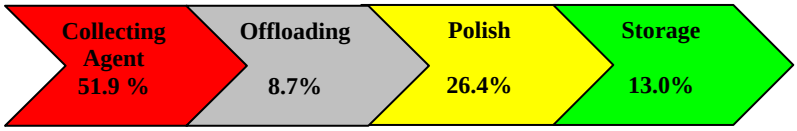
Typically, a rubber box has a usage life of 80 ton throughput, but many small scale village mills will not replace the rubber box until well beyond a 120 ton mark. It is therefore expected that the entry of new millers to replace the old mills would bring tremendous cost savings to the rice availability in the country. If the observed trends in Khammuane and Vientiane hold for most of the country, replacing old mills with new ones would save at least 5 percentage points of rice in the process of converting paddy to

white rice (a 60% average conversion ratio for medium-to-large mills and a 55% conversion ratio for small village mills – usually steel mills, banned for use in many countries, including Indonesia and Malaysia).

This shift towards new mills can be expected to generate rice loss reductions of approximately 120,000 tons annually. Using the current marketable price of rice in Lao of Kip2,400/kg, the expected benefits from modernizing the milling industry can yield as much as an additional US$30 million per year.

Closer scrutiny of rice milling reveals that a large share of value addition (51.9%) is for collecting paddy, followed by polishing (26.4%) and storage (13.0) – see Diagram 4. As a result, rice milling as a process (excluding the collection charges) has a cost of US$ 9.2/ton.

Diagram 4: Value Chain for Rice Milling



Source: Global Development Solutions, LLC™

Comparing this with the neighboring Cambodia and Thailand, for example, Laotian medium and large mills are equally competitive in terms of rice milling process costs (Cambodia US$12/ton, and Thailand US$16.5/ton). Thus it is expected that addressing issues of rice collection and delivery, most notably in terms of improving the road network, could yield positive externalities for rice millers in terms of reduced costs. This could potentially free up resources for technological improvements, where Laotian mills lag most.

When measured against Asian rice producers, Lao is the laggard in paddy to milled rice conversion rate, which at 60%, does not compare favorably to Vietnam and Thailand with conversion rates of 65% and 66% respectively (see Table 3).

Table 3: Paddy to Milled Rice Conversion Rate	
Country	**Conversion Rate**
Japan	73%
Taiwan	73%
China	70%
Thailand	66%
Vietnam	65%
Cambodia	63%
Myanmar	62%
Lao	60%

Source: Global Development Solutions, LLC™

Another feature of the existing rice value chain in Lao, and more specifically in Khammuane is the fact that very little contract milling takes place. By far the most prevalent practice is to exchange milling service for rice meal. The result of such a practice is to create an incentive for the millers to maximize yields of head rice and to minimize cracks to reduce the amount of small rice cracks and meal, something which the miller gets to keep for providing his/her services. First class rice meal[3] sells for about Kip1, 100-1,200/kg (the same price as paddy), which creates an incentive for a miller to maximize rice meal rather than head rice output. Finding ways to encourage contract milling among farmers could potentially rectify the current situation whereby most mills report broken rice rates of 25%.

Millers perform an important function for rice production in the country through provision of inputs, mainly fertilizer, to farmers in exchange for paddy. A sample exchange of fertilizer provided by a large scale miller in Khammuane (8 ton/hour capacity) in return for a promise to pay with paddy on the part of the farmer is illustrated in Diagram 5 below. At first glance, this exchange is captive to the farmer, and at exorbitant interest rate of 12% per 6 months from nursery to harvesting (or 24% annualized rate). In fact, the primary drivers of this deal and its high rent level are external to this deal. First, access to finance is generally not available anywhere near the farmer's village. Borrowing for the purpose of purchasing fertilizers is next to impossible. This creates an opportunity for millers to charge exorbitant rates. Secondly, enforceability of contracts is highly unreliable and therefore default risk is borne entirely by the lending mill, which, as a result, puts a premium on the cost of fertilizer.

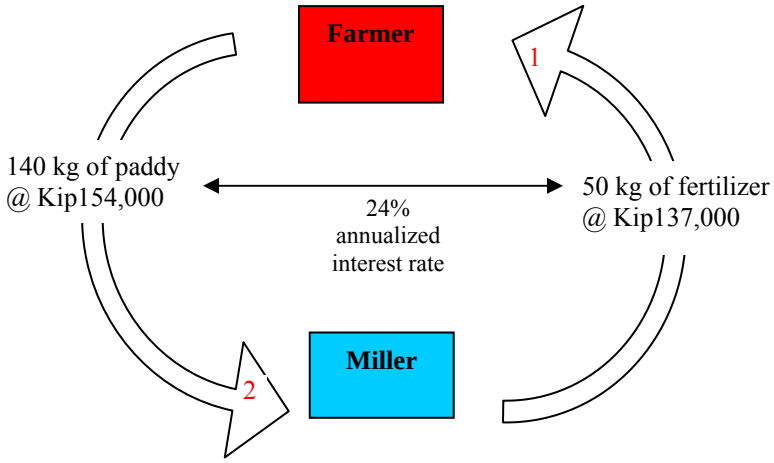
Creating an enabling environment where access to credit and contract enforceability is improved is anticipated to increase the flow of inputs in the rice value chain, and thus improve rice production. In the example of the fertilizer financing illustrated in Diagram 5, the miller has borrowed Kip1.6 billion from the Agricultural Bank against an estimated collateral of Kip3.5 billion (7 trucks, 2 houses, 5 parcels of land, and the entire mill), at an interest rate of 22% per year.

Upon provision of fertilizer to the farmer, the mill is in fact acting as a bank to the farmer, and putting a 2 percentage point risk premium on extension of financing for

[3] Rice meal that has highest content of fine rice cracks

fertilizer to the farmer. According to interviews in the field, the millers prefer not to play the role of "bank" for the farmer since they are in the business of milling and not banking. Coupled with lack of enforceable contracts, the risk of farmers not paying back in-kind with paddy is always real. In 2004, 100 tons of fertilizer lent to farmers was never recovered by the miller. Nevertheless they do lend to farmers in-kind with inputs since their business is all about maximizing scale efficiencies of milling, and as such continuous inflows of paddy are critical.

Diagram 5: Input provision Miller – Farmer



Source: Global Development Solutions, LLC™

In this context, and especially considering the lack of direct access to credit for rice farmers, provision of better access and conditions of credit to millers is expected to benefit the farmers by indirectly creating better terms of borrowing on the part of the millers, and thus better terms of in-kind lending to the farmer.

Where millers have a potential and do make the most of the asymmetrical access to information and inputs is in terms of establishing moisture content of rice. Higher moisture content of rice decreases the value of rice in that rice cracks more easily thus reducing the yield of head rice. The consensus in the rice milling community in Khammuane is that 13% moisture content is used as a benchmark to price rice from farmers. Measuring moisture content is entirely up to the miller, particularly as farmers have no access to metrological equipment and service for measuring the moisture content. Increasing the provision of such services is expected to remove what is clearly a conflict of interest in the buyer-seller relationship of millers and rice farmers.

Transplanting: The value chain analysis shows that transplanting is the second highest value adding component in the farm-to-mill rice value chain (20.1%). The particular farmer hires 18 people for 10 days, and pays them Kip20,000/day for transplanting rice at his 12 hectares parcel. Other farmers in the province report daily wages in the range of Kip15,000 – 20,000/day. Transplanting cost per hectare is US$30.0. This is well within

regional transplanting costs, and is better than Cambodia's US$37.5/ha and Thailand's US$63.4/ha. As such, transplanting costs don't represent a bottleneck in rice production in Lao, as per value chain analysis.

What cannot be seen from the value chain is that mound spacing at this farm is at a density of 20 mounds/m^2, with three seedlings per mound (60 seedlings/m^2), which could be typically seen in other farms. According to current research, closer spacing (25 – 40 mounds/m^2), can increase yields. Further research would be needed to establish whether potential yield gains justify increased labor costs of transplanting, which is an extremely labor-intensive operation.

Fertilizer: Cost of fertilizer and its application is the third highest value adding activity of rice production in lowland environment (18.5%). Although not very common, fertilizer is increasingly being used in Lao. The vast majority of fertilizer used in rice farming is 46-0-0 (urea) and 16-20-0. Prevailing fertilizer prices in Khammuane as of May 2005 are presented in Table 4.

Table 4: Fertilizer Prices, Khammuane, May 2005

Group	Fertilizer	Retail Price (Kip/kg)
Organic	Rice Bran	1,000
Inorganic	15-15-15	2,650
	16-8-8	2,550
	16-20-0	2,750
	46-0-0	3,250

Source: Global Development Solutions, LLC™

Farmers' application of fertilizer in terms of volume was found to vary considerably. The most common application was about 50kg/ha of nitrogen, and not more than 10kg/ha of P_2O_5 and K_2O combined. In the highlighted case, fertilizer use was 100kg/ha (50kg 46-0-0, and 50kg of 16-20-0). Splitting the nitrogen requirements in order to match it with crop demand is very rarely practiced. Nitrogen is either applied all at once during transplanting or applied on two different occasions. In the case of the farmer highlighted here, fertilizer is applied twice, first at transplanting and then 42 days after transplanting (DAT). Multiple studies confirm that splitting the application of nitrogen into three or more periods yields superior results when compared to one or two applications (see Table 5). It is therefore expected that providing extension services on farm management with extended focus on farm (fertilizer) management will increase the rice output with the existing inputs of fertilizer.

Table 5: Nitrogen splitting and effect on yield

Number of Splits	Timing of N application	Yield (kg/ha)
1	Transplanting	3,130
2	Transplanting and 50 DAT	3,312
3	Transplanting and 35 and 55 DAT	3,496
4	Transplanting and 20, 40 and 60 DAT	3,405

Source: IRRI/NAFRI, 2001

Very low application of potassium is worrisome in that low levels of potassium application coincide with stagnation in rice yields in many SE Asian countries (refer to Table 6 below). Laotians use very little potassium in rice farming. As a result the challenge will be to introduce new crop management techniques by providing extension services that would increase the awareness about proper application of fertilizers and its impact on rice yield.

Table 6: Benchmarking Fertilizer NPK use by rice farming in SE Asia

			N		P_2O_5		K_2O		Consumption ('000 t)		
	Yield t/ha	Area planted with modern varieties	Ferti-lized %	Rate kg/ha	Ferti-lized %	Rate kg/ha	Ferti-lized %	Rate kg/ha	N	P_2O_5	K_2O
Cambodia	1.94	11%	30	15	20	14	5	3	8.4	5.2	0.3
Indonesia	4.25	77%	90	105	70	22	40	14	1,192.6	177.5	64.5
Lao	2.93	2%	30	55	20	15	5	5	11.4	3.1	0.2
Malaysia	2.94	68%	90	95	90	40	70	35	59.2	24.9	17.0
Myanmar	3.24	72%	60	35	50	12	10	4	126.0	36.0	2.4
Philippines	2.95	89%	85	51	85	15	75	11	175.0	51.5	33.3
Thailand	2.33	68%	90	62	90	33	60	17	560.7	298.4	102.5
Vietnam	4.11	80%	90	108	80	45	50	40	744.1	275.6	153.1
SE Asia	3.48	75%							2,877.4	872.2	373.3
								Ratio	8	2	1

Source: Better Crops International, Special Supplement, May 2002.

Other issues – Improved Varieties: The subsistence nature of rice farming in Lao is the determining factor in the farmer's choice of planting multiple varieties at the same time. In order to diversify against crop loss, which can effectively mean malnutrition and hunger for the extended family, farmers' preference for traditional, stable yield varieties is understandable (only 2% of farmers are believed to use improved varieties). The challenge of increasing yields through use of modern varieties is, therefore, a confidence building exercise as much as it is a process of conveying technical and scientific merits of improved varieties. Support for extensive use of demonstration plots with participation from farmers is anticipated to yield positive results, and be the most feasible way of introducing new varieties among subsistence farmers in Lao.

A look at improved rice varieties recommended by the research community to the lowland rice farming community in Lao reveals that the choice is limited to glutinous types (see Table 7 below). As highlighted at the outset of the report, in terms of export growth, glutinous types are limited by a fairly weak global market share (2%). It is therefore crucial that more non-glutinous rice varieties be introduced in the country in order to be able to tap into the rest of the global market segments that is dominated by non-glutinous varieties. Of course, one way that would encourage farmers to switch to non-glutinous varieties would be for them to improve yields of glutinous varieties to meet self-sustainability requirements using less land and resources so that focus can be given to producing non-glutinous varieties. In this sense, introduction of glutinous and non-glutinous varieties are not mutually exclusive.

Table 7: IRRI/NAFRI recommended varieties for wet-season production in Lao, 2001	
Variety Name	**Rice type**
TDK1	Glutinous
TDK2	Glutinous
TDK3	Glutinous
TDK4	Glutinous
PN1	Glutinous
PN2	Glutinous
TSN1	Glutinous
NTN1	Glutinous
RD10	Glutinous
RD8	Glutinous
RD6	Glutinous
KDML 105	Nonglutinous (Jasmine)

Source: 'Nutrient Management in Rain fed Lowland Rice in The Lao PDR", Linquist & Sengxua, IRRI/NAFRI, 2001.

Other issues – Floods and Drought: Damage to rice crops by floods and drought in Lao is pervasive and seems to have higher level of incidence in the central regions of the country (see Table 8 below). Direct support on the part of GOL to support the farming community in mitigating climate-driven losses is imperative. As in other provinces, Khammuane provincial authorities put emphasis in mitigating drought risks through expansion of the irrigation network. To date, out of 57,000 hectares of rice area in the province, 18,000 hectares are covered by the canal network. According to provincial officials, more than 300 private pumps extract water from both the canal and private wells. Additional support for maintaining and extending the canal network is needed.

Challenges from flood are just as high, and in this respect the provincial authorities do not seem to have a clear strategy for supporting the farming community. In the first 5 months of 2005 alone, 11,000 hectares of rice area were flooded. In some instances, farmers take the initiative in their own hand and create drainage systems around their rice areas. In the case of the farmer from Nam Pa village, he was one of the 30 farmers in the village who collected Kip 30,000,000 cash and using their own labor created a drainage canal around an estimated 100 hectares of rice fields. The canal is still not complete due to the fact that cash funds have been exhausted. The irony here is that when asked why they are not seeking additional funds from local institutions, the farmer's appear to be

Picture 1: Drainage system, Rice Farming, Khammuane

Nam Pa Village, ©Global Development Solutions, LLC™

convinced that they will not be able to get a hearing let alone funds from local institutions for completing and extending the drainage network. This suggest that there is a lack of support at the local level for initiatives from the farming community, even though chances of success of such bottom-up approaches are usually higher than top-down grand scale designs and policies. It is therefore crucial that such initiatives are supported in order to decrease pervasive losses from floods in the province. According to interviews, crop losses during flood years are well above 70%, which, when transposed over longer periods of time brings down the average yields of lowland farmers at par, if not worst than upland farmers who have significantly lower flood risk.

Table 8: Rice crop's damage to floods and droughts

Year	Damage	Region affected
1966	Severe flood	Central
1967	Drought	Central and southern
1968	Flood	Central
1969	Flood	Central
1970	Flood	Central
1971	Severe flood	Central
1972	Flood and drought	Central
1973	Flood	Central
1974	Flood	Southern
1975	Drought	All regions
1976	Flash flood	Central
1977	Severe drought	Northern/central (Savannakhet)
1978	Large flood	Central and Southern
1979	Draught and flood	Northern(drought), southern (flood)
1980	Flood	Central
1981	Flood	Central
1982	Drought	All regions
1983	Drought	All regions
1984	Flood	Central and southern
1985	Flash flood	Northern
1986	Flood and drought	Central and southern
1987	Drought	Central and northern
1988	Drought	Southern
1989	Drought	Southern
1990	Flood	Central
1991	Flood and drought	Central
1992	Flood and drought	Central (flood and drought), northern (drought), southern (flood)
1993	Flood and drought	Central and southern
1994	Flood and drought	Central and southern (drought)
1995	Flood	Central and southern
1996	Flash flood, drought	Central
1997	Flood	Central and southern
1998	Drought	All regions
1999	Flood	Central and southern
2003-2005*	Flood*	Khammnuane*

*Source: Constraints to Rice Production Systems in Lao PDR, International Workshop of Increased Crop Production for Lowland Rice in SE Asia, Vientiane, 2001. * Interviews, Global Development Solutions, LLC.*

3.4.3 Integrated Value Chain Analysis – Upland Rice

As far as upland rice is concerned, the strategic focus of GOL is to minimize slash-and burn practice in the uplands and shift crop cultivation to lowland areas. From the perspective of a value chain analysis, upland rice farming has a very short value addition process, whereby no external inputs are used, planting is through direct seeding rather than transplanting, and by and large land preparation and harvesting dominate the value chain.

In the case of an upland rice farmer in Don Ka Sen Village in Khammuane, harvesting is the highest value addition stage (57.6%), followed by land preparation (20.2%) and drying and milling (15.9%) – see Diagram 6 below . Comparing the per hectare cost of lowland and upland farm-to-mill rice production , lowland rice is almost 60% cheaper to produce compared to upland rice, at US$104.10/ha (versus US$169/ha for upland rice)

However, the cost of production per ton is US$63.09, basically in the same range as upland rice. From a macro economic standpoint, the policy choice of shifting upland cultivation to lowland environments is not expected to yield substantial benefits. However, considering the fact that lowland cultivations yields twice as much rice as upland areas of the same size, it is clearly more productive to cultivate rice in lowland environments.

Picture 2: Upland Rice Farm, Khammuane

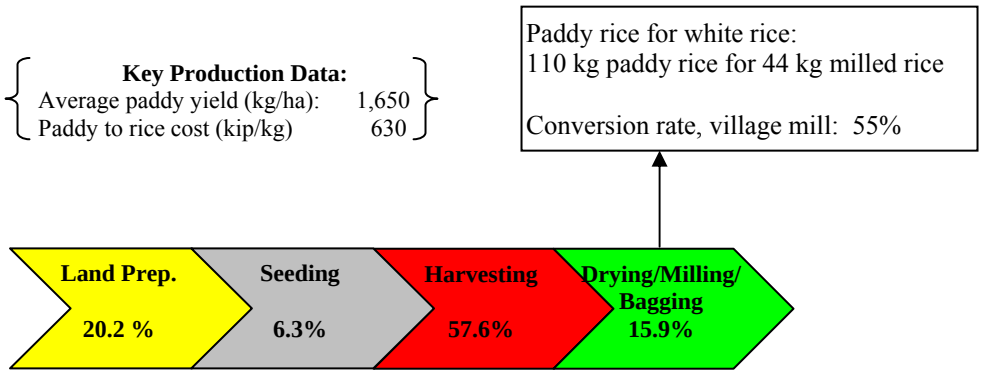
©Global Development Solutions, LLC™

Harvesting: A typical upland farmer in Khammuane owns one hectare of land, and harvesting is a labor-intensive process, as is land preparation. In the specific case analyzed, the farmer uses his own labor (an imputed cost of Kip15,000/day) and is helped by two fellow villagers (at the same imputed cost, paid for in rice) who harvest rice over a week to ten day time period. The most often quoted problem of the farmer is that during harvest, it is difficult to find labor to assist the farmer on non-cash, in-kind basis. Since the disposable income of the upland farmer is very small, the farmer pays the hired harvest workers in-kind with rice. It is very probable that this lack of labor availability is caused by workers moving to lowland areas to maximize incomes. For instance, in the Khammuane lowlands, Kip20,000/day was the going wage rate for hired labor during harvesting periods.

Farmer report losses of up to 5 bags (330 kg of paddy) due to lack of labor for harvesting. It is not clear, without further analysis, to establish any recommendation on how the labor

shortage issue can be addressed. Movement of labor from upland to lowland areas in general, and specifically during harvest periods, is only a natural flow of people seeking better opportunities and higher wages.

Diagram 6: Value Chain for Upland Rice Production in Khammuane, Lao



Source: Global Development Solutions, LLC™

Drying/Milling: Outdated mills and captive relationships of farmers with millers are perhaps the biggest value destroyers. Poor milling performance of small steel village mills (55% conversion rate from paddy-to-rice) is the most problematic aspect. What compounds the problems for upland farmers is that access to modern mills, typically located around major urban centers in the lowlands, is made very difficult by the virtue of poor road access. The farmers interviewed in the uplands walk around 12 km to access a road that leads to a district town or bigger city. It is anticipated that improving the road infrastructure would improve the marketable yields of upland farmers. Improvement of such access could improve not only access to markets of rice farmers in the uplands, but also for ones that cultivate other crops with a more perishable nature.

3.4.4 Cross Cutting Issues

Apart from improvements in road infrastructure in the uplands, which is expected to improve market access for rice farmers in Lao, two areas that cut across all types of rice farming and which are expected to provide additional benefits are improvements in fertilizer use and use of improved seeds. Current fertilizer use shows that the area closest to Southeast Asian practices is fertilization for Nitrogen (N) application, which is currently at 55 kg/ha.

In all other aspects, however, farm management of NPK fertilizers in Lao is lagging behind. The percentage of farms using NPK fertilizer is one of the lowest in the region, with the starkest difference being the low level of Potassium use (5% of total area). Also, in instances when inorganic fertilization is used, there is room for improvement in terms of timing of fertilizer application, be it through increased frequency (3 instead of 2 times

per season) or optimization of fertilizer use in relation to panicle initiation and flowering of specific varieties, as reflected in days-after-transplanting intervals.

Very low use of improved seeds is also an area that cuts across all types of rice farming in Lao. It is estimated that not more than 2% of the area is planted with improved varieties (refer to Table 6 in page 27 above). Interviews suggest that the preference to traditional varieties is as much an issue of risk-aversion of conservative farmers (who prefer to use tested varieties with known yields) as it is related to other aspects such as financing of or know-how about improved varieties.

4 Sector Analysis – Coffee

4.1 Summary of Findings

4.1.1 Barriers to Competitiveness

The following matrix provides a summary of key findings that inhibit the competitiveness of the coffee sector in Lao.

Chart 5: Summary of Key Barriers to Competitiveness in the Coffee Sector in Lao
5.0 Market Constraints 5.1 No access to information about variety selection 5.2 No formal and transparent means of access to finance drive farmers to use high cost financing through brokers 5.3 Absence of efficient market distribution channel for accessing agricultural inputs 5.4 No market information about price and quality requirements leaves farmers at the discretion of brokers and traders to set prices 5.5 No established supply chain system in place that promotes market oriented transactions 5.6 Lack of market information to allow farmers to improve negotiation leverage with brokers and other buyers 5.7 Lack of market information about market trends and consumer preferences 5.8 Absence of a code of conduct among players in the sector to limit pirate purchasing 5.9 Price discovery process for coffee is not necessarily reflective of actual cost due to the lack of market information 5.10 High cost of transporting
6.0 Governance 6.1 Absence of grading system and standards for coffee acts as a disincentive to produce quality product 6.2 No certification system for liquoring specialists to categorize coffee that responds to demands of international buyers 6.3 Poor physical infrastructure limits access to agricultural inputs, while at the same time increasing the cost of transporting coffee from farm to processing location 6.4 High inland transport and logistics costs, particularly related to the distribution of agricultural inputs 6.5 Absence of an awareness program targeted towards rural farmers regarding cropping options besides coffee, particularly if coffee farming is considered an informal income supplement 6.6 Need to introduce cost saving measures for smallholder primary processing 6.7 Extremely high cost of export clearance and authorization from various government offices 6.8 Lack aggressive bilateral negotiations to establish reciprocal inspection and authorization agreements with neighboring countries 6.9 Lack of regular framework, certification, standards and enforcement capability to help ensure that seedlings sold in the market meet quality requirements to ensure productive coffee plants 6.10 Absence of grading, classification and quality standards to differentiate product pricing and to reward farmers for producing a quality product
7.0 Institutional 7.1 Absence of metrological services, particularly to measure moisture content of coffee 7.2 Absence of or weak extension services, particularly for rural farming communities 7.3 Limited know-how regarding plant spacing and on-farm tree management 7.4 Weak representative association to develop country branding, product imagining/positioning, product strategy, particularly given that Lao coffee has the distinction of being organic 7.5 Poor planting techniques may be undermining the productive potential of coffee trees, resulting in low yield rate per tree 7.6 No standards and certification procedures to help ensure the sales and distribution of high quality seedlings 7.7 No institutional support available for farmers to combat a range of diseases and pests that attack coffee trees and their fruit 7.8 Productivity improvement exercises to help reduce the cost structure for smallholder primary processing 7.9 Lack of access to farming techniques, particularly for rural farming communities

7.10 Need to improve awareness among rural farming communities regarding crops and cropping options 7.11 Lack of know-how regarding post-harvest handling and storage techniques, resulting in high loss rate
8.0 Human Resources 8.1 Poor post-harvest handling techniques 8.2 Poor on-farm techniques 8.3 Low on-farm labor productivity due to poor on-farm production techniques 8.4 Little knowledge about farm management 8.5 Limited knowledge and skills base of extension workers 8.6 High and continued reliance on Vietnamese field technicians to support on-farm technical activities
Source: Global Development Solutions, LLC

4.1.2 Key Market Drivers

At first glance, there are no specific market drivers that generate demand for Lao coffee. The pattern of exports has not changed much in recent years where a large share of Robusta exports continue to go to EU, particularly Poland, Switzerland, Belgium, Germany, France and Romania. Exports to these countries are generally driven by the benefits under GSP (General System of Preferences) from 35 countries, including the EU. In January 2002, the EU granted duty exemption to Lao exports, including coffee. Combining the GSP with competitive prices, Lao offers a desirable option for coffee importing countries, particularly from the EU.

One of the reasons why exports of Lao Robusta to Vietnam is high has to do with the close tie between the coffee producing and trading community in Lao and Vietnam. Specifically, the largest producer of coffee in Lao is a Vietnamese-Laotian with close ties to the Vietnamese business community. In addition, many of the technical personnel working in Lao to help improve coffee production come from Vietnam.

As Lao is not a member of the ICO (International Coffee Organization), it does not derive direct benefit from being a member of the largest global coffee organization in the world.[4] In addition, preliminary analysis suggests that the Lao Coffee Exporters Association lacks the necessary capacity to actively engage in an aggressive marketing, image building and country branding campaign. While efforts are being made by the Association, it continues to lack strategic vision and strategy to take advantage of niche market opportunities. Furthermore, taking into consideration that there is very little additional prime coffee growing land remaining, critical volume required to become a viable player in the niche market would require increase in production derived from efficiency gains as a result of improved production techniques.

Preliminary analysis suggests that there is no clear market driver driving the coffee sector in Lao, and that growth has come more as a random event rather than as a result of strategic planning.

[4] Membership to ICO requires a minimum production level, which Lao is unable to meet.

4.1.3 Option for Growth

Taking into consideration that expanding the production area of coffee is limited, and that Lao is a minor player in the international market, and yet, it is able to produce high quality, organic coffee, suggests that the sector will need to explore options for growth within niche and specialty markets where large volume producers have generally been slow to exploit (perhaps not for too much longer). For example, Mexico is one of the largest producers of organic coffee, but only 2% of its production is certified as organic. As a consequence, many coffee farmers are unable to take advantage of the premium prices offered in this niche market. Unfortunately this is the same situation that coffee farmers in Lao face today. In this context, organizing producers in the sector whether under the current Exporters Association or through another entity, so that farmers can obtain certification would be a critical first step in expanding options for growth in the coffee sector.

Currently, niche markets can be categorized into four distinct market areas, namely gourmet/rare; organic; shade-grown, and fair trade. Taking into consideration the current production methods used in Lao, existing coffee farmers have the potential to qualify for organic, shade-grown and fair trade status (refer to table below).

Table 9: Niche Coffee Categories

Category	Characteristic
Gourmet/Rare Organic/Estate	Coffee selling at premium prices due to the location where the coffee is produced, which suggests premium quality. Examples include Jamaican Blue Mountain, Hawaiian Kona Fancy, Haitian Bleu, Papua New Guinea Sigri A, Ethiopian Yirgacheffe, and Kenya AA
Organic	Coffee grown and processed without the use of chemicals, including fertilizers, chemical pesticides and herbicides
Shade-Grown	Coffee grown under natural forest canopy, which provides habitat for birds and other wildlife, and plants
Fair Trade	Coffee purchased from fair trade certified cooperatives, generally independent of middlemen

In the case of fair trade coffee, sales have grown at a brisk pace. In 2003, for example, the market grew by 25.9%, where the market paid 15% premium over non-fair trade coffee.

The biggest challenge for Lao's coffee sector is that currently the country has virtually no institutional support structure that caters to a number of important metrological aspects of coffee production. These include:

- Certification of seedling production;
- No internationally recognized standards for coffee classification;
- No certified liquoring specialists;
- Little to no extension services available to coffee farmers, particularly in areas related to uniform weighing standards, and measurements of moisture content; and
- Lack of phytosanitary facilities, particularly related to fumigation requirements.

In the absence of these technical functions, which generally fall into the public service domain, the ability of coffee farmers to obtain international certification for organic, shade-grown, or fair trade, is greatly diminished. In this context, serious consideration is required on the part of the government in conjunction with representatives from the coffee sector to come up with a common vision for growth, and to jointly develop and institute industry standards that help to create a path for farmers and processor to take advantage of prevailing niche market opportunities.

4.2 Sector Profile

The French introduced coffee to Lao in the early 1900s, which was mostly exported to Vietnam. Since the departure of the French, the evolution of the coffee sector in Lao experienced two significant periods. First in the 1980s when the government encouraged lowland farmers to move to the Boloven Plateau by clearing vast forested areas to be used for coffee plantations. The government set up cooperatives called *Nikhom*, which generally consisted of redundant soldiers from the military. In addition, another type of farmer's cooperative called *Sahakone* was established. These cooperatives acted more as collection and distribution agents rather than as grower's cooperative. Many *Sahakone* did not last more than three years. But it is generally recognized that coffee production during this period was used as a form for debt repayment to other socialist countries to finance the revolutionary war.

The second period of development in the coffee sector came in the mid-1990s when the Lao government was seeking to join ASEAN. With coffee producers enjoying peak prices in the international market, the government encouraged private investors to invest in coffee plantations and to engage trading. While coffee prices have since dropped dramatically, coffee continues to be an important export commodity for Lao. While there is some coffee grown in the Northern Provinces, nearly all of the primary coffee production takes place in the southern region, particularly in the Champasack, where over 80% of all coffee is produced (refer to the table below).

Table 10: Coffee Production by Province (2003)

	Hectare	% of Total	Tons	% of Total	@ Yield Rate kg/ha
Northern Region	**103**	**0.3%**	**77**	**0.3%**	**747.6**
Luangnamtha	13	0.0%	8	0.0%	615.4
Oudomxay	53	0.1%	32	0.1%	603.8
Luangprabang	37	0.1%	37	0.2%	1,000.0
Central Region	**38**	**0.1%**	**30**	**0.1%**	**789.5**
Xiengkhuang	38	0.1%	30	0.1%	789.5
Southern Region	**36,394**	**99.6%**	**22,111**	**99.5%**	**607.5**
Saravan	10,942	29.9%	2,260	10.2%	206.5
Sekong	3,772	10.3%	2,023	9.1%	536.3
Champasack	21,680	59.3%	17,828	80.2%	822.3
Attapeu	230	0.6%	202	0.9%	878.3
TOTAL	**36,535**	**100.0%**	**22.218**	**100.0%**	**608.1**

Source: FAO and MAFA

While accurate statistics on total production area and production volume varies somewhat according to sources, in 2004 it was estimated that approximately 37,576 hectares of land was under cultivation for coffee, with total production reaching approximately 23,000 tons.

Currently, 70% of production is Robusta, 20% is Arabica and the remaining 10% is Catimor. Production is gradually shifting in favor of cultivating Arabica and Catimor, which command a much higher market price. But for poor rural farmers whose primary source of income and livelihood is not coffee, Robusta continues to offer a viable choice as it is a much hardier variety and requires limited care.

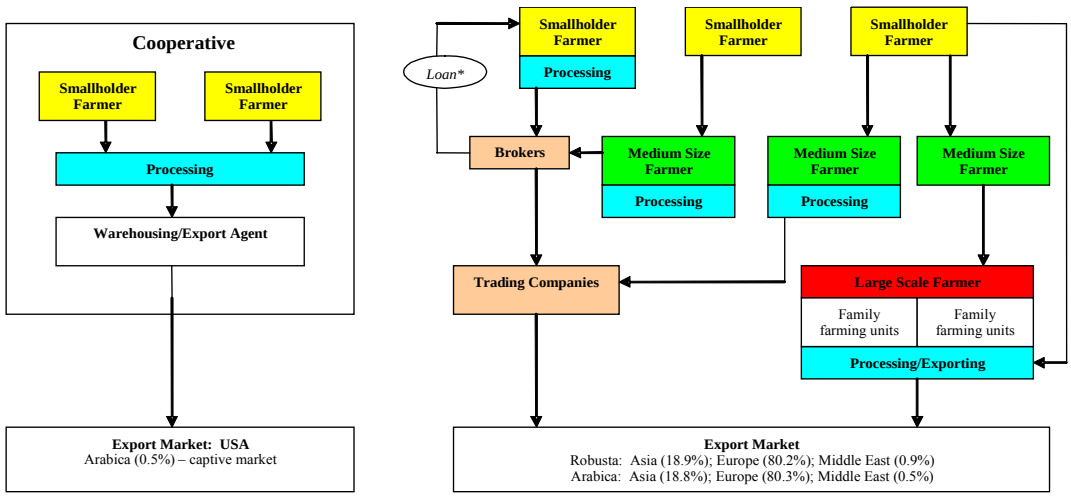
Although it has gained in popularity, coffee is not a widely consumed product among the local population. As with many coffee growing countries, Lao coffee farmers have never tasted their own coffee. With very little domestic demand, coffee is an important export commodity for Lao.

4.2.1 Market Structure and the Coffee Supply Chain in Lao

Commercial coffee production is a relatively new phenomenon in Lao. While coffee production has taken place for over a century, commercialization of production and engagement in the international market is still generally seen as uncharted waters for many farmers, processors and traders. In this context, the market structure and supply chain for coffee is still evolving.

While no reliable statistics were available on the number of smallholder coffee farmers operating in Lao today, it is estimated that a majority of coffee production takes place among smallholder farmers that farm between 0.5 – 3 hectares of land. According to government sources, the coffee sector is directly responsible for generating over 210,000 jobs.

Diagram 7: Coffee Supply Chain Structure in Lao



Source: Global Development Solutions, LLC

The market structure for the coffee sector resembles an upside down pyramid where there are a large number of smallholder farmers, very few medium size farmer (<10 hectares), and a single large coffee plantation (210 hectares). In addition, there is a budding cooperative movement which began in 2004 with 500 smallholder farmer members.

The selection of supply chain is somewhat contingent on the variety of coffee grown, the processing method selected, and accessibility to traders.

1. **Smallholder (Dry process):** Generally, Robusta, once picked, can be sun dried and then sold to a broker or a trader. Sun drying, however, yields lower quality coffee and thus commands a much lower market price. Once the coffee is dried, a smallholder farmer has a number of options for selling his coffee:
    a. Sell directly to a broker who in turn will have the coffee hulled (outer shell removed), and then sold to a trading company;
    b. Smallholder farmers can rent a huller and then sell the parchment (green coffee after it has been hulled) to a broker or directly to a trading company; and
    c. Sell the dried coffee to a medium size farmer/broker, who in turn hulls the coffee and sells it directly to a trading company.
2. **Smallholder (Wet process):** A wet pulping process is used to process Arabica and Catimor. A smallholder can select a number of options to sell his coffee:
    a. Rent a pulper and a huller to process the coffee. Once cleaned, sell the clean coffee directly to a trading company;
    b. Sell the cherry (coffee when ripe for picking is referred to as a 'cherry') to a medium sized farmer with processing capacity to process the cherry, which in turn would be sold to a trading company; and
    c. Sell the cherry to a large estate/processor/trader.
3. **Medium Size Farmer:** Some medium sized farmers also rely on brokers to get their coffee to market, while others deal directly with trading companies:
    a. Process and sell parchments or clean coffee to broker, who in turn sells it to a trading company;
    b. Process and sell parchments directly to trading companies; and
    c. Sell cherry directly to large plantation/processor/trader for processing and sales.
4. **Large Scale Estate:** As there is only one large scale plantation on which coffee farming takes place now, the operation is fully integrated. The plantation grows its own coffee, as well as purchases cherries from other farmers, both small and medium for processing. The plantation has a pulping facility located in the plantation, and a hulling facility some 20 km away where sorting, grading, packing and warehousing takes place. The same company also operates a trading, as well as a transport company, which handles all of the marketing and logistics for exporting coffee.
5. **Cooperative:** There is one cooperative currently operating in Lao that exports directly to the United States. Five hundred smallholder farmers grow, process and sell premium coffee through the cooperative to a captive consumer, a

roaster/retailer in the United States (further detail provided in subsequent sections of this report).

The wet-dry process helps preserve the quality of coffee. But this process requires additional labor and equipment, both of which are often in short supply among smallholder farmers. Channels through which smallholder farmers get their products to market tend to vary from year-to-year depending on the prices offered by a broker or trader. In this context, there is no established supply chain system in place that promotes market oriented transactions.

This point is evident in the fact that brokers tend to offer smallholders bridge loans 3 or 4 months prior to harvest time. Poorer farmers and farmers requiring funding are offered loans at a rate of 20% per month, and often agree to sell their harvest to a broker at 50% of the prevailing market price. Similarly, smallholder farmers may elect to borrow money from a broker at an equally high interest rate to rent a pulper and a huller in hopes of commanding a better price for his coffee.

Taking into account that virtually no market and technical information is available to farmers, when harvest time arrives, farmers continue to be price takers, and lack adequate negotiating leverage against brokers and other intermediaries. Similarly, in the absence of extension services, farmers are unable to measure the moisture content of the coffee. Here again, brokers take advantage of this situation and put downward pressure on prices. In addition, some brokers are known to use tin cans to measure the volume of coffee, but often cheat the farmer by pounding in the bottom of the tin. Thus, a need for a uniform weighing station or at minimum standardized weighing system for coffee needs to be put into place to help ensure that coffee farmers are able to maximize their revenue potential from coffee farming. In this context, a clear need exists to establish a more transparent marketing mechanism that allows farmers to retain more of the value from the harvest.

4.2.2 The Role of Coffee as an Export Commodity

As an export commodity, coffee is the second most important commodity for Lao when measured in terms of export value. In 2003, Lao exported approximately $153 million worth of commodities, of which $10.9 million (7.1%) was coffee (green beans) – refer to the table below.

Table 11: Value of Agricultural Exports for Lao

Commodities	Value (x1,000 US$) 2002	2003	% of Total
Beer of Barley	44	64	0.0%
Maize	46	405	0.3%
Soybean	6	5	0.0%
Groundnuts (in shell)	24	21	0.0%
Sesame seeds	41	355	0.2%
Preserved vegetables	23	23	0.0%
Apples	163	163	0.1%
Fresh Fruit	1	1	0.0%
Prepared Fruit	149	372	0.2%
Green coffee	***10,294***	***10,973***	***7.1%***
Pimento	4	42	0.0%
Nutmeg, mace cardomen	10	25	0.0%
Lint cotton	16	140,285	90.6%
Cattle	462	113	0.1%
Dry skilled cow milk	30	30	0.0%
Dry Hides - Cattle	7	104	0.1%
Buffalo	4,014	1,757	1.1%
Wet hides - Buffalo	12	12	0.0%
Pig meat	5	5	0.0%
TOTAL	**15,351**	**154,755**	**100.0%**

Source: FAOSTAT

When measured in volume, over 80% of coffee exports, both Robusta and Arabica, are destined for Europe, while nearly 19% is exported to Asia. In 2004, Lao exported 20,405 tons of Robusta, and 2,096 tons of Arabica, as green beans. The largest importer of Robusta from Lao was Poland, which imported 8,961 tons (43.9%) of all exports, while Germany was the largest importer of Arabica from Lao with 612 tons (29.2%) – refer to Table 12 below.

Referring to the export of Robusta, part of the reason why Vietnam was the second largest export destination (15.4%) might be explained by the fact that there is a close tie between some of the large coffee companies in Lao with traders in Vietnam. For example, the largest coffee company in Lao, Dao Heung is owned and operated by a Vietnamese-Laotian, and many of the technical personnel responsible for the production of Lao coffee have been recruited from Vietnam. During 2004, prices commanded by exporters varied widely. For Robusta, the low was approximately $300/ton, with the high of $800/ton. On the other hand, Arabica saw even larger price spreads with the lowest price of $300/ton and the highest at $6,000. Excluding the anomaly of $6,000/ton, the highest price commanded by Arabica in 2004 was $1,850/ton.

Table 12: Export of Robusta and Arabica (tons) by Country (2004)

Country of Destination	Robusta	% of Total	Country of Destination	Arabica	% of Total
Poland	8,961.0	43.9%	Germany	612.0	29.2%
Vietnam	3,140.4	15.4%	Spain	396.0	18.9%
Switzerland	2,770.2	13.6%	Poland	384.0	18.3%
Belgium	2,597.4	12.7%	Vietnam	282.9	13.5%
Germany	1,060.2	5.2%	France	180.0	8.6%
Singapore	446.4	2.2%	Thailand	56.3	2.7%
Romania	363	1.8%	Lao	46.0	2.2%
France	300.0	1.5%	Belgium	36.0	1.7%
Israel	192	0.9%	China	28.0	1.3%
Lao	145.0	0.7%	Singapore	24.0	1.1%
Italy	96	0.5%	Philippines	18.0	0.9%
Portugal	93	0.5%	USA	11.5	0.5%
Greece	76.8	0.4%	Malaysia	9.0	0.4%
Thailand	62	0.3%	Japan	5.8	0.3%
Cambodia	52	0.3%	Taiwan	3.0	0.1%
Spain	37.2	0.2%	Russia	2.0	0.1%
China	12.6	0.1%	UK	1.8	0.1%
TOTAL	**20,405.2**	**100.0%**	**TOTAL**	**2,096.3**	**100.0%**

Source: Compiled based on data from the Coffee Exporter's Association of Lao

4.2.3 Key Regional Competitors

Within the Mekong Region, Vietnam is the largest producer of coffee in Asia.[5] In fact, Vietnam dominates the regional market, commanding over 45% of all coffee production in Asia, and over 10.2% of world production. In this context, Lao is a small player in both the regional and international market, where the country's production represents 0.27% of the world's coffee output.

Thailand cultivated over 66,400 hectares of coffee, Vietnam over 500,000 hectares, and Myanmar just over 5,000 hectares. While the area of coffee production in Lao is nearly one-half that of Thailand, and only a fraction of Vietnam's, one of the most unique characteristics about coffee production in Lao is the tree density. Specifically, the number of trees planted in each hectare of land. Generally, it is not unusual to have tree density between 1,250 and 2,500 trees per hectare. This would require tree spacing to be between 3.0 m x 3.0 m to 2.5 m x 2.5 m. In the case of Lao, however, tree density can be as high as 4,000 per hectare for Catimor. This would require spacing to be as little as 1.2 m x 1.2 m, which by most standards is extremely tight spacing.

Generally, most coffee farmers in the Mekong Region grow Robusta, with the exception of Myanmar, where 77% of productive coffee area produces Arabica. With tighter competition and lower international prices, farmers in Lao are beginning to appreciate the

[5] For a detailed value chain analysis of Indonesia's coffee sector, refer to *"Value Chain Analysis of Strategic Industries in Indonesia. Section 1 - Coffee Industry in Indonesia: The Challenge of Weak Farm-to-Market Linkage"*, October 2003. Global Development Solutions, LLC.

significance of quality and consumer preference towards Arabica. In this context, a gradual shift is taking place in Lao away from Robusta to both Catimor and Arabica varieties.

Another unique feature of Lao coffee farming is the fact that most smallholder farmers practice organic farming, not necessarily out of choice, but more as a result of necessity. For most farmers, the cost of fertilizers and sprays are far out of reach, while at the same time, however, soil and growing conditions are favorable enough to provide adequate yield to attract farmers into this sector. In addition, in many areas where coffee is grown, infrastructure and access to transportation is so poor that even if competitively priced agrichemicals were available, cost of accessing agricultural inputs would be so excessive that it would not warrant their use.

From the perspective of the competitiveness of Lao coffee farmers, the fact that smallholder farmers are unable to utilize agrichemicals somewhat undermines the potential yield rate of coffee plants, but it also has a positive feature, which has not been properly exploited by the sector. As the coffee market has become increasingly more competitive and consumers more quality conscious, the international market is giving increasingly more attention and paying premium prices for organic coffee. Although most Lao coffee farmers produce organic coffee, it has not been able to take advantage of its unique situation for a number of reasons, for example:

- In the absence of extension services, farmers have poor on-farm technical skills and poor post-harvest handling, all contributing to low yield, poor quality control, poor product quality, and limited volume of marketable product;
- Absence of marketing infrastructure from both within the country to improve awareness among the farming community, and to develop a 'coffee culture' within Lao, as well as outside the country to draw the attention of key buyers in the international coffee market regarding the potential of Lao organic coffee;
- Lack of 'country branding' and 'brand imagine' associated with Lao coffee;
- The lack of capacity within the Coffee Grower's Association of Lao to promote organic coffee, both within the country and to foreign consumers.

Table 13: Greater Mekong Coffee Comparison

	Lao	Thailand	Vietnam	Myanmar
Production Area (ha)	37,576	66,400	500,000	5,000
Yield (kg/ha)	681	1,193	2,500	457.9
Tree Density (trees/ha)	3,300*	1,106	2,667	na
Tree Spacing (meters)	1.2 x 1.2**	3x3	3x3	2.4x1.2
Varieties				
Robusta *(Coffea canephora)*	70%	99%	90%	23%
Arabica *(Coffea Arabica)*	20%	1%	10%	77%
Catimor	10%			
Production Volume (tons)				
Robusta	16,100	85,550	630,000	430
Arabica/Catimor	6,900	850	70,000	1,400
Total	23,000	86,400	700,000	1,830
Growing Altitude (meters)				
Robusta	900	>800	<800	na
Arabica	>1,000	800 - 1,200	>800	>900
Agrichemical Use				
Fertilizers		x	x	x
Sprays		x	x	x
Organic	x			
Cultivation System				
Pure-stand/Unshaded	x	x	x	
Homegarden/Intercropping	x	x	x	x
Agroforestry system		x		
Processing Technique				
Robusta	Dry	Wet	Wet	Dry
Arabica	Wet	Wet	Wet	Dry
Pricing				
Pre-set		x		
Market price	x		x	x
World Market Share (%)	0.27%	1.58%	14.3%	
Export Volume (tons)				
Robusta	20,405	60,000	na	na
Arabica	2,517	0	na	na
Export Type (tons)				
Green bean	13,959	59,311	749,200	na
Soluble	na	208	na	na

Source: Compiled by Global Development Solutions, LLC

* Lower tree density = 2,000/ha

** Up to 1.5 x 1.5

4.3 Integrated Value Chain Analysis

4.3.1 Product Profile

Three varieties of coffee plants are generally grown in Lao, namely Arabica, Catimor, and Robusta. Arabica was introduced to Lao by the French in 1938, but when grown at elevations below 1,000 meter, it is highly susceptible to disease which Catimor and Robust are not. Given the resistant nature of the variety, Robusta quickly became a dominate variety among coffee farmers in Lao. Until recently, Robusta accounted for

over 90% of all coffee produced in Lao. But with the change in consumer tastes and recognition of a more favorable pricing structure, farmers are now starting to convert to Arabica and Catimor, where the balance of production has shifted to 70% Robusta, 20% Arabica and 10% Catimor.

Catimor, a hybrid between Katsura (a Brazilian variety), and another variety from Timor in Indonesia, a number of varieties of Catimor were introduced to Lao in 1993. Currently there are 7 varieties of Catimor planted in Lao, namely, Catimor 133, LC1162, P86, P88, T5175, T8667, and BO2. Of the seven, Catimor 133, and LC1162 are the most favored variety among coffee farmers in Lao.

Coffee plants tend to do well in altitudes between 500 – 1,200 meters where ambient temperatures are between 25° C and 8°C. Arabica and Catimor do particularly well when grown at an elevation above 1,000 meters. The Boloven Plateau, which stretches between four southern provinces (Champasack, Saravanne, Sekong and Attapeu), on volcanic poriferous soil, and receives over 2,000 mm of rainfall annually, provides an ideal climatic condition for coffee production.

Robusta tends to have a long life cycle. Robusta tress can grow and produce for nearly 50 years, but local farmers tend to cut their trees by the end of the 10th year. Once planted, a Robusta tree can be harvested beginning in the 5th year. Both Arabica and Catimor grow to about 9 – 10 years of age. Catimor, however, can be harvested beginning in the 3rd year, and Arabica beginning in the 4th year. As mentioned earlier, one of the unique characteristic of coffee farming in Lao is the high tree density. As the table below indicates, as many as 4,000 Catimor trees are planted per hectare, where 2,500 trees per hectare is generally a norm for other varieties.

Table 14: Comparison of Basic Characteristics of Varieties of Coffee Grown in Lao

	Density	Weeding		Harvest	Yield Rate (kg/ha)		Conversion Ratio
Variety	**Trees/ha**	**# per season**	**Month**	**Months**	**Cherry**	**Green**	**Green: Cherry**
Robusta	1,100	1	Sept	Jan - Mar	1,800	400	4.5
Typica	2,500	2	July/Nov	Dec - Jan	3,600	600	6
Catimor	4,000	2	July/Nov	Dec - Jan	6,000	1,000	6

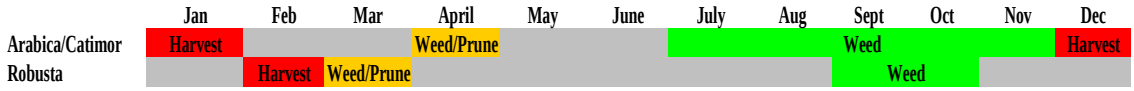
Source: Global Development Solutions, LLC

While Arabica and Catimor are harvested about the same time – between December and January, Robusta is harvested slightly later in the January to March period. Perhaps what is most troubling about these figures is that even with the high yield rate per hectare, partly due to the high tree density, yield rate per tree is disturbingly low. Specifically, yield rate per tree averages between 1.4 – 1.6 kg/tree, which is substantially lower than what we might find in places like Kenya where prime Arabica plants yield between 6 – 9 kg per tree.

Generally, weeding is conducted once for Robusta in September, and twice for Arabica and Catimor between July and November. In addition, pruning is done between March and April. Finally, harvest for Robusta takes place around February, while harvesting

Arabica and Catimor takes place slightly earlier between December and January (refer to the table below).

Table 15: Cropping cycle for Arabica/Catimor and Robusta, Lao



Source: Global Development Solutions, LLC

4.3.2 Establishment Costs

To establish a new coffee farm, the establishment cost is estimated to be approximately 2.98 million kip per hectare ($298/ha). This includes land preparation, the cost of seedlings, and labor for planting (refer to the table below).

Table 16: Establishment Cost for Organic Coffee in Lao

	Kips/ha			$/ha			
	Labor	**Input**	**Total**		**Labor**	**Input**	**Total**
Land Preparation	300,000	500,000	800,000	Land Preparation	$ 30.00	$ 50.00	$ 80.00
Planting	180,000	2,000,000	2,180,000	Planting	$ 18.00	$ 200.00	$ 218.00
Total	**480,000**	**2,500,000**	**2,980,000**	**Total**	**$ 48.00**	**$ 250.00**	**$ 298.00**

Assumptions:

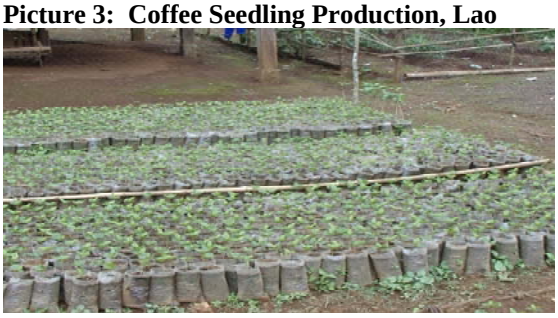
Labor (land prep)	
# of workers	2
# of days	10
Total man days	20
Total cost (kips)	800,000
Labor cost/day	15,000

Planting	
# of workers	3
# of days	4
Total man days	12
Total cost (kips)	180,000
Labor cost/day	15,000
# of seedlings/ha	5,000
cost/seedling (kips)	400

Source: Global Development Solutions, LLC

The Coffee Research and Experimentation Center (NREC) under the National Agriculture and Forestry Research Institute (NAFRI), located between Pakse and Paksong was established in 1990 to develop new seed varieties and to make seedlings available for commercial sales. Currently, the NREC manages approximately 200 hectares with 14 staff to develop and facilitate the seedling needs of the coffee sector. However, much informal and formal production is already taking place in response to the demand for new seedlings. As the photographs below indicate, substantial quality differences exist between informal and formal producers of seedlings. The photographs were taken within 2 days of each other, so the level of maturity exhibited by the seedlings should be about the same. Where the commercial seedling production takes place under protective shading and is watered regularly, the informal seedling production is

Picture 3: Coffee Seedling Production, Lao



Informal Seedling Production, Remote Village, May 2005 ©

Commercial Seedling Production, Bolaven Plateau, May 2005 ©
Global Development Solutions, LLC

established on the side of a house where no shade was available, and the seedlings were not watered on a regular basis.

While the entrepreneurial initiative to develop and sell seedlings is commendable, it should be noted that the pursuit of commercialized coffee production will require stringent quality control measures to be enforced and possibly even the introduction of certification to help ensure uniform seedling quality.

According to local sources, the price of seedlings ranges between 400 – 600 kip ($0.04 - $0.06) each. As Table 16 above indicates, the number of seedlings used per hectare is high (5,000 seedlings/ha). This high figure is generally to compensate for some initial losses during the first year of planting.

4.3.3 Integrated Value Chain Analysis

To understand the production pattern and value added activities in the coffee sector, five separate value chain analyses were conducted, namely two value chain analyses for Arabica (smallholder and commercial production), one for Catimor (smallholder production), and two for Robusta (smallholder production from two separate locations). As the summary table below indicates, the cost of production varied widely from 5,231 kip/kg for smallholder Catimor, to 13,950 kip/kg for commercial Arabica production.

Table 17: Summary of Production Cost and Yield Rates

	Yield rate (kg/ha)		Production Cost
	Cherry	Clean Coffee	Kip/kg
Arabica (smallholder)	3,600	600	7,569
Arabica (commercial)	4,200	700	11,957
Catimor (smallholder)	6,000	1,000	5,231
Robusta 1 (smallholder)	900	200	9,536
Robusta 2 (smallholder)	1,800	400	8,233

Source: Global Development Solutions, LLC

With the exception of commercially grown Arabica, all other production was conducted without the use of agrichemicals. In this context, the coffee is organic, particularly when

it is taken into consideration that historically, no chemicals have ever been applied at any of the farms used for this exercise.

4.3.3.1 Arabica

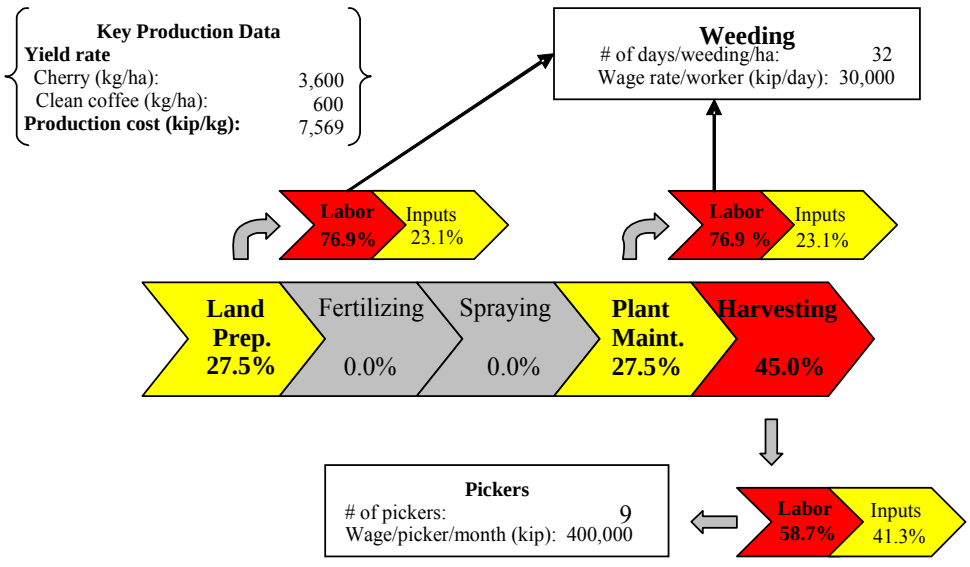
Although Arabica constitutes only 10% of total coffee production in Lao, given the higher prices that it fetches in the market, it is growing in popularity among Lao coffee farmers. Generally, farmers, whether smallholder or commercial, are able to achieve a cherry-to-clean coffee conversion ratio of 6-to-1, which is average when compared to other coffee countries around the world.

Smallholder Production

In this example, the yield rate for cherry was 3,600 kg/ha, which translated to 600 kg/ha of clean coffee, where the cost of production was 7,569 kip/kg. What these figures do not reveal is the productivity of each coffee tree. On this particular farm, the tree density was 2,500 trees/ha. With a per hectare yield rate of 3,600 kg, yield rate per tree is only 1.44 kg/tree, which is low by any standard. This in part can be explained by the relatively poor plant maintenance skills, including the lack of pruning.

The example used for this analysis came from a smallholder farmer who is a member of a cooperative. Generally, members of cooperatives tended to share labor, but at the same time, agree to pay higher wages than the average wage rate to help even out the distribution of wealth from the sales of coffee. This explains the higher wage rate (30,000 kip/day as opposed to 15,000 kip/day). As evident from the value chain analysis below, all value added comes from labor input.

Diagram 8: Value Chain for Smallholder Organic Arabica Production in Lao



Source: Global Development Solutions, LLC

While labor input for weeding is important and the figures presented here represent an average volume of input, it should be noted that farmers were engaged in very little additional plant maintenance activities. In addition, while it would have been possible to obtain natural manure, given the remoteness of the farm and the lack of transportation access, it was not possible for the farmer to apply natural fertilizers to the plant.

Low yield rate per tree means that at harvest time a farmer must spend more time trying to find a cherry to pick than from a tree which has a higher production rate. This is evident in the value added and the productivity of workers during harvesting. In this particular case where the yield rate was 1.44 kg/tree, the cost of picking cherry was 558 kip/kg. As will be shown in a later example, this is nearly twice the cost of harvesting when compared to a higher density tree.

Commercial Production

The cost of production at the commercial farm, when measured in kip/kg, is the highest among all of the farms analyzed for this exercise (11,957 kip/kg). Yield rate, when measured in kg/ha was 17,000 kg, which is extremely high. But given the high tree density (3,300 trees/ha), the high per hectare yield rates were understandable. This tree density translated to a per tree yield rate of 5.15 kg/tree, which falls well within an acceptable range of being a productive tree (4.5 - 9.0 kg/tree is an average yield rate for Arabica).

It is not clear, however, why the farmer elected such a high density planting strategy. Although per hectare yield rates are high, the limited spacing between each tree (1.5 m x 1.5 m spacing) discounts the tree's potential to achieve a higher per tree yield rate. As evident from the photograph, spacing between trees is extremely tight.

Picture 4: Coffee Planting Technique, Lao

High density planting technique used by a commercial coffee farmer in Lao, Paksong, May 2005© Global Development Solutions, LLC

What is evident, however, is that the commercial farm is run professionally, and is well organized for expanding its production and is well positioned to introduce quality standards demanded by the international market. Unlike smallholder farms, the commercial farm has a professional, full time technical and management team on the plantation working with all of the farmers who are organized into 5 hectare units.

The strategy adopted by the commercial plantation is to provide each family unit (which generally consists for 6 to 8 members) a 5 hectare plot to manage. Each family unit is paid $1,000 the first year, and $1,200/year in subsequent years to manage every aspect of their plot. Each

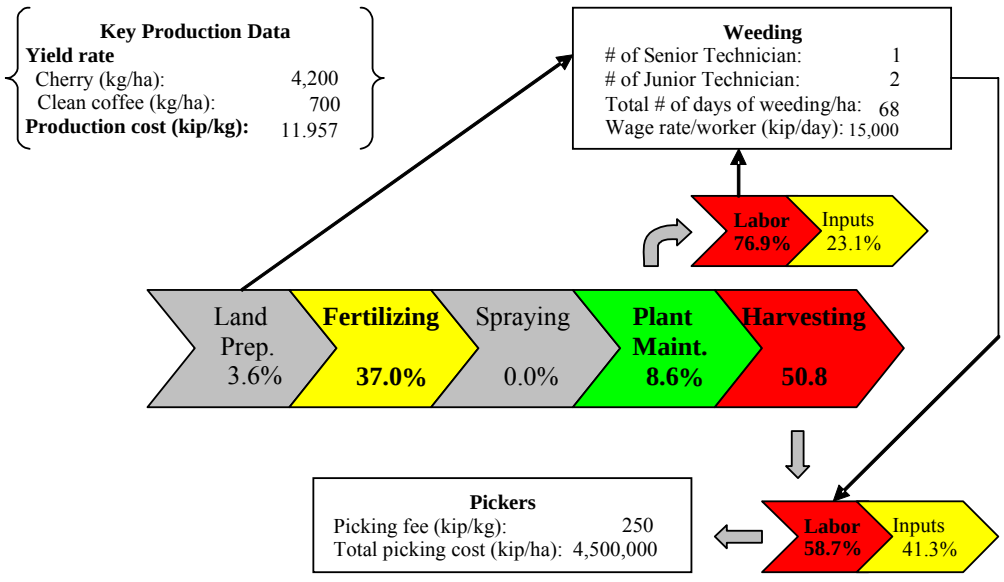
family is given a house in which to live located on the plot, a communal school for their children and access to a free health clinic.

Technical and management teams provide families with the necessary skills training. In this context, the commercial plantation has created an enclave where employment is created for a small number of local families, who are at the same time engaged in commercial production of coffee.[6]

In addition to the family unit wage, when the plantation has a good harvest, families are also offered a 'bonus' at the end of the season which reflects the favorable revenue generated from each of the family plots. While this approach to plantation management brings about consistency in the labor force, and an opportunity to control the quality of the coffee, there are clear overhead costs associated with it that the plantation will have to manage through improved yield rates to help bring down the per hectare production cost.

The value chain analysis indicates that the highest value adding component for commercial Arabica farming is harvesting (50.8%), followed by fertilizing (37%), and plant maintenance (8.6%).

Diagram 9: Value Chain for Commercial Arabica Production in Lao



Source: Global Development Solutions, LLC

[6] The manager of the plantation noted that all of the technical staff is from Vietnam, and many of the technicians are returning to Vietnam to their own plantations. While attempts were made at transferring

Harvesting: Of the value added for harvesting, 58.7% is focused on labor inputs. Recalling that in smallholder production, the picking fee when measured in kip/kg was 558, which is well over twice the amount required under commercial production. This could, in part, be explained by the fact that technical supervision is provided throughout the harvesting process, and workers receive training on selection and picking. Even taking into account the overhead cost associated with having a management team in place, labor productivity and efficiency gains seem to clearly justify this input. This suggests that on-farm technical training could go a long way toward improving the production and productivity of farmers, particularly in smallholder production.

Fertilizing: As mentioned earlier, coffee grown on the commercial plantation is the only one analyzed that used chemical fertilizer. Specifically, the plantation used one ton of NPK at a cost of 3,100,000 kip/ha ($310/ha). According to the plantation manager, the use of fertilizers has helped improve the yield rate dramatically (no accurate measurements on yield improvements were available at the time of the interview).

The plantation purchased NPK at a price of 620 baht/50 kg bag ($15.50/50 kg bag), which is a very favorable price (FOB Mombasa for NPK is approximately $17.45/50 kg bag). What is troubling and requires further investigation is the inland transport and logistics cost of delivering fertilizer to inland areas. Specifically, during the same period in which this analysis was conducted, NPK was selling at FOB $195/ton Mombasa. Taking into account that it cost the plantation $310/ha/ton, the differential between FOB price and delivered price is a staggering 59%. This suggests that while the initial purchase price of fertilizer via Thailand is favorable, cost of delivering the same fertilizer to inland areas seems to be prohibitive.

Further work is required to determine the cost structure for the delivery of fertilizer as well as its appropriate use, particularly given the favorable soil conditions available in the region.

4.3.3.2 Catimor

Of all of the coffees analyzed, smallholder Catimor performed the best when measured in terms of kips/kg. Specifically, the yield rate was approximately 6,000 kg/ha of cherry, which translated into 1,000 kg/ha of clean coffee based on a production cost of 5,231 kip/kg. While the unit production cost was the lowest amongst all of the varieties analyzed, yield rate per tree was very low.

According to interviews, the tree density for Catimor is 4,000 trees/ha, which is extremely high. Given per hectare yield rate of 6,000 kg, this translates to only 1.5 kg of cherry per tree. Here again, there is concern over whether tree density is too high, which undermines the productive potential of each individual tree.

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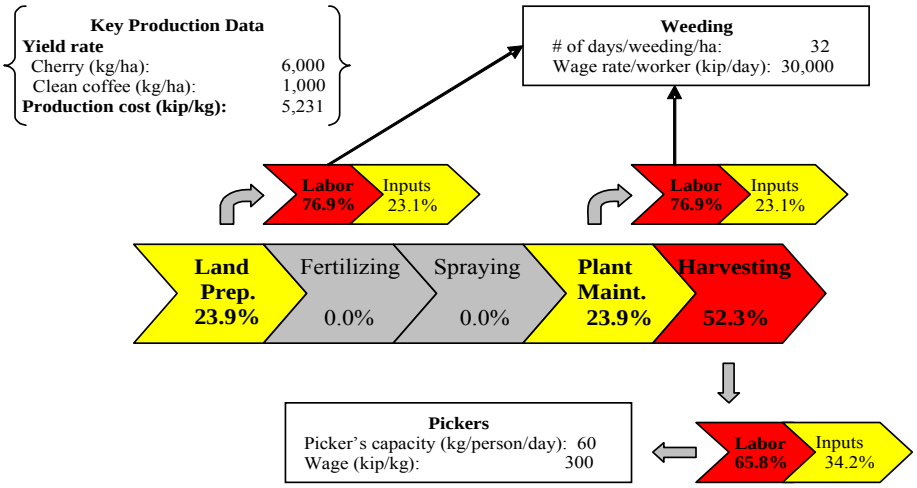
skills to local Lao farmers, the quality of labor and motivation is still lacking amongst local technicians, and thus further external support may be required to provide technical support to the farming family units.

Diagram 10: Value Chain for Smallholder Organic Catimor Production in Lao



Source: Global Development Solutions, LLC

The value chain analysis indicates that harvesting (52.3%), followed by plant maintenance and land preparation (23.9%) were the highest value adding activities for the smallholder farmer producing Catimor.

Harvesting: The analysis of smallholder Catimor farming highlighted the fact that whenever non-family members were hired as 'day laborers' to help pick cherries during harvest time, the standard form of payment was based on the amount that a person would pick in a day. According to interviews, the capacity of an average picker ranges from 45 - 60 kg of cherry/person/day. Based on a labor productivity of 60kg/person/day, the generally accepted wage rate was 300 kip/kg.

In the past, farmers would pick cherries whether it was green (unripe) or red (ripe), which were then all processed together. With slow but increasing awareness about quality, many farmers and brokers are no longer accepting green cherry as a part of a deliverable. And in fact, if a delivery contains green cherry, payments to a farmer would be discounted.

Picture 5: Ripe coffee cherry before being pulped

Photograph courtesy of Jhai Coffee Farmer Cooperative., Paksong, 2005

Land Preparation and Plant Maintenance: As with smallholder Arabica production, the level of weeding was approximately 32 man-days/ha. However, no other additional plant care such as pruning was done during this period. In this context, on-farm training is likely to help improve yield rate per tree.

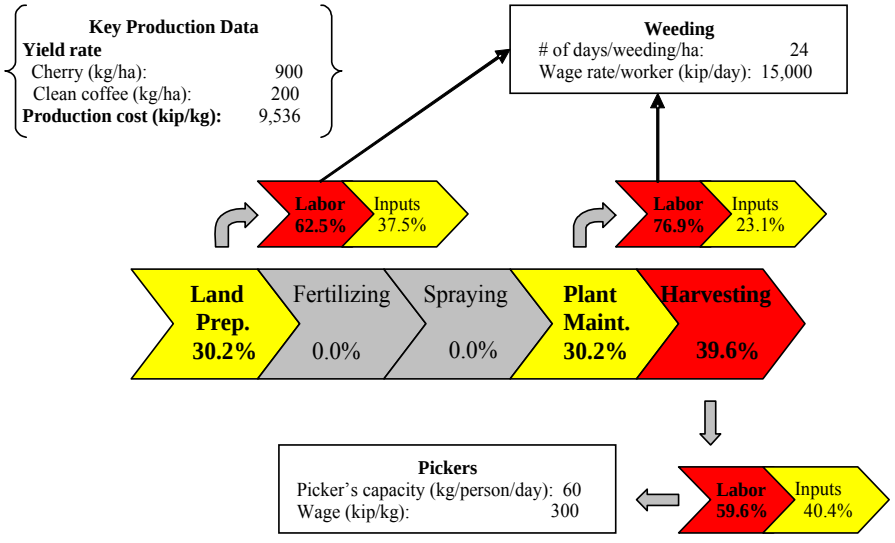
While the cost of production is low, perhaps the most troubling aspect of this analysis is the high tree density and the consequent low yield rate per tree. Further work is required to determine the optimal number of trees per hectare, particularly given the prevailing growing conditions in the Boloven Plateau. Initial assessment suggests that the current method of planting is depriving the productive potential of each individual tree, and that further consideration is required to introduce other planting methods to help improve yield rate per tree.

4.3.3.3 Robusta (1): Casual/Informal Smallholder Producer

A value chain analysis for two Robusta farmers was conducted. The first is an independent smallholder farmer and the second belongs to a cooperative. For the independent smallholder farmer revenue from coffee production was important, but was not the primary source of income. Consequently, limited attention was given to the maintenance and upkeep of the farm, which is reflected in the low yield rate. Specifically, the yield rate for the independent smallholder was approximately 900 kg/ha, which translated into 200 kg/ha of cherry at a production cost of 9,536 kip/kg.

The value chain analysis indicates that harvesting (39.6%), followed by land preparation

Diagram 11: Value Chain for Smallholder Organic Robusta (1) Production in Lao



Source: Global Development Solutions, LLC

and plant maintenance (30.2%) constituted the highest value added activities. For harvesting, the farmer used day laborers, paying them 300 kip/kg.

As indicated earlier, for this particular farmer coffee production was not the primary source of income. As such, limited amount of resources was directed toward maintenance and care of the coffee farm. This is reflected in the fact that only 24 man-days of weeding were devoted to the care of the coffee plants, and no pruning was done whatsoever.

What this analysis suggests is that while Robusta is a hardier variety than Catimor and Arabica, given the poor yield rate and the high unit cost of production (as reflected in kip/kg), casual or informal coffee farming is extremely costly for the potential economic benefits that a farmer may gain from operating a coffee farm. The high cost is also reflected in the fact that yield rate per tree is a mere 0.3 kg/tree. This is even lower than some of the poorer coffee farms in Kenya where the lowest yield rate per tree rarely goes below 1.0 kg/tree.

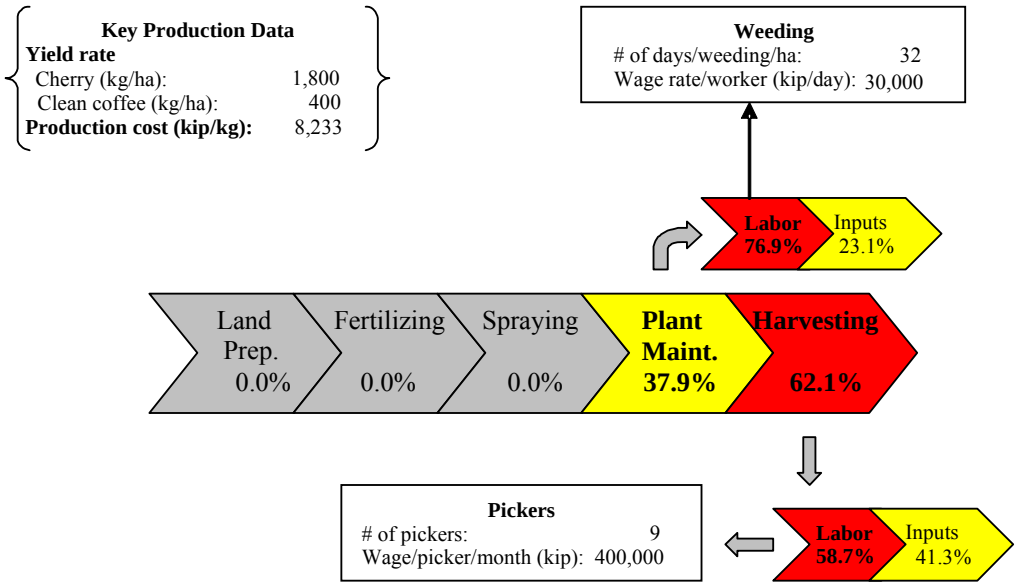
In this context, these figures suggest that further work is required to determine whether casual or informal coffee farming should be discouraged in place of other forms of income generating activities.

4.3.3.4 Robusta (2): Smallholder Cooperative Member

The second type of smallholder Robusta farmer interviewed for this exercise is a member of a cooperative. Unlike the previous Robusta farmer, this particular farmer was able to realize a yield rate of 1,800 kg/ha of cherry or 400 kg/ha of clean coffee at a production cost of 8,233 kip/kg. While the cooperative member was able to achieve twice the yield rate per hectare compared to the informal Robusta farmer, the cost of production, when measured in kip/kg is high compared to the cost of producing Catimor and Arabica.

As the value chain analysis indicates, the highest value added for this farmer was harvesting (62.1%). The reason for the high distribution of value added for harvesting is that this particular farmer did not investment any resources in land preparation – specifically, to weeding the coffee farm at the beginning of the season.

Diagram 12: Value Chain for Smallholder Organic Robusta (2) Production in Lao



Source: Global Development Solutions, LLC

Knowing that weeding is an important aspect of coffee tree care, the farmer did little to maintain his trees. When asked about this particular situation, the farmer pointed out that he has planted his trees along a forested area to take advantage of the shading available from the surrounding trees. Coffee trees tend to perform better when shade or indirect sun is available, thus it is not out of the ordinary for farmers to plant coffee in the forest as this farmer has elected to do. But generally this method of farming is practiced among poorer farmers who tend to rely on foraging and other informal economic means to meet their household consumption needs.

The weeding that was done later in the season was basically to clear away enough weed to help expedite the harvesting process rather than for the care of the coffee plant. Although very little care was given to the coffee trees by the farmer, the yield rate per tree was 1.8 kg/tree, which is low, but substantially better than the first Robusta farmer. While planting along shaded wooded areas seems to have helped this particular farmer improve his yield rate when compared to first Robusta farmer, it still raises the same question as to whether causal coffee farming is a viable economic option for poor farmers, particularly in remote areas.

As a final note, many coffee farms suffer from an insect infestation called coffee berry borer (CBB). Taking into account that most farmers do not spray their crop, CBB eats its way into the coffee cherry, and lays its eggs in the bean. Amazingly, the CBB can survive the drying process and are easily passed onto future generations of coffee production. It is estimated that up to 15% or more of a harvest is lost to CBB.

From a marketing perspective, leaving the coffee crop completely free of agrichemicals is a useful strategy to tap into specialty/niche markets. If farmers are to adopt this method of farming, alternative pest control methods need to be considered to help curtail losses and to improve crop productivity. But given the lack of institutional infrastructure and capacity, the likelihood that farmers would have access to integrated pest management options is highly unlikely. In this context, strengthening the capacity of extension services, as well as encouraging private participation in these activities is a necessary first step to help improve yield rates and the competitiveness of Lao coffee.

4.3.4 Primary Processing

Once a cherry is picked, it must be processed either using a dry or a wet-dry method.

Dry-Method: This method of processing consists of spreading the cherry on the ground in an open area to allow the sun to dry the cherry. Generally, smallholder farmers growing Robusta will use the dry method. Under favorable conditions, a farmer may only need to dry the cherry for approximately 30 days. The cherry must be turned over to allow for even drying. Generally, the moisture content of the bean must be brought down to at least 13%, but given the fact that measuring equipment is not readily available, there is very little quality control at this stage of processing. Once a cherry is dry, the once red outer shell turns black and fragile.

Wet-Dry Method: Farmers generally use the wet-dry method to process Catimor and Arabica. Once an Arabica or Catimor cherry is picked, it must be pulped within 24 hours to avoid rot. The first stage of processing is for the cherry to be pulped (the outer shell is ground off). As the pulping takes place, water is poured through the pulping machine. This helps to separate the 'floaters' (poor quality beans) from the rest of the beans, which generally settle on the bottom of the water channel.

A commercial pulper is a multi-stage piece of equipment which takes off the outer shell and channels the parchment (coffee bean with the inner skin still intact) through a water canal and separates the parchment using a gravity feed.

Picture 6: Coffee Pulping, Paksong, Lao

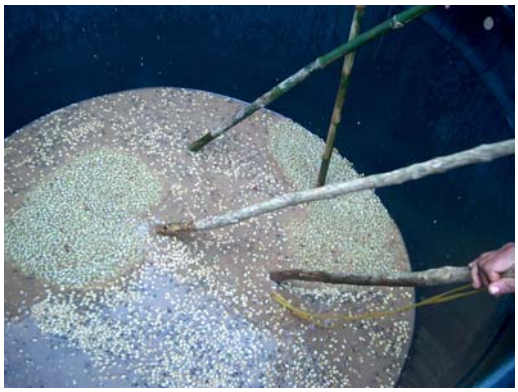
Medium-scale commercial pulper, Paksong, Lao, May 2005©.
Global Development Solutions, LLC

Small motor pulper and sorting canal, Paksong, Lao, 2005. Photograph courtesy of Jhai Coffee Farmer Cooperative.

Smallholder farmers generally use a small motor pulper and sort the parchment by hand. Generally, small motor pulpers are less efficient and require substantial labor input to sort through parchments.

Once the outer shell is removed, what remains is called a parchment, the green bean and its inner skin. At this stage, the parchment must be 'fermented' in water for up to 20 hours before it is sorted and dried. The fermentation period for Lao coffee is relatively short when compared to other countries like Kenya where parchments are allowed to ferment for up to three days. Fermentation and the subsequent soaking helps to remove the residual sugar from the green bean.

Picture 7: Coffee Fermentation, Soaking and Washing, Paksong, Lao



Smallholder farmer fermenting parchments. Paksong, Lao, 2005. Photograph courtesy of Jhai Coffee Farmer Cooperative.

Smallholder farmers, soaking, washing and sorting. Paksong, Lao, 2005. Photograph courtesy of Jhai Coffee Farmer Cooperative.

Once the parchments have been soaked and cleaned, they must now be dried. The drying takes place outdoors on a drying table, which consists of a long wire mesh table. As mentioned earlier, it takes up to 18 days of direct sun to dry the parchment to bring down the moisture content to between 11% - 12%. In order to achieve even drying, the beans must be turnover several times each day. Here again, no measuring equipment is available to measure the moisture content of the parchment. In this context, quality control continues to be a problem.

Picture 8: Coffee Drying, Paksong, Lao

Parchments ready for drying. Paksong, Lao, 2005. Photograph courtesy of Jhai Coffee Farmer Cooperative.

Smallholder farmers drying parchment. Paksong, Lao, 2005. Photograph courtesy of Jhai Coffee Farmer Cooperative.

Once parchments are properly dried, they are bagged in 100 kg bags and stored, ready for sales to a broker or for secondary processing.

4.3.4.1 Value Chain Analysis for Primary Processing

A value chain analysis for both commercial and smallholder primary processing was conducted to contrast the difference in cost and value adding activities. The analysis showed that commercial pulping cost approximately 265 kip/kg, while smallholder pulping cost nearly 2.5 times the amount (669 kip/kg).[7]

Table 18: Commercial and Smallholder Primary Processing Cost for Coffee in Lao

Primary Processing: Commercial

	Primary Processing			265.13 Kips/kg		
	Transport	**Processing**	**Packing**	**Maintenance**	**Transport**	**TOTAL**
Unit Cost	1.43	134.41	0.00	17.86	111.43	**265.13**
% of TOTAL	0.5%	**50.7%**	0.0%	**6.7%**	**42.0%**	**100.0%**

Primary Processing: Smallholder

	Primary Processing			669.63 Kips/kg		
	Transport	**Processing**	**Packing**	**Maintenance**	**Transport**	**TOTAL**
Unit Cost	200.00	181.50	85.00	3.13	200.00	**669.63**
% of TOTAL	**29.9%**	**27.1%**	**12.7%**	0.5%	**29.9%**	**100.0%**

Source: Global Development Solutions, LLC

The first and the most dramatic difference between the two processing activities is that for the commercial operation, the pulping facility is located on the plantation. As a consequence, the initial transport cost to bring the cherry to the primary processing facility is negligible. The transport cost to move parchment from the primary to the secondary processing facility is also higher for smallholder farmers who generally rely on local 'tuk tuk' to get the parchments to the secondary processing facility. While on the other hand, the commercial operation has its own fleet of trucks to transport the parchments to the secondary processing facility.

Even when transport costs are discounted from the overall primary processing costs, the cost of smallholder processing is 77% higher than commercial processing. The largest difference between the two processing methods is in the packing. In the commercial processing, taking into account that the parchments are moved immediately from the primary to the secondary processing facility, the cost of packing and storage does not appear as a part of a value added activity for primary processing. While for smallholder

[7] The primary processing costs are extremely low when compared to Kenya where costs are nearly 10 times the amount found in Lao. The difference in cost of electricity (twice as high in Kenya on a Kwh basis) between the two countries can only explain a part of the large difference. In this context, further analytical work may be required to identify the differences.

farmers, parchments are bagged and stored until the farmer feels that the market is offering a favorable price. In this context, here the difference in cost is an accounting matter rather than a technical cost issue.

If the cost of packing is discounted from the overall cost of primary processing for a smallholder farmer, however, the difference in processing cost is still over 22%. This difference is due to economies of scale, and the efficiency of large scale processing. Evidence of this can be found in the fact that with the small motor pulper, the fuel cost for processing one kilogram of clean coffee is approximately 136.5 kip/kg, while for commercial pulping, the cost of electricity for pulping is 92.8 kip/kg.

This data suggests that further, more rigorous analytical work is required to determine how and whether efficiency gains can be realized using small motor pulping process, particularly to help reduce primary processing costs for rural coffee farmers.

4.3.5 Secondary Processing

Secondary processing is when parchments are hulled (the inner skin is removed) and the green bean is sorted according to size and shape. Here again, there is a price differential between commercial and smallholder hulling. According to preliminary analysis, the total secondary processing cost for a commercial operation is approximately 113 kip/kg of clean coffee, while smallholder hulling is about 100 kip/kg.

Table 19: Dry (Secondary) Processing (Cost/ton) in Lao

	Commercial	Small Scale
Hulling		
Transport to warehouse	20,000	
Reception of parchment	7,500	
Power	10,000	
Machinery maintenance	5,000	
Supervisors/Labor	21,000	
Other inputs	4,000	
Handling		
Bagging/storage	5,000	
Transport to Thai Border	5,000	
Truck maintenance	30,000	
Other services	5,000	
TOTAL ($/ton)	**$11.25**	**$10.00**
TOTAL (Kip/ton)	112,500	100,000
TOTAL (Kip/kg)	113	100

Source: Global Development Solutions, LLC

A closer scrutiny of the data suggests that for the commercial processor, the cost of processing also includes transport to the Thai border and truck maintenance cost. When these two factors are discounted from the cost of secondary processing, the actual processing cost was only 72.5 kip/kg. Here again, economies of scale seems to help explain the lower cost structure for secondary processing.

It should be noted that smallholder farmers do use the services of commercial processors. In this context, further work may be required to help develop a more efficient channel to access and contract commercial processing facilities.

4.3.6 Summary

Preliminary data from the integrated value chain analysis suggests that given the various cost structures and processing methods, farmers who elected to farm the Catimor variety, using the small motor pulping and commercial hulling, performed the best when measured in profits (10,828 kip/kg). This was followed by smallholder farmers growing Arabica (8,462 kip/kg) and commercial Arabica farmers (4,706 kip/kg).

Table 20: Production Cost and Possible Net Profit/Loss Profile for Lao Coffee, 2005
All Prices in Kip/kg

	Farming cost	Primary Processing	Secondary Processing	Total Cost	Selling Price to Broker within Lao	Direct Sales	Net Profit/ Loss*
Arabica							
Smallholder	7,569	669	100	8,338	16,800		8,462
Commercial	11,957	265	72	12,294		17,000	4,706
Catimor	5,231	669	72	5,972	16,800		10,828
Robusta							
Informal	9,536		100	9,636	9,000	-	636
Cooperative	8,233		100	8,333	9,000		667

* Net profit before broker fees

Source: Global Development Solutions, LLC

As the table above indicates, Robusta farmers did not fair well in this analysis. Specifically, informal Robusta farmers using a dry method end up with a net loss of 636 kip/kg, while the cooperative grower faired slightly better with 667 kip/kg net profit. It should be noted that this profit does not reflect deduction of broker fees.

These preliminary figures suggest that further efforts are needed to move farmers away from Robusta, and to reconsider the economic benefits of promoting informal coffee production as an income supplement for rural farmers. On the other hand, further efficiency gains, particularly in on-farm and post harvest handling techniques can go a long way toward improving the income generating potential for rural coffee farmers.

Another problem which did not appear in the value chain analysis, but is of great importance to the development of the coffee sector is the absence of quality standards. Specifically, given that quality standards and grading systems have not been established, there is no incentive for farmers to strive to produce better quality coffee. In this context, traders who can spot high quality coffee take advantage of a farmer by offering to pay the prevailing market price, and then reselling the coffee at a premium through foreign buyers.

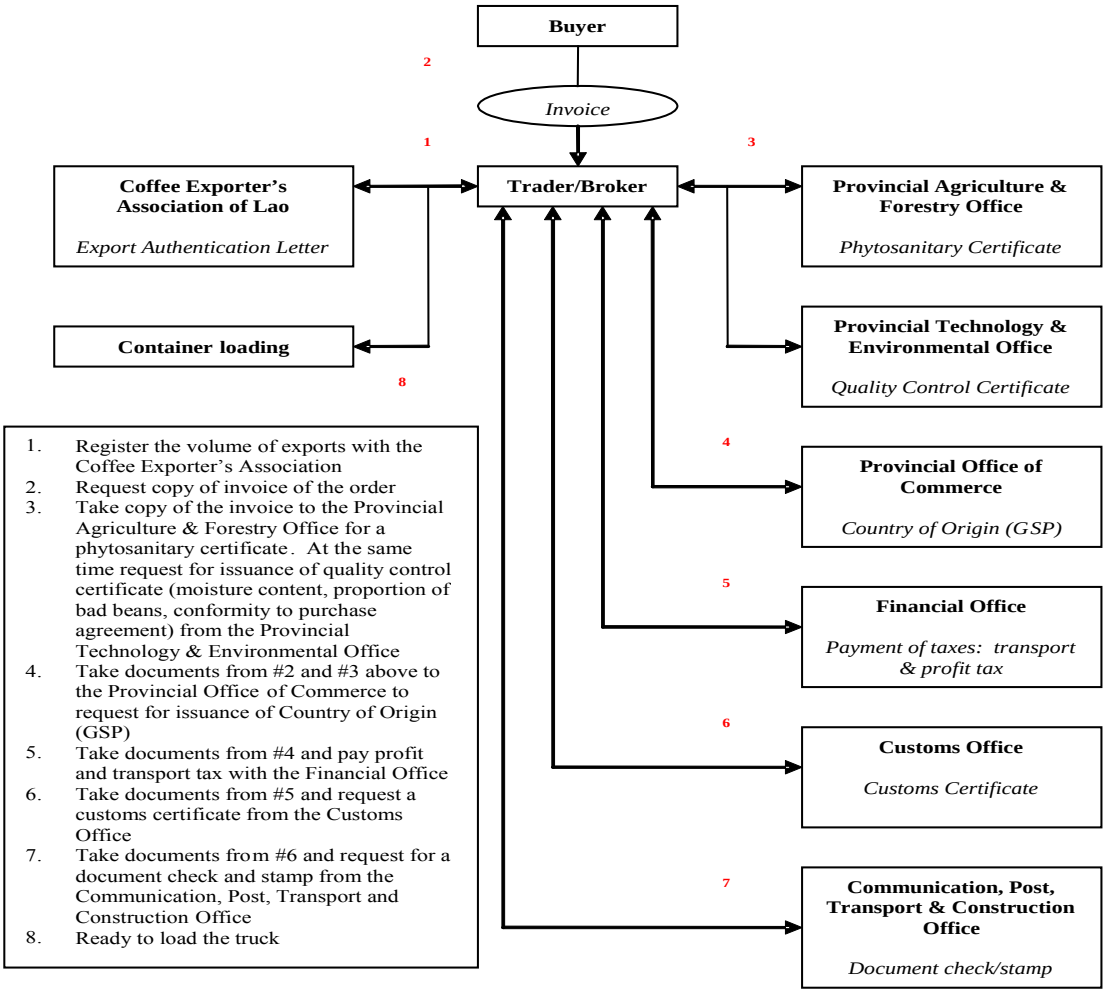
The absence of quality and grading standards also points to the fact that Lao lacks certified liquoring specialists to help categorize coffee, as well as to respond to demands from international buyers seeking distinct and complex flavor, aroma, acidity and

character. In this context, with regards to standards and certification, Lao is lagging behind other major coffee producing countries.

4.4 Export Procedure for Exporting Coffee from Lao

Once the coffee has been cleaned, sorted and bagged, it is ready to be exported. Before this can happen however, a trader (company or an individual) must follow a 7 stage approval process at a cost of approximately 13.4 million kip for a 20 foot container, which can carry up to 19 tons of coffee (refer to diagram below).

Diagram 13: Procedure for Exporting Coffee from Lao PDR



Ministry & Association	Activity	Time (days)	Cost (kips)/20' Container
Agriculture & Forestry	Phytosanitary Certificate	0.5	19,200
Technology & Environment	Quality Control Certificate	0.5	19,200
Commerce	Country of Origin (GSP)	0.5	110,000
Finance	Transport and profit tax	Immediate	1,344,000
Customs	Customs clearance	0.5	8,640,000
Communication, Post, Transport & Construction	Document check & stamp	Immediate	100,000
Exporter's Association	Registration of export volume	Immediate	76,000
Other Costs			3,131,600
TOTAL			**13,440,000**

20' container = 19 tons of beans

Source: Global Development Solutions, LLC

Given the number of stages required for approval, the actual time required for authorization is relatively short (in most instances, full clearance can be obtained within 3 – 4 days). In July 2001, the government introduced a decree on import-export management with an objective of lessening the procedural steps by setting up a "One-Stop Service Unit". The objective of setting up this unit was to gather all of the relevant approving bodies at various border checkpoints.

Since 2001, a number of other notices and instructions were issued to help expedite the authorization process, with the latest instruction issued in September 2004 (Import-Export Instruction No. 24/PM), which requires further simplification so that only one counter and one signature would be required for each office, and all of the documentation for each office must be completed within 1 – 2 business days.

While in principal the "One-Stop Service Unit" is in place to expedite the export process, in reality, however, it does not function efficiently. In many instances, all of the officers required for authorization are not present at the same time, resulting in delays that may last hours or even days. In such situations, an exporter must pay a fine to the shipping company on the other side of the border waiting to collect the shipment. In addition, when consolidated export transaction costs are compared against Cambodia (Sihanoukville), the cost of transiting goods through Laem Chabang Port (Thailand) is extremely costly.

Table 21: Comparison of Consolidated Export Charges

	Lao*	Sihanoukville**
Export Clearance/Authorization Document	$1,344.00	$329.03
Transport to Port	$431.00	$323.00
Port Documentation/Charges	$589.80	$153.00

*via Laem Chabang
** from Phenom Penh, Cambodia
Source: Global Development Solutions, LLC

But as the table above indicates, although port documentation and related charges through Laem Chabang are 3.9 time more than the actual costs charged in Sihanoukville Port,[8] the more disturbing aspect of this comparison is the substantial difference in export clearance and authorization costs which are 4.1 time higher in Lao when compared to Cambodia. Although the charges presented here for Sihanoukville Port does not reflect the high undocumented charges, the gap between the two charges are substantial and warrants further detailed analysis.

Unfortunately, given the time constraint, the team was unable to conduct an export authorization time lapse analysis. Taking into consideration that some smaller traders

[8] The cost presented here does not reflect the high undocumented costs associated with exporting through Sihanoukville Port. In addition, taking into consideration that changing port related charges in Thailand has a complex political dimension, the focus of our attention should be on helping to reduce local charges such as the export documentation and authorization charges.

have greater difficulty acquiring all of the necessary authorization in a timely fashion, this suggests that further detailed analysis in this area according to border crossing would serve as a useful benchmark to help identify specific areas where improves are required to expedite import-export transaction requirements in Lao.

4.4.1 Transportation and Documentation Costs Associated with Exporting Coffee from Lao

As mentioned earlier, transport and documentation costs associated with exporting coffee from Lao is high when compared to an example from Cambodia. In this context, a detailed breakdown of costs associated with transporting coffee for exports was undertaken to highlight some of the key areas of concern.

Table 22: Coffee Export Transaction Costs, Lao
20 Foot Container, from Chongmex to Laem Changang Port

Chongmex - Laem Chabang Port	**Cost ($)**	**Cost (Kip)**	**Cost (Baht)**
Total Transport and Documentation Costs	***$807.50***	***8,075,000***	***32,300***
Chongmex - Laem Chabang Port Transport	***$431.00***	***4,310,000***	***17,240***
Other Costs	***$376.50***	***3,765,000***	***15,060***
Document charges	$50.00	500,000	2,000
Thai customs fee	$40.00	400,000	1,600
Undocumented cost (Thai)	$61.00	610,000	2,440
Clearing agent fee	$107.75	1,077,500	4,310
Freight forward fee	$64.65	646,500	2,586
Stuff charge	$7.50	75,000	300
Other charges	$45.60	456,000	1,824
Port Charges	***$213.30***	***2,133,000***	***8,532***
Port Clearing Charges	$95.60	956,000	3,824
THC	$65.00	650,000	2,600
B/L	$20.00	200,000	800
Handling	$25.00	250,000	1,000
Tax	$7.70	77,000	308
LoLo			
Undocumented cost (Port)			
TOTAL With Port Charges	**$1,020.80**	**10,208,000**	**40,832**

Source: Global Development Solutions, LLC

As the table above indicates, transport (42.2%), documentation charges (36.9%), and port charges (20.9%) added up to $1,020.80 for a 20 foot container. As mentioned earlier, port charges are not dictated by the Lao Government, thus the focus of the discussion will be on the documentation costs. Taking into consideration that Lao does not have a functioning treaty to allow for reciprocal customs and clearance authorization, all cargo must be inspected once in Lao to meet provincial and national authorization requirements, and again at the border of entry into one of the neighboring countries, and finally at the port where the cargo is to be loaded onto a ship. As a consequence, import-

export transaction costs are generally higher than non-land lock countries. In this context, whether minimizing the financial burden of local inspections or aggressively negotiating bilateral agreements with neighboring countries, action is required to help reduce the financial burden, particularly related to government inspections of exporting goods from Lao.

Preliminary analysis suggests that within the context of documentation charges associated with exporting coffee, undocumented costs ('tea money') paid to Thai officials, particularly at the border crossing, accounted for approximately 16.2% of the overall documentation charge. An additional 12.1% of the documentation costs were directed towards Lao officials for undocumented costs. In total 28.3% of the total documentation costs were unofficial payments to help expedite the export process. While the cost of producing and processing coffee is relatively competitive in Lao, export transaction costs quickly discount the competitive edge that Lao has as an exporter of coffee.

5 Sector Analysis – Maize

5.1 Summary of Findings

5.1.1 Barriers to Competitiveness

The following matrix provides a summary of key findings that inhibit the competitiveness of the maize sector in Lao.

Chart 6: Summary of Key Barriers to Competitiveness in the Maize Sector in Lao
9.0 Market Constraints 9.1 Poor access to information about seed variety selection 9.2 Poor access to appropriate seed varieties 9.3 Untimely access to finance through APB drive farmers to use high cost financing through brokers 9.4 Absence of efficient market distribution channel for accessing agricultural inputs, particularly seeds 9.5 High cost of tractor hire due to high cost of fuel 9.6 Absence of a transparent market transaction mechanism for farmers to trade maize 9.7 Lack of market information to allow farmers to improve negotiation leverage with brokers and other buyers 9.8 Absence of a contract mechanism to help bind relationship between farmers and their investors/sponsors 9.9 Absence of a code of conduct among players in the sector to limit pirate purchasing 9.10 Price discovery process for maize is not reflective of actual cost due to the lack of market information 9.11 No local value added to maize, thus foregoing local capital retention by at least a factor of three 9.12 High cost of transporting
10.0 Governance 10.1 Lack of promotion and awareness to take advantage of local seed varieties 10.2 No soil conservation programs in place to limit aggressive slope and hill tillage, and to offer alternative methods of farming 10.3 Lack of regulatory framework and enforcement capability to help ensure that seed varieties sold in the market serve the best interest of the farming community 10.4 Better access to affordable farm land and land titling is not addressed 10.5 Absence of grading, classification and quality standards to differentiate product pricing and to reward farmers for producing a quality product 10.6 Excessive government interventions in market transactions
11.0 Institutional 11.1 Absence of or weak extension services, particularly for rural farming communities 11.2 Lack of knowledge about multiple or intercropping techniques 11.3 Continued use of slash and burn technique with little to no training available on conservation measures 11.4 Lack of access to farming techniques, particularly for rural farming communities 11.5 High soil erosion and increased danger from landslides 11.6 Absence of an awareness campaign to move farmers away from the use of retained hybrids to more productive local seed varieties 11.7 Improve awareness among rural farming communities regarding crops and cropping options 11.8 Absence of metrological services, particularly to measure moisture content of maize 11.9 Lack of know-how regarding post-harvest handling and storage techniques, resulting in high grain losses 11.10 Weak farmers associations to help pool resources and to organize community or communal storage sheds
12.0 Human Resources 12.1 Poor on-farm farming technique 12.2 Little knowledge about farm management 12.3 Limited knowledge and skills base of extension workers
Source: Global Development Solutions, LLC

5.1.2 Key Market Drivers

A. Regional Animal Feed Market

The one principal market driver for maize production in Lao is the growing demand for animal feed in neighboring countries such as China, Thailand and Vietnam. The total number of livestock produced in 2004 between these three countries was over 1 billion animals, with an average annual growth rate of between 2.8% - 3.0% per year, with the largest sustained growth coming from China. It is anticipated that this growth will continue at its current rate, which is expected to create further demand for maize and other feed inputs.

B. Domestic Livestock Production

In addition to the growth in the animal feed market in the Mekong Region, the livestock sector in Lao is also growing at a steady pace yet the country continues to be a net importer of animal feed. It is estimated that in 2004, 4.1 million animals were produced in Lao, which reflects an average annual growth rate of 3.7% for the past two years.

Human consumption of maize is limited and there is no commercial application of maize in Lao. In this context, demand for maize in Lao is likely to come from traders operating along border areas of China, Thailand and Vietnam, as well as from local feed mills.

5.1.3 Options for Growth

Integrated Feed Mills

While demand for animal feed continues to place pressure on maize production, the animal feed sector in Lao has not responded in kind with new investments in further value adding activities. As a consequence, maize continues to exit the country in its raw form rather than as a value added product. In this context, taking into consideration that Lao is capable of producing all of the key inputs required for the production of animal feed, it is anticipated that options need to be explored to encourage investments in establishing integrated feed mills, as well as to establish an efficient feed distribution network. Given the poor road infrastructure, particularly in rural areas, a distribution network would most likely be decentralized, and revolve around key provinces that produce maize, rice, beans and other crops required as inputs for supporting an integrated feed mill.

Generally, initial investment required for establishing a small and medium scale integrated feed mill is no more than $300,000. For such an operation, the start-up cost is limited, but other non-cost issues need to be considered. These include:

- Appropriate equipment and technology;
- Training for operating a feed mill;
- Affordable storage and warehousing services;
- An efficient market distribution network;

- Establishment and enforcement of phyto-sanitary standards;
- Affordable transport services;
- Enforcement of standardized labeling requirements;
- Affordable metrological services; and
- An efficient market infrastructure that allows farmers to trade the necessary inputs for the production of animal feed

5.2 Sector Profile

With over 2.7 million tons of production, rice dominates the agricultural sector in Lao. From the perspective of area harvested, maize is the second most important crop in Lao (48,000 ha), with production reaching over 112,000 tons in 2004.

Table 23: Production of Key Crops in Lao (2004)						
	Rice	**Sugar cane**	**Maize**	**Cassava**	**Tobacco**	**Coffee**
Production (tons)	2,700,000	225,000	112,000	83,000	33,400	32,200
Area Harvested (ha)	820,000	6,700	48,000	4,200	6,700	37,000
Yield (tons/ha)	3.3	33.5	2.3	19.7	5.0	0.8
Source: FAOSTAT						

Alternative crops grown in conjunction with maize include beans and root vegetables including cassava. The average farm size ranges from 0.7 – 3.2 hectares with some single farms reaching as large as 15 hectares or more. It is estimated that approximately 60% of maize land is inherited and 30% of the land being reclaimed. In this context, clear land titling is not always a common characteristic among Lao maize farmers.

With an average rainfall of between 1,380 mm, rain fed[9] agriculture along slopes with clay soil conditions (Calcaric cambisol, ferric, haplic acirsol) is a relatively common feature of Lao maize farming conditions. The usual planting cycle begins in April with harvesting in August, with the exception of those farmers who leave their crop on the stock for drying, in which case harvesting takes place in September. With no fertilizer and 16 – 20kg of seeds per hectare, the average yield rate achieved by Lao maize farmers ranges between 2.3 – 5.2 tons per hectare.

Given an average farm gate price of 651 – 792 kip/kg, over 90% of the harvest is sold to poultry and livestock feed mills. While there are a number of feed mills operating in Lao, a large portion of the maize is exported formally or informally to China, Thailand and Vietnam.

In 2001, the price of maize declined to a low point of about 480 kip/kg when the Government prohibited the export of maize to help secure input material to boost

[9] The rainy season is May to September.

domestic feed production. Unfortunately, feed exports did not respond according to Government plans, which resulted in an overstock of maize in the local market.

5.2.1 Key Policies and Institutions

The Ministry of Agriculture and Forestry (MAF) articulated its policies towards the development of the agricultural sector under the "Vision for Agricultural and Forestry Development until the Year 2020". The development policy emphasized three key factors:

- Stable production of food;
- Production of commercial agricultural and livestock production; and
- Stabilization of slash-and-burn farming.

In addition to the MAF's 2020 vision, with the assistance of the Asian Development Bank, further clarifications were made through "The Government's Strategic Vision for the Agricultural Sector", which emphasized seven key development approaches:

1. Planning;
2. Human resources development;
3. Business regulatory reform;
4. External trade;
5. Flat land transformation;
6. Slopping land development, environmental management and shifting cultivation; and
7. Irrigation.

More specifically in the maize sector, the Provincial Agriculture and Forestry Office (PAFO) and the District Agricultural and Forestry Office (DAFO) and the Agricultural Promotion Bank (APB), play a central role for farmers seeking to access agricultural inputs. First, an assessment of seed demand is conducted by DAFO. Based on this data, a meeting is convened between DAFO, PAFO, the Ministry of Trade, APB and private traders to define the seed requirement for the upcoming season. While farmers are free to purchase seeds or to use retained hybrids, those interested in clean seeds of a particular variety tend to purchase seeds through the DAFO-PAFO-APB scheme.

On the product marketing side, in the late 1990s, the decentralization policies of the Government transferred greater authority to the provinces, especially to the Provincial Commerce and Tourism Office. To facilitate this process, the State Enterprise for Food and Crop Promotion (SEFCP), under guideline No. 06/PM (23/3/1999) from the Prime Minister's Office was authorized to:

- Implement government policies, including price control in markets under the direction of the Provincial Commerce and Tourism Office;
- organize cooperative groups;
- adjust prices;
- mobilize members to follow government regulations and decrees;

- coordinate with other relevant agencies to promote production, management and inspection activities;
- promote payment in local currency;
- eliminate illegal trade;
- control trading inside and outside the province; and
- control quality, weigh scale, grading, and protect consumers.

Given this wide reaching authority, in some provinces SEFCP holds a monopoly on marketing food commodities, often not allowing private traders to operate without SEFCP authorization.

Under Decree No. 755/KKh (20/6/2001), the Ministry of Commerce controls the establishment and control of markets, which stipulates the role and function of district and provincial governments. The decree instructs district and provincial authorities to organize a Market Management Committee for each market.

Ministerial Decree No. 464/KKh (8/12/1993) gives opportunities for all people to enter into retail trade by following established tax and arbitration regulations. This Decree helped liberalize trade, particularly at the retail level.

Local retail markets are organized by the Local Market Organization (LMO), which is attached to the District or the Provincial Commerce and Tourism Office. The role of the LMO is to collect rent, manage market activities, and to assure a clean and secure market place. LMO does not control prices and the flow of commodities into the market.

5.2.2 Market Structure and the Supply Chain for Maize

Agricultural production in Lao is dominated by rice, but other cash crops under cultivation include tobacco, cotton, sugar cane, coffee and maize. According to an Agricultural Production Survey conducted by the MAF, between 48,000 - 50,000 hectares are under maize cultivation, with production reaching over 117,000 tons in 2000 (this figure has declined to approximately 112,000 tons in 2004). Disaggregated by province, Luangprabang, Huaphanh, Sayabury, and Siengkhuang constitute over 46% of the country's total production of maize (refer to Table 24).

While some maize is consumed domestically, most of the production is exported to China, Vietnam and Thailand to be used as animal feed. Most maize production takes place on family farms where average area of cultivation is between 1 – 2 hectares.

Table 24: Maize Production in Lao (1999-2000)

	Hectare (ha)		Ton/ha		Ton		
	1999	2000	1999	2000	1999	2000	% of Total
Vientiane Mun.	1,350	1,830	2.79	2.83	3,770	5,175	4.4%
Phongsaly	4,210	3,220	2.31	2.29	9,720	7,376	6.3%
Luangnamtha	1,230	370	2.00	2.01	2,460	743	0.6%
Oudomxay	1,170	2,330	2.27	2.35	2,660	5,486	4.7%
Bokeo	1,910	1,610	2.37	2.78	4,525	4,471	3.8%
Luangprabang	4,570	4,730	2.16	2.19	9,850	10,357	8.9%
Huaphanh	6,160	6,040	2.35	2.45	14,490	14,808	12.7%
Sayabury	4,980	5,590	2.50	2.50	12,450	13,965	11.9%
Xiengkhuang	5,890	5,910	2.51	2.52	14,810	14,876	12.7%
Vientiane	2,130	3,470	2.64	2.61	5,625	9,060	7.7%
Borikhamxay	640	1,660	2.46	2.46	1,575	4,085	3.5%
Khammuane	690	780	2.49	2.42	1,720	1,889	1.6%
Savannakhet	2,990	4,220	2.05	2.05	6,120	8,671	7.4%
Saravane	1,710	4,290	2.29	2.25	3 915	9,657	8.3%
Sekong	300	830	2.20	2.19	660	1,815	1.6%
Champasack	270	1,420	2.37	2.21	640	3,144	2.7%
Attapeu	400	450	1.86	1.89	745	851	0.7%
Xaysomboun SR	150	260	2.50	2.20	375	572	0.5%
Total	**40,750**	**49,010**	**2.36**	**2.39**	**96,110**	**117,001**	**100%**

Source: Ministry of Agriculture and Forestry (Agricultural Production Survey)

5.2.2.1 Accessing Agricultural Inputs

Taking into consideration the favorable soil conditions and the lack of financing, maize farmers in Lao generally do not apply fertilizers and sprays, with the exception of some manure. In this context, the only agricultural input required is maize seed. There are at least four ways in which maize farmers are accessing seeds:

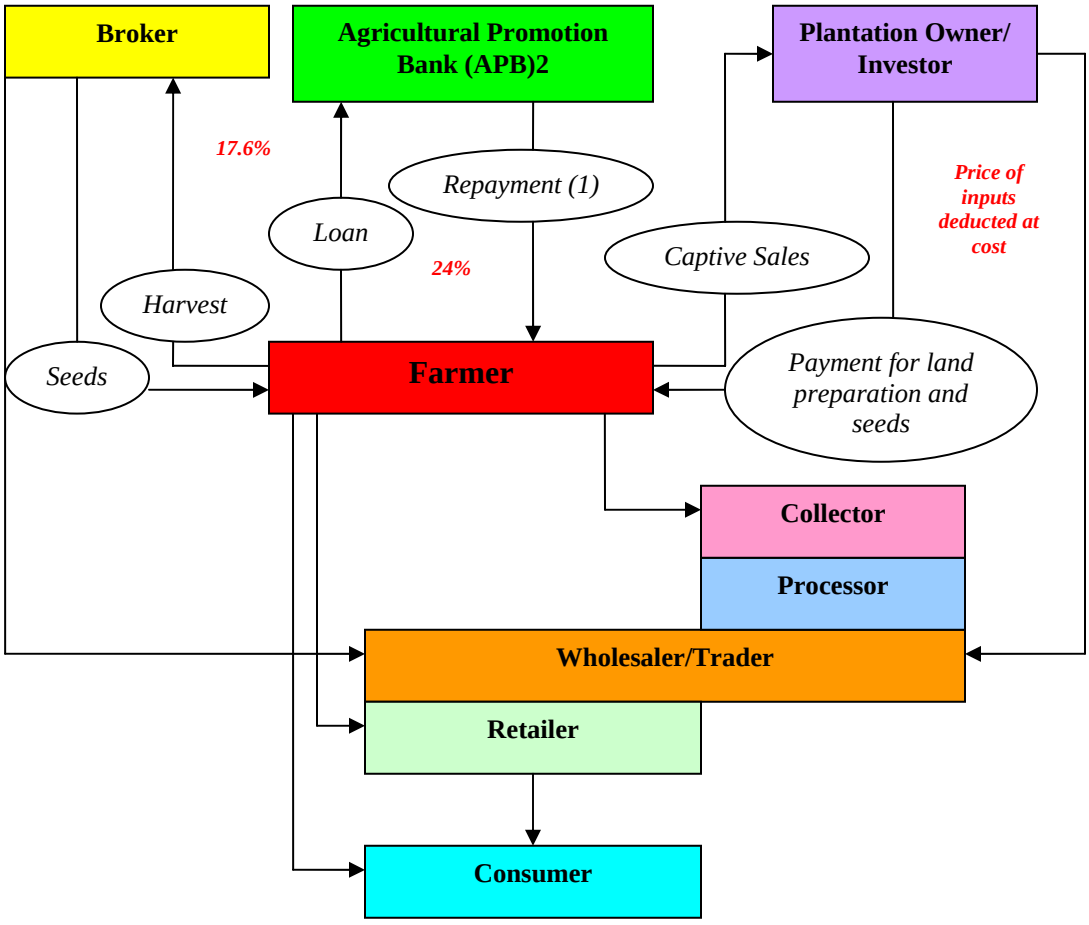
- Retained hybrids (recycling previous year's seeds);
- Purchasing seeds through a PAFO-DAFO-APB scheme;
- Acquire sponsorship from an investor or an estate owner; and
- Acquire seeds through a broker.

While yield rates tend to be lower than using a clean seed, maize farmers, particularly in poor areas, rely on retained hybrids from the previous year to sow their next crop. There is ample evidence to suggest that recycling seeds has a negative impact on yield rates, but in the absence of an affordable agricultural input purchase scheme, maize farmers are likely to continue using retained hybrids.

Under the PAFO-DAFO-APB scheme, seeds are purchased and distributed by PAFO-DAFO to farmers, and paid for using a loan issued by the APB. Credits to farmers are generally issued in late April or May, and following the harvest in November/December, the loan is repaid by the farmer to the APB with interest, which was raised to 20% per

annum in March 2004. Currently, there are no other formal credit institutions other than the APB, but increasing number of villages are instituting their own informal lending activities where interest rates range between 20% - 42%.

Diagram 14: Accessing Agricultural Inputs and Maize Markets



1. 30% - 40% interest rate/season
2. In conjunction with the Provincial Agriculture and Forestry Office (PAFO) and the District Agriculture and Forestry Office (DAFO)

Source: Global Development Solutions, LLC

A relatively new phenomenon in the market is the introduction of 'investors' or 'sponsors' who provide a range of financial support to farmers in exchange for their harvest. Generally, farmers are given seeds, fertilizers and other inputs, in exchange for a captive sale of the maize harvest.[10] No formal contracting arrangements are made, and such agreements are built on trust. In addition to providing agricultural inputs to help win farmers' loyalty and trust, food and other provisions are sometimes provided to the

[10] In some instances, an 'investor/sponsor' may pay for land clearing and preparation.

farmers. Generally, such 'investors' or 'sponsors' have their own farms and possibly even a processing facility. In this context, the purchasing scheme is not much different from a relationship that a farmer might have with a broker, but the intent of the 'investor' or 'sponsor' is to develop a long-term relationship with farmers so as to establish an on-going out-grower scheme.

The last type of input financing is through a local broker. As with many other sectors, a broker provides the necessary inputs to the farmer, and the farmer has the option to pay for these inputs in cash or take them on credit. Generally, farmers tend to use credit particularly for the purchase of seeds.

A broker or a trader purchases seeds from Vietnam or Thailand at a price of about 17,000 kip/kg. When farmers pay cash for the seeds to a broker, generally, the cost of seeds is about 18,000 kip/kg (this gives the trader or broker a 5.9% margin). On the other hand, if a farmer takes the seed on credit, then the cost of seeds goes up to approximately 20,000 kip/kg, which is paid back to the broker after the harvest. This provides the brokers with a margin of approximately 17.6%.

Table 25: Maize Seed Purchased from Vietnam and Resold to Farmers

	Kip	% Margin
Purchase price	17,000	
Resale price:		
Cash	18,000	5.9%
Credit	20,000	17.6%

Source: Global Development Solutions LLC

While the cost of financing seeds through a broker is relatively high, in this particular case, it is lower than the cost of financing seeds through a PAFO-DAFO-APB scheme.

5.2.2.2 Farm-to-Market Supply Chain

The marketing system in Lao is still in its embryonic stage. The market is characterized by many small traders and the markets are generally very crowded (refer to Diagram 14 above). Middlemen tend to play an important role in bridging the gap between various players along the supply chain. This of course adds to the transaction cost of maize from farm-to-consumer.

Once the crop is harvested the maize farmer has a number of options to get the crop to market.

- ***Broker:*** If a farmer has a previous arrangement with a broker to sell the harvest, the broker will collect the harvest where the price of the seeds and any other inputs purchased on credit from the broker is deducted before the farmer is paid. The broker then takes the harvest to be sold to a wholesaler or a trader who in turn sells the maize to feed mills.

- ***Investor/Sponsor:*** Very much like the arrangement with a broker, if a farmer has a previous arrangement with a broker to sell the harvest, an investor/sponsor will collect the harvest where the price of seeds and any other inputs provided are deducted from the value of the harvest, generally at cost. The investor/sponsor may have his own thrasher, or may elect to pay someone else to process the maize before selling it to a trader or even processing it further to make animal feed for both market sales and internal consumption.
- ***Direct Sales:*** The farmer may have his own thrashing equipment or own processing equipment as a group within a village, where the maize is processed and is sold directly at a nearby village market.
- ***Collector:*** Generally, there are one or more farmers who also serve a function as a collector for a village. These farmers often have motor bikes or other means of transportation to collect maize from other villagers and to deliver it to a processor for processing.
- ***Collector/Processor/Wholesaler:*** Unlike a collector mentioned above who is a member of the same village as the farmer, there are independent collectors, or middlemen, generally from outside the village who collect, process and sell maize. As farmers do not have a formal and binding agreement with brokers and investors/sponsors, independent collectors are known to disrupt the distribution system by offering farmers a slightly higher price than those agreed on between farmers and brokers and investor/sponsors, thus tempting farmers to break their pre-arranged agreement with other buyers.

Price Discovery Process

The price discovery process takes place in a number of ways according to the marketing channel used by a farmer. When a farmer is using a broker, the broker establishes the price according to the prevailing retail market price. The previous year's prices and production costs are taken into account, but farmers generally do not have access to or knowledge of current prices and are therefore price takers in the negotiation process.

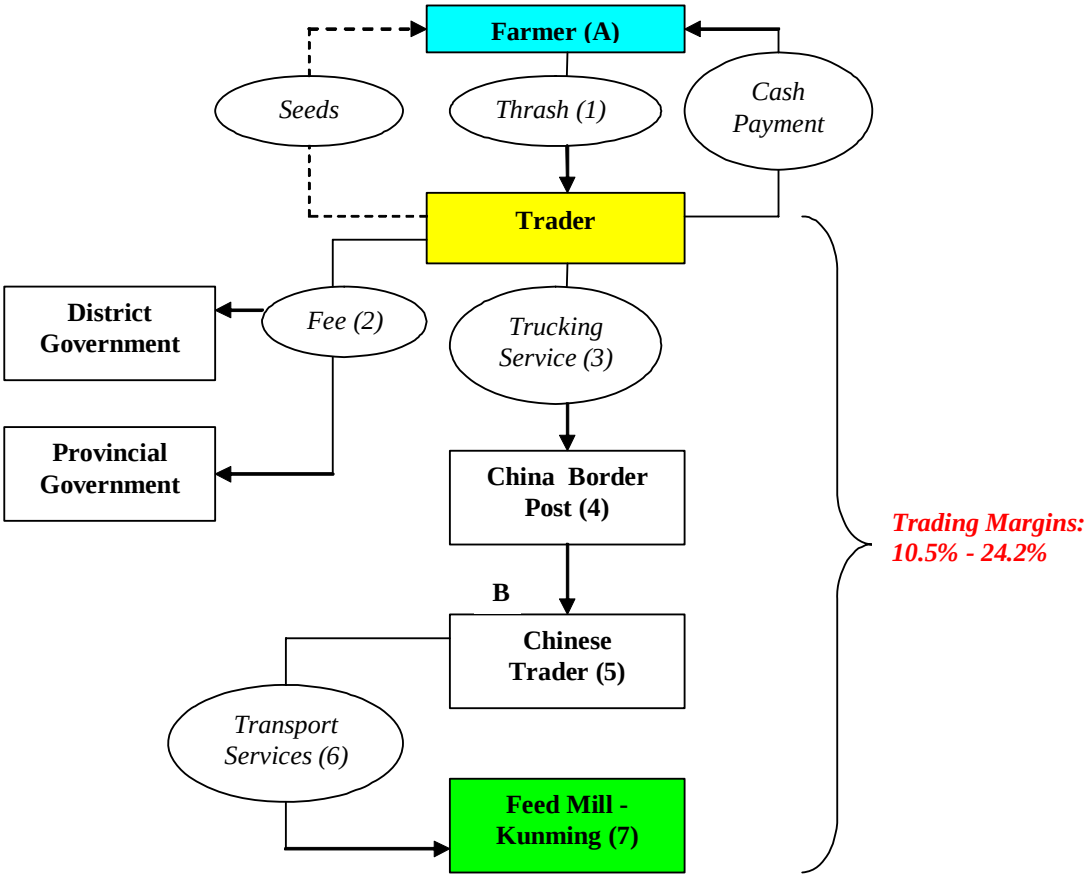
In the case of farmers who are also collectors, the prices are set by the farmer based on the prevailing price at the market and the volume of maize being traded at the market. Here again, in the absence of market information, all market transactions are based on spot market prices.

An Example of Maize Trading with China for Use as Animal Feed

While maize is consumed locally in the form of maize meal, whole roasted cobs, and in other forms, the focus of attention is often on selling maize for animal feed. Local traders as well as traders from Vietnam, Thailand and China often seek out maize production from Lao. Generally, the pattern of transactions between farmers and traders that channel maize into the animal feed market is similar. In this context, Diagram 15 below provides insight into the transaction costs associated with transferring maize from farmer to a feed processor in Kunming, China.

In this example, the farm gate price of maize was 700 kip/kg and the trader pays for thrashing, which cost approximately 30,000 kip/kg. Once the maize is ready to be transported, the trader pays a fee of 220 – 240 kip/kg to both the district and provincial government offices, equally. The maize is then trucked to the Chinese border post at a cost of about 13.6 kip/kg[11]. The delivered price of maize to the Chinese border post is 950 – 970 kip/kg.

Diagram 15: Maize Transaction Flow from Farmer-to-Feed Mill



A. Farm gate price: 700 kip/kg (September 2004)
B. No tariff on border trade if <3.9 million kip/person/day
1. Thrashing cost: 30,000 kip/ton
2. 13,636 kip/ton or 13.6 kip/kg
3. 220 – 240 kip/kg
4. Delivered price: 950 – 970 kip/kg
5. Trader's purchasing price: 1,050 – 1,180 kip/kg
6. 471 kip/km/ton
7. Delivered price: 1,380 – 1,500 kip/kg

Source: Global Development Solutions, LLC

[11] In-country transport cost tends to vary from location to location – further discussion of this issue is provided later in this report

Once at the border, tariffs are assessed by Chinese customs official, but as long as the value of the transaction is less than 3.9 million kip per person per day, the trader is free of any duties. The trader then transfers the maize to a Chinese trader at a price of 1,050 – 1,180 kip/kg.

The Chinese trader then transports the maize from the trading post to the feed mill in Kunming at a cost of about 471 kip/km/ton, where the final delivered mill gate price is 1,380 – 1,500 kip/kg. Based on these calculations, the average trading margin is in the range of 10.5% - 24.2%.

Maize Traded for Local Consumption

Given limited developments in the market network, differentiation between wholesalers and retailers is somewhat blurred. Specifically, it is difficult to locate a traditional wholesaler as they generally operate early in the morning and they are quickly replaced by retailers later in the day.

It is estimated that there are 99 provincial and district retail markets and over 125 communal markets spread out throughout the country.

Table 26: Retail Markets in Lao

	Provincial & District Markets					Communal Markets				
	State	Collective	Private	Total	% of Total	State	Collective	Private	Total	% of Total
Vientiane Mun.	12		17	29	29.3%	2		30	32	25.6%
Louangprabang	10	6		16	16.2%	5	38		43	34.4%
Khammouane	7		3	10	10.1%	2			2	1.6%
Savannakhet			32	32	32.3%			32	32	25.6%
Champassak			12	12	12.1%			16	16	12.8%
Total	29	6	64	99	100.0%	9	38	78	125	100.0%
% of Total	29.3%	6.1%	64.6%	100.0%		7.2%	30.4%	62.4%	100.0%	

Source: Ministry of Commerce and Tourism

There are at least three types of retailers operating in Lao.[12]

- ***Permanent/Professional Retailers:*** Generally, this category of retailer is well established; they operate shop fronts, handle stock, tend to specialize in one or more groups of products and are open the entire day. Given the fixed overhead cost which must be incurred, prices in such shops are 20% - 50% higher than other types of retailers.
- ***Semi-Permanent Retailers:*** This category of retailer operates out of temporary stalls, and generally operates near or around Permanent/Professional Retailers. They tend to move from one location to the next and sell a range of products.

[12] Retail market fees (Kip):

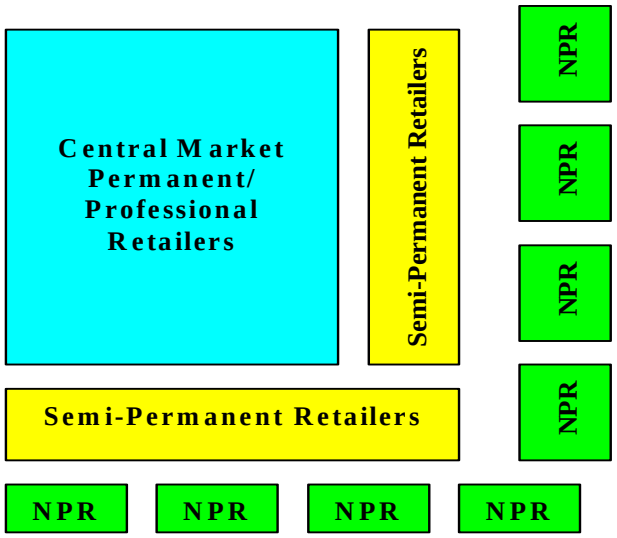
Sample Locations	Stall rental fee/month	Cleaning fee (daily)	Day ticket
Thongkhankham, Khouadine, Thatlouang, Naviengkham, Souksomboun, Savanxay	90,000	2,000	1,500
Pakse	130,000	2,000	1,500

Source: Market Study on Agriculture and Fisheries Products in Lao PDR, JICA, 2001.

- ***Non-Permanent Retailers:*** Many such retailers are farmers or collectors that sell products directly from the farm. This category of retailers does not have a fixed stall space and they display their goods on the ground, but generally must pay a Semi-Permanent Retailer or other shop keeper a fee to set up in front of their retailing space.

An example of a retail market area layout is provided in the diagram below.

Diagram 16: An Example of Retail Market Layout in Lao



NPR: Non-Permanent Retailers
Source: Global Development Solutions, LLC

Cost of Local Transport

The cost of transport tends to vary according to location and the type of products being transported. For transporting bags and baskets of commodities, the transport cost ranges from 627 kip/km/ton to as much as1,587 kip/km/ton.[13] While geographic location, road conditions, accessibility and distance is a factor, further work is required to ascertain the principal factors driving the wide variance in transport cost. With respect to bulk commodities, transport costs range between 247 kip/km/ton to as much as 1,000 kip/km/ton (a separate section on transport will cover issues related to cross-border transport and logistics issues).

5.3 Key Competitors

Surrounded by China, Thailand, and Vietnam, Lao is the smallest player in the maize market within the Mekong River Region. With total production reaching 112,000 tons,

[13] Calculations based on a bag weighing 35 kg.

Lao is dwarfed by China's maize production which reached approximately 131,860,000 in 2004. In this context, China is not viewed as a competitor, per se.

Table 27: Average Maize Production in Neighboring Countries, 2004				
	China	**Thailand**	**Vietnam**	**Lao**
Production (tons)	131,860,000	4,270,000	2,400,000	112,000
Area Harvested (ha)	25,583,990	1,130,000	964,600	48,000
Yield (tons/ha)	5.2	3.7	2.4	2.3
Export (tons)	14,822,200	49,576	9,528	NA
Source: FAOSTAT				

Even with this massive production volume, China continues to import maize from Lao to help fuel its growing livestock sector. In this context, the key competitors within the region are generally considered to be Thailand and Vietnam, even though both import maize from Lao. The table below provides a comparative profile of the maize production system in Lao, Thailand and Vietnam.

Table 28: Comparative Maize Production in Lao Thailand and Vietnam			
	Lao	**Thailand**	**Vietnam**
Major crops grown	Rice, beans, root vegetables, cassava, coffee,	Rice, cassava, rubber, and sugar cane	Rice, rubber, coffee, cashews, black pepper
Hectares planted	48,000 ha	1.13 million ha (33% of all upland farmlands)	964,600 ha
Total production	112,000 tons	4.2 million tons	2.4 million tons
Average farm size	0.7 – 3.2 ha	7 ha	0.3 – 1.5 ha
Land ownership	No clear titling - inheritance (60%), reclamation (33%)	Upland and highland: no land certificate Planes: own land and multiple crop	NA
Climatic zones	Rain fed, 100 - 500 masl, sloped land and ridge	Rain fed uplands; and rice-based irrigated agro-ecozones. Uplands in altitudes higher than 500 masl	Northern lowlands; northern uplands (700 – 2,000 masl); central highlands and central coast lowlands ; central highlands and central upland (400 – 1,500 masl); southeast Mekong Delta lowlands; southeast Mekong Delta uplands (100 – 200 masl)
Soil type	Clay rich soil type - Calcaric cambisol, ferric, haplic acirsol	Clay, clay loam, sandy loam	Various
Rainy season	May – September	May – September	May – September
Average	1,380 mm	900 – 2,000 mm	1,400 – 2,000 mm

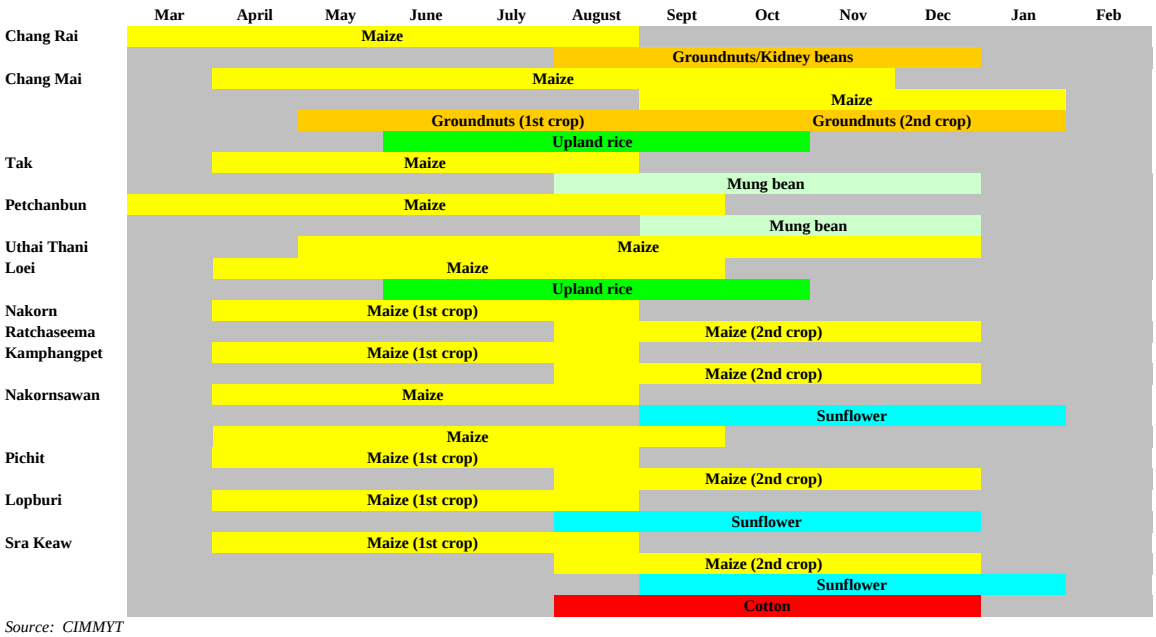
rainfall			
Yield rate[14]	2.3 - 5.2 tons/ha	2.06 – 5.10 tons/ha	2.28 – 3.65 tons/ha
Planting cycle	April – August (harvest in Sept when dried on stock)	April – July/August (plant-to-harvest cycle: 100 – 120)	Northern upland: 1st crop: Jan/Feb – May; 2nd crop: April/May – August; Sept/Oct - January
Second crop	Beans, root vegetables, cassava,	Mung bean, groundnuts, sorghrum, red peas, soybean	Cassava, coffee, mung bean, groundnuts, sweet potato, rubber, sugar cane, black pepper
Seed variety	LVN10 (most popular), 984, 9698, 9999, 9430, 9988, CP888	CPDK888 (best harvested when dried in the field); C919; C717 (matures early and give good fresh harvest)	LVN10 (most widely used); DK888, DK999, LVN20
Average seed cost	CP888 ($2.25 - $3.21/kg), LVN10 ($1.49 - $1.86/kg)	Hybrids: 80 – 90 baht/kg ($2.00 - $2.25/kg); Open pollination variety (OPV): 15 baht/kg ($0.38/kg)	Open pollinated variety (OPV): 1,700 – 2,500 dongs/kg ($0.12 - $0.18/kg); LVN: 1,800 – 19,000 dongs/kg ($0.13 - $1.36/kg) DK: 34,000 – 37,000 dongs/kg ($2.43 - $2.64/kg)
Seed use/ha	16 – 20kg/ha	19 – 22kg/ha	17 (upland) – 24 (lowland)kg/ha
Grain-to-seed output ratio	1:26	1:26	1:26
Fertilizers by type	Generally not used	Urea (46-0-0), Triple 15: (15:15:15) – 310 baht/50 kg bag: 16 -20-0 (414 baht/50kg bag)	Urea: 2,000 – 2,300 dongs/kg NPK: 2,500 – 2,600 dongs/kg Phosphorous: 900 – 1,250 Potassium: 2,000 – 2,400
Wage rate	13,000 – 36,000 kip/day ($1.30 – $3/day)	100 – 120 baht/person/day ($3/person/day)	20,000 – 25,000 dongs/person/day ($1.43 - $1.79/person/day)
Marketing	90% sold immediately after harvest	55% sold immediately after harvest 25% sold 1 – 2 months after harvest 15% sold 2 – 3 months after harvest 5% sold >3 months after harvest	NA
Maize usage	90% sold to poultry and livestock mills for animal feed	80% - 100% sold to poultry and livestock mills for animal feed	87% - 90% sold to poultry and livestock mills for animal feed
Average farm gate price	651 – 792 kip/kg($0.06 – $0.08/kg)	2.2 – 4.6 baht/kg ($0.06 – $0.12/kg)	1,300 – 2,000 dongs/kg ($0.09 - $0.14/kg)
Source: Global Development Solutions, LLC			

[14] Yield rate figures presented here may differ from the FAOSTAT presented earlier as these figures are compiled by the country's respective governments.

With respect to the total area planted and total production, both Thailand and Vietnam exceed Lao by at least a factor of twenty. The common characteristic of maize production in all three countries is that nearly 90% of maize production is consumed by the animal feed sector (which is also the case in China). In all three countries some level of intercropping or multiple-cropping is practiced, with mung beans, groundnuts, sorghum, soybean, cassava and other root vegetable as a income supplement for maize farmers (refer to diagrams below).

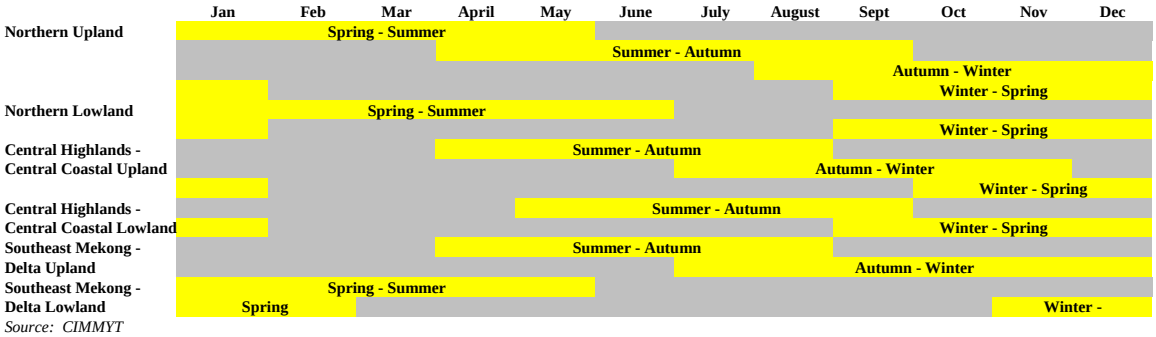
All three countries have a similar production cycle beginning in May and harvesting between August and September, but Northern Uplands in Vietnam are able to enjoy two growing seasons. With rain fall between 900 – 2,000 mm, rain fed agriculture is the principal source of water for all three countries. Fertilizers and agricultural chemicals are not widely used, generally due to high cost, but also because of the relatively fertile soil conditions enjoyed by maize farmers.

Diagram 17: Maize Production and Intercropping Pattern in Thailand



Source: CIMMYT

Diagram 18: Maize Production Pattern in Vietnam



Source: CIMMYT

Based on an average use of 18kg of seeds per hectare, Thai maize farmers achieve the highest average yield rate with yields ranging from 2.06 – 5.1 tons/hectare. The high yields can, in part, be attributed to more farmers in Thailand using fertilizers when compared to similar maize farmers in Lao and Vietnam. Seed use per hectare ranges from 16 – 24 kg/ha with the highest use among lowland maize farmers in Vietnam (24 kg/ha).

With wage rates ranging from $1.30 - $3.00/day, Lao is considered to have low wage rates. This is certainly the case when compared to Thailand where maize farmers generally begin with a wage of approximately $2.00/day, while in Vietnam, the wage rate is $1.43 - $1.79/day.

When comparing farm gate prices between the three countries, the lowest price is approximately $0.06/kg, with the highest price as much as $0.14/kg among Vietnamese maize farmers. Unfortunately, the upper end of the price scale for Lao farmers tend to be lower than farmers from Thailand and Vietnam with the high of about $0.08/kg. This is generally explained by the relatively poor quality of maize and given inadequate post harvest handling facilities, maize sold by Lao maize farmers have high moisture content (further details is presented in the following section).

5.4 Integrated Value Chain Analysis

5.4.1 Product Profile

The most popular hybrid variety used among maize farmers in Lao is the LVN10, with growing interest in the CP888. LVNs are imported from Vietnam priced between $1.49 - $1.86/kg, and the CPs from Thailand at a substantially higher price of $2.25 - $3.12/kg.

Other hybrids include 984 (Pacific Seeds Ltd, Vietnam), and 9698, 9999, 9430, 9988 (Bioseed Genetic Ltd, Vietnam). In addition to these hybrids, poor farmers tend to rely on retained hybrids from the previous year and OPVs, which generally tend to have lower yield rates.

Seeds are generally sown in early May and require 2 to 3 weedings per season. Given the high cost of fertilizers and sprays, most maize farmers in Lao generally do not use agrichemicals, but they are able to achieve yield rates ranging from 2.3 to 5.2 tons/ha.

LVN 10s are generally planted in rows that are 70 cm apart, and spaced 25 – 30 cm apart, with 1 – 2 seeds per hole. On average, 16 – 20 kg/ha of seeds are used. The LVNs are adapted to lowland tropical production environments, producing yellow semi-flint and of an early to intermediate maturity (100 – 120 days), which meets the needs of the livestock and poultry industry. LVNs are less susceptible to windy conditions when compared to varieties such as HQ2000, where LVN experience over 43% stalk breakage,

particularly during the flowering phase of the crop's growth cycle. Similarly, LVNs tend not to yield as much as other varieties, such as the P11 (4.2 - 4.7 kg/ha for P11s as opposed to 2.5 – 4.0 tons/ha for LVN10) during severe draught.

Table 29: Agronomic Characteristics of LVN10 Compared to HQ2000

	Days from Planting			Height (cm)		ASP (1-5)		Husk cover	Stem borer	Ear worms
	Pollen	Silk	Maturity	Plant	Ear	Plant	Ear	(1-5)	(1-5)	(1-5)
LVN10	88	90	139	219	123	2	3	1.0	1.5	1.0
HQ2000	84	85	134	205	96	2	2	1.5	1.0	1.0

Source: Research Development and Distribution of Hybrid Maize "Nakhon Sawan 72", Pichet Grudloyma, et al (2002)

5.4.2 Cropping Cycle

For establishing new farm land, land clearing begins as early as February, where land is cleared using manual labor, draft animals and tractors. On average, it is estimated that land clearing costs approximately 1,200,000 kip/ha ($120/ha). As a part of the clearing process, slash and burn technique is used to cut back brush and undergrowth. This is done generally in March for both new and existing maize farm. There is very little rain during this period, and plowing occurs during late March into April using draft animals and tractors. Average cost of plowing level land is estimated at 525,000 kip/ha ($52/ha), and sloped land costs approximately 825,000 kip/ha ($82.50/ha).

Table 30: Land Preparation Cost for Maize Farming in Lao

	Kip	$
Land Preparation (Level land)	525,000	$52.50
Land Preparation (Sloped land)	825,000	$82.50

Source: Global Development Solutions, LLC

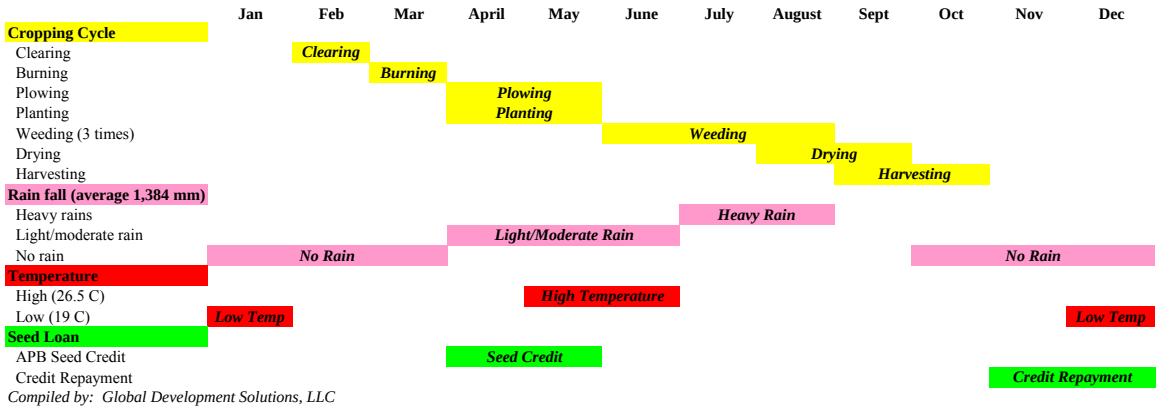
As noted earlier, a high proportion of maize farms are located on slopes. In such cases, tractors are used to plow the land by backing up the hill and plowing down the field. The combination of this type of farming practice combined with complete deforestation of farm lands has contributed to substantial soil erosion, as well as landslides.

Picture 9: Land Preparation, Sloped Maize Farming, Lao

Land preparation for sloped maize farming area using tractors (Lao PDR, May 2005) © Global Development Solutions, LLC

Once the land is plowed, planting begins immediately before the arrival of light and moderate rains which begin during the April – May period.

Diagram 19: Maize Cropping Cycle in Lao



As mentioned earlier, this is also about the time when APB seed credits are issued, and when brokers are providing credit to farmers to purchase seeds.

Weeding is done manually and is repeated 2 to 3 times between June and August, depending on the severity of weed infestation. By August, farmers are ready to dry the maize. For some farmers, drying is done on the stalk, but this leaves the maize open to insect and rodent infestation. Alternatively, some farmers use drying sheds, but generally, these are open air sheds which are equally susceptible to insect and rodent infestation.

5.4.3 Integrated Value Chain Analysis

An integrated value chain analysis (IVCA) was conducted on 4 different varieties of maize seeds using both machine and hand tilling. The varieties selected for the analysis include: LVN10, CP888, Hat Dok Keo 4 (a local variety), and retained hybrid. It should be noted that variety performance varies slight from region to region, but the overall distribution of value added and yield rates remain proportional to the overall cost of production.

In addition, three types of labor is utilized in maize farming, namely, family labor, labor exchange, and hired labor. Generally, family labor followed by labor exchange tends to dominate the types of labor used. The only exception is when a tractor is hired to till the land, in which case both equipment and labor is hired. In order to have a balanced perspective on labor input, all labor input, including family labor was monetized at between 10,000 – 13,000 kip/day. In this context, net profits accrued by a maize farmer as indicated in the IVCA reflect a minimum profit level, which may need to be inflated to reflect actual profits when wages are not paid to family members.[15]

[15] The IVCA model allows for adjustments to be made to recalculate the distribution of value along the value chain. In this context, if further analysis is required based on specific number of wage versus family laborers, tractor hire costs, farm gate price, and other costs, this can be accommodated.

Whenever machine tilling was used, farmers generally hired people from the village or from the surrounding area with tractors. Depending on the relationship between the farmer and the tractor owner, the price for tractor hire ranged from 400,000 – 650,000 kip per hectare, but was even higher when plowing steep grades. It was noted however, that the distribution costs associated with tractor hire, namely labor, fuel, maintenance, and transport cost, was similar whether it was 400,000 or 650,000 kip per hectare.

As the summary table below indicates, based on yield rate per hectare, CP888 performed the highest at 5,369 kg/ha, while as expected, retained hybrids performed the worst (1,536 kg/ha). Perhaps a more telling figure is the cost of production. LVN10 (367.9 kip/kg for hand tilled, 371.2 for machine tilled) and the local variety Hat Dok Keo 4 (578.2 kip/kg) clearly out performed CP888 (604.3 kip/kg) when compared in terms of kip/kg of production. Perhaps the most disturbing figure is the cost of production for the retained hybrid, which was as much as 7 times that of other seed varieties.

As cost of production varied, the farm gate price also varied, ranging from 651 kip/kg to as high as 956 kip/kg. These differences also contributed to the differentiated net profits for the different varieties and farming techniques used.[16] The following IVCA provides a breakdown of each of the 5 seed varieties and farming techniques selected for this analysis to provide further insights into the key constraints faced by maize farmers in Lao.

Table 31: Sample Comparison of Maize Seed Varieties Grown in Lao

	Yield Rate	Cost		Selling Price	Net Profit
Seed Variety	**kg/ha**	**kip/ha**	**kip/kg**	**kip/kg**	**kip/kg**
CP 888 (Machine Tilled)	5,369	3,244,614	604.3	651	46.7
LVN 10 (Hand Tilled)	5,411	2,001,903	367.9	813	445.1
LVN 10 (Machine Tilled)	5,280	1,959,813	371.2	792	420.8
Retained Hybrid (Hand Tilled)	1,536	4,063,630	2,645.6	956	- 1,689.6
Hat Dok Keo 4 (Machine Tilled)	3,622	2,094,333	578.2	794	215.8

Source: Global Development Solutions, LLC

The IVCA for maize is broken into 8 different value adding stages, namely:

- Seed selection;
- Land preparation;
- Planting;
- Fertilizing/spraying;
- Weeding;
- Harvesting;
- Shelling/bagging; and
- Administrative (land rent)

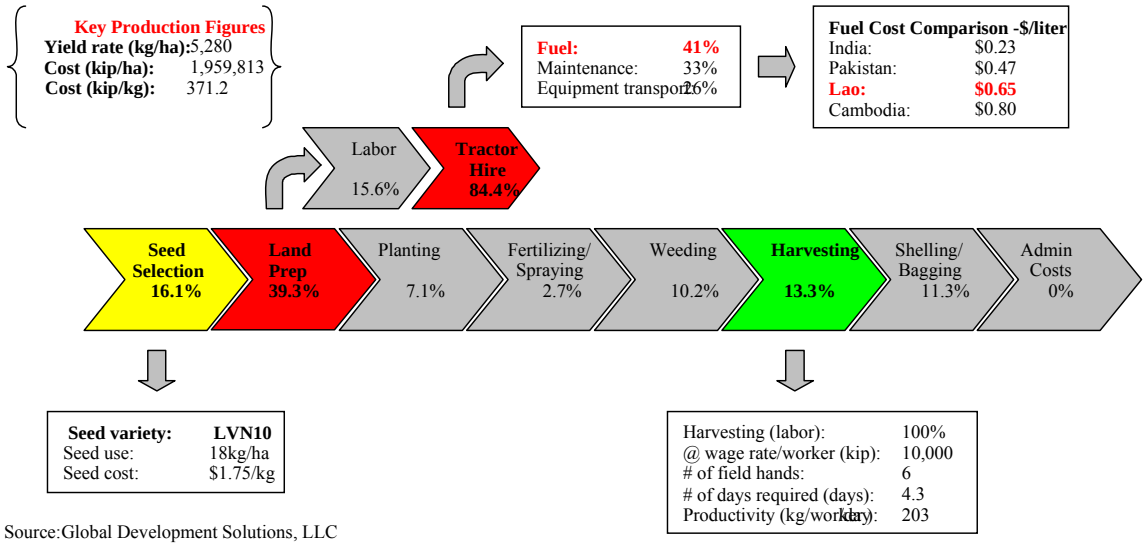
[16] Ibid.

In the case of retained hybrids, there is no seed selection cost, and also whenever a farmer owns the land, there is no land rent, and thus the administrative support costs were zero.

5.4.3.1 LVN10 (Machined Tilled)

At a cost of 1,959,813 kip/ha ($195.98/ha), LVN10 using machine tilling for land preparation yielded approximately 5,280 kg/ha. In this particular case, the highest value added activities included land preparation (39.3%), seed selection (16.1%), and harvesting (13.3%).

Diagram 20: Value Chain for Maize Production Using LVN10 – Machine Tilled



Source: Global Development Solutions, LLC

Land preparation: The cost of tractor hire ranges from 400,000 – 900,000 kip/ha ($40 - $90/ha). Taking into consideration that a tractor and driver must be hired, the highest value added in land preparation was the tractor hire, which constituted 84.4% of the total value added. As mentioned earlier, the distribution of costs for tractor hire generally remained the same, namely 41% for fuel, 33% for maintenance, and 26% for equipment transport. Given that demand for tractor services are relatively high, and scheduling is generally not done ahead of time, transport cost is an integral part of the overall hiring cost.

As the fuel cost comparison indicates, fuel cost per liter in Lao is lower than in Cambodia, but substantially higher than other countries in the region such as India and Pakistan. While fuel costs may be somewhat lower in Lao than in other countries the cost of tractor hire in Lao is exceptionally high (refer to table below).

Table 32: Comparative Cost of Tractor Hire by Country		
Cost of Tractor Hire	**$/ha**	
	Large Tractor	**Small Tractor**
Lao	$40.00 – $90.00	Unusable for slope and hill plowing

Vietnam	NA	$11.00 - $14.000
Cambodia	$45.00	$7.00 - $10.40
Source: Global Development Solutions, LLC		

Part of the reason for the large gap in price is that so much of the maize land is on slopped or hilly areas where small hand tractors are not operable. Secondly, taking into account the greater fuel consumption associated with operating a tractor constantly up hill, also contributes to the higher cost. As will be evident from the following section, however, the cost of farming LVN10 using a hand tilling technique yielded a lower cost of production than the machined tilled farming presented here.

While farming techniques currently used (vertical tilling up and down a slope or hill), particularly around deforested areas, in itself posses a number of soil erosion and land slide problems, a clear need exists to introduce a more cost effective and conservation oriented farming technique, which is terracing or horizontal tilling. Terracing or horizontal tilling has already been adopted by many Vietnamese and Chinese farmers to prevent soil erosion and land slides, particularly when farming along hillsides. Rather than tractors, however, draft animals must be used to till the narrow terrace, which means additional work, but offers farmers a sustainable solution compared to the current technique, which is likely to erode most of the top soil within 5 years time.[17]

Given the relatively limited access to information about various farming techniques, there was no evidence to suggest that terracing techniques have been considered at all by maize farmers.

Seed Selection: The second highest value adding activity (16.1%) is seed selection - LVN10, which is imported from Vietnam. As indicated in an earlier section, the price of LVN10 ranged from $1.49 - $1.86/kg, while compared to accessing identical seeds in Vietnam cost approximately $0.13 - $1.36/kg. This suggests that further support to develop and promote local varieties, such as the Hat Dok Keo 4 or other indigenous varieties could go a long way in helping to reduce one of the few agricultural inputs required by maize farmers.

With regards to seed selection, one notable aspect about Lao maize farming is that the average seed use per hectare is 6% - 20% lower than Vietnam, for example, and yet the average per hectare yield rate can be as much as 30% more, even when limited or no fertilizers and other agrichemicals are applied. As one agricultural extension agent put it, the favorable yield rate is a testimonial to the good soil composition and positive nutrient value that naturally exists in many maize growing areas. However, attention must be brought back to the unsustainable land management techniques currently being employed by most maize farmers in Lao.

Harvesting: The third highest value adding activity is harvesting (13.3%). Harvesting is done completely by hand. Based on a yield rate of 5,280kg/ha, it takes a workforce of six nearly five days to harvest one hectare. This suggests that labor productivity when

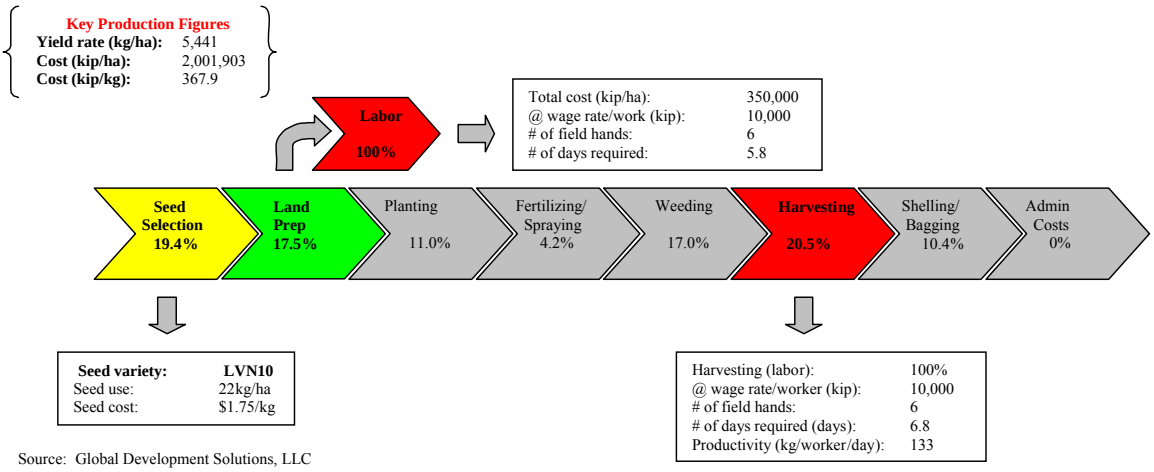
[17] Quote from a local agricultural extension worker.

measured in kg of maize picked per person per day is 203kg, which is relatively high. While it was not possible to obtain comparative data from other countries in the region, the average amount of labor input required for the entire cropping cycle was approximately 18% for Lao, when compared to Vietnam, for example. While other IVCAs indicate much lower labor productivity, the rate of harvest indicated in this example suggests that adequate labor skills exist in some farming areas for the sector to remain competitive.

5.4.3.2 LVN10 (Hand Tilled)

Similar to the LVN10 (Machine Tilled), the yield rate was high, but the hand tilled farming yield 5,441kg/ha, which was 3% higher. However, per hectare production cost was 2,001,903 kip, which was 2% higher than the machine tilled farm.

Diagram 21: Value Chain for Maize Production Using LVN10 – Hand Tilled



Source: Global Development Solutions, LLC

Taking into consideration the fact that hand tilled farming took substantially more labor input, given the slightly higher yield rate, the cost per kg of production for hand tilled farming was approximately 367.9 kip/kg compared to 371.2 kip/kg for the machine tilled.

While the three highest value added activities for both the machine and hand tilled farming was the same, the sequence was slightly different. Rather than land preparation, harvesting constituted the largest value added (20.5%) for the hand tilling, while seed selection constituted (19.4%) and land preparation was 17.5% of the total value added.

Perhaps the most noteworthy aspect of the hand tilled value chain is the fact that it highlights the extremely high cost of tractor hire:

- Even at a cost of 350,000 kip/ha for labor input for land preparation, the overall cost of production was slightly lower using the hand tilled method.

- Labor costs reflect assumed wages paid to family members, so if such costs were not factored into the equation, the cost of land preparation would have been even lower than what is reflected in this IVCA
- Reflecting labor productivity rates for harvesting, productivity at the farm using the hand till method was only 65% of labor used by the farm employing the machine tilling method. Specifically, the labor productivity on the farm using the hand till method was 133kg of maize per hectare, while on the farm that employed a machine tilling method, labor productivity was 203kg of maize per hectare. Given that farmers generally use the same labor pool for the entire season, it stands to reason that labor productivity during harvesting is a positive indicator for the entire cropping cycle.

What this indicates is that while moving away from vertical machine plowing, a technique currently used by maize farmers, to a horizontal plowing or terraced method would require additional labor input, with the introduction of adequate techniques and training, the potential for maintaining or possibly improving labor productivity and competitive production cost remains imminently attainable.

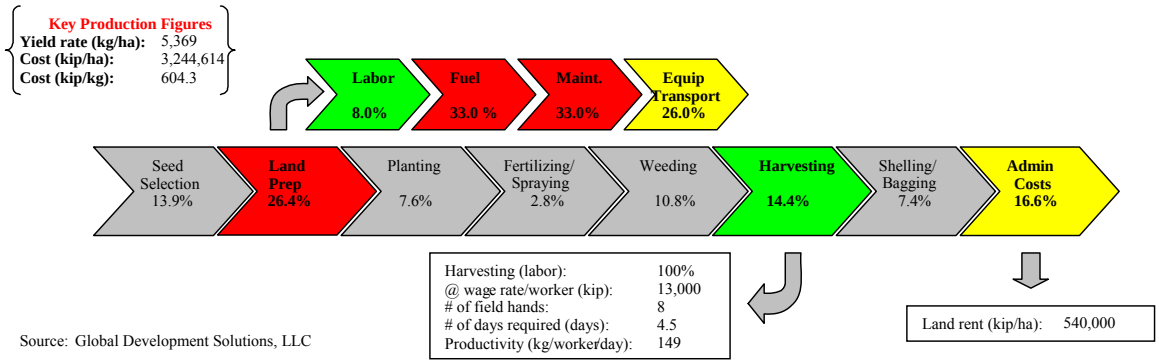
5.4.3.3 CP 888

CP 888 (or often referred to as CPDK888 in Thailand) is the most popular single-cross hybrid variety used in Thailand, which is also gaining popularity among maize farmers in Lao. CP 888 has been in use in Thailand for over 10 years, but according to a CIMMYT/IFAD survey conducted in 2004, maize farmers in Thailand are increasingly disappointed with the performance of CP 888 and are expressing their desire to return to hybrids introduced earlier, but are no longer available in the market. In this context, some caution may be required to help ensure that 'dumping' of undesired seed varieties from the Thai market does not take place, and that proper farmer awareness programs are put into place to avoid disinformation about seed performance.

Given the relatively high per hectare yield rate (5,369 kg/ha, which is slightly less than 2% higher than the LVN10 machine tilled), the cost of seeds is substantially more ($2.25 - $3.21/kg for CP 888 as opposed to $1.49 - $1.86/kg for LVN10), which makes the CP 888 prohibitively expensive for many lower income maize farmers.

Unlike the first two IVCAs, the IVCA for CP 888 is slightly different in that the maize farmer rented land, and the tractors available for tilling was an older model than the others, which explains the relatively high maintenance cost. In this context, the three highest value adding activities were land preparation (26.4%), administrative cost or land rent (16.6%), and harvesting (14.4%) – see Diagram 22 below.

Diagram 22: Value Chain for Maize Production Using CP888 – Machine Tilled



Perhaps the three most noteworthy aspects of this value chain are:

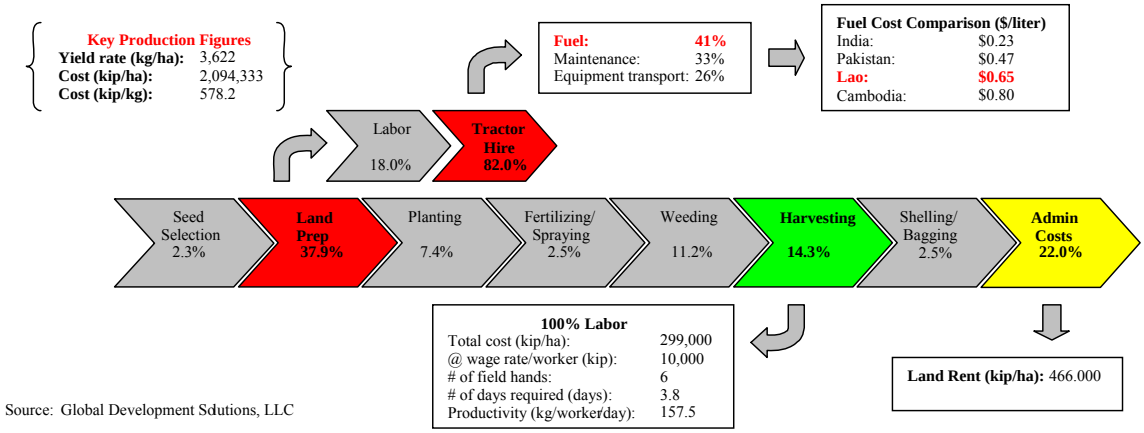
- Farmers were paid 13,000 kip/day rather than the 10,000 kip/day elsewhere to help retain the necessary workers needed, particularly during harvesting season;
- As mentioned earlier, the cost of seeds is nearly double that of LVN10, which contributed to the higher overall cost of production per kg of maize; and
- Given the fact that the farmer paid rent for his land (540,000 kip/ha for single crop use), the cost per kg of producing became substantially higher than the other varieties. Specifically, the cost per kg of maize production was nearly twice or 604.3 kip/kg, compared to 371.2 kip/kg for LVN10.

5.4.3.4 Hat Dok Keo 4

Perhaps one of the more interesting stories that evolved from the IVCA is that a local variety called Hat Dok Keo 4 performed relatively well when compared to both LVN10 and CP 888. Although the yield rate per hectare was only 67% of the LVN10 (hand tilled), taking into consideration that a machine rather than hand tilling method was used, compounded by the fact that the farmer paid land rent at a rate of 466,000 kip/ha, the overall cost per kg was 5% lower than the CP 888.

The seed costs are extremely modest when compared to other varieties (43,000 kip/ha or $0.27/kg when applied at a rate of 16 kg/ha). At this price, Hat Dok Keo 4 seeds were nearly 4 times less in price when compared to other varieties. This is particularly important when we consider the last IVCA which is an analysis of a maize farmer using retained hybrid – the worse case scenario in the analysis.

Diagram 23: Value Chain for Maize Production Using Hat Dok Keo 4 – Machine Tilled

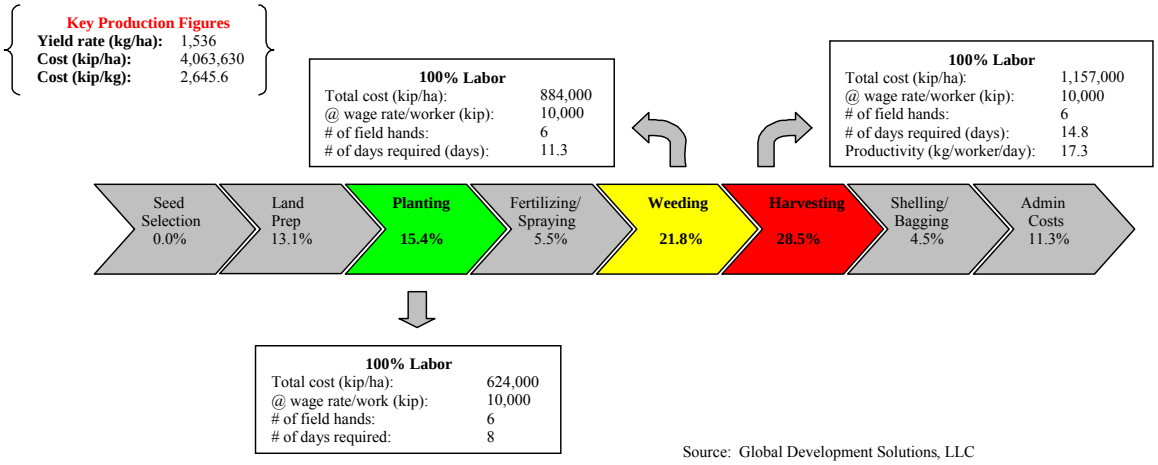


Source: Global Development Solutions, LLC

5.4.3.5 Retained Hybrids

The IVCA for retained hybrids represents the worse case scenario among all of the maize farmers analyzed for this exercise. Generally the type of farmer who uses retained =hybrids is the poorest farmer, and does not view maize farming as a primary economic and revenue generating function. In some instances, farmers in this category would forage or work for other farmers. In this context, the level of skills and awareness about proper farming techniques is limited at best.

Diagram 24: Value Chain for Maize Production Using Retained Hybrids – Hand Tilled



Source: Global Development Solutions, LLC

As indicated in the IVCA, yield rates are extremely low (1,536 kg/ha), while the cost of production when measured in kip/kg is exceedingly high (2,645.6 kip/kg). This can partly be explained by the fact that the cost of family labor needs to be discounted from this figure, while at the same time, labor productivity is exceptionally low – 17.3 kg of maize harvested per person per day. This figure is 10 times lower than the average found among other maize farmers reviewed for this IVCA.

The low labor productivity is attributable to the fact that other farmers who assist in the labor exchange are equally limited in their training, and also generally live on limited means where maize farming is not a principal form of income generation, and rely heavily on foraging as a main source of sustenance.

Given these dismal production figures, an intervention to move this category of maize farmers away from using retained hybrids to a local variety like Hat Dok Keo 4 (if indeed seed prices can be maintained at $0.27/kg), even if limited on-farm care was available, this could conceivably make a dramatic difference in the livelihood of the rural poor. While further more in-depth analysis is required to analyze the prospects for such a transformation, preliminary data suggests that limited interventions can potentially have a substantial impact on the rural income generation in Lao.

5.5 Critical Post Harvest Issues

Equally important to value adding activities during production are two post-harvest issues that undermine the competitiveness of maize farming in Lao.

5.5.1 High Moisture Content of Maize

When maize is harvested, the moisture content is in the range of 18% - 19%. So, farmers using a seed variety with a 100 day production cycle may elect to leave the maize on the stalk for an additional two to four weeks to allow the maize to dry. Generally, farmers tend to harvest within two weeks of when the ear is ripe, at which point, the moisture content is between 15% - 17%.

Maize traded in the market is required to have a moisture content of between 13.5% - 14%. In most cases, because of the short term income needs of rural farmers, they tend to sell the maize at 15% - 17% moisture content. This has several implications.

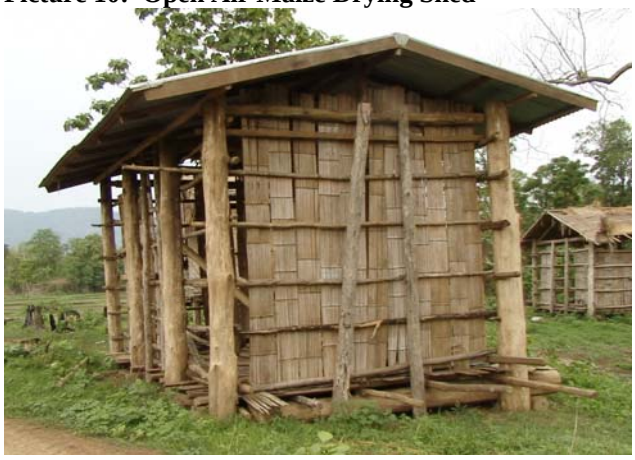
- Since farmers sell their maize through a broker, a price that a farmer can command for his maize is heavily discounted from the prevailing market price by the broker on the understanding that the maize has not been properly dried.
- Taking into consideration that extension services, particularly in rural areas are non-existent, there is no way for a farmer to calculate the moisture content of his maize. This always puts the farmer into a position of being a price taker rather than having an opportunity to negotiate fairly with a broker.

- Investors or sponsors who support out growers are forced to purchase maize with high moisture content, particularly taking into consideration that if the investor/sponsor demands the maize to be dried further, farmers simply break their contractual agreement and sell the maize to another broker.
- Having purchased maize with higher moisture content, an investor/sponsor must now pay for storage to dry the maize, and face further post harvest losses resulting from pests, rodents and bacterial infestation.

5.5.2 The Absence of Adequate Storage Facilities

Taking into consideration that very few commercial quality maize storage facilities are available in Lao, nearly all maize is dried on the stalk and in open sheds where maize is susceptible to both field and storage pests. Interviews with farmers suggest that there are at least 8 types of field pests and 2 types of storage pests that contribute to post-harvest losses. While a detailed survey of post harvest losses for maize has not been conducted for Lao, there are plenty of indications which suggest that post harvest losses from pests are equal, if not worse than those faced by maize farmers in Thailand. In Thailand, for example, 3% - 25% of post harvest losses are attributable to field pests, and an additional 2% - 7.9% to storage pests (refer to Table 33 below).

Picture 10: Open Air Maize Drying Shed



Lao, May, 2005) © Global Development Solutions, LLC

This suggests that in an extreme case, nearly a third of the harvest could be lost to field and storage pests. Interviews indicated however, that between weight loss from maize with high moisture content, and losses from field and storage pests, an investors/sponsor can expect to loss between 10% - 22% of the value of his purchase before it is sold to a milling facility for further processing.

Table 33: Average Post Harvest Maize Losses, Thailand

(% of total production)

Field Pests	**Low**	**High**
Stem borer	2.0	3.7
Maize ear borer	-	2.5
Cutworm	-	2.0
Maize bug	-	5.0
Field mice	-	4.2
Blight	1.0	1.9
Grasshopper	-	3.0
Stalk rot	-	2.0
Other pests	-	0.7
Subtotal	***3.0***	***25.0***
Storage Pests		
Weevils	2	5.2
Rodents	0	2.7
Subtotal	***2***	***7.9***
Total Loss	**5.0**	**32.9**

Source: IFAD/CIMMYT

In this context, while the margins look favorable and the cost of production is competitive when compared with farmers from the region, it fails to factor in an additional 10% - 22% discount to reflect post harvest losses, due principally to the fact that adequate measuring equipment and services, farm-to-market support infrastructure, such as storage facilities, are not readily available to help improve the competitiveness of the maize sector in Lao.

5.6 Growth Opportunities in the Animal Feed Sector

Most maize farmers and a number of businesses in the cereals sector in Lao view the animal feed sector as a potential growth area. This is understandable simply from the sheer volume of interests shown by Chinese, Vietnamese and Thai traders who come to purchase maize from Laotian maize farmers. In addition, maize utilization rate for feed by key neighboring countries, namely Thailand, China and Vietnam, is the highest in all of Asia (refer to the table below).

Table 34: Maize Utilization as Feed	
China	76%
Thailand	96%
Vietnam	74%
Asia	67%
Source: FAOSTAT	

When these figures are transposed against the volume of animal production by the three neighboring countries, it is easy to see why the demand for animal feed and more specifically for maize grown in Lao continues to grow (refer to Table 35 below). As the table indicates, given the number of animals produced, particularly in China, the magnitude of feed required is staggering.

For example, for pigs, the most popular livestock in the region, the meat-to-feed weight ratio is 1:2. Generally, a sow is sold for slaughter at a weight of no less than 100 kg, which means that a farmer would have required 200 kg of feed to bulk the pig to minimum market weight. In China, for example, where 472.9 million heads of pigs were produced in 2004, the meat-to-feed ratio would translate into 47.3 million tons of meat weight, requiring 94.6 million tons of feed per year to support just piggeries in China.

Table 35: Production of Livestock in China, Thailand and Vietnam
-Number of heads-

CHINA	**2002**	**2003**	**2004**	**% Annual Growth 2004**
Cattle	101,109,959	103,468,000	106,539,500	3.0%
Buffaloes	22,690,850	22,732,750	22,808,750	0.3%
Sheep	135,893,407	143,793,000	157,330,415	9.4%
Goats	161,476,917	172,921,000	183,362,773	6.0%
Pigs	464,694,621	469,808,000	472,895,791	0.7%
Chickens	4,098,910	3,980,546	3,074,748	-22.8%
Ducks	686,354	660,354	660,361	0.0%
Geese	235,199	227,772	227,987	0.1%
Turkeys	235	191	186	-2.6%
Horses	8,262,305	8,090,322	7,902,310	-2.3%
Asses	8,815,000	8,499,000	8,499,000	0.0%
Mules	4,362,000	4,194,000	3,957,000	-5.7%
Camels	279,000	264,000	265,000	0.4%
Rabbits	191,289	194,259	194,253	0.0%
Total	**912,796,046**	**938,833,194**	**967,718,074**	**3.1%**
THAILAND				
Cattle	4,819,713	5,048,170	5,000,000	-1.0%
Buffaloes	1,612,534	1,800,000	2,000,000	11.1%
Sheep	39,326	42,000	42,000	0.0%
Goats	177,944	178,000	178,000	0.0%
Pigs	6,878,642	7,059,000	7,159,000	1.4%
Chickens	235,233	177,114	170,000	-4.0%
Ducks	25,034	20,000	17,000	-15.0%
Geese	260	260	270	3.8%
Horses	8,108	9,000	9,000	0.0%
Asses	28	28	28	0.0%
Mules	25	25	25	0.0%
Total	**13,796,847**	**14,333,597**	**14,575,323**	**1.7%**
VIETNAM				
Cattle	4,062,966	4,397,300	4,200,000	-4.5%
Buffaloes	2,814,452	2,834,886	2,850,000	0.5%
Goats	621,913	780,354	800,000	2.5%
Pigs	23,169,532	24,879,100	23,500,000	-5.5%
Chickens	163,100	178,010	177,000	-0.6%
Ducks	69,900	69,000	75,000	8.7%
Horses	110,900	112,500	112,000	-0.4%
Total	**31,012,763**	**33,251,150**	**31,714,000**	**-4.6%**

Source: FAOSTAT

China, Thailand and Vietnam are all importers of animal feed (refer to Table 36 below). Currently, however, much of the maize produced in Lao is generally exported to these countries as maize rather than feed.

Table 36: Feed Trade of Countries Along Mekong Delta, 2003
- In tons-

	Cambodia	China	Lao	Thailand	Vietnam
Total Imports	17,573	1,172,082	13,199	2,413,679	1,384,208
Maize bran	-	57,755	-	38	-
Maize cake	-	562	-	236	-
Total Exports	-	2,213,329	-	439,374	4,231
Maize bran	-	84,202	-	10,251	-
Maize cake	-	426	-	160	-

Source: FAOSTAT

A small number of feed companies currently operate in Lao. The most prominent is Gold Coin Feed Company, located in Vientiane Municipality. Others include National Food Products International (Bokeo), Lao Agro Industry Company (Vientiane), and The SAA Co. (Savannakhet).[18] There are a number of smaller feed mills, but they generally serve a captive market and are not necessarily operated as independent commercial feed producers.

Focusing again on pigs, while maize is an important feature of feed production (refer to table below), its use dominates a pig's feed regime during the growth phase of the animal where nearly 39% of the animals' consumption is made up of maize.

Table 37: Input Costs, Pig Feed Production Lao

	Hog Feed			Piglet Feed			Sow Feed			
Inputs	**kg/mixture**	**% of Total**	**Cost (kips)**	**kg/mixture**	**% of Total**	**Cost (kips)**	**kg/mixture**	**% of Total**	**Cost (kips)**	**Purchase Price (Kips/kg)**
Maize	0	0.0%	-	350	38.9%	525,000	250	28.1%	375,000	1,500
Rice husk	330	35.1%	495,000	70	7.8%	105,000	350	39.3%	525,000	1,000
Milled rice	450	47.9%	675,000	220	24.4%	330,000	130	14.6%	195,000	2,100
Beans (wet)	0	0.0%	-	100	11.1%	150,000		0.0%	-	10,500
Beans (dry)	160	17.0%	240,000	160	17.8%	240,000	160	18.0%	240,000	9,500
Total	**940**	**100.0%**	**1,410,000**	**900**	**100.0%**	**1,350,000**	**890**	**100.0%**	**1,335,000**	

Source: Global Development Solution, LLC

The large consumption of maize is phased down as the pig reaches maturity, at which point the use of rice husk and milled rice is increased to help bulk up the animal's body

[18] In 1995, animal feed production in Lao reached approximately 3,019 tons, which increased to approximately 18,500 by 2000.

weight. Perhaps what is important to note from the table above is that Lao currently either produces or has the potential to produce all of the ingredients required for manufacturing pig feed, one of the most popular animal feed in the region. In this example, however, the local feed manufacturer was importing beans from Thailand since it was not readily available through local producers.

In addition to the growing demand for animal feed in the Mekong region, while the total production is small, the livestock production is growing at a faster pace (an average annual growth rate of 3.7% over the past two years) than in the region. It is estimated that in 2004, 4.1 million animals were produced in Lao (refer to the table below).

While demand for animal feed continues to place pressure on maize production, the animal feed sector in Lao has not responded in kind with new investments in further value adding activities. As a consequence, maize continues to exit the country in its raw form rather than as a value added product. In this context, taking into consideration that Lao is capable of producing all of the key inputs required for the production of animal feed, it is anticipated that options need to be explored to encourage investments in establishing integrated feed mills, as well as to establish an efficient feed distribution network. Given the poor road infrastructure, particularly in rural areas, a distribution network would most likely be decentralized and revolve around key provinces that produce maize, rice, beans and other crops required as inputs for supporting an integrated feed mill.

Table 38: Livestock Population in Lao

Stocks (Head)	**2002**	**2003**	**2004**
Cattle	1,207,700	1,200,000	1,250,000
Buffaloes	1,089,400	1,080,000	1,100,000
Goats	127,500	128,000	128,000
Pigs	1,416,400	1,650,000	1,650,000
Chickens	15,274	13,000	14,000
Ducks	1,700	3,000	3,000
Geese	95	100	100
Horses	30,000	31,000	31,000
Total	**3,888,069**	**4,105,100**	**4,176,100**
% Growth		**5.6%**	**1.7%**

Source: FAOSTAT

Generally, initial investment required for establishing a small and medium scale integrated feed mill is no more than $300,000. In this example, the start-up cost is limited, but other non-cost issues need to be considered. These include:

- Access the appropriate equipment and technology;
- Access to training for operating a feed mill;
- Affordable storage and warehousing services;
- Access to affordable metrological services;
- Establish and enforce phyto-sanitary standards;
- Enforce standardized labeling requirement;
- Affordable transport services;
- An efficient market distribution network; and
- Establish an efficient market infrastructure that allows farmers to trade the necessary inputs for the production of animal feed

6 Sector Analysis – Livestock

6.1 Summary of Findings

6.1.1 Barriers to Competitiveness

The matrix below provides a summary of key findings that impede to competitiveness of the livestock sector in Lao.

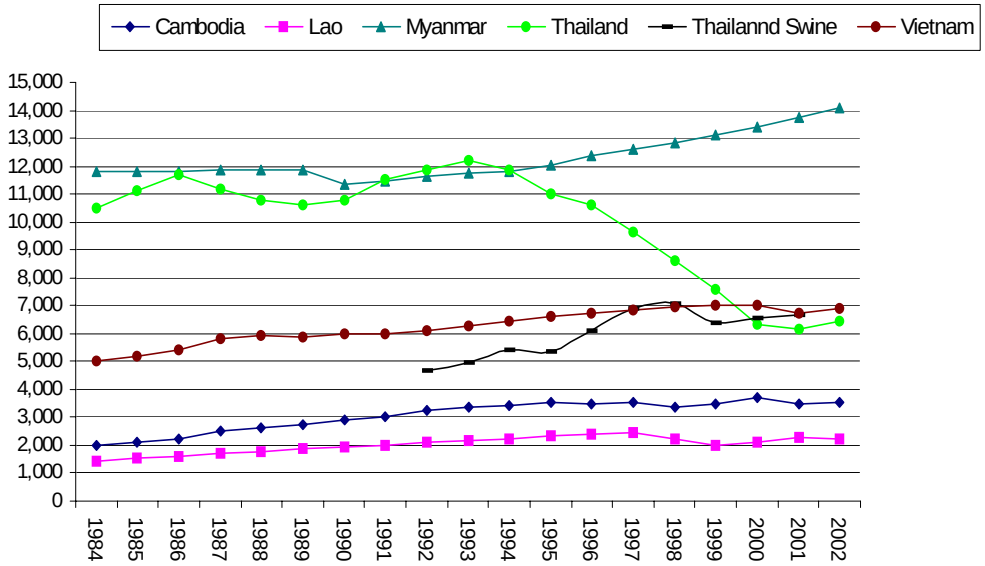
Chart 7: Summary of Key Barriers to Competitiveness in the Livestock Sector in Lao
13.0 Market Constraints 13.1 Poor cattle breed performance 13.2 No local cattle feed industry 13.3 Growth of hog industry hampered by high interest rates of state-run banks 13.4 Inefficiencies in the maize sector ripple through the cost of local feed 13.5 Emergence of private-sector driven feed industry discouraged by monopolistic state-owned feed enterprises 13.6 Soybean imports from Thailand display a high margin variation 13.7 Local feed supplies uncompetitive vis-à-vis Thai imports
14.0 Governance 14.1 Lack of genetic improvement support for cattle industry 14.2 Free movement of goods across provinces legislated but not enforced 14.3 Preserved government right to intervene and distort markets that are deemed strategic
15.0 Institutional 15.1 Absence or weak extension services, particularly for rural farming communities 15.2 Lack of access to breeding improvement technologies 15.3 Poor disease control and response capabilities of government institutions
16.0 Human Resources 16.1 Non-existent animal record keeping 16.2 Little knowledge about farm management 16.3 Lack of knowledge about breed improvements and performance 16.4 Limited extension work support
Source: Global Development Solutions, LLC

6.1.2 Key Market Drivers

In most general terms, market drivers for Laotian livestock and livestock products are concentrated around two key issues: regional and local demand conditions as well as threats coming from animal disease outbreaks. First of all, demand-pull conditions from Thailand, its largest trading partner, have a considerable impact on decision making in terms of opportunities for profitable raising and trade of livestock.

East Asian trends over the last twenty years reveal that as far as bovine animals are concerned, Thai livestock numbers have sharply fallen from early 1990s well into 2002 (Figure 6). During the same period, growth rate of bovine animals slowed down significantly in Lao (from mid 80s to mid 90's, Lao bovine animal stock increased almost

Figure 6: Bovine Animal Population, East Asia, 1984-2002



Source: Complied by Global Development Solutions™, (FAO, OAE Thailand)
Note: Thai swine population data from 1992-2001.

70% from 1.4 million to 2.3 million, and has remained in or around that level well into 2003).[19] The strong correlation between the fall in bovine animal figures in Thailand and flattening of Lao growth in the same animal population group suggest that Thailand may increasingly be relying on countries such as Lao for supply of bovine animals, and as such shape the supply and investment characteristic in the livestock sector in Lao to a large extent.

This demand-pull influence from Thailand can manifest itself on the ground in Lao in many forms. One is to put pressure on farmers and traders alike to sell as much animals as possible to lock-in the favorable (increased) demand signals from Thailand. This could lead to sales of livestock at below optimal levels in terms of weight (selling young beef animals as opposed to full-weight ones) as well as sales through unofficial channels. Recent statistics from official Thai Customs figures suggest that a combination of both may be taking place. As can be seen from Table 39 below, the official Thai import statistics from Lao show that both value per animal and overall quantity of animal bovine exports from Lao are low. Considering the fact that a full weight mature bovine animal in Lao trades at between US$ 200-250, the export value to Thailand at an average price of US$ 125 per animal could be related to sales of underweight, young animals. Also,

[19] The only other country with similar slowdown in growth correlated to Thai sharp fall in bovine animal population is Cambodia.

the actual numbers of exports of live animals are unrealistically low by even the most conservative estimates and on a downward trend, which suggest a robust illegal trade is taking place.[20]

Another market driver that emerges from the data analyzed is that what holds true for bovine livestock does not seem to be the case for the swine industry. Namely, Thailand has a robust swine industry that has grown 44% from 1992-2001 (currently operating at swine population levels of around 7 million). As a result, large sways of Laotian swine raising areas along the Mekong corridor have a robust competing industry just across the river. One can interpret this direct competition as a major market driver that impedes the

Table 39: Laotian Exports of Live Animals and Meat to Thailand, 2001-2004

	2001		2002		2003		2004	
	Units	US$ (CIF)	Units	US$ (CIF)	Units	US$ (CIF)	Units	US$ (CIF)
Live Bovine Animals (heads)	**37,815**	**5,110,310**	**35,275**	**4,998,895**	**14,829**	**2,085,924**	**15,867**	**1,702,628**
Bulls and Cows	7,514	870,456	4,303	516,027	1,051	125,736	411	43,895
Buffalos	30,301	4,239,854	30,972	4,482,868	13,778	1,960,188	15,456	1,658,733
Meat of swine, fresh, chilled or frozen (kg)	**4,000**	**2,694**	**0**	**0**	**0**	**0**	**0**	**0**

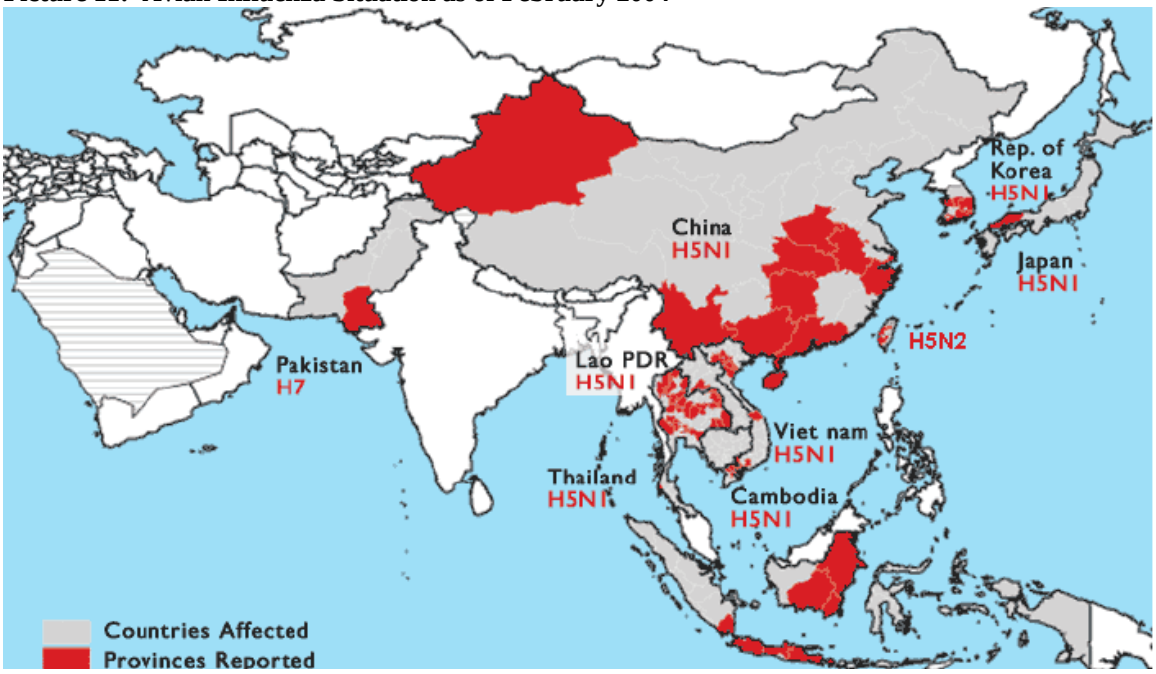
Source: Complied by Global Development Solutions™ from Thai Customs.

development and competitiveness of hog industry in Lao. That would, however, be only partially true. Interviews in the field suggest that the robustness of the swine industry in Thailand can have major beneficial spillover effect in Lao. First, economies of scale in Thailand enable Laotian farmers to have the opportunity of accessing Thai feed at relatively competitive prices, something that would not be the case were the industry to rely on the domestic feed industry. Secondly, as field interviews suggest, the Thai market provides much needed anchoring price signals that guide investment choices for Laotian commercial hog farmers.

An additional market driver for livestock and livestock products is related to disease outbreaks. Avian influenza in birds is a case in point. A latent factor that may turn into a major market driver is the fact that the specter of challenges from global bird flu influenza is in danger of slowly widening towards pig populations in Asia. As of August 2004, Chinese researchers reported H5N1 virus strain in pigs (prevailing in most East Asia including Lao), something which is seen as a crucial link in the mutation of the disease to a form that can infect humans.[21] The most recent virology studies from Hong Kong and Liverpool warned pigs could provide a launch pad for bird flu to cross from animals to humans.[22]

[20] Estimates of exports from various sources range in the level of 100,000 bovine animals per year, of 3-6 times more than reported at any one year from 2001-2004 in official statistics.
[21] *RFA, "Link to Pigs Edges Birdflu Closer to Pandemic", August 23, 2004.*
[22] *The Guardian,* May, 2005.

Picture 11: Avian Influenza Situation as of February 2004



Source: FAO

The ramification for Lao in terms of potential pig exports are significant, as any further confirmation of the link of H5N1 to pigs (and potentially humans) is almost certain to lead countries to invoke quarantine and import bans across the world. Apart from obvious public health hazards, from a trading point of view, a threat to swine populations in the region can be devastating for the swine industry in Lao, as countries next door such as Thailand will almost certainly try to make use of porous borders and dump pigs across the regional borders, thus depressing price levels that can put the nascent local hog industry out of business.

6.1.3 Options for Growth

Even though in some instances the above section refers to livestock farming as 'industry', this term could very well be too onerous for the sector. Livestock farming in Laos is by and large a subsistence-based activity without any semblance of a typical industrial sector that adds value across multiple market segments of industry. Size of farms is small. Processing of meat and other animal byproducts such as hides and skins is nonexistent. The number of feed mills in the entire country is in single digits.

Despite its low level of development, the sector has significant room for growth. First of all, local demand for meat exceeds supply, especially in urban areas like Vientiane. This provides an opportunity for entry into commercial livestock farming by existing or new farmers. Also, population growth in Lao is robust, at 2.6%, which could potentially increase the consumer base for meat.

What growth avenues will the sector take, if at all, depends largely on a set of necessary conditions that need to be met. For commercial pig farming, an emergence of a local competitive feed industry may be needed for the sector to grow. This is not necessarily related to reduction in price levels of and dependency on imported feed, as much as it is related to the integration of the sector across value adding activities in search of economies of scope and scale. The example of the development of the pig industry in neighboring Thailand is a case in point.

There, much like in Lao today, up until the mid 1980s, intermediaries collected pigs from village to village, and then delivered them to slaughterhouses. Illegal operating of slaughterhouses was commonplace. The role of the intermediaries diminished in importance as contract growing of pigs driven by feed mills took place. Feed milling companies provided feed, breeding stocks, as well as veterinary services and farm management skills to contracted pig growers. Gradually this opened the way for Thailand to exports of pork to East Asian countries.

While the potential growth path of pig industry in Lao may not necessarily take this path, options for growth of intensive, commercial pig production will almost certainly lie in the development of flow of information, know how and financing along the axis of input-farm management-extension service provision.

Growth options for extensive farming practices, as is the case with cattle production in Lao, represent a more complex set of challenges. Such farms make little use of marketable inputs and produce a combination of food crops and livestock. The order of importance of crops and livestock interchanges, and only a handful, very small players throughout the country engage in commercial livestock production. Thus, although market demand from the region remains robust, growth options of livestock sector have to either come from creation of and access to pastures on year-round basis or increased reliance on compound feeds to address energy needs of animals during periods of drought.

Both options require much more efficiencies on both the market and policy side than does intensive pig farming. Access to land for cattle and buffalo would directly compete with pressures on land for crop cultivation, and therefore, in general, options for growth of the sector are in areas where this competition of grazing land with arable land is lowest: in uplands and away from the lowlands already cultivated with rice and other crops. Growth in the bovine animal sector can also be achieved by shifting extensive cultivation into an intensive one, for which supplies of cattle feed are indispensable.

Another factor that guides investments and growth of the sector is closely related to animal reproduction. While Laotian commercial pig farmers have acquired white pig breeds with proven economics of pig farming, the Chinese Yellow cattle and swamp buffalo represent the breeds available to potential commercial production of cattle and buffalo in Lao. As a result, the economics of any investment is closely determined by animal genetics. For example, within 7-8 months, a gilt of Large White breed is able to reproduce and may give birth to an average of 120 piglets during five years of a

reproductive cycle. These pigs reach full body weight of 100 kg by six months of age. Typical for tropical heifers, on the other hand, a Chinese Yellow cattle enter the reproductive cycle at 14-15 months of age, produce around 10 calves in their reproductive lifetime, and it takes two years or more to reach full body weight of 250kg for females and 350 kg for males.

6.2 Sector Profile

As of 2003, the population of livestock in Lao reached approximately 4.1 million, of which little over 4 million were pigs, cattle, and buffalos. As of year 2000, there were an estimated 592,650 holdings with livestock; 208,140 of which (35%) raised cattle, 322,139 (54%) raised buffalos, and 327,500 (55%) households raised pigs. The national average heard size is 4.5 heads for cattle, and approximately 3 heads per heard for buffalos and pigs.

At provincial level, central and southern provinces of Khammuane, Savannakhet, Saravanne, and Champasack dominate livestock production (See Table 40 below). These 4 provinces have over 50% of national cattle and buffalo population, and 35% of national pig population.

Table 40: Selected Livestock Population, Lao, 2002-2003

	Thousand Heads					
	Pigs		Cattle		Buffalo	
PROVINCE	**2002**	**2003**	**2002**	**2003**	**2002**	**2003**
Vientiane Capital	37	110	56	58	22	23
Phongsaly	65	65	18	24	31	32
Luangnamtha	52	56	21	21	22	24
Oudomxay	91	113	37	48	46	45
Bokeo	45	52	21	23	22	25
Luangprabang	135	127	41	37	53	50
Huaphanh	134	178	43	45	60	54
Xayabury	95	103	68	60	60	61
Xiengkhuang	70	72	77	83	42	40
Vientiane	92	95	99	102	70	72
Borikhamxay	42	45	41	45	38	41
Khammuane	68	71	54	56	78	80
Savannakhet	218	224	383	385	279	282
Saravane	127	182	80	93	72	84
Sekong	35	36	14	15	20	21
Champasack	74	89	132	125	117	118
Attapeu	20	20	10	11	44	45
Xaysomboun SR	16	17	14	14	15	16
Sub Total	1,416	1,650	1,209	1,245	1,091	1,113
Share in Total	**38.1%**	**41.2%**	**32.5%**	**31.0%**	**29.4%**	**27.7%**
Total 2002	**3,716**					
Total 2003	**4,013**					

Source: Ministry of Agriculture and Forestry, Lao, 2004.

According to 1999-2000 data from FAO's Asia and the Pacific Office, in the whole country, 66% of the cattle owners had less than five head of cattle. 10% of the total number of holdings with cattle had ten or more animals. The majority of buffalo owners have just a few animals. About 52% of the buffalo owners in all the provinces had only one or two head of buffalo. Only 2.5% of the total holdings with buffalos had ten or more animals. The majority of pig owners have just a few animals. About 80% of the total number of holdings with pigs had less than 5 animals. 15% of holdings with pigs had between 5 and 9 animals.

In all the provinces, 12% of cattle are under one year of age. About two thirds of cattle are 2 years and over. Of these, females outnumber males by 3.0 to 1. In terms of buffalo, 6% of buffalo are under one year of age. Buffalo aged 3 years and over make up 67% of all buffalo. Of these, females outnumber males by 2.6 to 1. Pigs aged 9 months and over make up 49% of all pigs, and females outnumber males by 2.0 to 1. The predominant cattle breeds in Lao have similar characteristics to Chinese Yellow cattle. Buffalo breeds of Lao are generally categorized as Swamp buffaloes.[23]

The pig population has well defined breeds with standard qualities. Predominant pig breeds are local ones called Mulad. Although the local breeds have inferior indicators in terms of litter size, meat quality, as well as body weight, their scavenging nature makes them good performers in Laotian rural environments. Most common commercial breeds are mainly Large White, Landrace and Duroc exotic breeds or crosses. These 3 breeds produce lean meat combined with efficient feed conversion (in general, 3 kg of good feed is needed to produce 1 kg of pork).

6.2.1 Key Policies and Institutions

Under the previous centrally planned system of equal income distribution, regardless of performance, economic agents only tried to meet the numerical target quotas. The system discouraged independent initiative, innovation, and efficiency improvement. As it became clear that such economic policies were impeding growth and development, reforms of New Economic Mechanism (NEM) was introduced, around three main pillars: (i) macro-economic stability and fiscal adjustment; (ii) private sector encouragement; and (iii) public sector reorganization.

Private sector encouragement in the livestock sector remains shallow, however. Though competition is officially pronounced to be a 'major driving force for economic development', Laos' approach in this direction in livestock, however, has been state intervention into various market functions remains rather strong as compared to other economies in the region. Nonetheless, some initial cornerstones of an evolving competition policy have been set. The most recent landmarks are Prime Minister's

[23] Individual buffaloes show large variations in milk yield, conformation, meat production, growth rate, and other characteristics. Systematic genetic improvement of buffalo has almost never been attempted. Large bulls that would be best for breeding purposes are often being selected as draft animals and castrated, or sent to slaughter. The result is that the buffalo's overall size in countries such as Lao, Thailand and Indonesia has been decreasing as genes for large size and fast growth are lost.

Decree on Trade Competition (DTC) of February 2004, and PM order 24 *on Trade Facilitation* on September 2004. The order on trade facilitation is specifically aimed at removal of inter-provincial barriers, such as authorizations for movement of goods within the country. It is not known when or whether these decrees will come into force or whether they will be enforced at all. Provincial authorities in Lao wield a significant level of power and control, and in essence this is fragmenting the market, including the one for livestock and livestock products.

Marketing, trade and slaughter of livestock are a de facto government monopoly through State Enterprise for Food and Crop Promotion (SEFCP) and its trading arms in provinces, State Foodstuff Enterprise (SFE). The need for update and enforcement of trade facilitation and competition laws according to market principles is important to secure entry of private investment in trade and marketing of livestock products. In line with general vagueness of the legal environment in the country, the competition decree is also vague.

Article 1 of DTC stipulates that objectives of the decree are to "define rules and measures to regulate monopolization and unfair competition in trade of all forms, aiming to promote fair trade competition, protect the rights and legal interests of consumers and to encourage business activities in the Lao PDR…."[24] The Decree than stipulates measures against monopolistic behavior, collusion and other non-competitive arrangements. But, Article 13 of the same decree leaves a vague caveat by stipulating that "any act in articles [that lay down anti competitive arrangements] *may* be exempted for some specific sector or business for socio-economic or security reasons."[25] Notwithstanding its right direction, this decree shields monopolistic SOEs, including the ones in livestock marketing with a potential of encouraging what the decree has set out to discourage: anticompetitive behavior.

The institutional support structure for livestock is driven from the Department of Planning in the Ministry of Agriculture and Forestry through Department of Livestock and Fisheries at the central level. Provincial Agriculture and Forestry Offices (PAFO) and District Agriculture and Forestry Offices (DAFO) govern livestock sector at provincial and district level. Extension workers at village level are managed by DAFO at district level, and receive research and extension support from National Agriculture and Forestry Research Institute (NAFRI) and Extension Service (NAFES).

Provincial authorities, despite instructions and orders from the prime ministerial level to remove barriers on free flow of goods throughout the country, wield significant power in controlling the flow of livestock in and out of provinces. In Khammuane province, for example, the official statistics refers to livestock sales out of the province as "exports" to other provinces and/or the country.

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[24] Decree of Trade Competition, PMO No.15, Dated 04/02/2004, Vientiane. The Decree, among other things, defines the concept of market dominance, monopoly, mergers and acquisitions, and unfair trade practices; and provides for the establishment of a Trade Competition Commission, which will be responsible for the implementation and enforcement of the Decree.

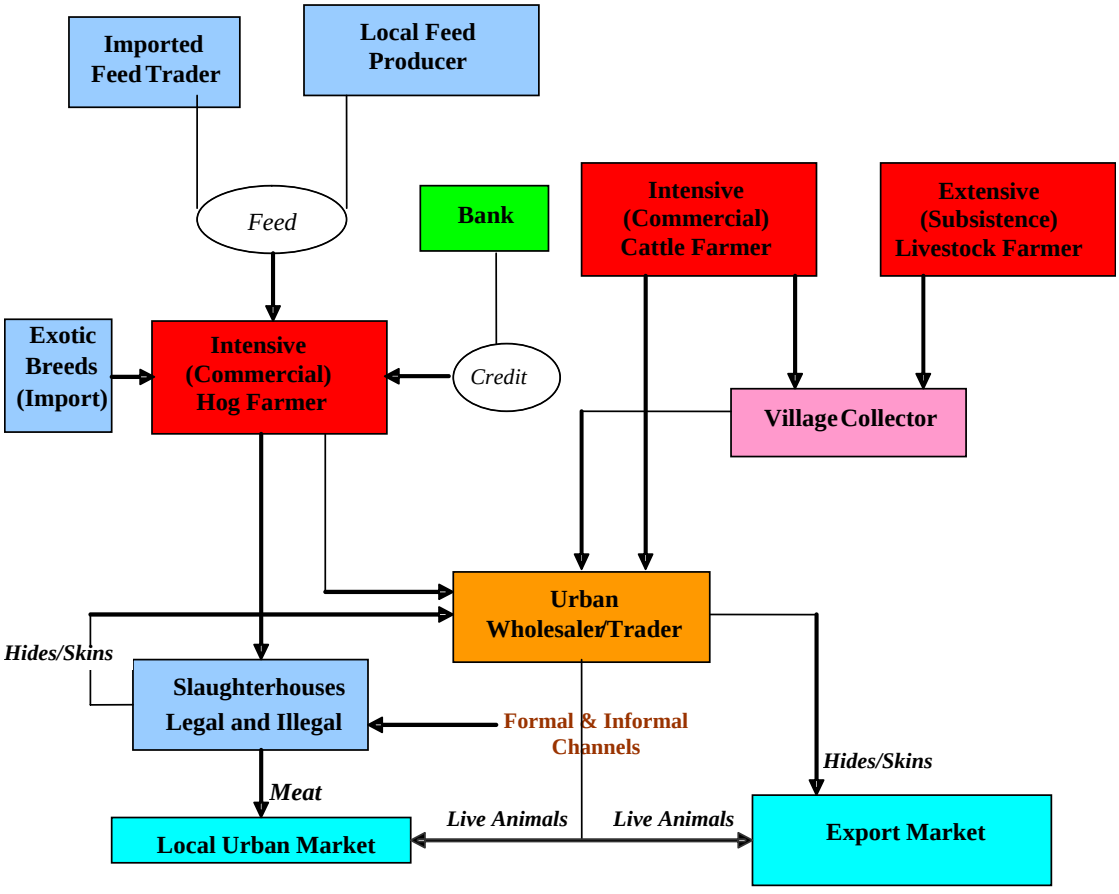
[25] Ibid 24. Italics inserted.

6.2.2 Market structure and the supply chain

The market structure for livestock (hog, cattle and buffalo) production and trade is illustrated in the diagram below. Interviews on the ground reveal that commercial livestock production is by and large undertaken in the hog sector, and limited commercial production takes place in the cattle sector. There was no commercial buffalo enterprise that could be identified in the country.

Extensive livestock farms are generally low-input operations whose main economic activity is almost never based solely on animal production. They use livestock for multiple purposes, including provision of drought power, manure, and as savings asset. As such, these farms are on the fringes of the supply chain of inputs, be it feed or finance. Nevertheless, they participate in a developed network of trade for live animals.

Diagram 25: Livestock Market Structure, Lao



Source: Global Development Solutions, LLC

Small traders at village and district levels purchase animals from rural households and move them to transport points near major cities. There, wholesale or retail traders collect live animals by truck, at which point, depending on livestock, they supply the local urban markets with hogs, cattle and buffalo, and export markets mainly with cattle and buffalo. Trade at wholesale level is both formal and informal. Official statistics from Thailand indicate unrealistically low levels of official trade, between 15,000 – 30,000 heads of cattle and buffalo a year (see Table 39: Laotian Exports of Live Animals and Meat to Thailand, 2001-2004 in Page 97). Although speculative, estimates of real numbers of livestock trade range at 100,000 per year. Animals cross the Mekong into Thailand all along the Lao border, and it is difficult to discount, or for that matter, confirm these figures. What could be gathered from the interviews is that all across the Mekong Corridor, from Vientiane to Champasack, the price level for a head of cattle or buffalo ranges between Kip 2.0-2.5 million at wholesale level. In other words, at the range of live weight of 100-150 kg/head, the price ranges at Kip 16,000 – 17,000 per live weight kilogram of animal.

Commercial livestock production, on the other hand, appears to be emerging, albeit at a low scale and primarily for hog farming. The largest commercial cattle farm that could be found in the country numbers 261 heads, in Vientiane province. Live weight of mature, full weight cattle was reported on average 150 kilograms, same as in few cattle farms in Khammuane province, with the largest heard there numbering 35 heads. Hog commercial farms are in larger numbers, and market leaders in the sub-sector have emerged, with one numbering over 10,000 heads. Farms with 100-500 pigs can be found in many provinces.

Organized, high-input intensive hog farms are the only operations in livestock that are in a true sense commercial. Unlike cattle farmers, they rely on feed from both local and import markets, select breeds as major investment decision, and access finance for startup or growth where available. Currently, there are no formal credit institutions at the provincial level apart from government-run banks.

Wholesale traders need licenses issued by SFEs to operate. As of May 2005, 91 such licenses were reported to have been issued; 4 licenses have been revoked due to illegal trading activities. Wholesale traders concentrated at urban centers purchase live animals from village collectors and then load them into trucks for sale at urban destinations or export them outside of the country, mainly Thailand. Live hogs are traded mostly in Thai Baht, while cattle and buffalo are quoted both in Kip and Baht. A live hog in Vientiane, Khammuane, or Champasack from farmer to trader sells at around THB 47-48/kg, or between Kip 12,700 – 13,000/kg, while a live cattle or buffalo, between 120-150 kg live weight, trades between Kip 2-2.5 million per head.

When reaching the urban centers, live hogs are traded at between THB 52-55, or Kip 14,040 – 14,850/ kg, (a margin of 11-15%) and live cattle or buffalo sell at 2.2-2.7 million per head (a margin of 8-10%). Main buyers of live animals in urban centers are the official and unofficial slaughterhouses as well as retail traders and butchers. The largest official slaughterhouse in the country is run by the State Foodstuff Enterprise of

Vientiane Capital (SFEV), which slaughters approximately 200 pigs and 150 cattle and buffalo per day. SEFV engages in both slaughtering service provision (between Kip 17,000-19,000 per animal) as well as trade of meat at wholesale level from its own purchases of livestock.

Observed farm-to-consumer margins for livestock (meat) in Lao suggest that the supply chain operates efficiently insofar as mark-ups are concerned, and exorbitant margins were not observed (see the table below). In fact, from live hog wholesale to retails pork, the margin in Lao is at 46%, well within the range of all important East Asian markets.

Table 41: Benchmarking Supply Chain Markups, Live Hog – Retail Pork

	Wholesale Live Hogs	Retail Pork	Margin
	US$/kg		
Lao	1.40	2.50	46%
Thailand	1.10	2.21	50%
Korea, rep	2.25	3.91	43%
China	1.03	1.64	37%
Japan*	3.00	3.77	20%
Taiwan	1.70	4.00	58%

Source: Compiled by Global Development Solutions, LLC™

* Margin in Japan refers to wholesale to retail pork

6.3 Integrated Value Chain Analysis

6.3.1 Product profile

An integrated value chain analysis (IVCA) was conducted on hog and cattle commercial farming in Khammuane. Pig and cattle breeds selected were Large White and Chinese Yellow type respectively. Comparative analyses for hog and cattle commercials farms were conducted in Vientiane province. As no feed producer existed in Khammuane at the time of the analysis, an IVCA was conducted for feed production in Vientiane, and compared to feed purchases from Thailand to assess the competitiveness of hog production in the Khammuane and its relationship with feed sourcing. No cattle commercial farm was found to use concentrated feed.

The end product of commercial hog and cattle farm is a live animal sold for meat. Once an animal is sold, it is transported and slaughtered. As a result, even though transportation and slaughter are not usually part of value addition of the farmer, they have been positioned next to the value-chain of the commercial farmer in order to provide a full picture of farm-to-market for cold-dressed meat. Thus, the IVCA for livestock farming is broken into 6 value adding stages:

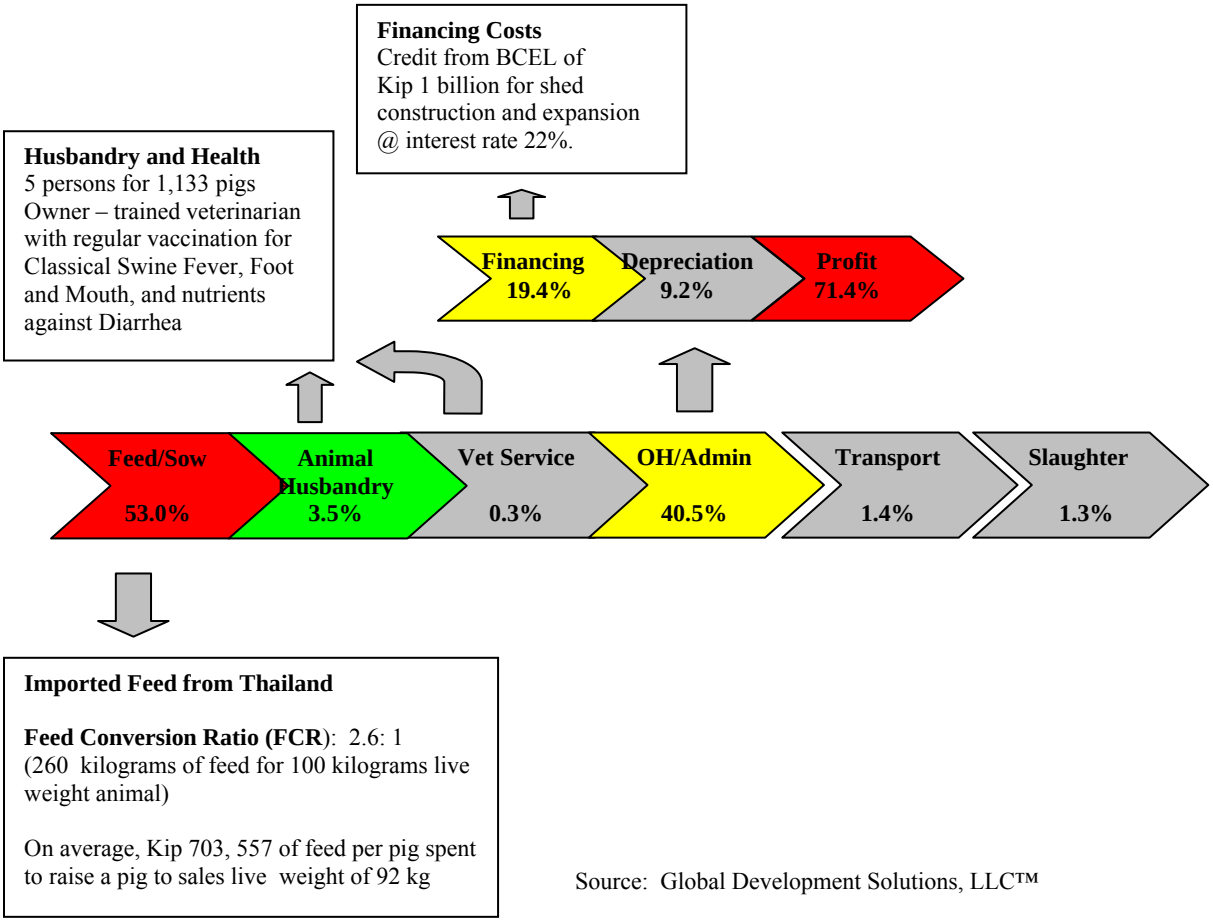
- Feed/Breed Purchase;
- Animal Husbandry;
- Veterinary Service ;

- Overhead/Administration;
- Transportation to Slaughterhouse; and
- Slaughter.

6.3.2 Integrated value chain analysis – Hog Farming

At feed levels of 216 kg/pig and 22.8 kg per sow over 6 months from birth to mature weight of 100 kilograms, a commercial hog farmer in Thakek, Khammuane Province produces at farm gate price of Kip 14,420/kg (US$ 1.4/kg) of live weight hog. When adjusted for transportation to Vientiane meat market and for slaughtering, a kilogram of cold dressed pork reaches the wholesale market in Vientiane at Kip 18,951/kg (US$ 1.9/kg). The highest value added activities included feed (53.0%), overhead and administration (40.5%), and animal husbandry (3.5%).

Diagram 26: Commercial Hog Farm-to-Meat Value Chain



Source: Global Development Solutions, LLC™

Feed: As the highest value addition component, containing and managing feed costs and applications is one of the key features of successful commercial farming. In this

particular example, the farmer buys feed from Thailand. Table 42 below compares feed costs of the particular commercial producer in Thakek, against costs of same category feed from a local producer in Vientiane and a local trader of imported feed away from urban center of Thakek.

The first observation that emerges from the IVCA is that the least costly option of buying feed is when imported directly from Thailand, as is the case with the commercial hog farmer in Thakek. The second issue is that the cost of imported feed increases by an average of 12.5% when purchased from retail outlets further away from the Mekong border with Thailand. This price increase is most probably due to transport and trade mark-up associated with moving and retailing feed. The fact that largest and most successful hog farms in the country are located in peri-urban centers along the Mekong illustrates further the fact that feed prices deep in the country may be prohibitively high for successful hog operations. In fact, at feed prices of 12.5% higher as per the case illustrated, the production costs would increase by 7.8%. The need to extend the road network from urban centers into rural areas is thus expected to benefit potential hog farm investing in other than urban centers.

Table 42: Comparative Feed Prices, Khammuane Province, May 2005

	Kip/kg			
Feed Type	Direct Imports from Thailand (1% Duty included), Commercial Hog Farmer	Imported from Thailand, Retail Outlet, Central Khammuane (55 km from Thai Border)	Factory Gate Price, Lao Feed Producer, Vientiane (Excluding Transport and Margin)	Price Gap, Local vs. Imported
Starter	4,140	4,950	n.a	
Grower	2,880	3,150		
Finisher	2,790	3,015	3,064	9.8%

Source: Global Development Solutions, LLC™

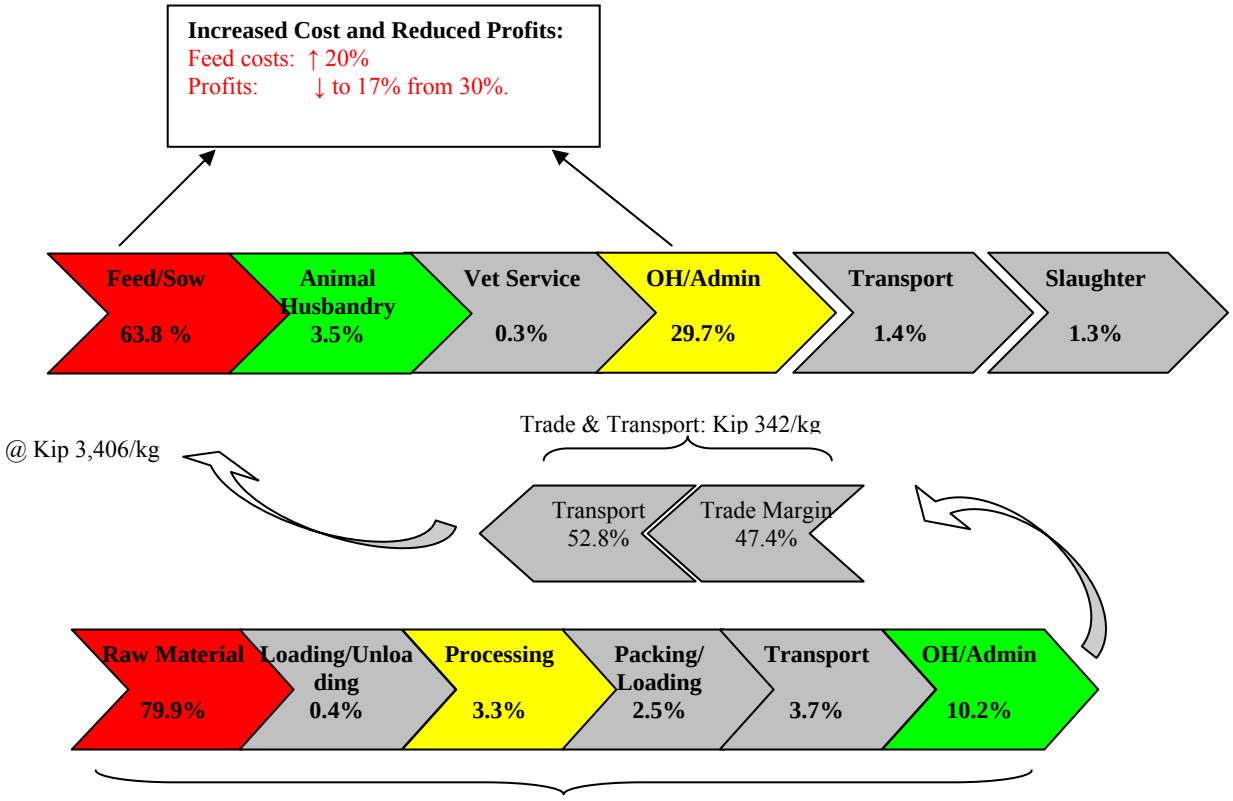
The hog producer in Thakek does not purchase locally produced feed mainly because of its higher price. A value chain analysis has been conducted for locally produced feed in Vientiane to see how locally produced feed influences the decision of existing hog farmers in Khammuane.[26] As Table 42 shows, the price differential between the price of local feed and the Thai imported feed, FOB Thakek, is 9.8%. This means that the price difference between the two sources of feed, at purchase price in Thakek, would be higher to account for transportation and wholesale/retail margin. For the purpose of the analysis, a transportation cost of US$ 0.05/km/ton has been assumed (same as the actual cost of moving live hogs from Thakek to Vientiane) and a modest wholesale/retail margin of 5% has been assumed.[27] Value chain analysis (illustrated in the diagram below) shows that sourcing local feed would increase the cost of commercial hog farming by 18.7%, via increased feed costs of 20%.

[26] There are no local feed producers in Khammuane, although as of May 2005, one was being set up by a local private investor.

[27] No local feed purchase from commercial hog farmers could be identified in Khammuane to gauge the range of retail margins in the market for local feed.

As a result, the farmer would be forced to accept a lower profit margin, at 17%, down from 30% when operating with cheaper Thai feed inputs. The pressure from Thai and other imports in main urban meat markets, and mainly in Vientiane, is such that increasing prices for the sake of maintaining the same profit margin would most probably put hog farmers out of business. The scenario becomes entirely unprofitable (negative profits) for hog farming were the assumed marketing/trade margin from local feed mill to farmer be increased at levels of 15% or above.

Diagram 27: Commercial Hog Farm-to-Meat Value Chain with Local Inputs



Source: Global Development Solutions, LLC™

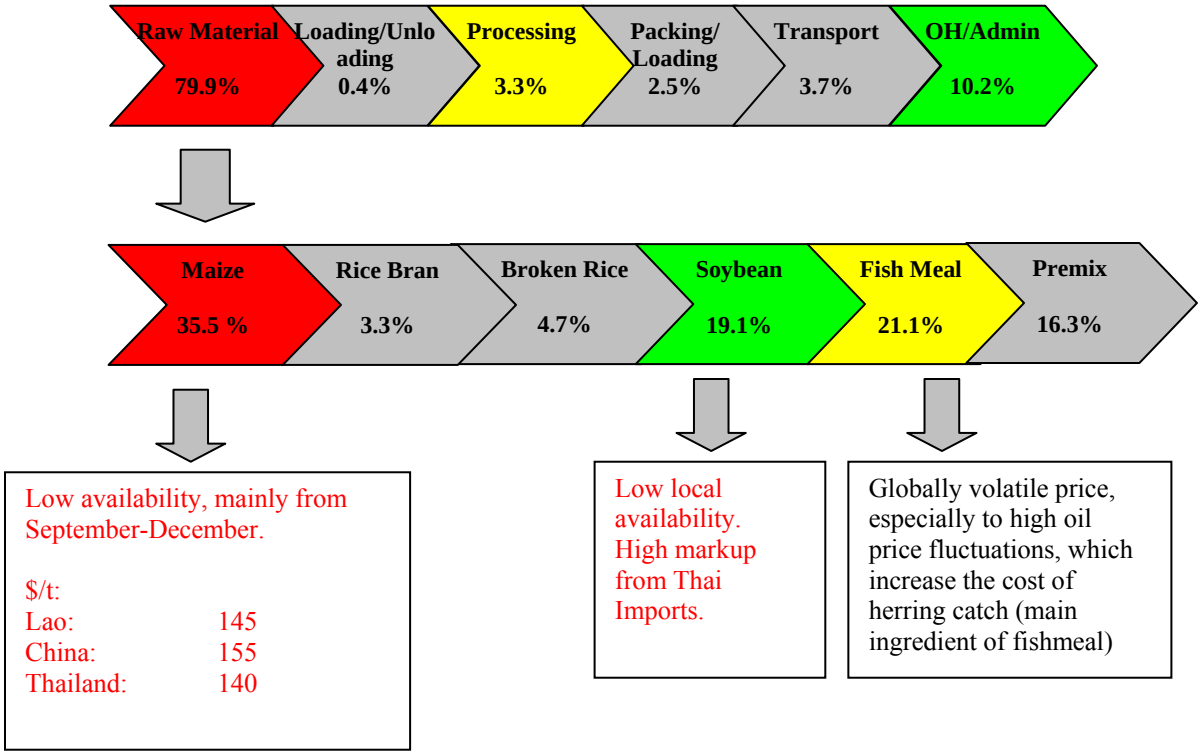
Thus, value chain analysis reveals that, at least for the local market, commercial hog farmers would be significantly hurt by using local feed. An alternative to sourcing feed from either local or foreign suppliers is to establish an integrated feed mill operation within a hog farm. A major commercial hog farmer in Vientiane with integrated feed mill reports feed costs per finished pig at Kip 7,500 per live weight kilogram, slightly below (1.9%) the Khammuane farmer who purchases imported feed. This suggests that there is room for cost reductions by engaging in integrated feed milling.

The inefficiency of local feed mills vis-à-vis the Thai imports, however, warrants further detailed analysis. When broken down into value added components, feed value chain

(see Diagram 28 below) reveals that raw materials constitute the largest value adding component (79.9%), followed by overheads and administration (10.2%) and processing (3.3%). Containing the raw material costs, therefore, expected to yield major cost decrease, which could be passed on to the local hog farmers and thus increase value addition in the local economy.

At production cost of Kip 3,064/kg, feed milling is driven by raw material costs (79.9%). At a combined cost of Kip 2,449/kg, maize (35.5%), followed by fish meal (21.1%) and soybean (19.1%) are the three major value added components of raw materials for hog feed (as produced by the particular producer). In terms of volume, maize constitutes 60%, followed by rice (broken and bran) at 14%, and Soybeans at 13% of feed. Since the value chain for maize (refer to *Section 5: Sector Analysis – Maize* on page 64) provides the main insights into bottlenecks of value addition from maize farming to feed milling, it is worth focusing on of the other two major inputs, soybean and fishmeal.

Diagram 28: Feed Value Chain



Source: Global Development Solutions, LLC™

Fishmeal prices in the global markets as per time of the analysis was trading at US$ 580/ton, with September futures prices in China, a big importer, ranging in the level of US$ 578/ton. In Lao, the price is in a close range of US$ 573/ton. What is not in close price range with neighboring countries is purchase price for soybean (see Table 43 below). Soybean currently trades in Chicago Board of Trade (CBOT) at the price level of US$ 250.37/ton. As per May 2005 trade data from Thai customs, soybean exports from

US to Thailand traded at US$ 276.02/ton, while Thai exports of soybean to Lao traded at US$350.71/ton, which after transportation reached the Laotian feed mill at US$ 360.45/ton, making the margin of the Thai-Laotian transaction at approximately 30%.[28] This is a very high mark-up that suggests a captive relationship of Laotian buyers for soybean vis-à-vis Thai traders.

Although further analysis would be needed to confirm the underlying dynamics of this high mark-up, nonetheless the local kg cost of feed decreases by almost 4%, from Kip 3,064 to Kip 2,948 if soybean prices are at par with Thai prices of imported soybean. Combined with other value added components, this could significantly increase the competitiveness of the local feed formulations in the market.

Table 43: Soybean Prices, Lao feed mills, May 2005				
Trade Route of Soybean Prices:	US$/MT	Trade &Transportation Markup		
		US	Thailand	Lao
US CBOT	250.37			
Thai CIF Import from US	276.02	10.2%		
Lao Feed Producers Import From Thailand	**360.45**	**44%**	**30.6%**	

Source: Global Development Solutions, LLC™, Thai Customs, CBOT.

Efficiencies in feed industry and grain production are crucial factors for development of livestock industry. Even in the biggest and highest growing markets, these factors go hand in hand with the growth dynamics of animal production (see *Case Box: China's Feed Industry* below). Improvements along value addition in the entire chain, from grain (and most notably maize) to feed to animal production is expected to give positive impetus to hog producers. It is also expected that integration through the entire chain would also lead to efficiencies and thus increase competitiveness of the animal production industry. This integration may be initiated from existing hog farms who may integrate backwards to grain production (as is the case with the largest hog farm in Lao) and then proceed with forward integration to either expand production through contract growing of pigs or further forward to slaughtering of animals and marketing of meat. Integration may also come from existing or new feed mills through contract pig farming by provision of inputs, expertise, and extension services. Which ever way the industry proceed, it is generally not the job of the government to pick winners and losers in the marketplace. It is, however, very much the duty of the government to remove constraining aspect for growth of the industry, and one such crucial aspect is in the finance sector.

[28] The bulk of Thai soybean imports are from the United States.

Case Box: China's Feed Industry

More than twenty years after economic liberalization, China has become the world's second largest producer of animal feed, right after the United States. The feed industry has become the fifteenth largest industry and an important component of China's economy. As most of the feed millers in the industry are privately-owned entities, the push towards consolidation follows market demand and conditions.

The concept of industrial production of feed was introduced to China by the CP Group.[29] Presently, the animal husbandry industry in developed countries accounts for 40-50% of the output value of the agricultural industry. Local consumption levels and diet patterns reveal a domestic demand for livestock produce, which will continue to sustain and stimulate the growth of the animal husbandry industry.

Issues related consolidation of feed industry

At present, China's feed millers are widely distributed, numerous and small-scale. Added to that is keen competition which has led to abuses. Currently, feed safety is mostly subjected to the self-regulation of the individual feed miller as supervision costs for such control are not only excessive but also ineffective. Generally, large-scaled enterprises are associated with huge investments, strong proprietary systems and high withdrawal costs; thus to ensure smooth long-term operation, a high degree of self-control is essential.

As consumers become increasingly health conscious, the food industry's requirements for feed safety and hygiene also become more stringent. This exposes the feed industry to greater risks, and only the larger-scaled enterprises are able to withstand the greater investment risks. Therefore, China's feed safety issue can be effectively addressed with consolidation of its feed industry.

Market liberalization in animal production industry requires support of integrated feed industry

In a global environment, a national or regional industry and its development will basically depend on the industry's comparative advantage. To sustain such advantages will require the industrial re-organization of feed industry that produces low-cost feed under strict safety guidelines. Moreover, the animal production industry is a major industry representing an important sector of the domestic economy and possesses bargaining power in negotiations between trading partners. Therefore, further market growth and development will depend on synergies between integrated animal producers and highly efficient and organized feed millers.

Inefficiencies in the grain and animal production industry

The current market structure of the feed industry is a product of the organization and structure of the grain and animal production communities. At the upstream, grain producers consist mainly of small-scaled farming units who are slow to respond to fluctuations in material cost and prices. Also, the small-scale productions also raise the cost of conveyance for feed grains. Individual feed millers are unable to realize much savings from further expansion alone as feed products are bulky, low value added, and incur transportation expenses. At the downstream, the animal production industry is mostly made up of small operators who are also the farmers. For such operators, they do not take into account labor costs when calculating operating cost. Thus, small-scaled producers are able to enjoy such an advantage when competing against industrialized production farms that required significant manpower to operate.

In low-input systems of the country, animal producers are less knowledgeable about quality, safety and cost of feed. Such farmers are also more likely to switch purchases from feed producers under the influence of sales agents. As such, the feed industry in China remains fragmented, with the large, medium and small producers co-existing and competing in the same markets. Due to the existing inefficiencies inherent in the grain and animal production industry, it is difficult for the feed industry to enjoy competitive advantage from economies of scale alone. Closely intertwined with the feed industry are the grain and animal production industry.

Source: EFEED, Singapore, 2004.

[29] CP group is a Thai company established in 1920's by a Chinese immigrant family. It started as a small shop in the 1940s in outskirts of Bangkok, and now is one on of the largest conglomerates in Thailand and the region.

Overhead/Administration: Overheads constitute 40.5% of hog farm-to-meat value chain, of which profits (71.4%), financing (19.4%), and depreciation (9.2%) make up the value added. The farmer has seen his business turn increasingly profitable (net profits at 30%) and is in a business expansion phase. He has built a new shed, expanded his water supply grid, and is planning to double the number of pigs. He has taken a 1 billion credit from Banque pour le Commerce Extérieur Lao (BCEL) at an annual interest rate of 22%. Even though profitable, the business could not access cheaper credit, as the other two state banks in Thakek offered less favorable terms. The credit also has a high collateral requirement of 250% (his land and real estate). This suggest that access to credit through the state-run banks is related more to the ability to provide high multiples of collateral rather than business projects with proven bankable propositions.

The implications stemming from such financing arrangements do not bode well for growth of the sector. The company highlighted in the analysis is in existence since 1986 and is one of the largest commercial hog farms in Khammuane. When such a profitable company is offered an interest rate of 22%, and a 250% collateral requirement, the chances for smallholder farmers in rural areas with little assets to gain access to favorable credit begins to look very bleak.

Thus, improving access and terms of credit of state-run banks, as well as opening the sector to competition at provincial level is critical for the hog farming sector to grow. One very opaque way in which high interest rates influences business decisions is that the pressure to sell swine at less than mature weight takes place. Businesses' preoccupation with strengthening cash flows and getting rid of high burden of interest rate becomes significant. For example, the hog farmer from Thakek currently sells pigs at 92 kg live weight, whereas a big hog farm in Vientiane reports sales at around 82 kg; both farmers raise pig breeds that have full weight potential of 100kg. While locking-in high prices in the local market does indeed shape the business decision of when to sell, another major driver is high interest rates that stress the cash flows.

Animal Husbandry: Animal husbandry constitutes 3.5% of value added. The major share of animal husbandry value added is in securing commercially viable breeds. Access to commercially viable breeds is done through Thailand. The price of pure bred Large White sow is Kip 2.70 million and a pure bred boar is imported at a price of Kip 6.75 million.[30] Ability to access proven breeds from Thailand is perhaps the single most important factor that provides opportunities for the growth of the hog farming sector in Lao.

While being a competitor, the Thai hog sector is providing a major externality benefit to hog raisers in Lao through provision of pure-bred breeds, at virtually zero cost for research and development. Unlike cattle and buffalo raisers, current and potential commercial hog farmers in Lao can rely on access to breeder stock from Thailand to help reduce operational uncertainty. As such, stakeholders in Lao should make most of

[30] It should be noted that all original prices of inputs were given in Thai Baht, which are here converted in Kip (at a rate of Kip 270 for 1 THB) for convenience.

reducing uncertainties in other aspects commercial livestock raising, most notably access to inputs such as feed and finance.

Other Issues: Poor veterinary and extension service capabilities

A common denominator that defines the success of a hog farming operation is closely linked to the availability of veterinary and hog-raising expertise. For example, both farms in Khammuane and Vientiane interviewed for this analysis are run by trained veterinarian-managers (trained in Thailand and Europe). For the majority of smallholders, be it in extensive or intensive farming, the opportunities to access extension services through trained veterinarians and specialist is extremely limited. As the Table 44 below illustrates, only 14 veterinarians a year with mixed degree of specialization are expected to enter the labor force in Khammuane in the next six years.

Table 44: Estimated Veterinarians Entering the Labor Market in Khammuane

Expected Village Veterinary Workers coming from:	2005	2006	2007	2008	2009	2010
Veterinary Short Term Training Programs	5	5	5	5	5	5
3 year technical school education	4	4	4	4	4	4
Bachelor of Science college education level	1	1	1	1	1	1
Master of Science college education level	1	0	1	0	1	0
Master of Science university education level	3	3	3	3	3	3
Total	14	13	14	13	14	13

Source: Provincial Department of Agriculture and Forestry, Khammuane

What compounds the problem is the fact that trained veterinarians tend to prefer government jobs to private sector jobs. If statistics from 2002 are something to go by, than the likelihood that veterinarians with high education will end up as private practitioners on the field is very slim (see Table 45 below). Successful investment in and management of commercial livestock operations is impossible without access to information as well as knowledge about animal health, feed strategies, as well as many other issues. While rectifying the lack of extension services falls upon both private and public stakeholders, the most likely pattern that should be encouraged is to develop the feed mill industry which will help integrate farmers into their value chain by provisioning inputs, knowledge and information, most notably on the key driver of profitability: feed.

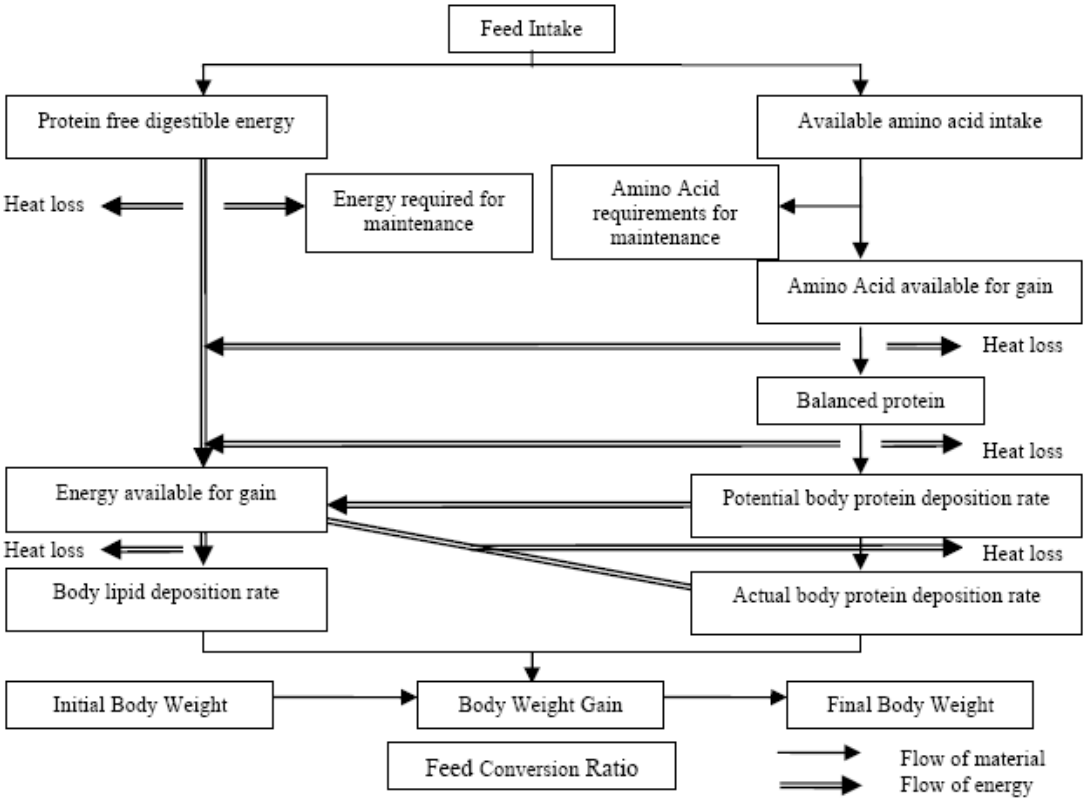
Table 45: Veterinarian and Extension Worker Numbers, Lao, 2002.

Activity	Note	Number
Veterinarians	Government officials (central, local)	42
	In laboratories, universities, training institutions	20
	Private practitioners	7
	Other	0
	TOTAL =	69
Technical Personnel	Animal health assistants (with formal training)	172
	Animal health auxiliaries	5,570
	Involved in food hygiene, including meat inspectors	105
	TOTAL =	5,847

Source: OIE HandistatusII Database

To get a better idea as to what kind of a challenge besets a smallholder attempting to understand, establish, and implement profitable pig raising techniques, a simple pig growth model is highlighted below. Without continuous and robust provision of extension services, the growth of the sector is seriously challenged by the sheer complexity of profitable pig farming.

Diagram 29: A Simple Pig Growth Model



Source: Framework for a simplified model to demonstrate principles of nutrient partitioning for growth in the pig, Modelling Growth in the Pig, EAAP, de Lange, C.F.M. 1995.

6.3.3 Integrated value chain analysis – Beef Cattle Farming

One of the largest cattle farms in Thakek district, with 35 heads of cattle is used as a sample to illustrate beef cattle farming in the province. The defining characteristic of this farm is that it started ambitiously the business in 1997 with 100 heads, purchased at US$ 100 each from local traders. By 2003, the number of cattle was decimated to 60 heads for causes unknown to the farmer. He suspects many causes for the death of his cattle. "We perhaps gave them the wrong grass, or maybe there was an outbreak we didn't know of. How should I know? I am not a vet," says the manager of the farm. At any rate, the farmer neither vaccinated his cattle nor had visits from any extension service provider. According to the farmer, every year or so a local official comes by to ask about cattle numbers, but that is all he sees from outsiders.

By 2004, farmer's cattle head count dropped to 40 as he started selling his cattle for fear of losing them once again to unknown diseases. He sold males at US$100 per head and females at around US$90 per head. He keeps no record of animals' weight, and his recollection is that live weight for animals sold in 2005 was at between 90-100 kg. As of May 2005, he has 35 cattle heads. His youngest son and daughter look after animals in open pastures throughout the year. During the dry season cattle is fed with crop residues from his farms. He has recently bought 50 kg of backyard forage seeds from Thailand (Brachiaria spp and Ruzi and signal grasses) at a price of US$2.5 kg. Although he suspects he will not have enough water for growing the grasses, he is willing to try once again to create some green pastures for his cattle in the hops that he can revive his cattle population. He has 17 cows not calved yet and is very hopeful he can revive his farm.

Yet, whether he will succeed with his plans is largely based on hope rather than informed decisions. The only information he has about growing his backyard forage seeds is a based on the leaflet from the Thai retailer that has come with the seed. In it, basically, the information is very general such as watering the seeds, expected yield, and some general commercial data. Whether the seeds will grow in his soil, what nutrients are needed, and other specific information is not known to the farmer. And this represents one of the largest cattle farms around Thakek.

Officials from the province didn't know much about the farm. They were very busy with attempt to contain an suspected outbreak of Hemorrhagic Septicemia (HS) in Nakai district of the province. As illustrated in the table below, the outbreak has killed 180 buffaloes and an unknown number of cows. Around 2,000 animals is the population of animals in the 15 affected villages.

Table 46: Livestock HS Disease Outbreak, April 3, 2005, Nakai District		
15 Villages Affected	Buffalo	Cows
Livestock population in the affected villages	1,500	500
Livestock Population Vaccinated*	1,154	336
Livestock Population Treated With Antibiotics	0	0
Livestock lost to outbreak, 7 weeks post-outbreak	180	unknown
Livestock saved , 7 weeks post-outbreak	115	0

Source: Interviews, Global Development Solutions LLC™

** Vaccinated for Hemorrhagic Septicemia (HS), the disease assumed by district authorities to be the cause of the outbreak as per prevailing symptoms. Vaccines administered post outbreak.*

The complete lack of rapid response capabilities in the province is best illustrated by the fact that while animals started showing signs of a disease on April 3, the letter from Chief of Nakai District to Chief of Agriculture and Forestry Department in Thakek was sent on May 30. In it, the district chief informs the provincial department that 3 disease samples *will be sent* (i.e. not yet sent) to Vientiane lab for analysis. This is almost two months into a suspected outbreak. While Khammuane is not a leading province in terms of livestock population, it still has significant numbers of livestock (see Table 47 in the next page).

Strengthening disease outbreak rapid response, and monitoring at provincial level is an absolute precondition if a commercial livestock farming and value addition is to emerge. Also, at the national level, effective control and surveillance programs need to be setup and financed. According to the district officials, the management of the hydropower project "helped us a lot by paying per diem for village veterinary officers as well as helping affected villagers to recover from livestock losses."

Table 47: Livestock Population, Khammuane, 2001-2004				
	2001	**2002**	**2003**	**2004**
Buffalo	86,347	77,727	78,949	70,614
Cow	52,763	52,634	56,055	52,525
Pig	71,395	68,314	70,705	47,608
Total	**210,505**	**198,675**	**205,709**	**170,747**

Source: Provincial Department of Agriculture and Forestry, Khammuane

But, the officers admit that although their veterinary station has a fridge with some vaccines and no antibiotics, the fact that the disease was not discovered in time had already left them behind in the efforts to contain the disease.

Going back to the cattle farmer in Thakek, it is difficult to establish a value chain analysis for this operation as there are no consistent and reliable figures about its operations. One thing that is certain is that commercial cattle farming in the province is almost non existent. By contrast, the pig industry appears to be consolidating, with the number of farms decreasing but average population per commercial farm has increased from 60 in 2002 to 128 in 2004 (see the table below). The data should be taken with caution as, for example, the figures for the farm which was visited and counted 35 heads were still being reported as being 60.

Table 48: Livestock Population in Commercial Farms, Khammuane, 2001-2004								
	2001		**2002**		**2003**		**2004**	
	Number (Farms)	Number (Animals)	Number (Farms)	Number (Animals)	Number (Farms)	Number (Animals)	Number (Farms)	Number (Animals)
Pig	81	6,028	211	12,773	160	13,980	136	17,459
Cattle	1	70	1	65	2	87	6	362
Total	82	6,098	212	12,838	162	14,067	142	17,821

Source: Provincial Department of Agriculture and Forestry, Khammuane

To get a better understanding of value addition potential from cattle farming, a value chain analysis is provided for a commercial cattle farmer in Vientiane. Although the figures for inputs and outputs (especially in terms of animal weights) leave a lot to be wanted, the commercial farm in Vientiane is clearly an organized farm with some reliable costing figures. The farm is situated in Vientiane Province, and numbers 261 heads. The nature of commercial livestock farming in Lao, which is at the same time a savings vehicle is best illustrated by the fact that the farm had 361 heads in 2004, when by February it sold 100 heads to secure funding for an education abroad for the owner's son. Value chain analysis suggest that farm gate cost for liveweight beef is US$ 1.30/kg, while the corresponding cold dressed beef price after the animal is transported and

slaughtered is US$ 1.89/kg. When farmers profit is taken into account, the prices per live weight and cold dressed meat are US$ 1.69/kg and US$ 2.41/kg.[31]

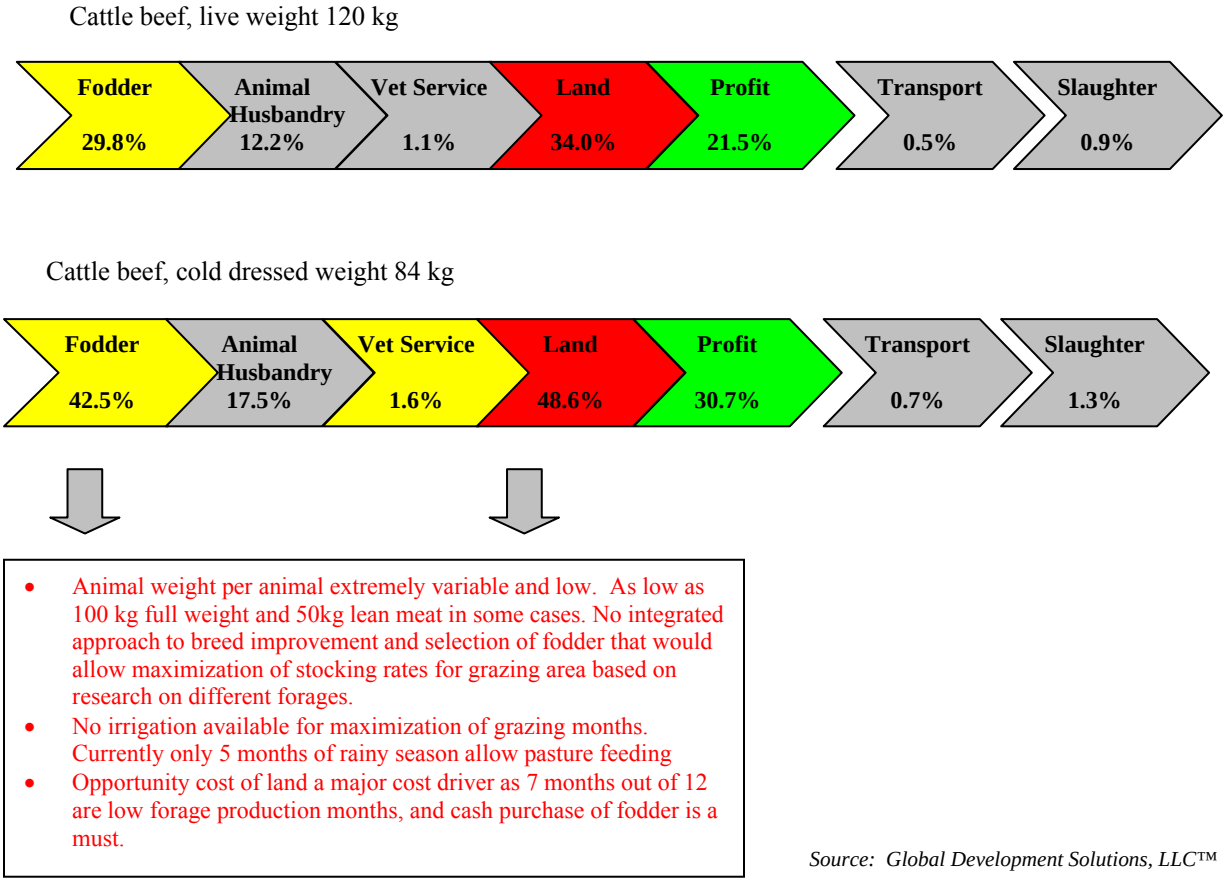
Land: As per Diagram 30 below, value chain analysis shows that land cost is a major cost driver (34.0% for live weight and 48.6% for cold dressed weight). To determine how many animals a farmers land will support (stocking rate), the farmer needs to know two things: 1) How much forage the particular animal or group of animals available in the rangeland will consume; and 2) How much forage is available. How much an animal will consume is directly related to its genotype while how much forage is available on the land depends on climatic conditions as well the quality of forage grown on the land. On both aspects the data from the particular farm is basically nonexistent.

This makes it very difficult to assess any maximization model, especially since the farmers do not keep records of animal weight gains, growth, and other indicators. Nevertheless, visits on the ground suggest that any potential effort of maximization of stocking rates is hampered by external factors beyond the control of a farmer.

For example, the particular farmer appeared very much interested to set up an irrigation system, with an estimated cost of US$ 50,000. Two factors prevent him from pursuing his ambition. First, he has not been able to access capital for financing the scheme. Judging by prevailing interest rates of 22-30% shared by hog farmers in urban centers, even if he were able to access credit, it is very probable that the cost of financing would be exorbitant. Secondly, in order to run an irrigation system, the farmer would need to access electricity. The nearest grid point is 8 km from his farm. The alternative to powering water pumps with petrol is judged to be too expensive by the farmer. It is therefore anticipated that access to affordable credit and extension of irrigation and electricity network in the country will increase the opportunities for growth of cattle farming.

[31] Opportunity cost of land was capitalized at a savings annuity of 3% were the farmer to sell his 30ha land at the prevailing price of US$ 200,000.

Diagram 30: Commercial Cattle Farming Value Chain



Source: Global Development Solutions, LLC™

Profits: As per the time of interviews, the profit rates from cattle farming appear to be healthy enough to stimulate expansion. This, however, needs to be taken with much caution. Unlike the established trading margins on kg basis for live hogs and pork, the variation on prices quoted for cattle is very high (as high as 50%). This is supposed to come from variations in weight of animals, which is just as high. For example, a typical interviewee shares sales prices as between Kip 2-3 million per cow, at weight between 100-150 kg per cow. While this may look as if a cow of 100kg liveweight sells for Kip 2 million and a cow of 150kg live weight sells for Kip 3 million, in reality when specifically asked how many cows were sold at specific prices and weights, no farmer has any record of such sales simply because they do not track animal weights. It is thus very important that extension services be provided to farmers in terms of farm management skills and record keeping. This does not only increase the chances of profit maximization during trading but also identification of diseases in livestock which often manifest themselves through weight changes in animals.

Other Issues: Introduction of Improved Breeds Non-existent

It is crucial that livestock development policies encourage the establishment of private professional breeding flocks either owned individually or by a group of farmers who will benefit from the scientific and technical support. To date, the predominant breed of cattle in Lao is the Chinese Yellow type. While well adapted to local conditions, evidence from the ground suggests that the room for improvement in terms of fattening for beef is very narrow. Mature live weight cattle of above 200 kilograms are not common. Typical cattle for fattening in developed markets, for example, ranges at weights of 600kg. Beef industries based on low-input low-output models are by and large inferior to models that operate on high-input high-output basis.

Existence of organizations having the necessary technical know-how and finance is a prerequisite for effective animal recording and genetic improvement programs. These organizations can come from the private sector, public sector, or both. For hog farmers, the chances that feed mills will take the example of Thailand and China in developing the sector through forward integration and provision of farm inputs (feed, breeding services, farm advisory services etc.) are real. For cattle raising, however, feed mills interviewed show no interest in integrating operation with cattle farms though provision of cattle feed, fodder seed, breeding services, etc. It is almost certain the economics of cattle feed provision does not fit well with local feed mills, who are, by and large concentrated on producing poultry and hog feed. Support of proven hog and poultry breeds under intensive farming conditions are a safer bet than supporting a cattle breed that has many unknowns in terms of feed conversion rates, performance under intensive farming, etc.

It is therefore anticipated that GOL, with the support of the donor community, need to fill the gap and play an active role in designing breed improvement programs by stimulating long term genetic improvement programs through infrastructure to support animal recording, training, accessibility of inputs, and breeding costs. Participation of farmers and their self-organization within marketing or types of organizations such as breeder associations that focus on their needs, are two important factors required for the success of any genetic improvement program, and need to be taken into consideration. Where investments in genetic improvement have failed is in cases when it was done on pro-bono basis, without assessing its costs and benefits over years, and clearly identifying who bears the costs and who benefits. Initially the provision of complete genetic improvement services may not be economically feasible, but demand-driven priorities will be defined for which farmers will have incentives to pay.[32]

[32] 7th World Congress on Genetics Applied to Livestock Production, August 19-23, 2002, Montpellier, France Session 25. *Developing sustainable breeding strategies in medium- to low-input systems Communication N° 25-15*

7 Sector Analysis – Furniture

7.1 Summary of Findings

Chart 8: Summary of Key Barriers to Competitiveness in the Furniture Sector in Lao		
Barriers to Competitiveness	**Key market drivers**	**Options for growth**
• Price and volume uncertainty of raw material supply anchored in a quota allocation and timber auctioning system that is not based on defined rules according to which stakeholders can base their operation planning • Long and costly export processing with characteristics of rent-seeking behavior on the part of officials • Erosion an pressure on cash flows and margins of producers driven by requirements to finance large shares of raw material supply within short periods of time • Captive position vis-à-vis transit transportation to export markets, driven by discriminatory practices on the part of neighboring Thai licensed monopolies in the sector of transit tranport	• Ability to control, manage, and gauge raw material supply volatility to a high degree, by the virtue of existence of rule-based allocation of timber resources as well as ability to acquire rights of ownership and management of timber resources over long periods of time (concession-based or other systems of forest exploitation regulation) • International markets driven by short time-to-delivery cycles as well as moderate to high price sensitivity in sourcing decisions • Seamless movement of good across borders indispensable for producers' goods to reach international clients in time • Market that rewards focus on design creativity and edge, innovation and ability to quickly upgrade product portfolio in line with fact-changing consumer taste	• Government balance of royalty revenue maximization goals with provision of sufficient supplies of raw material to manufacturers of high value added products • Removal of redundancies and rent-seeking during the export processing process so as to improve rather than impede exporters' lead times • Stimulate creation of design and knowledge centers to complement the existing base of international expertise in the country, the backbone of successful high value added exporters • At bilateral and multilateral levels, engage in removal of transport barriers that discriminate country's exporters

Source: Global Development Solutions, LLC™

7.2 Sector Profile

Wood processing and wood-related exports are one of the major export items in Lao. They constituted 35.7% of total exports in 2002. Despite its leading position in exports,

the sector is still an underdeveloped one. Namely, the bulk of exports are basic sawn and planked wood, without much value addition into higher value added products such as furniture. Historically, furniture share of wood exports has been between 1.7 - 3.2%, with the exception of 1998 and 1999 when furniture exports were strongest, constituting between 17 - 25 % of all wood sector exports.

Perhaps the most telling data concerning the underdevelopment of the sector is represented in Table 49 below: the reported imports of wooden products from Lao by Thailand, Lao's major trading partner.

Table 49: Laotian Exports of Wood and Wooden Articles to Thailand, 2001-2004 (US$*)

	2001	2002	2003	2004	2004 Share
Fuel Wood	768,337	19,601	18,908	100,818	
Wood Charcoal	1,928	10,131	12,011	28,245	
Raw Logs	15,218,683	1,474,031	1,107,663	3,080,099	
Rail (tram)way sleepers	61,228	59,258	22,252	1,185	
Wood sawn or chipped lengthwise	**50,230,112**	**71,950,059**	**73,955,863**	**61,311,098**	**74.45%**
Sheets for veneering and plywood	185,581	412,585	1,750,491	1,560,211	
Wood (including strips for parquet flooring) not assembled, shaped, whether or not planed	1,232,079	1,368,765	3,758,369	4,924,991	
Plywood, veneer, panels	813,663	852,409	3,369,489	11,170,973	
Furniture, prefabricated buildings	**36,033**	**55,400**	**114,500**	**170,180**	**0.21%**
TOTAL	**68,547,644**	**76,202,239**	**84,109,546**	**82,347,800**	

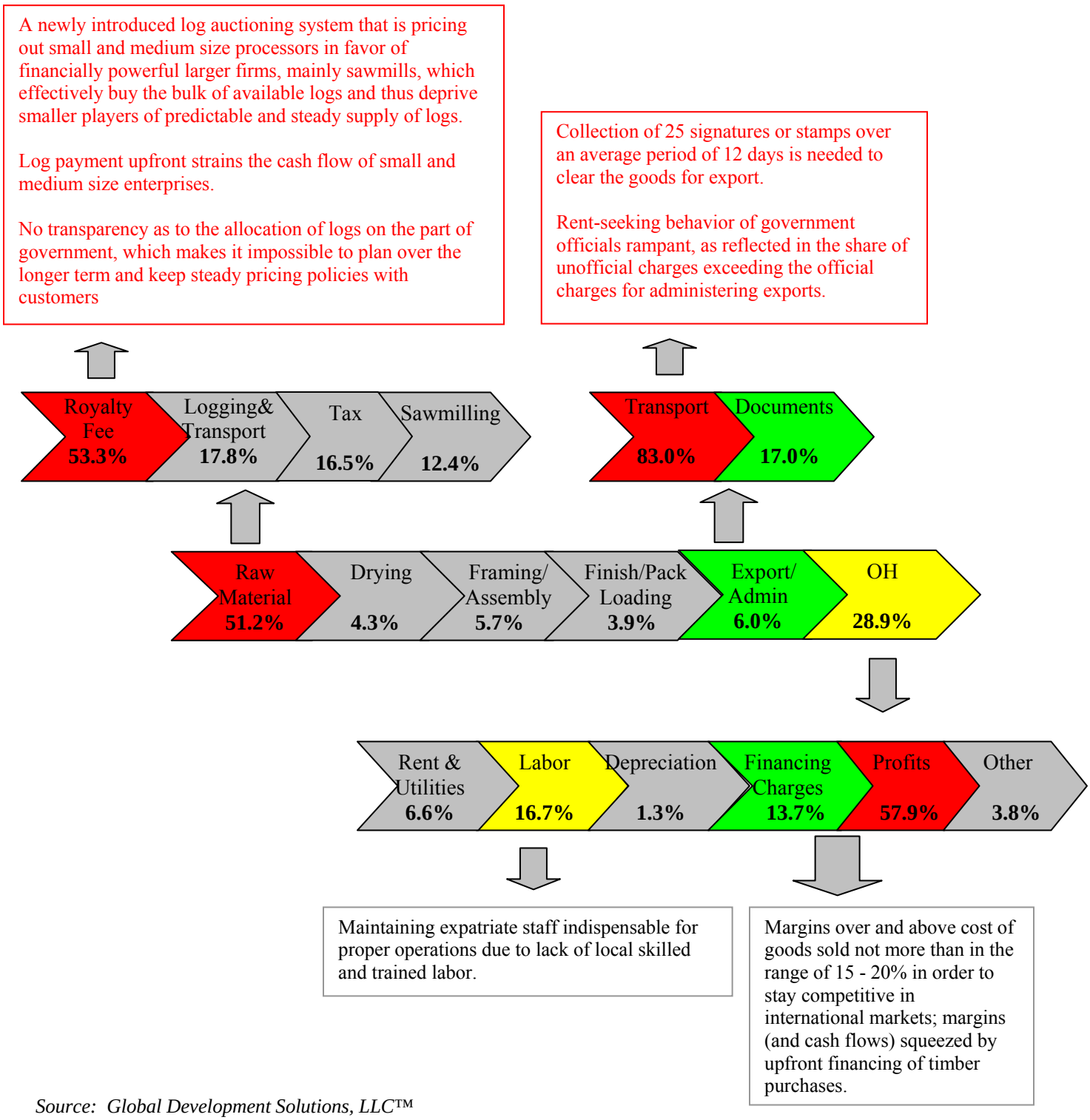
Source: Compiled by Global Development Solutions, LLC™
* Yearly average exchange rates used.

Laotian wood processing industry, therefore, is and remains an exporter of roughly sawn wood, without much value addition in the furniture sector. The value chain analysis will provide a snapshot of the wood processing industry to highlight its main challenges and distortions, and potential actions that could be taken to address them.

7.3 Integrated Value Chain Analysis

Diagram 31 below illustrates the value chain of a java chair, typically used as garden furniture, made from teak wood, purchased as ungraded or mix class of wood. The producer is situated in the province of Khammuane. Value chain analysis shows that the end-price of the chair, FOB Bangkok, is US$ 9.46, and the three highest value-added components are the raw material, at 51.2%, followed by overhead, at 28.9%, and charges for export administration, at 6.0%.

Diagram 31: Furniture Value Chain, Java Chair, Lao



Source: Global Development Solutions, LLC™

Uncertain Raw Material Supply

One of the most often mentioned issues that the secondary processors raise is the fact that raw material supply is volatile which introduces uncertainties in the production process, most notably the inability to plan customer orders over long periods of time. The primary cause of this volatility is mainly related to the distribution of wood by the government, who owns forest resources and logging operations through outsourced suppliers (see ANNEX 8.1 for log price lists).

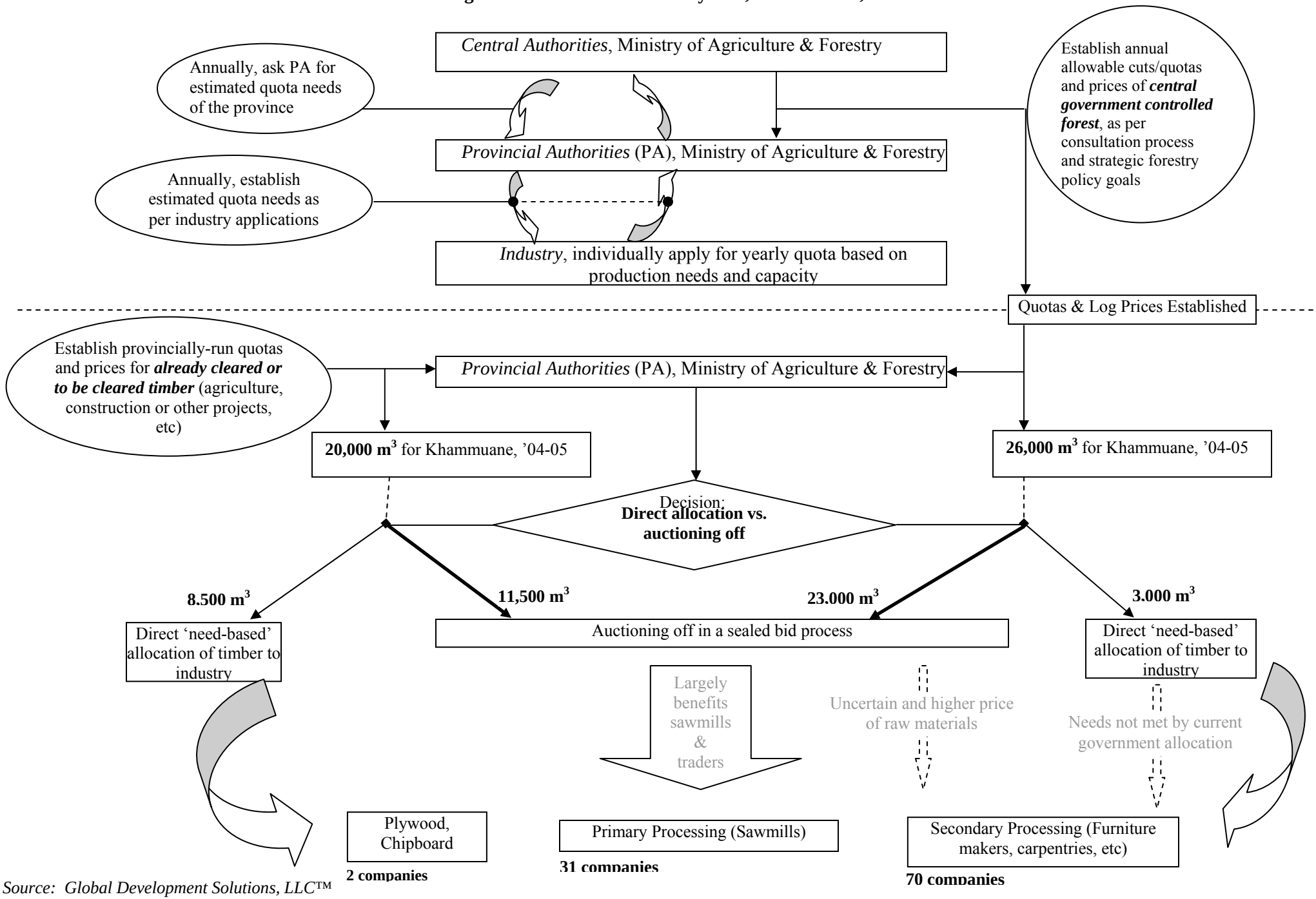
Introduced over the last year, the distribution of logs takes place through a mixed system of allocation of a portion of wood quota directly to wood processing companies, and auctioning another portion of wood quota through a 'sealed bid' bidding process, both under the authority and discretion of provincial forestry authorities. Diagram 32 below illustrates the wood allocation system in the province of Khammuane. Although variations from this system may exist in other provinces, by and large, judging from the interviews in other provinces (Champasak and Vientiane), the Khammuane system illustrated below is similar to the workings of the other provinces' wood quota allocation systems.

The key weakness and distortion mechanism of the current system is the arbitrary nature of wood quota allocation practiced by provincial authorities. Any direct insight into the decision making process of wood allocation and its underlying policy and economic justification could not be obtained. As corroborated by the private sector stakeholders, rule-based documents outlining the process of quota allocation either do not exist at all or are not shared with the public at large, and are nowhere to be found in any government institution, central or provincial. Thus, little to no formal guidelines seem to dictate the behavior of the sector, leaving way for random and often discretionary public sector decision making to define activities in the sector.

As can be seen from Diagram 32 below, the initial process of establishing the actual quantities and royalty fees for wood exhibits a rational approach in that it involves a consultative process whereby industry, through provincial authorities provides a channel to inform the central and provincial government about their raw material needs. Once the quota allocation process is finished, however, the consultation process ends, and the provincial forestry department becomes the gatekeeper and the all-powerful institution in terms of distributing the quota to the industry.

The provincial government uses two avenues of selling/distributing quotas. A part of the quota is distributed through direct allocation, another part is auctioned off. For the small and medium size furniture processors, it is critical that they purchase as much wood input material as possible through the direct allocation rather than through the competitive bidding process. The primary reason is in the fact that get displaced by

Diagram 32: Wood Allocation System, Khammuane, Lao



Source: Global Development Solutions, LLC™

larger players in the competitive bidding process, and most notably by the saw millers. For example, in the spring 2005 auction in Thakek, Khammuane, a local sawmill purchased all 3,000 m^3 auctioned off in a competitive bidding process involving three other companies (two sawmills and a furniture maker). The bidding process involved four separate log lists that were bid upon, with three bidding lists having a volume of 1,000 m^3 each.

Surely, the process of competitive auctioning has revenue maximizing potential for provincial authorities. In this particular case, the average price of logs at pre-auction stage had been US$97/$m^3$, while the end auction sales price was significantly higher at US$145/$m^3$. This bid has indeed maximized government revenue by yielding a margin of 49% over an above the starting pre-bid price of timber.

But, two problems have arisen as a result of the auction. First, 3,200 m^3 of logs ended up in the hands of a financially powerful trading company that has, among other businesses, a small carpentry shop with annual capacity of 500 m^3 of wood. This suggests that the purchase of wood by this particular company is driven more for the purpose of trading wood rather than to meet the raw material input needs of the carpentry business. By offering the highest price on all wood auctioned the company was able to purchase the wood despite having a wood processing capacity six times lower than the actual wood purchased.

While maximizing local government revenues, the end result of this system is that it effectively both deprives the other wood processing businesses of essential raw materials and shot up the price of the raw materials in case other processors decide to purchase logs from the winning party in the bidding process. Interviews in the field suggest that purchasing wood from sawmills or trading companies is next to impossible, since they have secure international markets for their produce where they can yield a much higher price than in the local markets.

It thus becomes an imperative that provincial governments balance the revenue maximizing goals with the particular needs of secondary wood processing businesses such as furniture exporters. The risk of the current system is that it displaces exporters of high value added products and promotes lower value-adding activities such as sawmilling and pure market trading speculation. For example, during the consultative process of quota allocation, a furniture exporter based in Thakek, Khammuane had requested a quota of 2,500 m^3, as matched by provisional orders from international clients. The company was allocated a meager 100 m^3 from direct allocation, and was encouraged to participate in bids to acquire its remaining share of log needed. In general this may be a good way to allocate resources, but in Lao this system is

Table 50: Quota allocation, Khammuane

Activity	Quota allocated (m^3)	Share of total quota
Sawmilling	4,300	50.6%
Furniture	1,200	14.1%
Plywood	500	5.9%
Chipboard	500	5.9%
Outside Province	2,000	23.5%
Total	8,500	100.0%

Source: Interviews GDS, LLC[tm]

disadvantaging the small and medium size high-value added producers at the expense of financially powerful lower-value added producers like sawmills or outright timber traders. Moreover, the system of direct allocation is also proving to be difficult for furniture makers, as can be seen in the allocations in the Khammuane province, whereby only 14% of quota had been allocated to furniture makers as of May 2005 (see Table 50 above). Two sample log trading leads for Laotian teak logs have been presented in Table 51 below (verbatim as quoted by a Malaysian trader) to illustrate the fact that local furniture processors compete for raw materials with an international trading network, something that may displace them out of the domestic raw material supply.

Table 51: Sample Trading Leads, Laotian Teak, June 2005

Trade Lead 1: Round Log Teak Wood A-grade, over 70 cm diameter		Trade Lead 2 : Teak Logs, 73 years old	
Model No.:	AMR-T02/RL	**Model No.:**	AMR/TL-2/T
Product Origin:	Laos	**Product Origin:**	Laos/Thailand
Brand Name:		**Brand Name:**	
Unit Price:	550 per cbm USD (NonNegotiable)	**Unit Price:**	930 USD (NonNegotiable)
Price Terms:	FOB Port Klang	**Price Terms:**	FOB Laem Chabang, Bangkok
Other Price Terms:		**Other Price Terms:**	price per cubic meter
Payment Terms:	L/C,T/T	**Payment Terms:**	CASH
Payment Remarks:		**Payment Remarks:**	
Supply Ability:	constant	**Supply Ability:**	2,300 cubic meters
Minimum Order:		**Minimum Order:**	500 cubic meters
Delivery Lead Time:		**Delivery Lead Time:**	
Inner Packing:		**Inner Packing:**	
Certification(s):		**Certification(s):**	

Source: Alibaba.com Trading Portal, June 2005.

The second problem is that, apart from, and perhaps because of, the fact that wood ends up in the hands of companies that are not necessarily in the business of wood processing, the auctioning system is increasing the log prices up to a point where the competitiveness of furniture processors may be put into question. For example, taking the log price increase of 49% that resulted from the particular auction mentioned above, the price of the chair manufactured by the furniture producer would increase by 32.2%, at the new, higher, price of raw material (in this case, ungraded, mix, class of teak wood).

While exact benchmarking data for the specific chair is not available, comparable prices for Windsor and Colonial type chairs from Malaysia, one of the global leaders in component furniture exports, are a useful benchmarking point. As Table 52 below shows, in the event the post-auction log prices consistently increase at levels that prevailed in the auction already highlighted, the Laotian furniture maker of Java chairs would be on the brink of pricing itself out of competition with countries like Malaysia. It should be noted that the types of Malaysian chairs compared in this case are generally

more sophisticated products to make and potentially sell at higher prices than garden chair of the Laotian producer.

Table 52: Benchmarking of Laotian Furniture Piece (in US$)

	Lao Java Chair			Malaysian Chair	
	At nominal quota raw material price	At post-auction, 49% increase of raw material price		Windsor Chair	Colonial Chair
Raw Material	$4.82		$7.85		
Drying	$0.40		$0.40		
Framing/Assembly	$0.54		$0.54		
Finishing	$0.19		$0.19		
Packing/Loading	$0.18		$0.18		
Export Charges	$0.58		$0.58		
Profits	$1.58		$1.58		
Other OH	$1.15		$1.15		
TOTAL (FOB)	$9.44	↑32.2%	$12.47	$ 8 to $9	$ 11.5 to $12.5

Source: Global Development Solutions, LLC™

In many respects, as the low export figures indicate (see Table 49 in page 121), the furniture industry in Lao is at its infant stage. While the strategic orientation of the authorities to allocating timber resources according to market-based principles is correct, it is difficult to see how the current system achieves anything to support the higher-value added furniture producers. Realignment of the current quota allocation is warranted in at least three aspects. First, as far as the non-competitive direct allocation is concerned, furniture makers should be given a larger share of timber, especially considering the fact that their dependency on the directly allocated timber is very high since their weaker financial muscle puts them at a disadvantage in the competitive bidding process.

Secondly, and closely related to the first aspect, a better balance needs to be done as to the quantities that will be sold in a competitive process versus direct allocation at preset log prices (currently over 77% of timber is up for grabs through a competitive bidding process). As the value chain shows, more than 53% of value added of a furniture piece is based on raw material supplies. The auctioning system in effect introduces a high degree of volatility to 53% of furniture maker's cost structure, and major fluctuations in this aspects can effectively make or break a company in/out of business. Allocating a larger share of stable, directly-allocated timber at prices that have historical precedence from previous years' quota prices would go a long way in decreasing the uncertainty of timber supplies and thus enable furniture makers to focus on they do best: making furniture.[33]

[33] It is a matter of course that another way to reduce raw material supply volatility for the wood industry is to introduce long term ownership of forest resources through concession based long term leases. Such systems enable wood processors to plan, manage, and use timber resources according to their business objectives without having to introduce price risk to the lifeblood of the business: timber. At the moment, in Lao, the government seems to be firmly determined to be the sole custodian of timber resources and therefore potential improvements may need to be sought within the existing system, rather than replacing it

High Overheads Reduce Profit Margins

The third issue identified by the value chain analysis is high overheads, which is generally driven by the high cost of finance. The current payment mechanism for timber is such that all acquired timber must be paid within a week of acquiring the timber (depending on the channel of acquisition, an upfront, on the spot cash or check payment of 20% of the value of timber may be required).

To put this in context, a furniture company that needs 2,500 m^3 of timber per year, has the two above-mentioned avenues of acquiring the timber. In the unlikely event that it has been allocated a direct quota, and depending on the type and grade of timber needed, the company would need to pay between US$ 250,000 – 1,000,000 (as per the price range of logs illustrated in ANNEX 8.1). In the event the company chooses to compete in the bidding process, this price range will most probably be higher. In both cases, though, the company would have to allocate significant amounts of money to secure its raw material supply. One way of securing such finances is to resort to financial institutions. Even though the prevailing foreign currency denominated credits (US dollar or Thai baht) are not high and range between 8-12% per year, the key external pressure put on the processors by the payment requirements for purchased log from GOL is that they have to acquire and finance all the yearly stock of raw material *at once.*[34] As a result, financing charges shoot up, and in the case of the java chair producer, it constitutes 13.7% of overhead costs.

One way to address this distortion is to split the auctioning quantities into smaller volumes, of say 200-400 cubic meters, rather than the current system of splitting the auctioned volume in bidding items (log lists) of 1000 cubic meters and over. This would most probably increase the overhead costs of operating the auctions which would be passed on to the consumers (processors), but it would alos increase the chance of furniture makers being able to acquire their raw materials in a phased way, through participation in multiple auctions, rather than having to purchase the entire yearly timber requirements at once. Also, in the event that direct quota allocation of timber is increased to meet the needs of furniture makers, than consideration should be given to phasing payment according to processors' actual use of timber throughout the year rather than at the point when legal title to timber is purchased and all at once.

The value chain shows that overheads are the second highest value adding component, at 28.8%. More than half of the overheads are in the form of profits. While this may seem high, when measured in actual terms, margins generally range between 15 - 20%. What is more concerning is the fact that margins are effectively eroded by financing charges

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with a new one. Nevertheless, a detailed analysis of potential advantages of a concession-based system may be warranted.

[34] This is the same as, say, a transport company having to purchase all of its fuel at the beginning of its operating year.

(13.7%), and expatriate labor (16.7%). Pre-profit cost structure of these companies suggests that financing (30%) and expatriate labor costs (35%) dominate overhead costs associated with operating a furniture company in Lao.

Even though overhead labor costs do compromise the profit margins, at present it is very difficult to find a local Laotian company that exports high-value added furniture without relying on the expertise and design skills of international experts. It is therefore of utmost importance that training and skills develop, as well as transfer of know-how be facilitated to help accelerate the indigenization of the sector..

At the same time, however, local capacity needs to be built in the form of educational institutions that would support the private sector through provision of trained labor force. Currently, in the case of Khammuane and Champasak provinces for example, there exist only two classes with 20 students each within vocational training colleges that provide training for wood processing. The placement of these students could not be traced directly with the schools, but judging from the interviews in the field, it appears that more graduates from these schools work within government departments than they do in the private sector. As the following section will illustrate, there is ample reason for graduates to choose government jobs: it is a very lucrative proposition.

Expensive and Time-consuming Export Clearing Process

As the value chain analysis indicates, export administration (6.0%) is the third highest value adding component. On average, the export administration of a shipment consigned for exports (usually volumes corresponding to one to two containers 20" containers) costs exporters of wood products between US$500 – $1,000, depending on the level and number of staff involved in the export clearance process. As can be seen from Table 53 below, there are two key features of the export administration process. First, unofficial payments exceed payments for official charges. Every step of the export clearance process requires unofficial handouts to be issued to government officials. On average, a company pays between US$100 to US$150 per export shipment. For a small to medium size company that ships between 30 containers of end product per year, this amounts to approximately US$3,000 – $4,500 per year.

Table 53: Sample Running Cost for Export Administration/Documentation of Wood Products

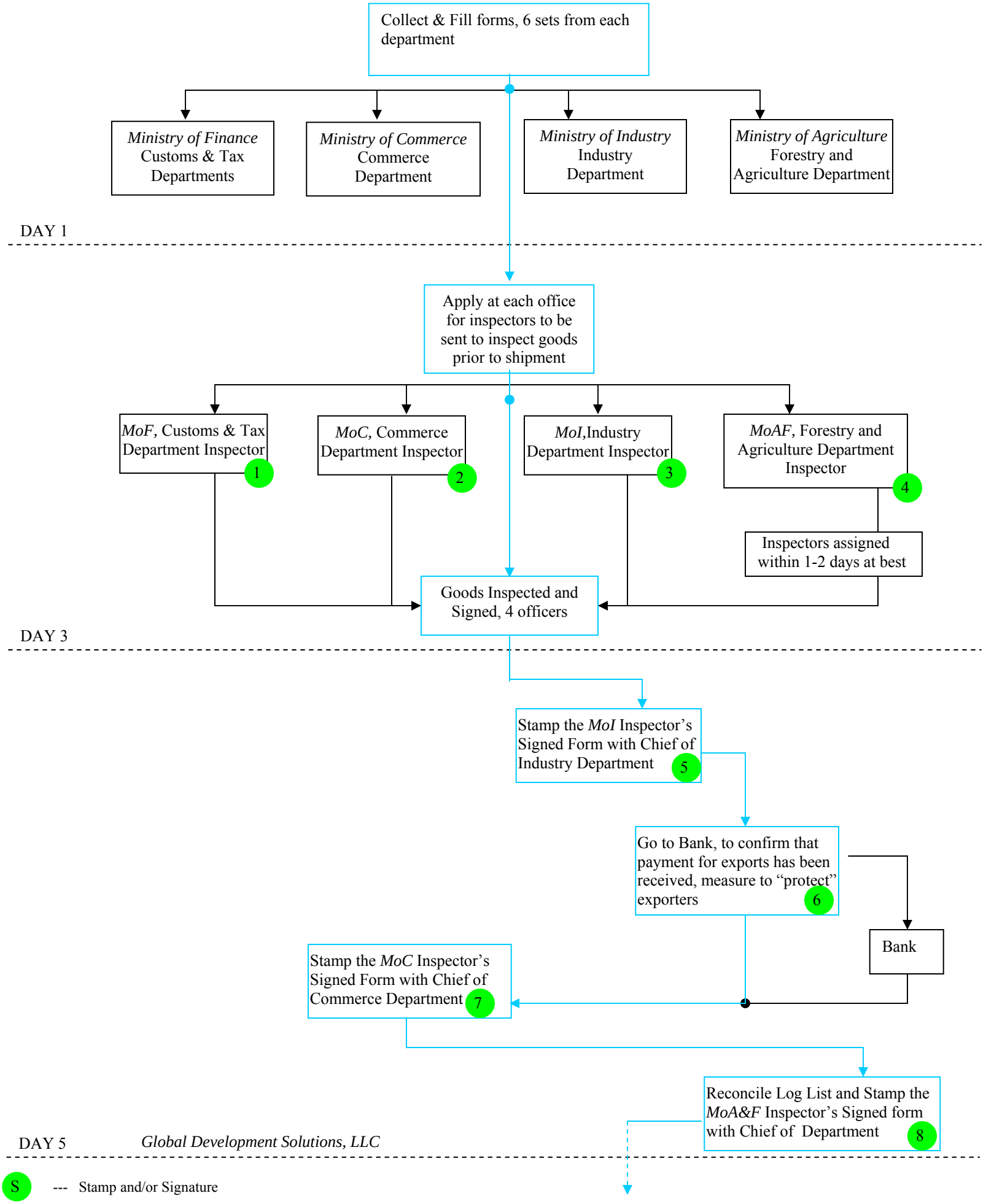
Expense	Kip	Share in Total
1. Customs Department Form	30,000	
2. Commerce Department Form	40,000	
3. Industry Department Form	30,000	
4. Agriculture Department Form	50,000	
5. Advance Profit Tax	171,000	
6. Property Tax	155,000	
7. Agriculture & Forestry Tax	22,000	
8. Mekong Ferry Fee	234,000	
9. Overtime Fee 1 Border Section	156,000	
Total Official Payments (Kip)	**888,000**	**45.5%**
Unofficial Payments:		
a) 4 Government Departments	200,000	
b) Paper work/export clearance handouts:	20,000	
	40,000	
	10,000	
	25,000	
	50,000	
	84,000	
	30,000	
	60,000	
	20,000	
	20,000	
	88,000	
	40,000	
	26,000	
	200,000	
	150,000	
Total Unofficial Payments (Kip)	**1,063,000**	**54.5%**
Total Running Cost of Export Clearance	**1,951,000**	
Total Running Cost of Export Documentation (in USD)	**195**	

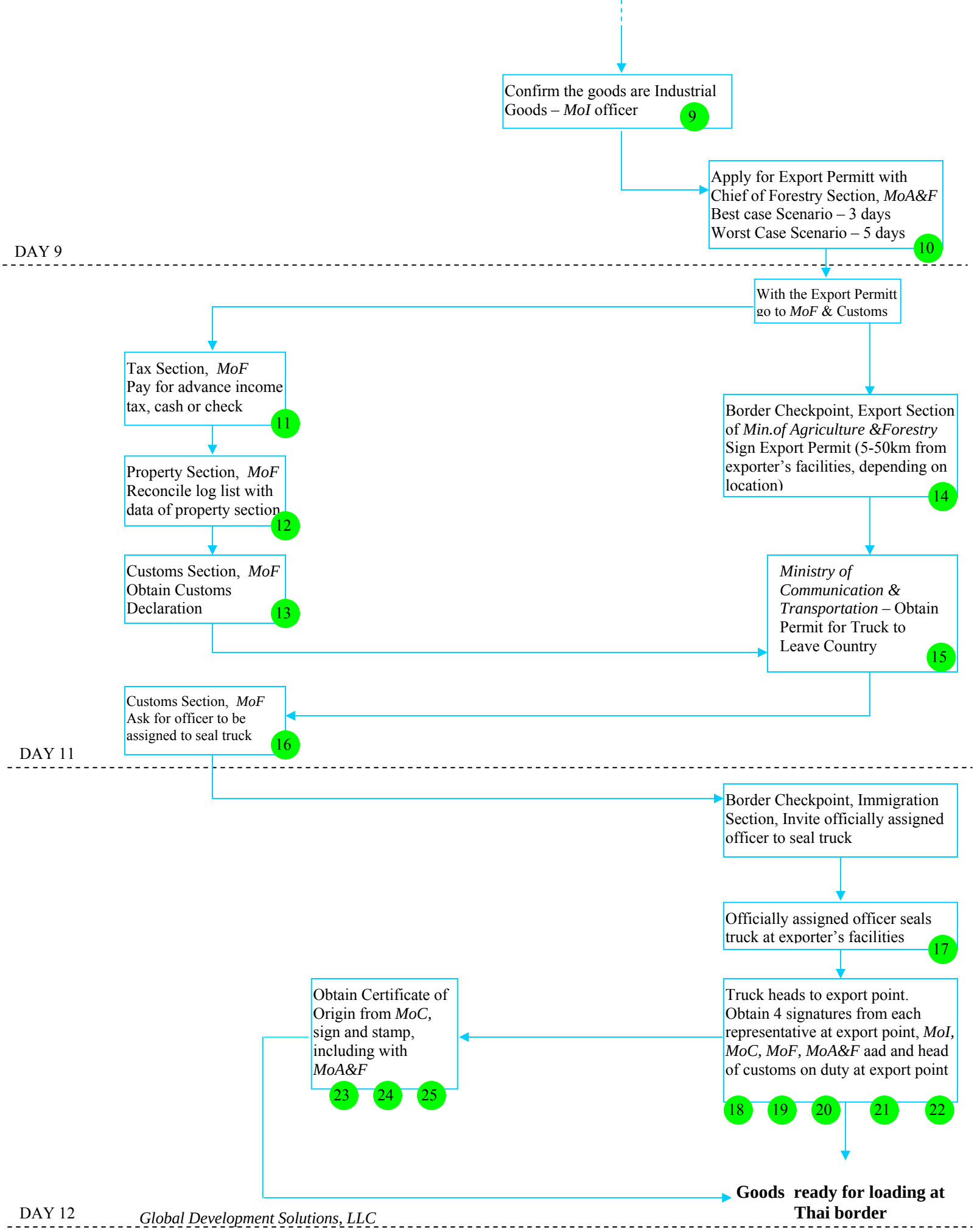
Source: Interviews, Global Development Solutions, LLC

Secondly, it takes approximately 12 days to complete all the paper work necessary to export. This entails significant resources on the part of the exporting companies, who must allocate staff for export clearance procedures. Usually this process requires involvement a number of people, including significant management involvement to oversee the documentation process.

Diagram 33 below shows the export clearing procedures for wood processing companies in Lao. The entire process takes an average of 12 days to complete and 25 stamps and signatures are required to clear a shipment through the Laotian border. By any standard, this is a major distortion that hinders the competitiveness of the sector. Not unlike most globally traded goods, furniture market is extremely customer driven, and time to delivery is just as important as price competitiveness for attracting and retaining customers.

Diagram 33: Export Clearing Procedures, Wood Product Exporters




Confirm the goods are Industrial Goods – *MoI* officer 9
Apply for Export Permitt with Chief of Forestry Section, *MoA&F*
Best case Scenario – 3 days
Worst Case Scenario – 5 days 10
DAY 9
With the Export Permitt go to *MoF* & Customs
Tax Section, *MoF*
Pay for advance income tax, cash or check 11
Property Section, *MoF*
Reconcile log list with data of property section 12
Customs Section, *MoF*
Obtain Customs Declaration 13
Border Checkpoint, Export Section of *Min.of Agriculture &Forestry*
Sign Export Permit (5-50km from exporter's facilities, depending on location) 14
Ministry of Communication & Transportation – Obtain Permit for Truck to Leave Country 15
Customs Section, *MoF*
Ask for officer to be assigned to seal truck 16
DAY 11
Border Checkpoint, Immigration Section, Invite officially assigned officer to seal truck
Officially assigned officer seals truck at exporter's facilities 17
Truck heads to export point.
Obtain 4 signatures from each representative at export point, *MoI, MoC, MoF, MoA&F* aad and head of customs on duty at export point
18 19 20 21 22
Obtain Certificate of Origin from *MoC*, sign and stamp, including with *MoA&F*
23 24 25
Goods ready for loading at Thai border
DAY 12
Global Development Solutions, LLC
S --- Stamp and/or Signature
Source: Global Development Solutions, LLC™

In contrast, while it takes approximately 12 days to process export documentation and clear goods within Lao itself, it takes only 30 to 31 days to clear, ship, and deliver the same goods from Bangkok to Rotterdam. In this context, almost 30% of time-to-delivery to end customer is lost to in-country export administration distortion. If Lao is going to have any meaningful exports of wooden value-added products, this export procedure red-tape must be greatly reduced.

Another issue hindering the competitiveness of the sector is the fact that currently only four market players in Thailand are authorized to handle transiting shipments through Thailand. As a result, Laotian exporters operate in a captive transiting market that adds significant costs. In the example of the furniture exporter, the Thai inland cost of transporting a 20 foot container from Thakek through Nakorn Pranom to Bangkok is THB 21,000, or US$525, and THB 41,500, or US$1,037, for a 40 foot container. This translates to approximately US cents 5.8 per kilometer-ton. By contrast, as per figures extrapolated from prevailing trucking costs, the in-country, non-transit trucking costs in Thailand range from US cents 2.2 to 3.7 per kilometer-ton.[35]

These figures suggest that Thai transit operators are making full use of their monopolistic position and charging multiples of domestic rates to customers from Lao. For example, over the same distance of 740 kilometers, the Thai transit companies quote a price in the range of US$525 to truck a load of 20 foot container from the border with Lao at Nakorn Pranom to Bangkok, while the domestic price for non-transit trucking from Chiang Mai to Bangkok is in the range of US$178.

One of the ways to address this external distortion from within Lao is to focus on gaining WTO access, wherein the practices of Thai transiting service providers can be challenged under MFN stipulations of WTO (both GATT as well as GATS) as discriminatory. Despite recent amendments to the 1978 Lao-Thai bilateral agreement that removed the original ban on Laotian companies to transit through Thailand, and despite the 1999 Tripartite Agreement on Facilitation of Cross Border Transport of Goods and People between Lao, Thailand, and Vietnam, customs procedures and border crossing regulation for transiting transport companies remain stringent. This discourages provision of transiting services from Laotian trucking companies through Thailand. Also, aging truck fleets, lack of driving competence (unfamiliarity with signs and signals) on the part of Laotian companies is helping perpetuate the dependence of Laotian exporters on Thai transit monopolies. Nevertheless, barring some unexpected gesture of goodwill on the part of Thailand, and until Lao becomes a WTO member, it is difficult to see how will this distortions be removed in the short-term, simply because lack of threat of enforceable penalties for discriminatory pricing undertaken by Thai operators is working in favor of perpetuation of these monopolies.

The least the GOL can do, however, is to remove export administration distortions within Lao. As Table 54 below shows, the second highest component in the export transaction cost structure of exporters is documentation processing within Lao (17%). As highlighted

[35] Extrapolated from *Thai Board of Investment, Cost of Doing Business, 2004* figures.

earlier, more than half of these costs are related to unofficial charges and it takes at least 12 days to process all the documentation.

Table 54: Export Transaction Costs, Thakek – Nakorn Pranom – Bangkok

Thakek - Bangkok (740 km)	USD	THB	% of Total	Days
Road Transport	20'	20'	**47.9%**	1
Thakek- Nakorn	25.00	1,000		
Nakorn - Bangkok	525.00	21,000		
Customs Clearance				0.05
Lao	100.00	4,000	8.7%	
Bangkok	125.00	5,000	10.9%	
Port Clearance/Charges	64.53	2,581	5.6%	1
THC	50.00	2,000	4.4%	0
Clearing Agent fee	62.50	2,500	5.4%	
Export Documentation Lao	195.10		17.0%	
TOTAL	$ 1,147.13			**2.05**

Source: Global Development Solutions, LLC™

7.4 Summary

Prevailing distortions along the lines outlined in the value chain analysis reveal that high value-added furniture industry in Lao is not getting appropriate support. To the contrary, a combination of rather myopic policies of the government oriented toward revenue maximization enveloped by rent seeking is hindering the industry's growth. On of the most stark manifestations of the distortionary influence of government upon the workings of the sector is the long and over bureaucratic and corrupt export clearance process. This clearing process is just one in a series of distortions that indicate not only that the sector is not appreciated for its export potential, but it is also seen as a cash cow for government coffers, official and unofficial.

The fundamental question then becomes what impact are these policies having on export competitiveness of high value-added wooden products producers in Lao and what are the options for growth of the sector in a global market driven by cut-throat competition. The best aggregate indicator that these policies are having a major negative impact on the industry is the make up of wood and wood related exports from Lao. The overwhelming majority of these exports are in the form of low value added rough or roughly squared wood. The sub-sector used a proxy for highlighting the wood processing value chain, namely wooden furniture, generates a small share of export earnings of the industry. In line with value chain analysis, this outcome is not anything else but a reflection of the barriers to competitiveness imposed on the sector, which operates in a global market driven by cut throat competition.

ANNEX 8.1: Log price lists, Khammuane and Champasak Provinces

Table 55: Commonly Used Species, Official Log Price List, Khammuane, 2004-2005						
Common Wood Name	**Botanical Name**	**Grade**	**Royalty**	**Logging & Transportation**	**Resource Exploitation Tax**	**End Price at Collection Point II**
			US$/m^3			
May Dou (Rosewood)	Pterocarpus, Pierre	A	356	50	46.29	452.29
		B	288	50	46.29	384.29
		C	268	50	46.29	364.29
		Mix	181	50	46.29	277.29
		Branch	67	50	46.29	163.29
		Stump	90	50	46.29	186.29
May Sak (Teak)	Tectona Grandis	A	327	50	46.29	423.29
		B	265	50	46.29	361.29
		C	246	50	46.29	342.29
		Mix	155	50	46.29	251.29
		Branch	40	50	46.29	136.29
		Stump	80	50	46.29	176.29
May Bak May Si (Balau)	Anisopterra Costata Vatica Cinera	A	60	30	16.29	106.29
		B	53	30	16.29	99.29
		C	46	30	16.29	92.29
		Mix	38	30	16.29	84.29
		Branch	32	30	16.29	78.29
		Stump	40	30	16.29	86.29
May Yang (Kerruing)	Dipterocarpus Alatus	A	64	30	16.29	110.29
		B	58	30	16.29	104.29
		C	53	30	16.29	99.29
		Mix	50	30	16.29	96.29
		Branch	40	30	16.29	86.29
		Stump	42	30	16.29	88.29
May Chick (Yellow Balau)	Shorea obtusa	A	53	30	15.43	98.43
		B	47	30	15.43	92.43
		C	43	30	15.43	88.43
		Mix	38	30	15.43	83.43
		Branch	30	30	15.43	75.43
		Stump	31	30	15.43	76.43
May Pek (Pine)	Pinus Khasya	A	58	30	15.43	103.43
		B	50	30	15.43	95.43
		C	42	30	15.43	87.43
		Mix	32	30	15.43	77.43
		Branch	35	30	15.43	80.43
		Stump	-	-		-

Source: Compiled by Global Development Solutions, LLC[T]

Table 56: Commonly Used Species, Official Log Price List, Champasak, 2004-2005					
Common Wood Name	**Botanical Name**	**Grade**	**Royalty**	**Logging & Transportation**	**End Price at Collection Point II**
			US$/m^3		
May Dou (Rosewood)	Pterocarpus, Pierre	A	356	50	406
		B	288	50	338
		C	268	50	318
		Mix	181	50	231
		Branch	67	50	117
		Stump	90	50	140
May Sak (Teak)	Tectona Grandis	A	327	50	377
		B	265	50	315
		C	246	50	296
		Mix	155	50	205
		Branch	40	50	90
		Stump	80	50	130
May Si (Balau)	Vatica Cinera	A	60	30	90
		B	53	30	83
		C	46	30	76
		Mix	38	30	68
		Branch	32	30	62
		Stump	34	30	64
May Yang (Kerruing)	Dipterocarpus Alatus	A	64	30	94
		B	58	30	88
		C	53	30	83
		Mix	50	30	80
		Branch	40	30	70
		Stump	42	30	72
May Chick (Yellow Balau)	Shorea obtusa	A	53	30	83
		B	47	30	77
		C	43	30	73
		Mix	38	30	68
		Branch	30	30	60
		Stump	31	30	61
May Pek (Pine)	Pinus Khasya	A	58	30	88
		B	50	30	80
		C	42	30	72
		Mix	32	30	62
		Branch	35	30	65
		Stump	-	-	-

Source: Compiled by Global Development Solutions, LLC[T]

ANNEX: Market Analyses of Selected Strategic Sectors in Lao People's Democratic Republic (Desk Study)

I. Introduction

This Market Analysis is a desk study focused on the five sectors analyzed in the IVCA. The study describes the sectors and the respective products both in the context of the economy of Lao as well as international demand. The purpose of the study is to show regional and international demand trends in the products of the sectors analyzed, and as a result to identify the main bottlenecks faced by the Laotian producers in fully realizing the opportunities of the global buyer-driven commodity chains. Also, the study aims to show potential avenues for the economy of Lao in the road to diversification of products as well as adding more value to the same. The study is based on data aggregated from multiple sources.[36] It also provides information on the country's primary export markets and most promising opportunities for development of domestic support industries for the goods and services needed to improve the terms of trade for exports. The analysis also outlines approaches to integrate specific sectors of the economy into a larger regional and international supply chain.

The process of globalization has promoted two types of chains through which global production networks manage and operate the producer-driven and the buyer-driven commodity chains. The first type is characteristic of capital-intensive industries such as automobiles, aircraft, computers, and other advanced technology industrial activities. The buyer-driven commodity chains are organized around labor-intensive industries in which the marketing and manufacturing agents (retailers, branded marketing agencies and branded manufacturers) set up global production networks, principally in developing countries. All sectors in this study fall into buyer-driven commodity chains.

[36] Data sources consulted include, among others: UN Comtrade, FAO, CIA Factbook, The Economist Intelligence Unit, Lao National Statistics Centre, USDA.

II. Lao in Perspective

1.0 Geography and Politics

With a population of approximately 5.7 million people[37], Lao People's Democratic Republic is considered one of the world's twenty least developed nations. Lao, with its capital in Vientiane, is a mountainous, tropical, landlocked country bordered by China to the north Myanmar to the north-west, Thailand to the south-west, Cambodia to the south-east, and Vietnam to the east. Total landmass amounts to 236,800km^2. The Mekong River is the country's main thoroughfare and its valley plains form the country's most fertile region. Mountains cover 80% of the country.

Established as a kingdom in 1353, Lao had been for most of its history dominated by one or the other of its neighbors. All had held sway over Lao at one point in time. In the 19th century, the king of Siam ceded to the French a large portion of territory which included most of Lao. During French reign, Lao remained undeveloped with no progress toward modernization. With some minor efforts to cultivate coffee and rubber, the main export remained opium.

Picture A1: Map of Lao

Source: CIA Factbook

Mayhem by way of civil war, coups and counter coups ensued after the departure of the French in 1954. This chaos elevated with the onset of the Vietnam War. Lao became a pawn for the superpowers and found itself plagued by continuous bombing sorties. Bomb tonnage dropped on Lao during the war was greater than that dropped on Europe during WWII.

After the dust settled in 1975, the 600 years of monarchy came to an official end with the establishment of the Lao People's Democratic Republic. Since then, Lao has been a communist state ruled by one party; Lao People's Revolutionary Party.

Although Lao is opening its door to the West, under the 1991 constitution, Lao continues to be a one-party, centralized system. For the day to day running of the country, the executive governmental power is held by a president, who is chosen by an elected

[37] 2003 census, Lao National Statistics Centre

National Assembly to serve a five-year term.[38]

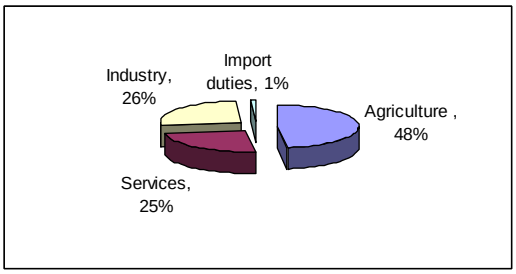
2.0 Economy

\The government of Lao began decentralizing control and encouraging private enterprise in 1986. The results, starting from an extremely low base, were striking; growth averaged 7% in 1988-2001 except during the short-lived drop caused by the Asian financial crisis beginning in 1997.[39]

Despite this high growth rate, Lao remains a country with a primitive infrastructure; it has limited telecommunications, no railroads and a rudimentary road system. The lack of a developed road network renders intra-country trade difficult. Electricity is available in only a few urban areas.

Most Laotians are subsistence farmers and rice is the principal crop. Timber and coffee are as well main agricultural products although the timber market structure is changing as will be seen in this document. Agriculture accounts for half of GDP and provides 80% of total employment.

Chart IX: Structure of GDP, 2003



Source: Lao National Statistics Centre

Like most developing countries, Lao is mainly an exporter of agricultural and other primary products while its imports consist of manufactured goods. Main export items include wood and wood products, electricity, forest products, coffee, tea, minerals, garments, handicrafts and others. The major import items are capital goods, industrial raw materials, spare parts and consumer goods.

Since 2001, GDP has grown annually at nearly 6% each year (see Table A1 in the next page). The government has set a GDP growth rate target of 7% for 2004/2005. That rate will more likely be closer to 6%. The Economist Intelligent Unit predicts GDP growth to be approximately 6.5% for 2005/2006. The economy will continue to benefit from aid from the IMF and other international sources and from new foreign investment in food processing and mining. The continued healthy growth of significant trade partners Vietnam and Thailand will also create residual benefits in bolstering the Lao economy.

[38] Historical data from www.visit-laos.com
[39] Much of the information for this section is derived from Economist Intelligence Unit; Country Report, Laos, November 2004

Table A1: Annual Economic Indicators, Lao 2000-2004

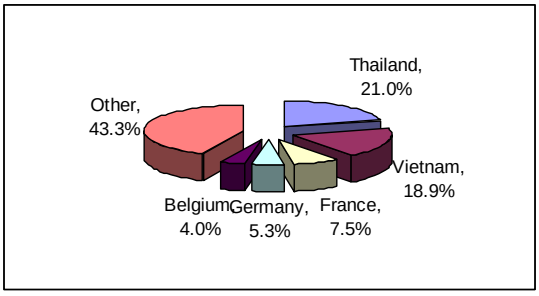
	2000	2001	2002	2003	2004*
Population (m)	5.2	5.4	5.5	5.7	5.8
GDP at current prices (Kips bn)	13,669	15,702	18,390	20,307	23,556
GDP (US$ bn)	1.7	1.8	1.8	1.9	2.2
Real GDP growth (%)	5.8	5.7	5.9	5.9	6.0
Consumer price inflation (average %)	25.1	7.8	10.6	15.5	11.6
Exchange rate (average; Kip:US$)	7,887.6	8,954.6	10,056	10,569	10,775
Exports of goods fob (US$ m)	330.3	331.3	297.7	359.4	431.0
Imports of goods CIF (US$ m)	535.3	527.9	431.1	482.0	569.0

Source: *Economist Intelligence Unit (EIU)*, Lao Country Report, November 2004.
**2004 figures are EIU estimates only.*

III. Direction of Trade

Thailand is the dominant trade partner for Lao. Bilateral trade with neighboring Thailand, which accounts for both the largest share of exports (21% in 2001) and imports (59.5% in 2001), continues to expand. This trade is dominated by Lao's imports from Thailand, mainly comprised of machinery and transport equipment, mineral fuels and food. Vietnam, the second most popular destination for Lao's exports, received 18% share of exports in 2003. Following far behind Thailand and Vietnam are three EU countries; France, Germany and Belgium.

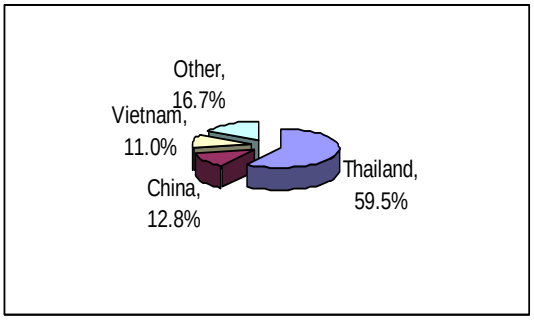
Chart A2: Export Partners, 2003



Source: Lao Country Report, November 2004

Taken as a whole, the EU is a major export market for Laotian goods and it is the second most significant export region after Asia. European countries favor the coffee from Lao as virtually all the Lao coffee exports go in this direction and to the United States. Chart A2 shows that the most significant recipients of Lao exports in 2003 were Thailand and Vietnam. As A1 above shows, where it is indicated that exports for 2004 were expected to reach US$431 million, a US$100 million increase from five years earlier.. Concerning imports, Thailand is the leading exporter to Lao accounting for more than half of all products flowing into the country (see Chart A3). China is a distant second in importance for imports into Lao.

Chart A3: Import Partners, 2003



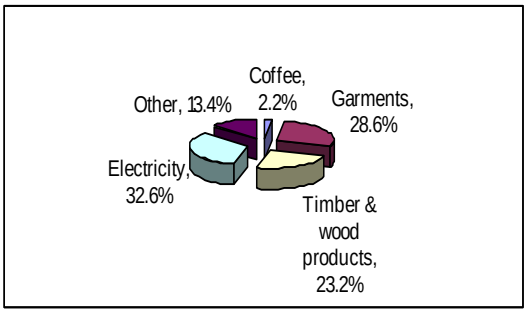
Source: Lao Country Report, November 2004

Vietnam is closely behind China.

The fastest growing trade relation for Lao is with China. In the first eight months of 2004 Laos's exports to China rose by 27.4% year on year to $8 million, according to official Chinese and Lao figures. During the same period, however, imports from China, fell by 9.5% to $68million. There is no obvious reason for the contraction in Chinese imports and this situation is not expected to continue. In fact, there is considerable optimism about the scope for future growth in Lao-China trade relations. In September, officials forecast that two-way trade will rise to $200 million in 2005, more than double the level reported in 2004. Lao interest in exporting to China is strong. In July of 2004, eight Lao companies registered to attend a trade fair in China. The companies were producers of handicrafts, furniture and agricultural products.[40]

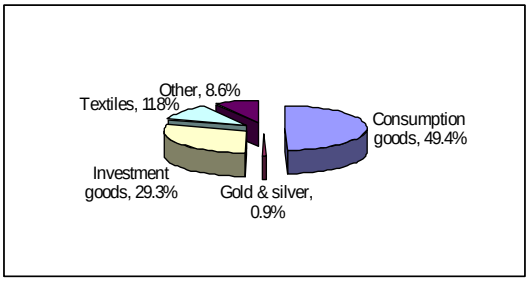
Main exports out of Lao are electricity, garments, timber/wood products and coffee. These products combine to comprise nearly 87% of all Lao exports. Lao's main imports are depicted in the chart below, as a percentage of total imports. Consumption goods made up the largest percentage of the imports but investment goods accounted for nearly 30% of the imports in 2001. Lao is industrializing itself following the support by the government of the development of private industry. Investment goods are mainly machinery and equipment.

Chart A4: Main Exports, 2001



Source: Lao Country Report, November 2004

Chart A5: Main Imports, 2001



Source: Lao Country Report, November 2004

Summaries for particular sectors under analysis are presented in the Tables A2 to A6 below. As opposed to the data from Lao official statistics, as listed in country reports, the following information is from UN Comtrade. The statistics do not match exactly as reported above but the general trends are in concurrence. Note, however, that this is mirror data since Lao has not reported trade information to UN Comtrade since 1974. Two other significant points are that Thailand did not report in 2002 and Vietnam did not report in 2003. These gaps apply to all data presented in the Tables A2 to A6. Data is missing from some years in the case where no data was in the Comtrade database. No imports of beef from Lao were reported at all in the measured period. Only live cattle, of non-pure breed, were exported. The situation for swine, on the other hand, is the opposite. No live pigs were exported; only fresh or chilled meat.

[40] EIU, Lao Country Report, November 2004

Table A2: Reported Maize Exports from Lao, 1999 – 2003 (mirror UNSTATS data)

Period	Trade Value
2003	$454,554
2001	$117,287
2000	$40,469
1999	$80,631
Reporter Title	**Trade Value**
Thailand	$692,941
Other reporters	$0

Table A3: Reported Rice Exports from Lao, 1999 – 2003 (mirror UNSTATS data)

Period	Trade Value
2003	$130,689
2002	$262,402
2001	$225,426
2000	$28,014
1999	$73,581
Reporter Title	**Trade Value**
Viet Nam	$199,000
China	$178,983
France	$83,899
Germany	$58,513
Belgium	$57,735
Other reporters	$141,982

Table A4: Reported Coffee Exports from Lao, 1999 – 2003 (mirror UNSTATS data)

Period	Trade Value
2003	$12,251,480
2002	$12,361,219
2001	$11,508,326
2000	$18,781,522
1999	$24,114,063
Reporter Title	**Trade Value**
Spain	$12,308,845
Switzerland	$12,213,904
France	$10,727,639
Germany	$7,900,621
Singapore	$6,807,450
Other reporters	$29,058,151

Table A5: Reported Pig Meat Exports from Lao, 1999 – 2003 (mirror UNSTATS data)

Period	Trade Value
2002	$23,451
2001	$2,701
2000	$3,575
Reporter Title	**Trade Value**
Austria	$23,451
Thailand	$6,276
Other reporters	$0

Table 6: Reported Furniture Exports from Lao, 1999 – 2003 (mirror UNSTATS data)

Period	Trade Value
2003	$411,831
2002	$399,838
2001	$998,100
2000	$624,023
1999	$990,350
Reporter Title	Trade Value
Asia	$1,304,259
Australia	$1,092,337
Denmark	$246,309
Japan	$184,566
Thailand	$180,419
Other reporters	$416,252

IV. Sector Analysis – Coffee

The popularity of coffee is unquestionable. With over 400 billion cups of coffee consumed each year, coffee is the world's most popular beverage. Coffee is a giant global industry employing more than 20 million people. In Brazil alone more than five million people are employed in the cultivation and harvesting of over three billion coffee plants.[41]

Coffee was first discovered in what is now Ethiopia and the beans were brought to the Arabian peninsula where the plants were first cultivated. From there the beans traveled to Turkey where they were roasted for the first time. The beans were crushed and added to boiling water and hence coffee, the beverage, was born.

Coffee first arrived on the European continent by means of Venetian trade merchants. In the 1700s, one small coffee plant was brought to the island of Martinique. Within 50 years this one plant spawned more than 19 million trees on the island. It was from this humble beginning that the coffee plant found its way to the rest of the tropical regions of South and Central America.[42]

Two main types of coffee beans are cultivated: robusta and arabica. It is said that it was arabica that was discovered in Ethiopia so many years ago. The two beans differ in several ways. Arabica is considered to be the more delectable of the two beans and it is the more cultivated of the two. Arabica accounts for approximately 75% of world production. It grows only in rich soil at altitudes between 600 and 2100 meters because it is more susceptible to both insects and heat.[43] Arabica beans take longer to grow because of the high growing altitudes and are more difficult to harvest.

Because the arabica tree is susceptible to disease, frost, and drought, it requires very careful cultivation and proper climatic conditions. Because of its delicate nature, an arabica tree yields only 1 to 1.5 pounds of green coffee per year. This is the coffee for which specialty roasters search. For these reasons, arabica beans are much more expensive than robusta. Compared to robusta, arabica has a more refined flavor and contains about 1% caffeine by weight.[44]

[41] Coffeeuniverse.com
[42] Mr. Cappuccino; telusplanet.net
[43] planetroasters.com
[44] baldmountaincoffee.com

Robusta is a hardy, disease resistant species. Grown mainly in Africa and Asia, robusta grows well in less than ideal soil, does best at lower elevations and adapts well to various locations. It yields a high amount of cherries (the term used for the ripe fruit of the coffee tree) that are smaller and rounder than those of arabica.[45] A robusta tree will yield 2 to 3 pounds of green coffee a year. Robusta is usually used in blends and in filters. Sharp/harsh in taste, it has twice the amount of caffeine (2% by weight) of arabica. Although generally not found in gourmet shops, robusta beans are often used in the processing of soluble (instant) coffees and popular commercial blends sold in supermarkets.[46]

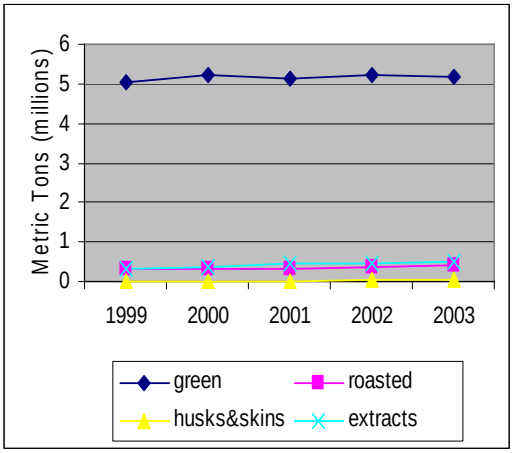
Although most robusta coffee is of a lower grade and inferior to arabica, premium robusta does exist. Premium robusta is reserved primarily for specialty espresso blends and is never found in canned coffee. Though it only constitutes 5-15% of the espresso blend, it is used because these beans add strength and make a desirable cream[47] in the shot of espresso.[48]

Liberica, a third recognized commercial variety of coffee bean, is also hardy and a low-altitude strain. This minor crop from Africa is similar to robusta.[49] Very little attention is given to this stain and its trade is insignificant compared to arabica and robusta.

For the purpose of this report, no distinction is made between trade of arabica and robusta unless otherwise noted. FAO and UN Comtrade statistics do not differentiate between the two types although there is information available from the International Coffee Organization. As will be discussed, Loa's coffee production is currently fairly even between robusta and arabica but arabica is gaining in share.

The concern of this text, and that most pertinent to Lao, is green coffee beans – not roasted, both caffeinated and decaffeinated. The classifications are 07111 (caffeinated) and 07112 (decaffeinated) in SITC Rev. 3. Even in these categories, decaffeinated is at a much lower percentage than caffeinated. The data compiled from FAO in this report is from the category "green coffee". Trade of green coffee far exceeds trade of any other coffee product. This is evident in Figure C1 as the graph depicts the comparison of imported coffee products.

Figure C1: Comparison of Imported Coffee Categories, 1999 – 2003



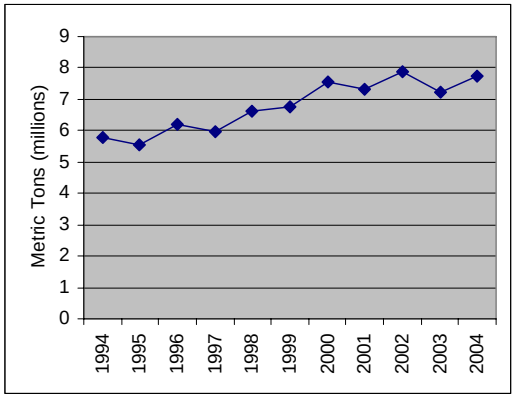
Roasted coffee is not heavily traded. Once coffee is roasted it is best consumed as soon

[47] The caramel, creamy layer on top of espresso.
[48] ineedcoffee.com
[49] baldmaountaincoffee.com

after as possible in order to derive maximum flavor. For this reason, exports of roasted coffee from producer countries are not favored. This is especially true for high grade and specialty coffees.

The general trend over the last decade shows coffee production increasing; not steadily, however (see Figure C2). Production has increased a healthy 34% between 1994 and 2004. Yet, in the span of these eleven years there have been four occasions in which the year-on-year production decreased.

Figure C2: World Coffee Production 1994 – 2004



Source: FAOSTAT

Brazil dominates in coffee production (see Table C1). In 2004, Brazil's share of world coffee production totaled 46%. In comparing cumulative totals in the three-year period of Table C1, Brazil has produced well over 300% more than second-place Vietnam.

Vietnam, however, is of particular interest. Ranked sixth in production a decade ago, Vietnam overtook Indonesia and Colombia in 1999 to capture the number two spot. Vietnam is the only country that has significantly increased production in the period shown in the three years covered in Table C1. Vietnam took in a bad year in 2002 but otherwise has seen strong growth in the past decade. Even with the sharp decrease in 2002, Vietnam's overall coffee production has increased more than 270% in the last ten years.

Lao is included in the table only for comparison purposes. Lao actually held the 28th spot in the production ranking for 2004. For comparison, Thailand had almost twice the production as Lao. Lao has, however, shown a steady increase in coffee production over the last decade. More about Lao will follow at the end of this text.

World import totals of coffee have grown at a slower pace than the increase in production. Import growth has been fairly flat over the last decade (see Figure C3). Imports were only 10% higher in 2003 than in 1994 and during no year between were imports higher than the 2003 level. This flat

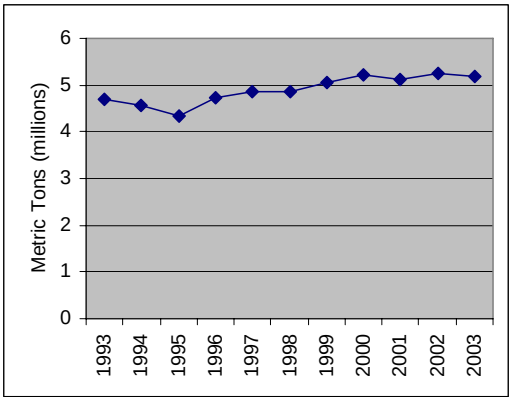
Table C1: Leading Coffee Producers, 2002 – 2004 (Mt)

	2004	2003	2002
Brazil	2,454,470	1,996,850	2,649,610
Vietnam	810,000*	771,200	699,500
Indonesia	702,274[F]	702,274	698,589
Colombia	678,000*	702,720*	690,840
Mexico	310,861[F]	310,861	313,027
India	275,000[F]	275,000*	317,000
Guatemala	222,000*	244,000*	221,820*
Ethiopia	220,000[F]	220,000[F]	220,000[F]
Uganda	186,000[F]	186,000*	189,000
Honduras	178,000*	150,000*	182,160*
Lao PDR	NA	22,218[N]	32,197[N]
F=FAO estimate, *=unofficial figure, N=According to National Statistical Centre, Lao PDR, NA=Not available			

Source: FAOSTAT

performance of coffee imports up until 2003 led the International Trade Centre to consider coffee to be a declining industry.[50] Recent data, however, demonstrates market corrections and the trend is shifting. The implications of the disparity between demand and supply, however, will be discussed in a later in this text.

Figure C3: World Coffee Imports, 1993 – 2003



Source: FAOSTAT

In comparing Figure C2 with Figure C3 it is seen that 72% of the total coffee production was imported by other countries. This compares with 79% of production being imported a decade previous (1994).

Since coffee is mostly grown in developing counties, the general direction of trade is towards the developed countries. In fact, North America and Europe account for 82% of the entire world coffee imports from the years 2001 to 2003. Western Europe, more specifically the European Union 15, comprises the huge proportion of the European imports. All of Asia combined imports approximately half of what North America imported in the cumulative period from 2001 – 2003.

Two and a half centuries ago, coffee was declared the national drink of the then colonized United States by the Continental Congress, in protest of the excessive tax on tea levied by the British crown.[51] Americans have kept up this coffee drinking tradition as the United States is the single largest importer of coffee (see Figure C4). Nearly one quarter of all coffee imported in 2003 went to the United States.

By weight the US imports most of its coffee from Brazil. However, according to the dollar volume, Colombia is quite a bit higher than Brazil. To add another perspective, the US imported the largest portion of its decaffeinated coffee from Germany by both dollar value and by weight. Table C4 summarizes this information.

Table C2: Coffee Imports by Region, 2001-2003

Qty (Mt)	2001	2002	2003	Cumulative
World	5,115,861	5,241,204	5,196,437	15,553,502
Developed Countries	4,662,509	4,723,963	4,763,965	14,150,437
Industrialized Countries	4,310,283	4,369,103	4,449,694	13,129,080
Europe	2,911,105	2,970,338	2,970,635	8,852,078
Western Europe	2,570,444	2,627,014	2,657,513	7,854,971
Eastern Europe	314,199	314,383	277,625	906,207
European Union (15)	2,461,116	2,521,133	2,547,056	7,529,305
North America	1,290,487	1,275,660	1,326,466	3,892,613
Asia	652,162	710,620	628,502	1,991,284
Asia Developed	402,944	417,607	396,609	1,217,160
East & South East Asia	101,801	153,329	110,155	365,285
Africa	170,613	201,835	153,372	525,820
North Western Africa	133,189	159,941	113,773	406,903

Source: FAOSTAT

[50] UNCTAD/WTO International Trade Centre; National Export Performance vs. International Demand, 1999 - 2003

[51] toper.com

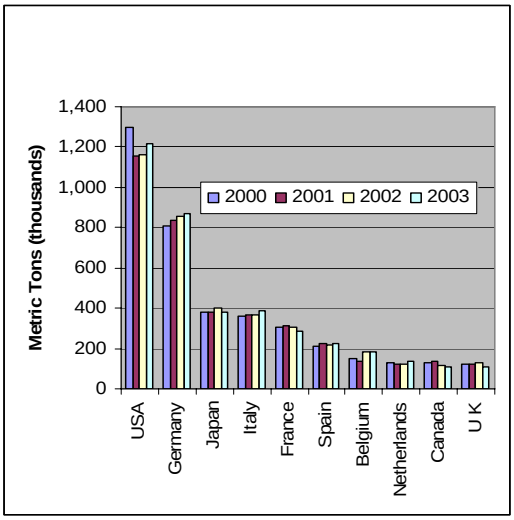
A significant factor not included in the table is to distinguish between robusta and arabica. Adding this dimension to the table will obviously complicate matters much further. The point of Table C4 is to demonstrate that coffee data can be expressed in a variety of ways. This table also is an indication that coffee prices, discussed later, vary greatly by region, type and year.

Table C4: US Coffee Imports by Price, Weight, Country and Type, 2003

	Weight (kg)		
	Caf	Decaf	Total
Brazil	294,684,992	8,802,824	303,487,816
Colombia	209,812,368	20,334,168	230,146,536
Germany	1,372,187	33,750,504	35,122,691
	Price		
	Caf	Decaf	Total
Brazil	$278,907,552	$14,103,742	$293,011,294
Colombia	$337,235,072	$39,506,656	$376,741,728
Germany	$2,310,722	$53,091,284	$55,402,006

Source: UN Comtrade

Figure C4: Leading Coffee Importers by Country, 2000 – 2003



Source: FAOSTAT

Not surprisingly, out of the top ten leading coffee importers, seven are European Union 15 members. Germany, with a much lower population than the United States, follows closely behind the US in coffee imports (see Table C5 for cumulative totals, 2000-2003). Not all of the German imports are consumed in-country, however. The same is true for Italy. These two countries, and to a lesser extent the other EU countries, engage quite heavily in re-export of coffee. These coffees are generally shipped roasted. Germany, Italy and Belgium are the three leading exporters of roasted coffee world wide. Since these are not coffee producing nations, the entire quantities are re-exports. The percentage of coffee re-exported, however, is fairly significant. For example, in 2003 Germany re-exported approximately 23% of its green coffee imports. In the roasted coffee category, Germany exported greater than three times its imports. Obviously, most of these exports came from roasting the green coffee imports.

Table C5: Leading Coffee Importers by Country, 2000 – 2003 Cumulative Total (Mt)

USA	4,837,856
Germany	3,374,592
Japan	1,542,393
Italy	1,484,637
France	1,206,345
Spain	880,765
Belgium	653,470
Netherlands	506,043
Canada	483,390
U K	476,922

Source: FAOSTAT

Germany imports most of its coffee by weight from Brazil (31%) followed by Vietnam (13%) and Colombia (11%). The only non-western leading importer is Japan. As noted in

the imports by region chart, Asia was third behind North America and Europe. In 2003, more than 60% of all of Asia's imports were contributed by Japan.

The information presented to this point is not to indicate that coffee is not consumed in developing nations. Since the coffee is produced in developing nations, these countries don't generally need to import coffee. Unlike rice, coffee is not a staple from which the majority of the population derives its nutrition. To gain a better understanding of coffee demand, consumption figures are helpful. These charts are from the International Coffee Organization (ICO) and are as current as can be found. Note that the measure is indicated in thousands of bags. A bag of coffee is 60 kg. Table C6 is added to demonstrate the amount of coffee as a percentage of production that is consumed in producer countries.

ICO presents consumption data on a per capita basis for importing countries. This information appears as Table C7 below. Figures are in kilograms per capita. Finally, to

Table C6: Coffee consumption among Selected Exporting Countries, 2001 - 2004

Crop year commencing	2001	2002	2003	2004	2004 as % of production
TOTAL	**27 206**	**27 314**	**28 067**	**28 373**	**24.86**
Brazil	13 250	13 500	13 750	14 000	36.59
Indonesia	2 000	1 833	2 000	2 000	34.78
Ethiopia	1 833	1 833	1 833	1 833	36.66
Mexico	1 500	1 500	1 500	1 500	33.33
Colombia	1 400	1 400	1 400	1 400	13.33
India	1134	1134	1134	1134	23.38
Philippines	821	829	917	917	207.00
Venezuela	690	690	690	690	75.00
Thailand	500	500	500	500	47.35
Vietnam	500	500	500	500	3.33
Madagascar	128	217	333	433	68.40
Dominican Republic	340	340	378	378	68.11
Haiti	340	340	340	340	85.00
Côte d'Ivoire	317	317	317	317	21.49
Guatemala	300	300	300	300	8.70
Cuba	220	224	224	224	80.00
Congo, Dem. Rep. of	200	200	200	200	36.36
Honduras	200	200	200	200	7.27
Costa Rica	255	225	272	192	9.77
Nicaragua	181	185	190	190	13.57
Uganda	150	150	150	160	5.82
El Salvador	144	153	153	153	10.70
Ecuador	200	150	150	150	20.00
Others	603	594	636	662	6.99

In thousand bags

Source: ICO

Table C7: Per Capita Coffee Consumption in Selected Importing Countries, kg/person

Calendar year	2001	2002	2003	2004
TOTAL	**4.55**	**4.53**	**4.65**	**4.65**
U.S.A.	4.09	3.94	4.24	4.27
European Community	***5.29***	***5.37***	***5.42***	***5.38***
Austria	7.74	7.10	5.64	7.51
Belgium/Luxembourg	5.52	9.13	9.60	8.08
Denmark	9.66	9.02	8.10	9.34
Finland	11.01	11.22	11.21	11.21
France	5.31	5.54	5.48	4.98
Germany	6.90	6.59	6.64	6.86
Greece	3.47	5.18	6.01	5.53
Ireland	2.29	2.08	2.28	2.94
Italy	5.44	5.41	5.73	5.63
Netherlands	6.47	6.10	6.76	6.36
Portugal	4.47	4.30	4.34	4.44
Spain	4.27	4.33	4.21	4.10
Sweden	8.49	8.31	7.88	8.18
United Kingdom	2.19	2.21	2.20	2.31
Other importing countries	***3.54***	***3.50***	***3.45***	***3.73***
Cyprus	4.34	4.48	4.56	4.48
Japan	3.27	3.24	3.18	3.27
Norway	9.46	9.15	8.95	9.20
Switzerland	6.80	6.78	6.90	6.35

In kilogrammes

Source: ICO

relate importing country consumption to exporting country consumption, consumption totals in importing countries is shown in Table C8 below. In total, world consumption

was estimated at 113.4 million bags in 2004, of which 28.37 million bags were accounted for by exporting countries and 85.03 million bags by importing countries.[52]

On the export side of the equation, Brazil leads all countries (see Figure C5). The top destinations for Brazilian coffee exports are Germany and the United States. In recent years either one of these two countries has been the leading export partner. Following these two countries are EU countries (Italy, Belgium and France) and Japan all ranking in at various positions over recent years. Vietnam stands firmly at second position among leading coffee exporters by weight. However, this is deceiving. As discussed previously, price varies according to many factors. In the case of Vietnam, much of the export is robusta and it is very inexpensive as compared to exports from other countries. In examining data according to unit price, it is seen that Vietnamese coffee is substantially less expensive than that of any other country (see Table C9 for an example of unit price for 2003). This low price for Vietnamese coffee has aided much in its rise to coffee trading prominence. Vietnamese coffee is not considered to be

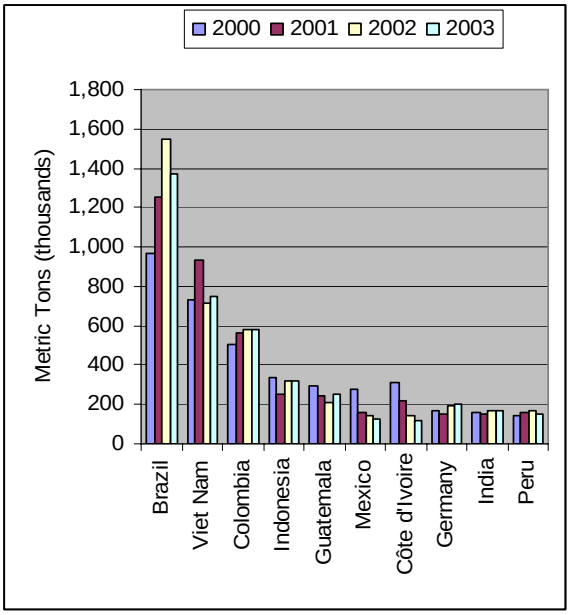
Table C8: Total Consumption in Selected Importing Countries, 2001 - 2004

Calendar year	2001	2002	2003	2004
TOTAL	**61 214**	**61 142**	**63 018**	**63 255**
U.S.A.	19 343	18 870	20 505	20 831
European Community	***33 351***	***33 829***	***34 163***	***33 391***
Austria	1 049	952	757	1 007
Belgium/Luxembourg	987	1 635	1 719	1 447
Denmark	863	806	728	839
Finland	952	974	973	973
France	5 241	5 492	5 428	4 937
Germany	9 468	9 064	9 133	9 441
Greece	579	865	1 003	923
Ireland	147	136	151	195
Italy	5 252	5 180	5 503	5 402
Netherlands	1 732	1 641	1 827	1 720
Portugal	768	739	745	762
Spain	2 869	2 908	2 826	2 754
Sweden	1 259	1 235	1 181	1 226
United Kingdom	2 185	2 202	2 189	2 305
Other importing countries	***8 520***	***8 443***	***8 350***	***8 493***
Cyprus	55	53	54	53
Japan	6 935	6 874	6 770	6 962
Norway	711	692	682	701
Switzerland	819	824	844	777

In thousand bags

Source: ICO

Figure C5: Leading Coffee Exporters, 2000 - 2003



Source: FAOSTAT

Table C9: Year 2003 Unit Pricing for Leading Coffee Exporters

	Quantity (Mt)	Value ($1,000)	Unit Value
Brazil	1,369,159	1,302,746	951
Viet Nam	749,200	330,000	440
Colombia	578,149	811,668	1,404
Indonesia	321,180	251,250	782
Guatemala	249,888	299,394	1,198
Germany	198,842	313,506	1,577
India	167,495	157,295	939
Peru	150,354	181,040	1,204
Honduras	144,892	180,722	1,247
Ethiopia	135,674	181,158	1,335

Source: FAO

[52] ICO Coffee Market Report, February 2005

of fine quality. As far as major producers/exporters are concerned, Colombia demands the highest unit price for its coffee.

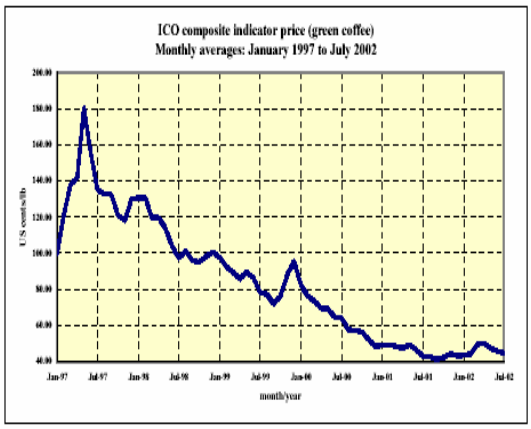
Colombian coffee has a much better reputation than does Vietnamese coffee. Although the unit price of Colombian coffee is high, the quality of the beans is valued by buyers. Buyers are willing to pay a premium for better coffee. This is reflected by the fact that Colombian coffee sells well, despite its high cost. In Central America as well, where arabica is almost exclusively grown, per unit price of coffee is high.

The Colombian coffee goes in large proportion to the United States. Japan and Germany follow at a distant second and then another large gap exists between these two countries and the fourth most significant export partner for Colombia. Canada and other EU countries are destinations for Colombian coffee.

As seen from viewing mirror data, Vietnam ships most of its coffee to Germany and the US. Following these two countries are Italy, France and Spain.[53]

Much has already been stated concerning price. The coffee market is extremely volatile. Several price cycles have occurred over the years. Most recently, the prices bottomed out in 2002/3. This prompted ICO to refer to this as a coffee crisis. Concern was that sustainability will not be maintained by coffee growing nations. Many of these nations depend on coffee trade and many of the individual farmers have no other means of income generation. Figure C6 shows the development of the crisis as charted by price.

Figure C6: ICO Composite Indicator Price (Green Coffee) Monthly Averages, Jan-97 to Jul-02



The y-axis indicates price per pound (US cents) and the x-axis indicates the month/year in six-month increments. The price of coffee in mid-97 was up to nearly 180 cents per pound. By mid-01 the price had plunged to approximately 40 cents per pound.

As submitted to the World Summit on Sustainable Development, the Executive Director of ICO reported that "This situation is caused by the current imbalance between supply and demand for coffee. Total production in coffee year 2001/02 (October-September) is estimated at around 113 million bags (60-kg bags) while world consumption is just over 106 million bags. On top of that, world stocks amount to some 40 million bags. Coffee production has been rising at an average annual rate of 3.6%, but demand has been increasing by only 1.5%. At the origin of this coffee glut lies the rapid expansion of production in Vietnam and new plantations in Brazil, which is harvesting a record crop in the current season."[54]

[53] UN Comtrade
[54] ICO, Submission to the World Summit on Sustainable Development, 2002

In 2004, however, hope returned to the coffee industry (see Figure C6). From the graph it is seen that the composite indicator has risen from approximately 55 cents/pound on January 5th, 2004 to 89.40 cents/pound reported on March 10th 2005. The average price in February 05 was 12.67% higher than that of January 05. This February price average is the highest the indicator has been since December 1999. The indicator price on March 11 was 107.36 cents/pound. A tight supply of arabica is fueling this recovery in prices. This production shortfall is expected to continue through 2006. All this bodes well for producers as the coffee industry has recovered, at least for the time.

Figure C6: Daily Composite Indicator Price, 5Jan04 – 10Mar05

Source: ICO

First cultivated there by the French a century ago, Lao is considered to have excellent coffee. It is said that possibly the best coffee growing region in Southeast Asia is the Boloven Plateau in Southern Lao. Lao beans, as the French CIRAD coffee research institute claims, are among the best 12 coffees in the world.

There was a significant drop in coffee production from 2002 to 2003 (see Table C10). Exports also experienced a drop (Table C11). This goes along with the world trends for this time period.

Table C10: Lao Coffee Production, 2002 & 2003

	Harvested Area (ha)		Production (tons)	
	2002	2003	2002	2003
Coffee	36,624	29,122	32,197	22,218

Source: Lao National Statistics Centre

Table C11: Lao Coffee Exports 2000 – 2003 (Mt)

	2000	2001	2002	2003
Laos	16,990	17,940	16,684	13,959

Source: FAOSTAT

V. Sector Analysis – Maize

Maize was domesticated in Central America some 6,000 to 10,000 years ago and was introduced to the rest of the world in the 16th through 18th centuries. Maize has become a major source of food for both humans and animals and it is grown in more countries than any other crop.

This versatile plant, actually a member of the grass family, can thrive in climates as diverse as the arid desert plains of the southwestern United States and the high Andean mountain plains of Ecuador and Peru. The temperate plains of the United States provide some of the best growing conditions for maize in the world, making the U.S. the world's top maize producer.[55]

Maize is categorized into several different types but the one used most for commercial purposes is dent maize, so called because the kernel typically forms a dent on the cap or crown at maturity. This is the most produced type of maize on a global basis, accounting for 73% of commercial production. Dent maize is used for everything from livestock feed to syrup and sweeteners to ethanol and industrial products.[56] Sweet maize, the type consumed by humans as corn on the cob, has negligible commercial production (less than 1%), though the crop has high cash value as a processed vegetable in industrial economies.

Three other classifications of maize are as follows:

- Pop - the original domesticated type, consisting of a small spherical grain with a floury (soft) starch core and a flinty (hard) endosperm shell. Moisture trapped in the floury starch expands upon heating and bursts through the hard shell, creating the popular confection. Pop accounts for less than 1% of commercial production.

- Flint - similar to pop but with larger grain. Flint was probably developed from pop types by selection for grain size and greater yield. This type is produced in areas where cold tolerance is required or where storage and germination conditions are poor. Flint accounts for 14% of commercial production.

- Flour – most popular type of maize for human consumption. Flour consists of soft starch that is easily ground to produce meal that can be consumed directly, or as a flat bread (tortilla), dumpling or beverage. Flour currently accounts for 12% of commercial production.[57]

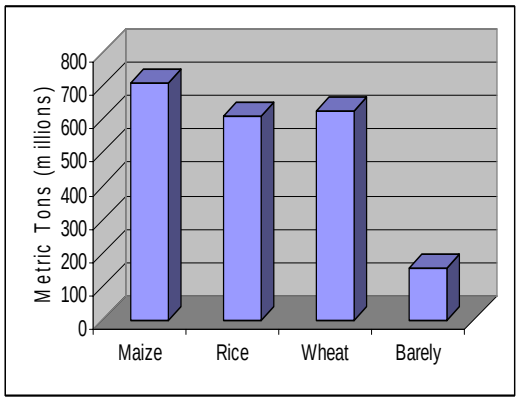
[55] US Grains Council
[56] US Grains Council
[57] Ricardo Salvador, Iowa State University

Maize is also often categorized by color: white and yellow. The bulk of maize grown worldwide is yellow, and three times as much maize is used for livestock feed as for direct human consumption. In parts of the developing world, demand for maize for livestock is increasing rapidly. Nonetheless, maize remains an important part of the human diet in many developing countries and, where it is grown, white maize tends to assume much greater importance than yellow varieties.

Maize is the most significant grain produced in terms of tonnage. In 2004 more than 705 million metric tons of maize were reported to have been produced world wide (see Figure M1). This is a 10% increase from the 2003 production total of 640 million metric tons.

The United States is by far the world's leading producer of maize and the country's domination is continuing to grow. In the past years the US has seen its production figures increase faster than other leading producers of maize. In fact, US percentage of global maize production is increasing year-on-year for the past several years. For 2002, 2003 and 2004, the US percent of world maize production has been 38%, 40% and 42% respectively (see Table M1).

Figure M1: Cereal Production, 2003



Source: FAOSTAT

Due to the myriad uses of maize (more detail following later in this report), countries of all economic levels have a use for this versatile crop. Developing countries rely on maize as a main source of human nutrition whereas highly developed countries use maize either for animal feed or for further processing. World wide, maize is used most significantly as livestock feed (up to 78%). Because of its amazing versatility, maize is produced widely and as well traded in significant amounts.

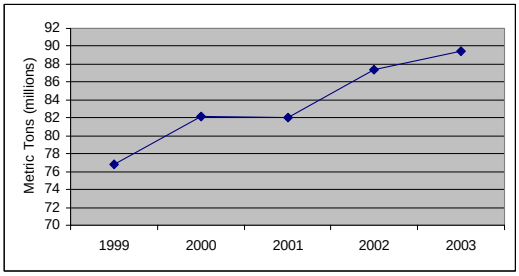
World imports of maize have slowly but steadily increased over the years (see Figure M2 in the next page). Since 1996 imports have grown from 77 million metric tons to more than 89 million in 2003. It is not correct to think, however, that maize imports are growing uniformly from region to region. Viewing regional data, it is seen that the trends are not so regular (see Figure M3 below). Asian data is left off Figure M3 because Asia outweighs the rest of the world in

Table M1: World's Leading Maize Producers

Production (Mt)	2002	2003	2004
USA	228,805,088	256,904,560	298,233,088
China	121,496,915	115,997,909	131,860,000
EU	40,821,064	33,856,212	41,129,600
Brazil	35,932,960	47,988,000	41,947,004
Mexico	19,299,236	19,652,416	20,000,000
Argentina	15,000,000	15,040,000	13,000,000
India	10,300,000	14,720,000	14,000,000
Indonesia	9,654,105	10,910,104	11,359,049
Romania	8,399,779	9,576,985	13,231,030
World	601,994,057	640,064,440	705,293,226

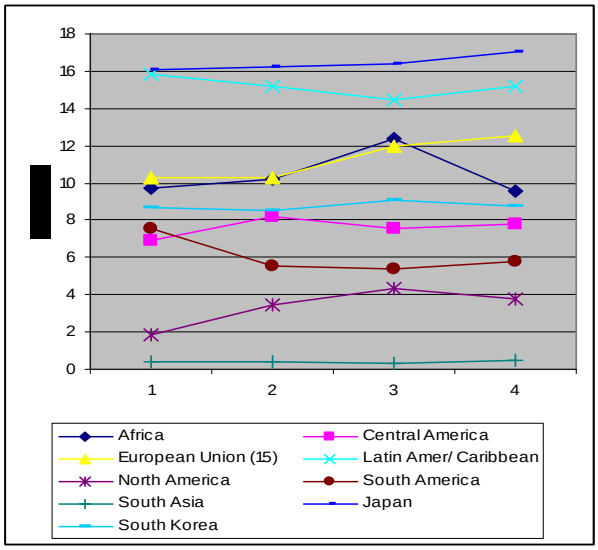
Source: FAOSTAT

Figure M2: World Maize Imports, 1996 – 2003



Source: FAOSTAT

Figure M3: Import Trends by Region, 2000 – 2003 (Mt millions)



Source: FAOSTAT

maize imports to such an extent that the scale gets skewed upwards thus making it too difficult to see the other trends.

Regionally, Asia is the most significant importer of maize thanks to the import volumes of Japan and South Korea, the numbers one and two importers of maize world wide. Japan far surpasses all other countries in maize imports. South Korea follows at a very distant second. Table M2 displays imports by region and Table M3 breaks this down further by country. As can be seen in the regional graphs, Japan's imports exceed any of the other regions in the world. Only in 2000 did the import totals of Latin America & Caribbean come close to equaling Japan's maize imports. Other than this, Japan is far above any other entire region in its importing of maize.

Table M3: Major Maize Importers by Country, 2001-2003, Metric Tons

	2001	2002	2003
Japan	16,221,654	16,420,532	17,064,246
South Korea	8,481,831	9,112,503	8,782,362
Mexico	6,174,028	5,512,911	5,764,149
Egypt	4,797,234	4,720,569	4,052,619
Spain	2,735,458	3,504,310	3,886,300
Canada	3,246,927	4,017,178	3,478,100
Iran	1,695,343	1,325,652	3,089,731
Malaysia	1,974,512	2,408,114	2,666,460
Nether-lands	1,915,731	2,054,254	1,996,582
Turkey	537,481	1,177,659	1,818,132

Source: FAOSTAT

Table M2: Imports by Region, 2001-2003, Metric Tons

	2001	2002	2003
Asia	40,620,037	42,690,314	46,748,225
Africa	10,183,782	12,370,806	9,578,119
Central America	8,165,181	7,560,149	7,791,071
European Union (15)	10,251,805	11,965,255	12,541,901
Latin Amer/ Caribbean	15,212,160	14,502,429	15,148,958
North America	3,456,969	4,317,494	3,815,416
South America	5,530,898	5,349,395	5,799,466
South Asia	405,695	327,054	506,129
Japan	16,221,654	16,420,532	17,064,246
South Korea	8,481,831	9,112,503	8,782,362
World	78,750,703	84,860,957	87,584,086

Source: FAOSTAT

Looking at specific country reports, Japan's totals in every year are nearly double that of second place Korea. Overall, in 2003 Japan accounted for nearly 20% of the world's total maize imports. Asia in total receives more than half of the world's maize imports. Another noteworthy point about Japan is that it was the only country of the top ten importers that did not display any year-on-year decreases in imports from 2000 to 2003.

Looking at the export side, the US is clearly the world's maize export leader. Although the US exports only approximately 20% of its production, nearly 50% of all maize exported throughout the world in 2003 had it's origin in the US (see Table M4). According to the data, 2003 exports were down for the US. China, the second leading exporter of maize world wide, had about a third of the maize exports that the US had in 2003 (and 2003 was a good year for China and a slow year for the US).

Table M4: Major Maize Exporters, 2001-2003 (metric tons)

	2001	2002	2003
USA	47,943,762	47,685,821	43,411,753
China	5,997,984	11,673,522	16,399,462
Argentina	10,934,068	9,483,591	11,912,789
EU (15)	8,388,479	9,848,618	8,740,029
France	7,046,438	8,378,135	7,079,809
Germany	595,657	664,692	856,604
Hungary	1,568,555	2,124,865	1,310,644
South Africa	620,267	749,870	785,141
India	113,504	78,178	543,271
Brazil	565,949	280,975	360,997
Chile	52,446	52,012	74,699
Indonesia	90,474	16,306	33,691
World	78,750,703	84,860,957	87,584,086

Source: FAOSTAT

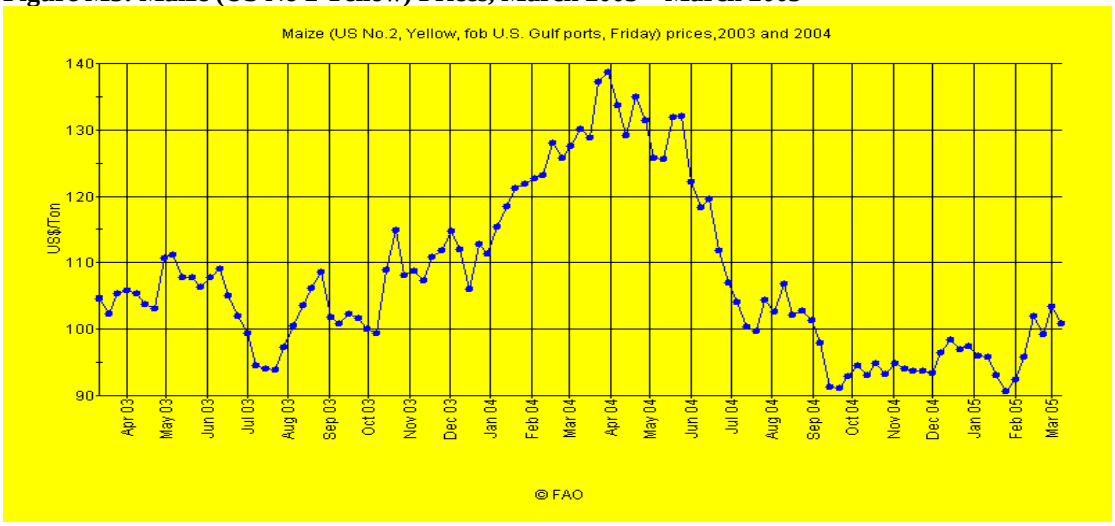
Japan is the largest and most consistent importer of maize in the world and the United States satisfies nearly all of Japan's demand. During fiscal year 2003, Japan imported 14.5 million metric tons of US maize. Mexico, Taiwan, Canada, Egypt and Colombia are also major corn importers and important markets for the United States.

The largest importers of Chinese maize are in Asia. South Korea is followed by Malaysia, Indonesia and then Japan in descending order. Actually, with the exception of Iran in the fifth spot, all of the top ten export partners for China are in east Asia. Thailand, the only importer of Lao maize, is ranked 12th by dollar value among China's export partners with a total of $41.7 million. The Thai situation has major implications for Lao and will be addressed below. Argentinean exports go mainly to the Americas with the US being the biggest recipient of Argentinean maize by far. The EU finds its markets for maize predominantly in other EU countries.

Concerning maize prices, being a commodity grain, the price fluctuates constantly. As seen in Figure M5 below, these fluctuations are rapid and erratic. Causes of flux are uncontrollable and are attributed to supply and demand. Supply, in turn, is often related to weather conditions. A further factor is related to the fact that world prices are quoted in dollars and therefore fluctuations in the dollar also have influence on the world market

prices of commodities.[58] As can be seen from Figure M5, seasonality is not an evident factor in determining world market maize price.

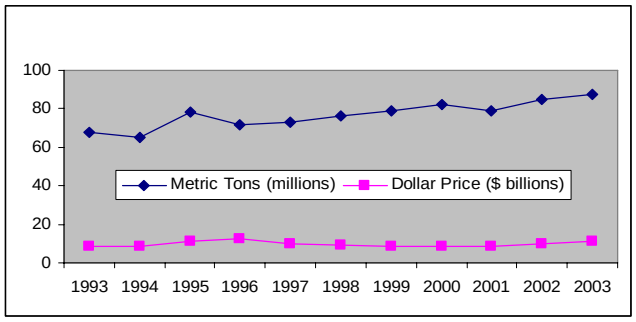
Figure M5: Maize (US No 2 Yellow) Prices, March 2003 – March 2005



Source: FAO

Figure M6 below demonstrates the relationship between quantity and price over the past years by comparing the tonnage of maize exports with its corresponding dollar value totals for each year. The comparison is made with world data. The same data is displayed for 2000 – 2003 but in tabulated form (Table M6) in order to gain a deeper understanding of the relationship. For example, in 2003 world exports were 87.6 million Mt and the dollar amount was $8.8 billion for an average price for the year of $107/Mt.

Figure M6: Relationship between Export Quantity and Dollar Value, 1993 – 2003



Source: FAOSTAT

Table M6: Relationship between Export Quantity and Dollar Value, 2001 – 2003

World Exports	2001	2002	2003
Metric Tons	78,750,703	84,860,957	87,584,086
Dollar Price ($1000)	8,870,266	9,871,829	11,137,440
Average price, $/ton	$113	$116	$127

Source: FAOSTAT

As noted previously, the popularity of maize world wide stems from its versatility. Maize has three possible uses: as food, as feed for livestock and as raw material for industry. For the most part maize is used as animal feed. In developed countries, 60% of maize is used to feed livestock.[59] Although in developing countries maize is used as a main source of

[58] Price Convergence on World Commodity Markets: Fact or Fiction; J. Bukenya and W. Labys, University of West Virginia
[59] FAO

nutrition for human consumption, these countries are also increasingly using maize as livestock feed.

A distinction was made earlier in this report between white maize and yellow maize. White maize is generally used for human consumption. In the United States, white maize comprises less than 1% of the entire maize production.[60] World wide, white maize is not a commercially important crop. For perhaps more than 400 million people world wide, primarily in sub-Saharan Africa and Central America, white maize plays a major role in the diet.[61] Maize accounts for more than 40 percent of total cereal production in sub-Saharan Africa. Africans use maize almost entirely to feed themselves. Eighty-five percent of the maize produced in eastern and southern Africa is used to feed people.[62]

There are numerous manners in which maize is processed for human consumption: sweeteners, cooking oil, starch, beverages both alcoholic and non, snack foods; the list is extensive. The industrial uses of maize are numerous as well. Thousands of everyday items – from toothpaste and cosmetics to adhesives and shoe polish – contain maize components. Maize is used in the manufacture of pharmaceuticals and maize also plays a role in aspirin. Starches are used extensively for industrial use and 75% of starches are derived from maize.[63] Industrial alcohol and fuel ethanol are also popular technologies that are receiving more attention as fossil fuels continue to rise in price.

Maize products are rapidly replacing petroleum in many industrial applications. Polylactide (PLA), a biodegradable polymer made from maize, is being used successfully in the manufacturing of a wide variety of everyday items such as clothing, packaging, carpeting, recreational equipment and food utensils. Because these products are biodegradable and made from a renewable resource, they offer tremendous environmental benefits.[64]

The outlook for maize is positive. In 1995 world demand for maize was 558Mt and this figure is expected to increase by 50% by 2020 to approximately 837Mt.[65] By 2020, demand for maize will surpass that for both wheat and rice in developing countries.[66] Asia plants almost half of the developing world's maize crop. Three-quarters of the maize consumed in South Asia is consumed directly as food, but in East Asia most maize is used for animal feed.[67]

A leading factor in the increase demand for maize in Southeast Asia, and as well several other regions in the world, will be the general economic growth of the region. Economic growth boosts income levels and causes a shift in dietary habits. Interestingly, as income levels increase, demand for course grains, such as maize, decreases as people favor rice

[60] US Grains Council
[61] FAO
[62] The International Development Research Center
[63] Interactive European Network for Industrial Crops
[64] US Grains Council
[65] Interactive European Network for Industrial Crops
[66] CIMMYT
[67] The International Development Research Center

and wheat. This trend is predicted to continue in Latin America, Asia and Africa.[68] However, rising income levels have already been met with a greater demand for meat and this rising demand for meat products also affects maize utilization, production, and trade throughout the region.

The rising demand for meat far outweighs the decreased demand for maize as a direct human food source. With two-thirds or more of maize production being used for animal feed, the increased need for maize as animal feed is evident as demand for meat grows. In the projections, steady long-term growth in the livestock sectors of developing countries in Asia, Latin America, North Africa, and the Middle East is expected to provide the impetus for significant increase in maize trade.[69]

The strong growth in GDP experienced by the Southeast Asian region during much of the last fifteen years (with exception being the economic crisis in 1997/1998) contributed greatly to diversification in diet and to the increased ability of consumers to purchase meat products. For example, feed demand from the expansion of Southeast Asian poultry industries stimulated domestic maize production, local feed industries, and maize imports.[70] The government of Lao has also tuned into the rising demand for meat and supports the developing cattle trade industry in the country.

In the case of Lao today, all of its maize exports go to a single source: Thailand. Reliance upon a single source is risky in the long run and the Lao export market will most likely have to develop new partners. The case of Thailand, however, is an interesting one. Thai imports of maize plummeted from 2001 to 2002. Reports put Thai import of maize at a ten-fold decrease between 2001 and 2002. A once significant source of maize for Thailand, China barely has any share left of the Thai market. Yet Lao does. According to UN Comtrade, in 2003 Lao moved into fourth place as a source for Thai maize imports (see Table M7).

Table M7: Source of Thai Maize Imports, 2003

Partner Title	Trade Value
USA	$911,122
India	$740,147
South Africa	$625,463
Lao People's Dem. Rep.	$454,554
Argentina	$331,598
Other partners	$428,869

Source: UNSTATS, Comtrade

[68] Economic Research Service: USDA
[69] Economic Research Service: USDA
[70] CIMMYT

Upon investigation of the Thai maize situation, it is seen that production has been fairly level since 2000 (slight decrease) yet between 2001 and 2002 Thailand's trade flow was reversed. Rather than being a net importer of maize, Thailand experienced a significant change in trade policy and became a net exporter (see Table M8). Fortunately for Lao, current Thai imports of maize are coming from Lao. If maize exports to Thailand continue to grow and if the demand for meat and/or livestock continues to grow, Lao's maize production will become increasingly important as a source of sustainable income. Lao maize production for 2002 and 2003 are shown in Table M9 as extracted from the production table in the Introduction of this Desk Study.

Table M8: Thailand Maize Snapshot, 2000 – 2004 (1000 Mt)

	2000	2001	2002	2003	2004
Production	4,462	4,466	4,230	4,160	4,270
Imports	122	341	32	16	13
Exports	72	24	502	153	198

Source: FAOSTAT

Table M9: Lao Maize Production, 2002 and 2003

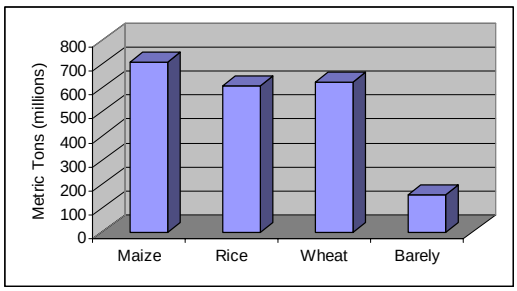
	Harvested Area (ha)		Production (Mt)	
	2002	2003	2002	2003
Maize	44,956	51,670	124,122	143,177

Source: National Statistics Centre, Lao PDR

VI. Sector Analysis – Rice

Rice had its beginnings millennia ago in Asia but there is not a consensus as to exactly which part of Asia the grain was first discovered. Today, however, rice is grown on every continent except Antarctica and it is the third largest produced crop behind wheat and maize (see Figure R1). The importance of rice is indisputable with more than half the world's population depending upon rice as the primary staple.

Figure R1: Cereal Production, 2003



Asian countries produce and consume about 90 percent of the world's rice. But rice is also a staple food in Latin America and the Caribbean, and a leading source of protein for the poorest 20% of the tropical population, supplying more protein per person than beans, beef, or milk.[71] Although rice is grown in quantities approaching that of wheat and maize, only 4 - 6% of total production is actually exported. In most of the leading producer countries, rice is a critically important staple. These countries have traditionally pursued a high degree of rice self-sufficiency to achieve food security. Export volumes are driven more by domestic supply and demand balances than by world market prices. As a result, compared to the world market for wheat and maize, rice prices in international markets are rather unstable. A small production shortfall in an important rice producing country often results in a surge in import demand and triggers a sharp rise in international prices. This, in turn, can seriously hinder importers' ability to secure affordable supplies on the world market.[72] Generally the trade policies of the leading producer nations are based on the following principles:

- export tariffs if domestic market has rice deficit;
- export subsidies if domestic market has rice surplus.[73]

Rice exists in a huge array of types, forms and varieties. There are approximately 40,000 different strains of rice to be known. Different specialists also categorize rice in different ways. However, it is common to refer rice depending on grain size: long, medium or short. The FAO trade data is divided into four segments based on the level of processing of the grains: paddy (rough rice – still in the husk), husked (brown rice – husk removed but still with the bran), milled (white rice) and broken.

[71] International Development Research Center
[72] FAO Corporate Document Repository
[73] UNCTAD

The most commonly traded rice form internationally is milled. It is also reported that long grain rice is the most commonly traded as well.[74] Long grain, milled rice is the most common form of rice consumed. Trade of paddy, and to a lesser extent husked rice, is uncommon because countries generally, in an effort to protect their domestic industries, mill the rice before exporting. Long grain rice is imported by a broad spectrum of countries in South and Southeast Asia, the Middle East, Sub-Saharan Africa, and Latin America. Indonesia, Nigeria, Iran, Iraq, the Philippines, and Saudi Arabia are typically the top long grain import markets. In contrast, medium and short grain rice are primarily imported by Japan, South Korea, Taiwan, Turkey, and Jordan. Expansion in medium grain rice trade is projected to be much slower than for long grain.

Although classified by some sources as long grain rice, basmati and jasmine are often separated into a category denoted aromatic rice. Aromatic rice makes up most of the balance of global rice trade. Aromatics typically sell at a substantial price premium to long and medium grain varieties in global markets. Glutinous (sweet rice) varieties only account for a small share of global rice trade.[75]

For the purpose of this report, rice refers to the general category with all four forms (paddy, husked, milled, broken) together unless otherwise specified. Trade data is conglomerated to reflect trade of all four of the above level of process classifications. In terms of SITC Rev.3, the classification used in cross referencing with UN Comtrade is 042 – rice.

As noted, Asia produces nearly 90% of the world's rice. In fact, nine out of ten of the leading rice producing nations are Asian, with the exception being Brazil in ninth place (see Table R1). In 2004 Lao was the twentieth largest producer of rice world wide.

Table R1: Leading Rice Producers 2002 – 2004

	2004	2003	2002
China	185,110,000	160,656,000	174,539,008
India	124,400,000*	130,400,000	108,900,000
Indonesia	53,100,104	52,078,832	51,489,696
Bangladesh	37,910,000*	39,090,000	37,593,000
Vietnam	35,500,000*	34,518,600	34,447,200
Thailand	25,200,000*	27,241,000	26,057,000
Myanmar	23,000,000*	24,640,000*	22780000*
Philippines	14,200,000*	14,031,000	13,270,653
Brazil	13,356,300	10,319,900	10,457,100
Japan	11,400,000*	9,740,000	11,111,000
USA	10,227,960	9,033,610	9,568,996
Lao PDR	2,700,000*	2,416,500**	2,375,100**
World	608,496,284	586,248,413	571,075,822
* = Unofficial figure; N = According to National Statistics Centre, Lao PDR			

Although there have been down years recently, overall world rice production is increasing (see Figure R2). Rice does not have the numerous industrial applications that maize has. Nearly all rice produced is used for food (either in its natural form or processed) or beverages (alcoholic and non alcoholic). Outside of the food industry, rice has some applications in the pharmaceutical industry. Nearly all the rice produced is,

[74] Economic Research Service, USDA
[75] Economic Research Service, USDA

however, consumed in one form or another. Therefore, the increased production of rice is driven by the direct consumption of the grain.

Figure R2: World Rice Production, 1993 – 2004

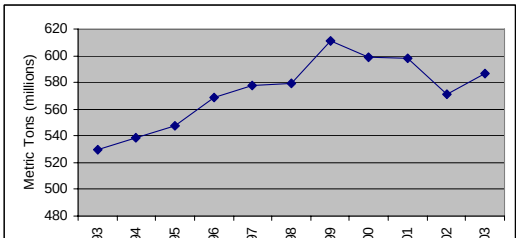
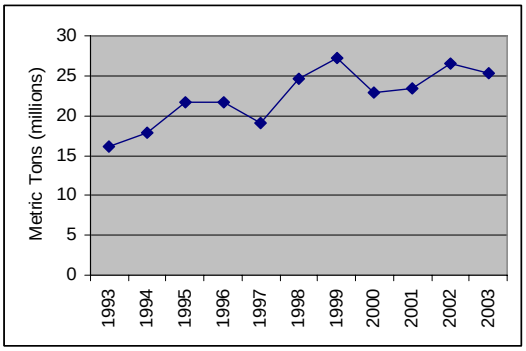


Figure R3: World Rice Imports, 1993 – 2003



Source: FAOSTAT

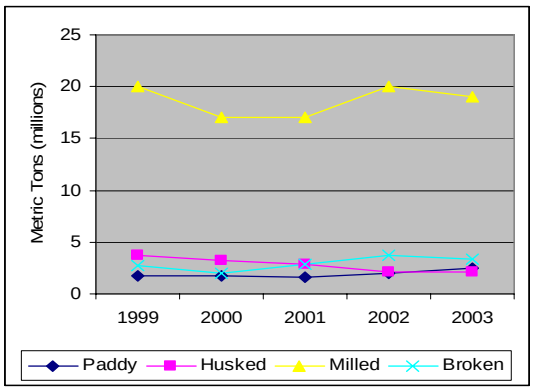
World imports of rice have steadily increased although, as written above, only 4 – 6% of world production is actually traded. This can be witnessed in comparing the world production totals in Figure R2 with the world import totals in Figure R3. For this comparison, the same years are graphed although production figures exist for 2004. World rice production for 2004 was 608,496,284 Mt, a 3.8% year-on-year increase over 2003.

Figure R4 indicates that a significant percentage of milled (unbroken) rice is traded, in contrast with other forms. It is evident from this figure that milled rice is the dominant form of rice traded, as already written above.

Asia is the leading producer as well as the leading importer of rice. Table R2 in the page below shows rice imports by region. As can be seen, Asia leads the way in rice imports with nearly half of all imports going to Asian countries. The importance of rice in Asia cannot be underestimated. In Bangladesh, Cambodia, Indonesia, Laos, Myanmar, Thailand, and Vietnam, rice provides 55 – 80% of total calories consumed.[76]

In contrast to the high volume percentage of imports going to Asia, South America imports relatively little rice. North America is also fairly low as is the EU. Developed countries import approximately 40% of the world's total maize imports whereas these same countries import only approximately 23% of the world's total rice imports. Rice is a significant grain for the developing world.

Figure R4: Comparison of Imported Rice by Form, 1999 – 2003



Source: FAOSTAT

[76] California Rice Commission, Statistical Report

Indonesia, accounting for 5.5% of world rice imports, is the leading importer by country. Indonesia imports most of its rice in equal shares from Thailand and Vietnam. These two countries made up more than half of Indonesia's rice imports from 2000 – 2003. China, the United States and India were other leading exporters of rice to Indonesia in this period.

Nigeria followed Indonesia with 4.5% of the import market in the period from 2000 – 2003. Thailand is by far the biggest import partner for Nigeria with a third of the market. India follows with less than 20%. The United States, China and South Korea comprise the other significant import partners for Nigeria.

Table R2: Regional Imports of Rice, 2000 – 2003 (Mt)

	2000	2001	2002	2003
Asia	11,538,800	9,709,867	12,872,622	11,651,115
Far East	5,399,826	4,283,043	7,054,887	6,429,118
East & South East Asia	4,094,336	3,374,946	5,245,404	4,314,793
Africa	4,950,885	6,896,858	6,765,361	5,999,644
Africa South of Sahara	4,177,678	5,978,784	5,805,532	5,039,303
Western Africa	2,906,740	4,681,397	4,604,465	3,496,751
Near East	5,411,300	4,842,855	4,940,093	4,497,676
Europe	2,974,526	3,021,740	3,288,475	3,336,908
EU (15)	2,033,313	2,063,034	2,145,081	2,176,501
Latin America & Caribbean	2,440,908	2,656,195	2,583,552	3,319,547
North & Central America	2,098,225	2,295,524	2,486,001	2,651,111
Developed Countries	5,074,624	5,283,204	5,810,852	5,803,016
World	22,808,946	23,356,325	26,578,217	25,310,670

Iran also sources most of its rice from Thailand: 40%. Pakistan supplies 20% of the rice to Iran and United Arab Emirates places third. U.A.E. is not a rice producer at all. Its trade is all via re-export. U.A.E. is the 14th largest importer of rice and as well ranks 15th in world wide exports. Iran is a significant importer of rice that flows through U.A.E.[77]

On the export side, Asia again is the leading region and Thailand is well ahead of any other country in quantity of rice exported. Thailand, with more than 40% of world rice exports in 2003, exports approximately two times as much as the second place Vietnam. Thailand has a reputation for high quality, long-grain, white rice, which usually commands a substantial price advantage over lower grades.[78] Its top partner is Nigeria followed by Indonesia, the United States, Hong Kong and Iran.

Vietnam became a net rice exporter in 1989 and has since grown to become the second leading rice

Table R3: Leading Rice Importers by Country

Importer	Metric Tons 2000-2003
Indonesia	5,421,457
Nigeria	4,565,642
Iran	3,722,570
Philippines	3,491,494
Saudi Arabia	3,213,916
North Korea	3,115,770
Brazil	2,987,040
Senegal	2,901,181
Bangladesh	2,798,397
South Africa	2,713,660
Japan	2,658,305

Source: FAOSTAT

[77] UN Comtrade
[78] Riceweb.com

exporter world wide. Vietnam's best customers are Indonesia and the Philippines.[79] In Vietnam, there is a trend toward planting modern varieties, which offer high yield and are better adapted to the environment.[80] This is contrary to the Thai practice which avoids the use of new varieties that may compromise quality.

Table R4: Leading Rice Exporters, 2000 – 2003 (Mt)

	2000	2001	2002	2003
Thailand	6,141,356	7,685,051	7,337,561	8,394,979
Viet Nam	3,476,983	3,729,458	3,240,932	3,813,000
USA	2,736,462	2,622,087	3,266,872	3,784,544
India	1,532,598	2,193,736	5,053,242	3,401,931
China	3,070,644	2,011,320	2,067,839	2,597,176
Pakistan	2,016,273	2,423,858	1,684,326	1,819,982
Uruguay	741,369	811,178	652,386	625,001
Italy	666,336	562,782	593,454	570,519
Myanmar	251,400	939,100	900,000	75,999
Egypt	393,057	656,192	464,402	585,759
World	23,561,034	26,839,220	27,613,554	27,537,236

Source: FAOSTAT

Although the United States ranks down in tenth/eleventh position as a rice producer, it is an aggressive exporter of rice. The population does not depend on rice as its main staple as in other producer countries. The two biggest customers of US rice are Japan and Mexico. Latin America imports much of its rice, approximately 45%, from the US.

India was a volatile and sometimes large rice exporter during the 1990s, primarily due to fluctuating production and stocks. Exports are projected to steadily increase over the next decade as high internal prices stimulate production and exportable supplies. India exports low-quality, long-grain rice and as well smaller quantities of high-quality basmati rice.[81] China exports high-quality, short-grain rice to Northeast Asian markets and low-quality, long-grain rice to Sub-Saharan Africa and some lower income Asian markets.[82] Pakistan exports both high-quality basmati and low-quality, long-grain rice. Although rice is an important source of foreign exchange, Pakistan has little ability to expand rice area, and its agricultural sector is confronting a growing water shortage.[83] Pakistan's main rice export partner is U.A.E. Pakistan does not have significant export partners in East Asia.

Italy is the only European country in the top ten in terms of exporters. Italy is famous for its high quality rice varieties such as Arborio, Carnaroli and Vialone Nano prized for their creamy texture and are the varieties most often used for preparing risotto.[84]

Rice prices, as already reported, fluctuate rapidly and dramatically. Supply and demand are naturally the significant factors determining price. Figure R6 is an example of the erratic nature of rice prices.

[79] Based on dollar value as revealed through mirror data on UN Comtrade.
[80] Riceweb.com
[81] Economic Research Service, USDA
[82] Economic Research Service, USDA
[83] Economic Research Service, USDA
[84] Grandi Riso, S.p.A.

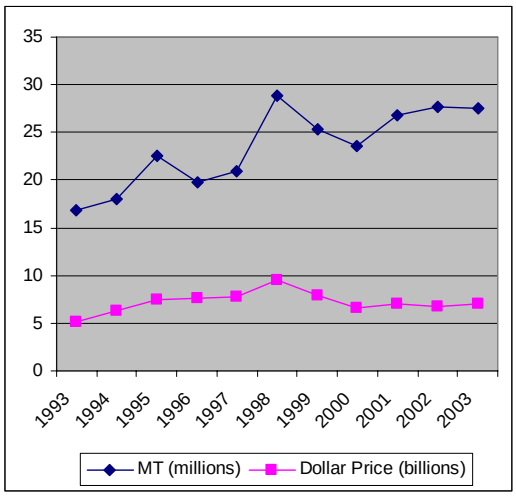
Figure R6: White Broken Rice, Thai A1 Super, fob Bangkok (Friday closing price), March 2003 – March 2005

Source: FAO

Figure R7 relates the price of rice to the quantity exported from 1993 – 2003. The comparison is made with world data. The same data is displayed for 2001 – 2003 but in tabulated form (Table R5) in order to get a better understanding of the relationship. For example, in 2003 world exports were 27.5 million metric tons and the dollar amount traded was $7.1 billion for an average price for the year of $257/Mt.

Global rice trade is projected to average 2.3% annual growth from 2005 through 2014. The biggest contributor to the growth will be the long grain rice category.[85] According to USDA, rising food demand from rapidly growing populations in Indonesia and Bangladesh will be responsible for much of the expected growth in global rice imports. Land constraints and already high cropping intensities indicate little opportunity for either country to significantly expand production.

Figure R7: Relationship between Export Quantity and Dollar Value, 1993 – 2003



Source: FAO

Sub-Saharan Africa and the Middle East are also major destinations for internationally traded rice. In both regions, strong demand

Table R5: Relationship between Export Quantity and Dollar Value

World Exports	2001	2002	2003
Metric Tons	26,839,220	27,613,554	27,537,236
Dollar Price ($1,000)	7,015,263	6,785,584	7,075,929
Av. Price $/ton	$261	$246	$257

Source: FAOSTAT

growth driven by rapidly expanding populations and rising incomes confronts limited opportunities to expand production, due to constraints such as agro climatic conditions in the Middle East and infrastructure deficiencies in Sub-Saharan Africa.[86] In general, as incomes rise in the developing countries, dietary shifts occur. People turn away from coarse grains such as maize in favor of wheat and rice.[87]

In Lao, rice is the principle crop accounting for 90% of total cropped areas (maize is second). Nearly 75% of the rice is grown along the Mekong River.[88] More than 85% of the rice produced is of the glutinous type –not a widely traded type of rice.[89] Rain fed lowland rice is the most common rice farming environment in Lao. Two other environments used in Lao are irrigated and upland rice environments.

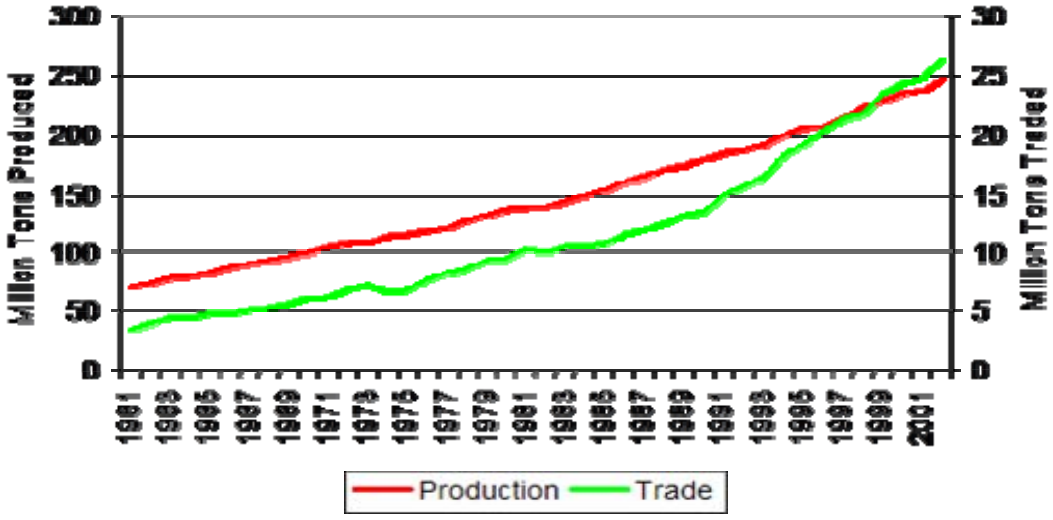
Problems lie in the poor distribution network due to the lack of an efficient road system. Also, as noted from the previous description of rained lowlands environments, drought and floods in the major rice-producing areas can quickly bring about a national rice deficit. Less than 5% of total production is traded within the country because of the high cost of marketing and underdeveloped infrastructure. More than 60% of rice producers in the uplands are estimated to suffer rice deficits. A lower but still significant percentage of rained lowland producers also have rice deficits. Most rained rice cultivation is based on a single wet season crop (hence, also termed seasonal rice), with little or no associated cultivation of other crops either before or after the rice crop.[90]

[85] Economic Research Services, USDA
[86] Economic Research Service, USDA
[87] CIMMYT
[88] FAO Global Information Early Warning System
[89] riceweb.org
[90] riceweb.org

VII. Sector Analysis – Livestock

International trade in meat is increasing rapidly, in both absolute terms and relative to total global meat production. From 1961 to 2003 total global meat production increased from 71 million tons to 271 million and trade increased from lows of 3.5 million tons to 26 million tons. As a percent of meat production, global trade increased from about 5% in 1961 to about 10.5% in 2002. Furthermore, there is a high correlation between the increase in meat trade and per person global GDP. As incomes increase so does demand for meat.

Figure L1: Global Meat Production and Trade:



Source: FAOSTAT

As for specific segments, total beef exports for major exporting countries are forecast at nearly 5.9 million tons for 2004, revised down 15 percent from October 2003 forecasts due to the impact of BSE in the United States. Brazil is forecast to surpass Australia as the top world exporter of beef, with exports expected to approach a record 1.4 million tons. Brazil has made outstanding strides in increasing its production, which is estimated to have grown 4% in 2004. Australia is expected to increase its exports in 2004 to Asian markets that have banned imports of U.S. beef. The United States remains the world's largest import market. In 2004, Japan, which has not recovered to its pre-BSE import volumes, is expected to fall to the fourth largest beef import market as imports from the United States and Canada are currently banned. Meanwhile, the EU is likely to remain a net importer, as prices remain high and its exports have never fully recovered from the BSE discoveries.

A brief description of key characteristics of major beef importing and exporting countries is given below, as per USDA statistics and analyses.

Key Beef Exporters:

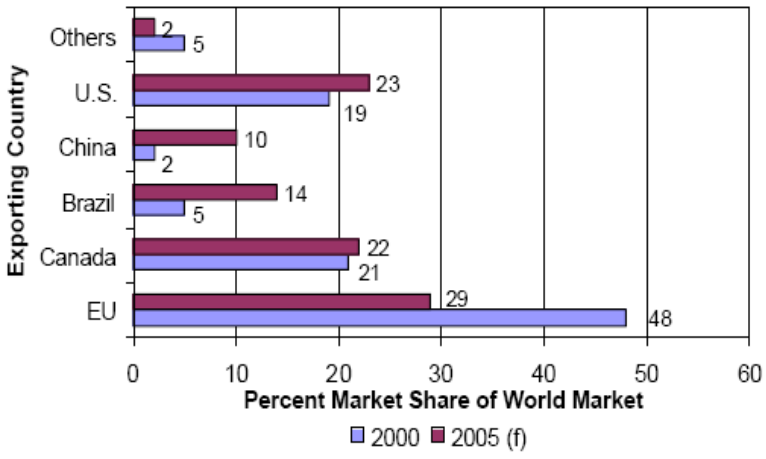
- **United States:** On December 23, 2004, the United States suffered a major trade disruption upon finding one case of BSE, which resulted in the closing of more than 70 foreign markets to beef imports from the United States. As markets are assumed to remain closed until importing countries announce a change in policy, beef exports for 2004 are forecast at 195,000 tons, just 17 percent of 2003 exports. Cattle supplies were already tight prior to the discovery of BSE, resulting from ongoing herd liquidation since 1996 because of drought in many areas and strong demand for beef.
- **Brazil: A**fter a decade of expanding its beef production, Brazil is forecast to become the world's largest beef exporter in 2004. This strong growth in the beef sector will lead to record beef exports, forecast at nearly 1.4 million tons in 2004. Brazil has doubled the number of countries it exports to in recent years and is likely to fill some part of the beef deficit left by import restrictions on the United States in Hong Kong and smaller markets looking for substitutes for U.S. beef. Brazil's expanded beef output, expected to reach a record 7.7 million tons in 2004, is due to improved genetics, better management, and higher profitability in cattle production.
- **Australia:** Total beef exports are forecast to increase to 1.3 million tons in 2004 as Australia takes advantage of U.S. beef being shut out of Asia. Japanese and Korean importers are likely to call upon Australia to supply additional beef. While grass-fed beef does not completely substitute for grain-fed beef, Australia has steadily increased its grain-fed beef production from 15 percent in the early 1990's to currently around 30 percent of total production. Australia's beef production is forecast at more than 1.9 million tons, mostly unchanged from 2003.
- **Canada:** In 2004, Canadian beef exports are expected to rebound from 2003 levels to 565,000 tons, due to increased exports to the United States and Mexico, its two largest markets. Canada suffered a major trade disruption with the discovery of one case of BSE in May 2003. Canada's exports reached only 384,000 tons in 2003 after it was shut out of most export markets in the second and third quarters of the year.
- **New Zealand:** Even with possible export growth opportunities due to BSE in the United States and Canada, exports are anticipated to fall 3 percent in 2004 to 560,000 tons. The New Zealand dollar has grown stronger, and returns to producers are falling. The United States, which takes half of New Zealand's beef exports, shows no weakening demand for New Zealand's frozen beef, particularly as U.S. cow slaughter is expected to decline. .
- **European Union:** Beef exports for 2004 are forecast at 360,000 tons down 10 percent from 2003 exports, due mainly to the Trade Related Quota (TRQ) imposed by Russia. Higher beef prices are expected to make it more difficult to compete with South American suppliers. In 2003, beef exports declined

from the previous year by 22 percent when the Russian TRQ and strong Euro exchange rate hampered exports from mainly Germany and Ireland.

Key Importers:

- **United States:** Beef imports for 2004 are 11 percent higher than 2003 at a record 1.5 million tons. Consumer demand remains strong, which has helped support prices after the closure of most U.S. export markets. Consumption is estimated to have expanded by 4 percent in 2004.
- **Russia:** Beef imports for 2004 are forecast at 650,000 tons, up 10 percent from 2003. Traditionally, imports have largely consisted of low-grade, frozen beef for further processing into sausage. A poor grain harvest is expected to cause a reduction in Russian beef production by limiting feed for cattle, and resulting in increased slaughter rates and reduced slaughter.
- **European Union:** The EU will remain a net beef importer in 2004 with a 200,000-ton trade deficit. Beef imports in 2004 are estimated at a record 560,000 tons, up 10,000 tons from 2003. Argentina, Brazil, Uruguay and Poland are the top exporters to the EU. In 2003, South America was so price competitive that it was able to ship beef above the TRQ with the full tariff rate applied.
- **Japan:** In 2004, Japan's imports are down 36 percent from 2003 at 520,000 tons. The ban on U.S. beef imports, if continued, creates a supply deficit that Australia and New Zealand are not expected to completely fill, due to the combination of already tight supplies in Australia and Japanese demand for grained beef. Japan will have to compete with Korea for beef from Australia and New Zealand unless additional North American beef is allowed into these markets. Consumption is forecast to decline by about 20 percent due to shortages of imported high quality beef.
- **Mexico:** In 2004, beef imports are forecast to decline 32 percent from 2003 to 250,000 tons due to the impacts from finding BSE in the United States, Mexico's largest supplier. The trade restrictions on U.S. beef, now relaxed for boneless beef from cattle less than 30 months of age, will allow a resumption of beef imports, but are expected to constrain Mexico's ability to import lower-value cow beef.
- **Korea:** Beef imports for 2004 are forecast to drop by 55 percent to 200,000 tons due to the ban on U.S. beef after the finding of BSE in the United States. This ban has had major impacts on the market, such as decreasing consumption of beef by about 27 percent and increasing consumption of pork and fish. In Korea, U.S beef usually accounts for 60 percent of imports.

Figure L2: World Market Share of Major Pork Exporters



Source: USDA

In terms of pork, world exports by major exporting countries (see Figure L2 below) are expected to reach the highest ever level at 4.6 million tons. A number of factors have contributed to increasing trade in pork worldwide. The weak U.S. dollar, which is expected to persist at least through 2005, is likely to continue making U.S. pork products an attractive buy abroad. Disease-related closures— avian influenza (AI) for poultry, and bovine spongiform encephalopathy (BSE) for beef— in important Asian markets could provide continued export strength. A brief description of key characteristics of major pork importing and exporting countries is given below, as per USDA statistics and analyses.

Key Pork Exporters:

- **United States**: In 2005, U.S. pork exports are expected to rise slightly to just over 1 million tons. Pork production marginally increases to 9.4 million tons in 2005. The majority of U.S. pork exports in 2004 were sent to Japan, 418,000 tons and Mexico, 243,000 tons.
- **Canada**: Canada's total pork exports for 2004 were 970,000 tons. Pork exports are expected to increase by 2 percent in 2005 to 985,000 tons. In 2004, Canada's top pork export markets were the United States and Japan, at 504,000 tons and 231,000 tons respectively. Prospects for increased Canadian pork exports to Japan are limited due to high Japanese inventories of frozen pork and competition from the United States and European Union. Canadian pork exports to the United States will remain strong in 2005 as the value of the U.S. dollar is expected to remain low against the Canadian dollar. Canadian live hog exports are expected to be 8 million head in 2005.
- **Brazil**: Brazil continues to develop as a major producer and exporter of pork and 2005 will be no exception with exports estimated at 640,000 tons. Brazilian pork production is forecast to increase by about 3 percent in 2005 to nearly 2.7 million tons. Domestic consumption is also expected to increase by 3 percent. Brazil's production has benefited from increased investment and Brazil is currently funding market activities aimed at developing potential export markets for its pork. Brazil has increasingly shifted exports to higher- valued pork cuts and these products now compromise 75 percent of exports.

- **European Union**: In 2004, EU pork production increased marginally while pork exports increased from 1.2 million tons to 1.4 million tons. Exports in 2005 are projected to decline to 1.3 million tons. Pork production and consumption are expected to decline slightly with increased shipments between the new and old member states. Export growth in 2004 was due to increased exports to Romania, Russia, and Asia, mostly Japan and Hong Kong.
- **China**: China is the world's largest pork producer and consumer. In 2005, Chinese pork production is expected to reach a record 49.7 million tons. China's pork industry is gradually shifting from backyard farming to commercial production with increased foreign investment and the movement of the rural population to urban areas, which drives consumption. China is the world's fifth largest pork exporter with the majority of its products sent to other Asian markets. Exports have increased from 73,000 tons in 2000 to 383,000 tons in 2004, and are forecast to reach 450,000 tons in 2005.

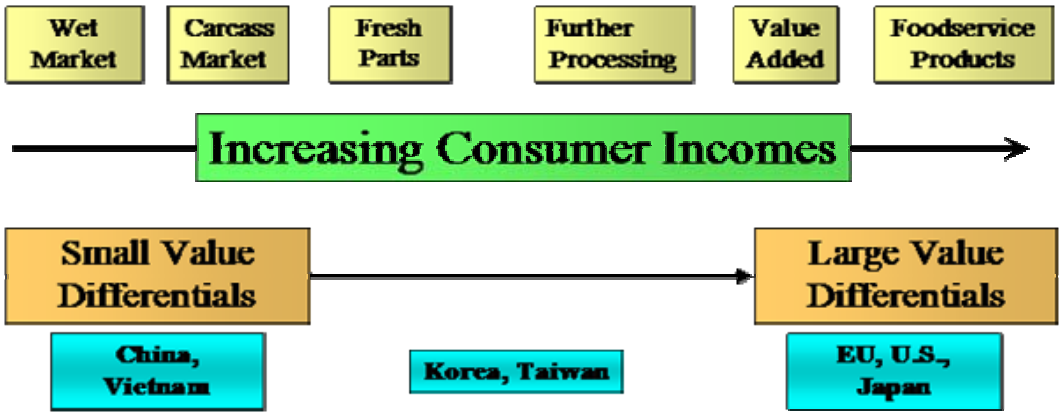
Key Pork Importers:

- **United States**: In 2004, the United States imported 499,000 tons of pork, a 7 percent decrease from 2003. The decrease in imports was due largely to the lower value of the U.S. dollar. Pork imports for 2005 are expected to reach 542,000 tons, the majority of which is from Canada and the European Union to meet consumer demand for particular cuts. Live swine imports are forecast to be almost 6 percent lower than last year, with the reduction attributable to required deposits/bonds, equal to dumping penalties, imposed on imported Canadian hogs and feeder pigs by the U.S. government in October 2004.
- **Japan**: In 2005, Japan is expected to remain the world's largest pork importer, importing a record 1.3 million tons, slightly above the previous year. The top five suppliers of pork to Japan in 2004 were Canada, Chile, China, Denmark, and the United States. In 2004, imports of beef and poultry were restricted by BSE and AI import bans resulting in increased pork imports to meet consumer demand for animal protein. However, in 2005 Japan has a high carry over of frozen pork stocks, which is expected to dampen imports.
- **Russia**: In 2005, domestic pork production is expected to grow by about 2 percent to 1.8 million tons. With demand for pork remaining strong, imports are expected to increase 5 percent in 2005 to 500,000 tons. In 2004, pork production grew slightly, limited by high feed costs and rising meat prices that resulted in slaughter at lower weights. Imports of pork decreased 23 percent in 2004 due to several factors: a temporary ban on Brazilian pork due to food and mouth disease problems (FMD), rising pork import prices, and problems with Russia's administration of its TRQ regime. Russian importers have also shifted to more boneless meat in order to maximize the use of import licenses with higher value and more profitable cuts.

In terms of consumer preferences, a tendency for diverging meat cuts' prices is strongly entrenched. In relatively poor countries most meat is sold in wet markets, and there is little or no difference in value attached to different cuts (or parts). The most extreme example is the live broiler market – the entire bird is sold for one price. On the other end of the spectrum there are places such as the U.S., Japan and Europe where different meat cuts have very different prices.

As pricing of the preferred meat parts increases producers have an incentive to increase production. However, as the production of the preferred parts increases so does the production of the parts people don't like as well. Those less favored parts prices fall as their supply increases. In total, producers continue to cover total costs, but cost recovery becomes more and more dependent on the willingness of consumers to pay premium prices for the cuts they want most. A general diagram of this progression is shown in Diagram L1 below, with trends in price differentials being pronounced in pork and beef.

Diagram L1: Parts values differentials and consumer income levels



Source: CGFI

Considering the fact that Lao exports of livestock products are exclusive in the from of live animals, it is apparent that the country is not in tune with international trends. International trade flows of meat display the fact that local tastes and incomes are driving important flows of meat, not carcasses. Here are some examples:

- Danish pork back ribs to the U.S.
- Danish, Canadian and U.S. pork loins to Japan and Korea
- Australian fed beef cuts to Japan and Korea
- Australian and New Zealand lean beef to the U.S.
- U.S. fed beef to Japan and Korea (suspended due to BSE)
- U.S. variety meats to a large number of countries
- Low value U.S. pork cuts to Russia
- Danish bacon to the U.K.
- Italian ham imports from all over Europe
- Thai processed broilers to Japan (suspended due to Bird Flu)

According to FAO data, the aggregate value of live animal trade in 2001 was $8.5 billion, while the aggregate value of trade in meat was over $43 billion.
Trade in live animals and whole carcasses, notwithstanding it being in the low value added segments of the market, continues to be viable. It is important to note that this trade is largely based on cost of production differentials rather than local demand. Lao's live animal exports to Thailand are almost certainly related to cost price differentials. Other examples include:

- Canadian pork exports to the U.S.
- Canadian live hogs exports to the U.S.
- Canadian live cattle exports to the U.S. (suspended due to BSE)
- Mexican feeder cattle exports to the U.S.

The importance of exports of meat parts/cuts, and the differing patterns by destination, can be illustrated by looking at the recent exports of any significant meat exporter. If some recent Canadian pork exports are examined, for example, the picture illustrated in Table L1 emerges. Two trends emerge. First, essentially none of the large volume of Canadian pork exports is in carcasses. Second, the pattern of shipments is very different

Table L3: Canadian Pork Exports, 2002, metric tons

	U.S.	Japan	Mexico	Korea	Other	Total
Fresh and Frozen:						
Carcasses	1,305	-	2,871	-	10	4,186
Hams	27,519	45,697	10,973	1	29,824	114,040
Backs, loins	23,045	50,286	674	48	6,484	80,537
Bellies	17,488	24,606	3,630	763	1,252	47,739
Shoulder, butts, picnic	21,158	46,410	6,282	3,168	7,847	84,865
Side & regular	214	893	74	395	4,911	6,487
Other boneless	105,913	13,662	13,187	1,669	52,087	186,518
Other bone-in	15,150	4,824	1,359	20,014	7,148	48,518
Offal	11	3,985	4,001	6,124	50,366	64,487
Processed:						
Hams cured	2,609	1	6	-	538	3,154
Backs, loins	679	41	-	-	245	965
Bellies, side bacon	0	55	895	-	1,089	2,039
Shoulders/butts/picnics	753	-	-	-	18	771
Pickled in barrels	0	-	-	-	4,495	4,495
Canned	44,489	7	28	5	292	44,821
Others	961	2,030	251	2	814	4,058
Total	261,294	192,497	44,231	32,189	167,420	697,680

Source: Ag Canada, CGFI

by country, and depends on the differing local demands of the destination nations. The same is true of U.S. exports.

The implications for Lao are manifold. One of the most important implications is that as a participant in the global meat production system, directly or indirectly, the country is dependent on trends of meat trade, and therefore inability to follow and adjust to such trends effectively means missing a major opportunity. The opportunities in meat trade are major in that trade has been growing faster than production for decades, and it is anticipated that when issues such as BSE are resolved it will resume that growth path.
It is very likely that meat trade will continue to grow for one simple reason. As countries on the left-hand side of the above Diagram L1 experience ever higher income levels, local tastes for parts of animals will emerge. In those country's local markets some parts will go up in value, some will go down, and the opportunities for two-way trade will increase as a result. Local producers will seek out export markets for their parts with falling value, and traders from the outside will seek out opportunities to ship in those parts with increasing value. What these local value patterns will be is difficult to tell, but it can be said with high degree of confidence that as income levels in countries like China and other Asian countries rise, opportunities for Lao to reap benefits from the meat trade will emerge. Companies that are able to discover these price differences, and ship products from low price areas to higher price areas, will add value, both their own bottom lines and to the customers they serve.

Another implication for Lao that stems from the global preference for differentiated meat, i.e. meat parts, is that encouraging the establishing of processing capabilities in the country is a must if the country is to play any role in the meat trade. Any such investments would have to be done in sync with targeting specific foreign markets as per specific consumer tastes in those markets.

Last but not least, Laotian producers need significant support from GOL in trying to reduce tariff barriers on meat in major world markets. It is somewhat remarkable that meat trade has been increasing in the face of some rather formidable political and economic barriers. Many countries have put up significant barriers to the free trade in meat and meat products. The US for example has strict import quotas on beef, and sanitary regulations on chicken that no other country can meet. Some other notable barriers would include:

- The current ban on U.S. beef imports into Japan, and most of the rest of the world
- An EU tariff-rate-quota on pork that effectively closes that market to imports
- EU tariff rate quotas on beef and chicken that severely limit imports of both
- Extremely high South Korean tariffs on all meat imports
- A Japanese sliding pork tariff that escalates with increasing imports, and a very high beef tariff
- High Philippine tariffs on pork
- Newly imposed Russian tariff-rate-quotas on all meats
- Very high Canadian tariff-rate-quotas on chicken imports that are designed to protect their production quotas
- High Canadian tariffs on beef imports

The Table L2 shows the approximate level of current tariffs on beef and pork for selected countries in Asia, Europe and the Americas.

Table L2: Meat tariffs and tariff equivalents for 2004 (% of value)		
Country	**Beef**	**Pork**
Australia	0	0
Brazil	12.5	11.5
Canada	26.5	0
China	12	12
EU	55-104	22-42
Hong Kong	0	0
Indonesia	5	5
Japan	38.5	Gate price
Philippines	10	40
South Korea	40	25
USA	26.5	0
Source: ERS/USDA		

Notwithstanding foreign barriers to trade, Laotian exports of livestock meat products are seriously hampered by the inability to progress in areas that define the major exporters from the rest of the world, and namely:

- Attention to and capabilities in animal disease control
- High grain or oilseed production in the country
- Adequate (large) pasture basis.

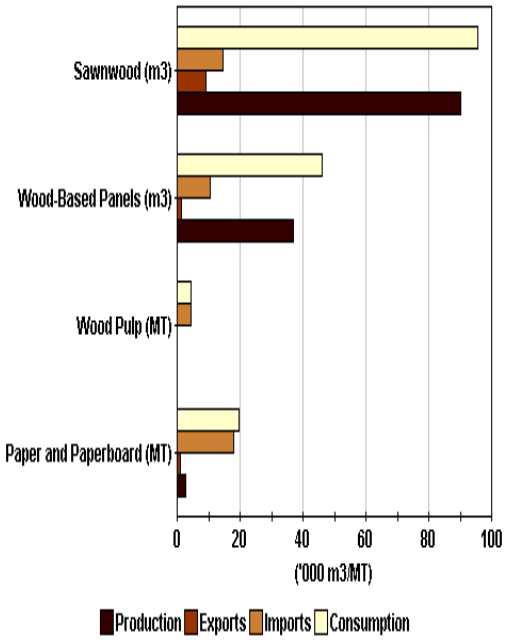
VIII. Market Analysis – Wood

1. Introduction: Market for Wood

As a prelude to the analysis of the market for tropical timber furniture, this report includes a brief presentation of the world market for roundwood (logs) and sawnwood. The reason behind this is so that the reader can see the direction of the tropical timber trade in order to gain deeper understanding of the forces that impact the world market for tropical wood furniture.

In 2003, global production of industrial roundwood, otherwise known as logs – a category that includes wood that is not used as fuel – was 1.58 billion cubic meters (m^3) of fiber, or approximately 45% of the wood harvested globally (see Figure A1). Sawn logs and veneer logs comprised 60% of industrial roundwood production, followed by pulp for paper and paperboard (approximately 25%), and processed wood products such as veneer sheets, fireboard, particleboard, and plywood (approximately 15%).

Figure A1: World Wood Outlook, 2003



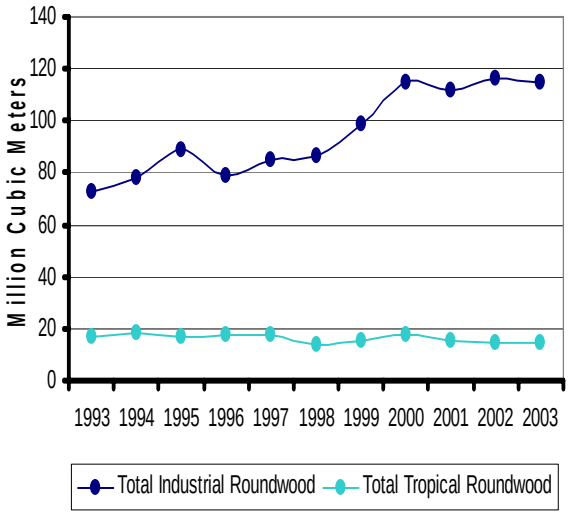
Source: FAO

Commercial timber production is a major global industry. In the early 1990s, production and manufacture of industrial wood products contributed approximately US$400 billion annually to the global economy, or about 2% of global GDP. North America, Asia, and Europe dominate industrial roundwood production (see Figure A1) but the timber industry is of relatively greater economic importance to some developing countries, where wood exports can account for up to 80% of foreign currency earnings. In the past 30 years, international trade in forest products has increased roughly threefold in terms of value, adjusted for inflation, and now accounts for about 3% of total world trade.

The share of tropical log production (the Laotian timber market falls into this category) and trade has been almost flat for the past 10 years - between 16 and 18 million cubic meters - and by 2002 the global export volume of tropical roundwood fell under 15 million cubic meters for the first time in a decade (see Figure A2). The total exports of all industrial roundwood, on the other hand, has steadily increased in the last 10 years, and reached 115 million m^3 by 2003.

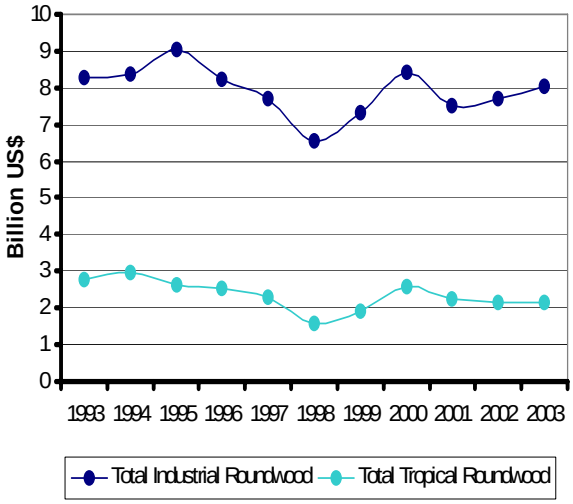
In terms of value, the trends of industrial tropical roundwood export have been the same, with price fluctuations of total values being almost identical (see Figure A3).

Figure A2: Tropical Roundwood vs. Total Industrial Roundwood Exports, by Volume



Source: FAO, 2004.

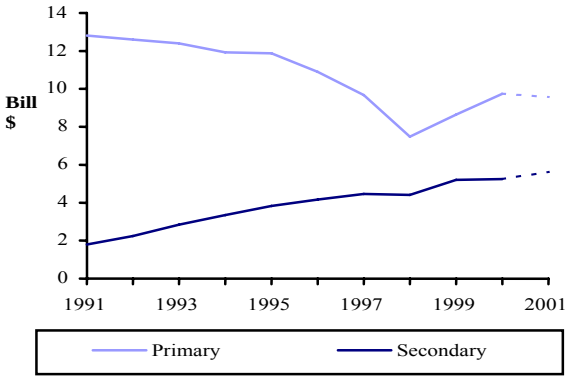
Figure A3: Tropical Roundwood vs. Total Industrial Roundwood Exports, by Value



Source: FAO, 2004

Between 2002 and 2003, China consolidated its position as the world's largest tropical log and sawnwood importer. In 2002, log exports from tropical countries fell almost 20% to 12.8 million cubic meters. A large part of this fall is due to export bans in Africa and Indonesia. Lao has as well instituted a ban on log export.

Picture F1: Primary vs Secondary Processing Exports



Note: 2000-2001 is an estimate.
Source: UN Comtrade

After the decline of 1990s, by 2002 the global tropical timber sector continued to develop steadily, although trends differed significantly between markets. China's increasing imports continued to drive the tropical log and sawnwood markets.

Many producer countries continue their shift to the higher value-added secondary processed products exports, the category in which furniture is included. Trade in these products continues to rise, while primary tropical timber products trade decline. As seen in Figure A4, the volume of the latter

trade is still larger, but the difference between the two is narrowing.

2. Round wood Market (Logs)

The share of logs in total primary processed tropical timber exports of ITTO producers[91] (in terms of both value and volume – roundwood equivalent volume) fell significantly in 2002 to 23%, the first time this ratio has dropped below 25% (see Table A1).

This ratio was over 60% during the 1980s. The main reason behind this trend is in the

Table A1: Exports by Producing Region, 2001-2003, (million m^3 roundwood equivalent)

	Log Production			Log Exports			Processed Exports			Total Exports		
Region	**2001**	**2002**	**2003**	**2001**	**2002**	**2003**	**2001**	**2002**	**2003**	**2001**	**2002**	**2003**
Africa	20.1	19.4	18.9	4.7	4.5	4.6	4.0	4.4	4.1	8.7	8.9	8.8
Asia-Pacific	85.9	76.9	74.1	11.5	8.4	8.6	36.0	32.5	32.8	47.5	40.9	41.5
Latin America	37.7	39.1	40.1	0.2	0.1	0.1	3.5	4.8	4.8	3.7	4.9	4.9
Total	143.7	135.4	133.1	16.4	13	13.3	43.5	41.7	41.7	59.9	54.7	55.2

Source: ITTO

fact that Latin American and Asian producers of logs have continuously developed their processing capacity and have exported less and less raw logs over the years, up to a point where countries like Brazil, for example, process 100% of their raw logs without exporting any logs at all.

Table A2: Proportion of Tropical Wood in Total Wood Imports, Selected Countries, 2002

	Logs	**Sawn wood**	**Veneer**	**Ply wood**
Belgium	1.1	15.4	32.6	48.8
France	32.5	10.1	51.1	27.8
Germany	5.8	2.7	32.5	21.9
Italy	6.7	3.9	26.2	14.3
China	28.6	53.1	56.4	91.4
Hong Kong	43.7	50.2	89.2	72.4
Japan	16.0	6.4	39.0	90.5
India	94.6	15	45.2	81.8
Malaysia	69.1	90.6	7.9	56.8
Thailand	95.0	74.1	61.1	95.5
U.S.A.	0.0	0.6	5.2	39.1
Canada	0.1	2.2	6.0	31.6

Source: ITTO

The Asia–Pacific region has rapidly replaced log exports with the export of processed products. Indonesian plywood exports and Malaysian exports of sawnwood, veneer and plywood have played a big role in this consolidation of Asian processed wood exports. Asian processed wood exports made up 75% of the total Asian export volume in 2001, and this share increased to 79% by 2003. Latin American tropical log exports are a small fraction of both production and total exports.

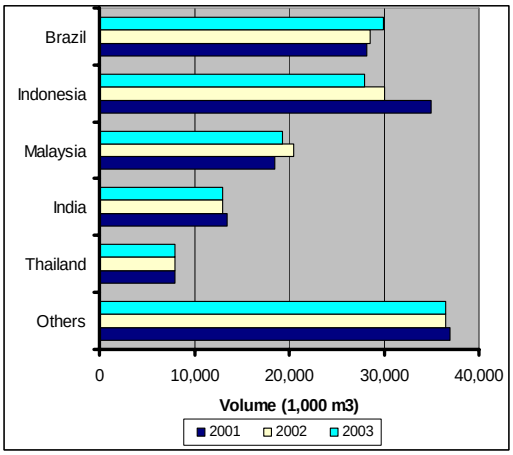
The proportion of tropical wood imports as compared to total wood imports

[91] Lao is not an ITTO member.

varies across countries and products (see Table A2). China, for example, has a significant proportion of its total log imports in tropical logs, at 28.6%, but that proportion is almost double for sawnwood, at 53%, and almost 100% of Chinese imports of plywood are tropical plywood.

The North American market, unlike the Asian market, relies very little on tropical sawnwood and does not import tropical logs at all. In Europe, Portugal and France appear to import more tropical timber in proportion to their total timber imports than any other country on the continent. Belgian's share of tropical log imports is negligible, but imports of tropical plywood are almost half of its total lywood imports.

Figure A5: Major Tropical Log Producers

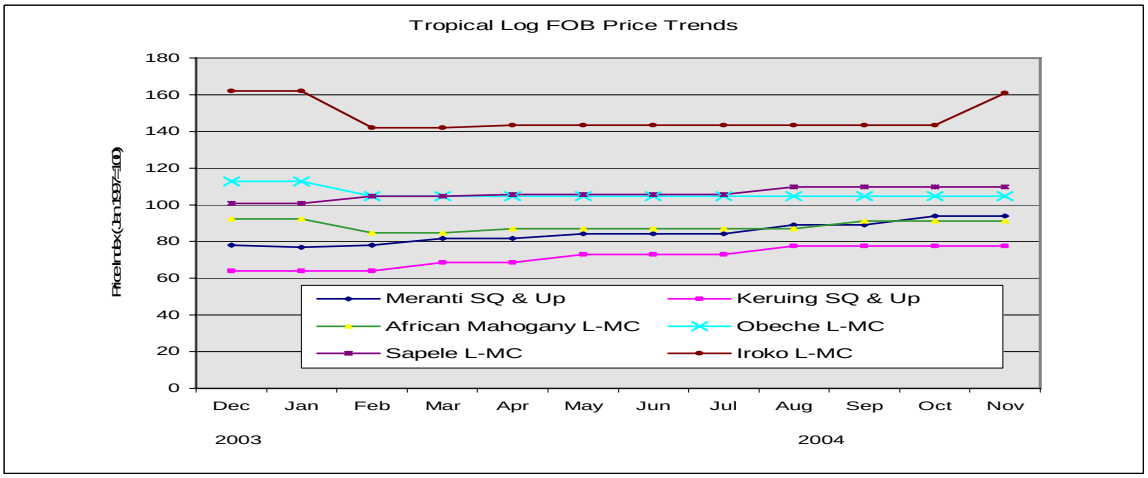


Source: ITTO

Figure A5 shows the top five tropical log producing countries: Indonesia, Brazil, and Malaysia, India and Thailand. These five countries together comprise approximately 70% of the total global production, estimated at approximately 140 million cubic meters.[92] In almost identical order, these countries make up the list of biggest consumers of tropical logs.

Concerning global log prices, over the long term prices have, for the most part, remained flat or lower than the price level of late 1990s, more precisely 1997 (see Figure A6 below).[93] The short-term fluctuation in prices in 2004 has followed a couple of major trends. Firstly, the encouraging signs of improvement in tropical log export prices seen

Figure A6: Tropical Log FOB Prices



Source: *Tropical Timber Market Report*

[92] ITTO estimates that illegal Indonesian log production is equal to or even greater than the estimates given in its 2003 report. Thailand's production is almost entirely based on its rubberwoood resources.
[93] Based on *Tropical Timber Market Report*, 16-30th of November, 2004.

in 2000 and 2001 were not sustained into 2002 and 2003. Fears of further declines were realized by late 2004. The momentum for price improvements seen in 2002 for African and Asian logs was not maintained into 2003. African suppliers have, however, fared better than suppliers in Asia where FOB prices have stubbornly held at levels some 30-40% below those seen prior to the Asian financial crisis of 1997. In Asia, log prices have been negatively affected by the continued weakness of demand for wood products in Japan, and the dominant role played by China in setting the Asian log trade, where China, the dominate buyer, is placing downward pressure on the price of wood.

Table A3: Major Species Log Prices, third quarter 2004

FOB	per m^3
Meranti SQ up	US$190-195
small	US$160-165
Keruing SQ up	US$170-175
small	US$140-145
Kapur SQ up	US$145-150
Selangan Batu SQ up	US$145-150

Source: TT Market Report. SQ=Sawmill quality.

Table A3 indicates prices of four major species of tropical logs. With the Chinese buyers gaining strong leverage, a question that remains to be answered is whether the low price demands by Chinese buyers will be met by firmness on the part of sellers. The fundamentals of supply and demand reveal that since global log production volumes are normal to low there is no pressing reason for price reductions at this time. Producers need to maintain current price levels and should resist any downward movements in prices over the coming months.

Table A4: Indonesian Log Prices, December 2004

Domestic log prices	per m^3
Plywood logs	
Face Logs	US$90-100
Core logs	US$60-75
Sawlogs(Meranti)	US$105-115
Falkata logs	US$90-95
Rubberwood	US$85-95
Pine	US$95-100
Mahoni	US$500-515

Source: *Timber Market Trends*, ITTO, 2003

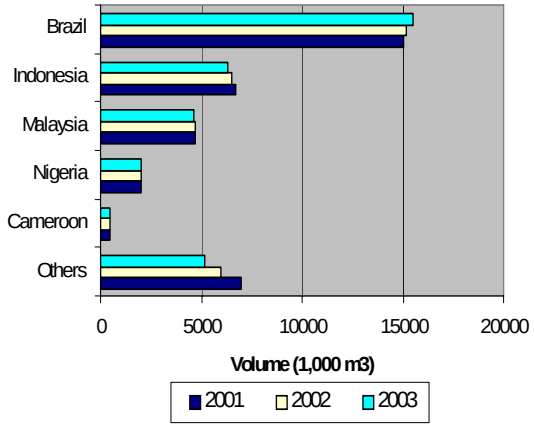
The log prices in Indonesia, one of the major world markets, are illustrated in Table A4. These price levels have been virtually flat for the whole of 2004 and no particular changes are expected in 2005.

3. Market for Sawn Wood

Production of tropical sawnwood in ITTO producing countries totaled just less than 34 million m^3 in 2003, up 0.3% from 2001. For the purpose of this study, identification of the major producers, exporters and importers along with the qualities involved will be summarized in the next few tables.

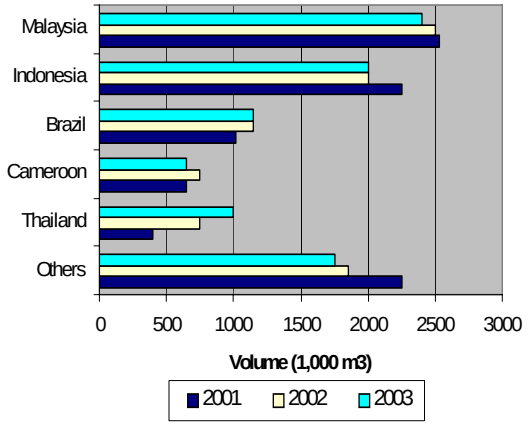
The Asian region accounted for approximately 35% of tropical sawnwood production in the world in 2001 and 2002. Figure A7 shows the major producers of tropical sawnwood from the years 2001 - 2003. Brazil is the world's top tropical sawnwood producer with

Figure F7: Major Tropical Sawnwood Producers, 2001-2003



Source: ITTO

Figure F8: Major Exporters of Tropical Sawnwood, 2001-2003



Source: ITTO

15.3 million m^3, followed by Indonesia with 6.5 million m^3, Malaysia with 4.6 million m^3, and Nigeria with 2 million m^3. Only Brazil's production showed growth over the period of 2001 - 2003. The top four producing countries constituted nearly 84% of global sawnwood production in 2002 – 2003. ITTO producers exported a total of almost 9 million m^3 of tropical sawnwood in 2003 (see Figure A8). Malaysia continues to dominate the trade in tropical sawnwood, with a bit over 2.5 million m^3 exported in 2001, constituting just less than 30% of total ITTO producer member exports.

In terms of major importers of tropical sawnwood, as was the case with tropical logs, China is by far the top importer. China's imports declined slightly by 1% in 2002 to approximately 2.9 million m^3, but leapt by 43% in 2003 to approximately 4.1 million m^3 (see Figure A9). China's tropical sawnwood imports are mainly from Indonesia (46%) and Malaysia (17%). Thailand imported 1.4 million m^3 of tropical sawnwood (up 43%) in 2002 as its large furniture and secondary processing industries continued to boom. Thai imports increased a further 5% to nearly 1.5 million m^3 in 2003. Both Thailand's and Japan's tropical sawnwood imports are primarily from Malaysia (71% and 40%, respectively). Japan also imported substantial quantities of sawnwood from Indonesia (48%).

4. Global Furniture Market

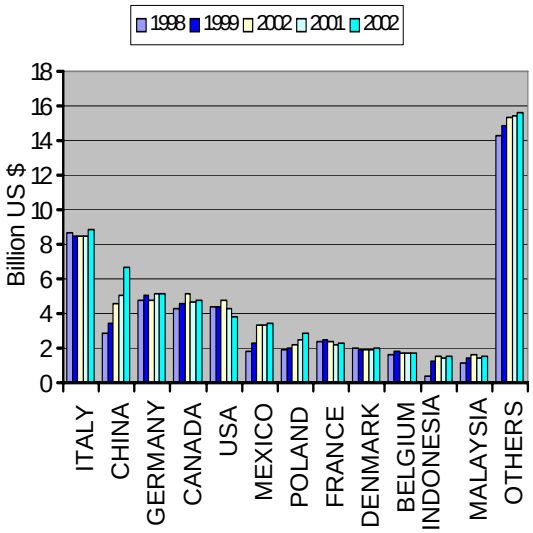
4.1 Introduction

Producing wood furniture and furniture components is considered secondary processing of timber. Secondary processed wood products (SPWP) hold higher value than primary processed wood (logs, sawnwood, veneer, plywood, and other reconstituted panels).

As previously seen in Figure A4, since the early 1990s imports of SPWP have narrowed the gap with imports of primary processed products. Furniture is leading the way for secondary processed products being by far the largest component of the SPWP category. Nearly two-thirds of all SPWP exports are furniture.

The furniture market is increasing steadily with 2003 world import figures for the total furniture market to be in excess of $75 billion while for wood furniture the amount is in excess of $35 billion.[94]

Figure A10: Global Furniture Exports, 1998-2002



Source: FAO

The export market for all types of furniture for the period of 1998 – 2002 is shown in Figure A10. Global exports in 2002 reached nearly $63 billion[95]. Between 1995 and 2000 trade in furniture worldwide grew by 36%, faster than world merchandise trade as a whole (26.5%), apparel (32%) and footwear (1%). By year 2000, furniture was the largest low-tech sector at $57.4 billion and exceeded apparel global trade ($51 billion) and footwear ($36.5 billion).[96]

Italy still dominates the global furniture market, but China is quickly closing in with its export growth in furniture being phenomenal; in five years from 1998 to 2002, China's exports of furniture grew from $2.8 billion to $6.7 billion. This growth of Chinese furniture exports explains, in large part, the country's dominant position in global imports of raw and sawn timber. In this global context, the Southeast Asian share of exports in the tropical wood furniture category is dominant. Indonesia and Malaysia and Thailand are among the world's top exporters.

[94] UN Comtrade
[95] ibid
[96] UNIDO, *The Global Wood Furniture Value Chain*, Vienna, 2003.

The recent trends in the furniture market may show some of the dynamics behind the appearance of market winners and losers in global furniture trade. One of the main trends has been the fact that furniture is increasingly seen as a commodity for which not only price but also time to delivery weighs heavily in the buyers' choice of supplier(s). In this sense, being competitive on price has to be coupled with competitiveness in an additional infrastructural capacity such as delivery efficiency, customs/ administrative effectiveness, and other non-price factors. Global competitiveness in the furniture market is increasingly dependent on time to deliver the product as well as price of the product. Moreover, some buyers' surveys suggest that timeliness of delivery ranks first among all types of buyers in their choice of supplier (be it one-store, multi-store, or specialized retailer), on par with quality and rating even higher than factors such as price, location, or product standards.[97]

Table F5: Challenges of Furniture Exporting

Generic	**Specific**
Delivery reliability	
Process efficiency	• Improve old/learn to work with new species • Improved and consistent input quality • Human resource development
Product introduction and/or upgrade	• Create designs suitable for specific species • Create designs suitable for manufacturing • Learn to utilize lacquers, paints, adhesives, synthetics, etc. without compromising the end-user safety requirements
Upgrade to new, especially higher value-added, value chain	Ability to move across value chains crucial: for example, moving from furniture to doors, from doors to industrial products, etc.

Source: Global Development Solutions, LLC™

Having noted this, however, some analysts have shown that there are some producers, most notably South African, that stay in the market by virtue of price competitiveness alone, since their quality and delivery reliability are very poor, they are distant from final markets and show little capacity to develop and upgrade skills in the value chain.[98]

By and large, having in mind the two main challenges of constant price squeeze and increased importance of time-to-market, the additional challenges that any new player in the furniture market needs to meet in order to succeed are not very different from the ones needed to succeed in any other sector. These challenges are:

- Improving process efficiency;
- Introducing new or improving existing products; and
- Upgrading and moving to higher value-added products.

More specific challenges, illustrated in Table A5, have to be met while striving to keep pace with the generally downward pricing trend yet without compromising the producers' capability to reap profits for reinvestment and further development.

[97] UNIDO, *The Global Wood Furniture Value Chain*, Vienna, 2003.
[98] Ibid.

4.2 Furniture

Although it is important to present data for the entire world market for wood furniture, it is of further importance to specify the size of the market for *tropical* wood furniture. It is tropical wood furniture that is relevant for exports emanating from Lao since Laotian forests are tropical.

The predominant source of information contained in this section emanates from the International Tropical Timber Organization (ITTO) and directly from trade data in UN Comtrade. ITTO member countries represent approximately 90% of the world's tropical timber trade.[99] Although Lao is not an ITTO member country, it is a tropical timber producer. Analysis of ITTO trade data, therefore, reflects the forces concerning tropical wood furniture trade; the same market that concerns Lao.

ITTO producer countries are transforming operations to produce higher value-added exports.[100] The bulk of this secondary processing is furniture which accounts for approximately two-thirds of all tropical SPWP trade values. Other significant categories of SPWP in trade are builder's woodwork (joinery and other builder's wood); other SPWP (packing, boxes and similar; casks, barrels, vats and other cooper's products; picture frames; table/kitchenware and other articles for domestic/decorative use; and tools, handles, brooms and other manufactured products); and moldings (continuously shaped or profiled wood).[101]

Major Importers

Table A6 indicates the major importers of wood furniture along with the corresponding import values from 1999 – 2003. For ease of visualization, Figure A11 pictorially represents the information listed in Table A6. Note that data is compiled only until 2003 since there is no data reported for 2004 in UN Comtrade as of the time of this report.

Table A6 also indicates the value of wood furniture imported by the major importers but emanating only from ITTO producer countries. For each country in each year there is a corresponding dollar value indicated below for the imports from ITTO producers. In parentheses indicates the percentage of imports that come from ITTO producers that correspond with the particular country and year, thus indicating a significant portion of the market for tropical wood furniture. This is not, however, to suggest that the tropical wood furniture market is limited in value to the amount imported from producer countries. Since roundwood and sawnwood are significant exports from ITTO producers, it is therefore safe to assume that considerable amounts of these products will be processed into tropical wood furniture. Therefore, imports from ITTO producers represent a minimum value for the overall market for tropical wood furniture.

[99] ITTO
[100] Lao as well has banned export of roundwood and sawnwood.
[101] ITTO

World wide import statistics indicate a robust wood furniture industry. Imports are growing steadily. From 1999 – 2003 wood furniture imports grew by 42%. The only relatively slow growth year was 2001 which was caused by a sluggish US economy. Considerable growth, however, was realized in the last year measured. World wood furniture imports grew a healthy 18% from 2002 to 2003. During the five-year period, imports from ITTO producers maintained a steady share of the world market varying from 15% - 17%.

Table A6: Major Wood Furniture Importers, 2000 – 2003 ($1000)				
	2003	**2002**	**2001**	**2000**
European Union	14,631,205	11,663,427	10,853,318	10,599,206
ITTO Prod. Share	*1,401,835 (10)*	*1,119,857 (10)*	*1,073,666 (10)*	*1,180,714 (11)*
Germany	3,321,158	2,718,354	2,797,640	2,704,091
ITTO Prod. Share	*155,537 (5)*	*110,991 (4)*	*130,290 (5)*	*151,611 (6)*
United Kingdom	2,999,233	2,249,760	1,889,588	1,713,107
ITTO Prod. Share	*384,677 (13)*	*325,016 (14)*	*308,896 (16)*	*311,134 (18)*
France	2,242,925	1,865,121	1,740,640	1,762,560
ITTO Prod. Share	*254,027 (11)*	*210,964 (11)*	*195,434 (11)*	*214,441 (12)*
Netherlands	1,147,675	1,007,311	951,665	949,574
ITTO Prod. Share	*156,226 (14)*	*134,994 (13)*	*130,754 (14)*	*165,860 (17)*
Belgium	1,084,355	883,553	850,653	854,974
ITTO Prod. Share	*101,216 (9)*	*80,879 (9)*	*79,503 (9)*	*87,780 (10)*
USA	12,276,417	10,679,710	8,953,353	8,937,775
ITTO Prod. Share	*2,533,100 (21)*	*2,370,065 (22)*	*2,095,771 (23)*	*2,155,356 (24)*
Japan	1,588,385	1,484,841	1,536,491	1,499,438
ITTO Prod. Share	*528,774 (33)*	*539,526 (36)*	*595,593 (39)*	*624,543 (42)*
China	791,754	879,938	770,583	799,165
ITTO Prod. Share	*733,653 (92)*	*843,394 (96)*	*744,038 (97)*	*777,977 (97)*
Canada	917,070	797,840	724,323	688,748
ITTO Prod. Share	*152,339 (17)*	*136,210 (17)*	*100,857 (14)*	*89,210 (13)*
Switzerland	1,056,510	917,614	856,522	886,463
ITTO Prod. Share	*8,538 (1)*	*8,484 (1)*	*6,475 (1)*	*6,949 (1)*
World	35,724,426	30,260,885	27,362,338	27,056,133
ITTO Prod. Share	*5,327,840 (15)*	*4,750,440 (16)*	*4,469,166 (16)*	*4,713,713 (17)*

Source: UN Comtrade

Concerning the importers themselves, the United States is by far the world's largest importer of wood furniture. At $12.3 billion in 2003 the United States accounts for one-third of world wood furniture imports. In 2003 the US was also the largest importer from ITTO producer countries with imports worth $2.5 billion.

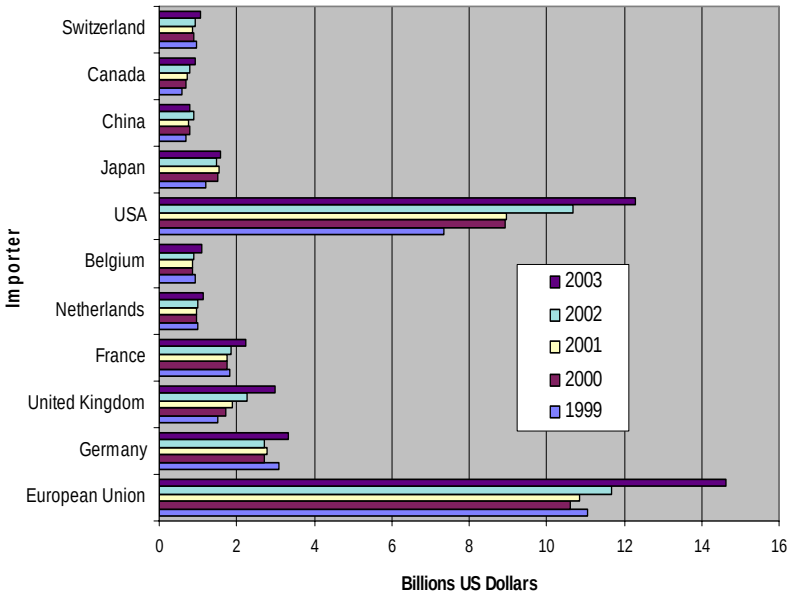
Even with a stagnant year in 2001, US wood furniture imports have increased nearly 350% in the past decade (1993 – 2003) and by 67% in the period from 1999 – 2003. The US market has been the catalyst driving all international wood furniture trade during this period.

The economic slowdown in the US in 2001 negatively impacted wood furniture imports. Imports remained flat for the year (0.20% increase over 2000) at $8.9 billion. The market rebounded sharply in 2002, however, posting a gain of 19.3% from 2001. The US maintained this rapid growth in wood furniture imports into 2003 with a 15% gain over the previous year.

Continued growth in US wood furniture imports, as well all categories of SPWP, is fueled by the recent unprecedented strength of the housing market. This trend has continued into 2005 but experts predict that the housing boom will subside to some degree due to rising interest rates (and therefore rising home mortgage rates). It remains first to be seen when this slowdown will occur and to what extent it will impact the growth in US wood furniture imports.

While US imports for wood furniture have realized strong growth in recent years, the percentage of that growth from ITTO producers is declining. As can be seen from Table A6 above, ITTO producer share of the US market has declined steadily from 26% to 21% over the five year period from 1999 – 2003. The dollar value, however, is still large and is still growing. Imports from ITTO producers increased 34% from 1999 – 2003.

Figure A11: Major Wood Furniture Importers, 1999 – 2003



Source: UN Comtrade

Wood furniture imports to the US came mainly from Canada, China and Italy in 2003. Canada and China compete fiercely for the large US market. Italy is the main supplier of upholstered furniture while Asia (notably China) is the main supplier to the US of ready-to-assemble furniture.[102]

ITTO producers took the fourth and fifth spots in the US furniture market as of 2003. Mexico accounted for $550 million while fifth place Malaysia followed closely behind with the US reporting imports worth $530 million from this ITTO producer.

The EU region's aggregate imports of wood furniture exceed those of the US, although with moderate EU import growth over the last five years the US is catching up. Both experienced slow growth in 2001 and both rebounded in 2002. The EU had a greater percentage increase into the following year (2003) than did the US. In fact, the EU's aggregate increase in wood furniture imports from 2002 to 2003 was substantial at 25% (compare to the US rate of growth of 15% in the same period). This is especially surprising since in the four-year period prior to 2003, EU aggregate wood furniture imports had increase a total of just barely more than 5%. From 1999 – 2000 the EU actually experienced a 4% drop in wood furniture imports.

While EU imports remain higher than those of the US for wood furniture, the US has a much higher percentage of its imports from ITTO producers. The EU, over the course of the reported five-year period, has maintained its share of ITTO producer imports at a fairly constant 9% – 11% (compared to the US which reports greater than 20% for each of the years). With this fact, the US is far ahead of the entire EU in dollar value of wood furniture imports from ITTO producers; not less than 180% higher in each year reported.

Examining the EU member countries individually, Germany leads the field in wood furniture imports. The EU's top five leading wood furniture importers are Germany followed by, in order of descending value, the United Kingdom, France, the Netherlands and Belgium. This has been the status quo since 2001 when the UK overtook France for the number two spot.

Close inspection of the EU's leading wood furniture importers reveals that none have particularly high percentage of their imports from ITTO producers. Two reasons contribute to this fact. First is that EU countries import the biggest percentage of their wood furniture from other EU countries. Second, with the emergence of the economies of Eastern Europe, EU countries are buying more than ever from neighboring countries to the east. Although Poland has formally ascended to the EU, it was not a member country in 2003, the last year of available UN Comtrade data. Besides Poland, EU imports emanate from other EU nations,[103]Indonesia, China, Brazil and Malaysia.

According to ITTO, the EU is gradually increasing imports of SPWP at the expense of primary wood products and shifting manufacturing facilities to lower cost countries[104].

[102] ITTO
[103] Over half of EU wooden furniture imports came from other EU countries in 2001.
[104] ITTO

This, of course, bodes well for countries such as Lao in which salaries are low and raw materials are readily available.

The UK and France follow Germany in descending order of significant wood furniture importers world wide. The UK has experienced steady import increases over the period whereas France actually decreased its imports from 1999 to 2000. The French market was again sluggish in 2001 and did not get beyond the volume it had in 1999 until 2002. Both France and, to a much greater extent, the UK saw significant increases in wood furniture imports from 2002 to 2003 (20% and 33% respectively).

Both the UK and France import a significantly larger share of wood furniture from ITTO producers than does Germany. The UK has seen some recent decline in percentage import from ITTO producers (18% in 2000 compared to 13% in 2003) but the dollar value of the ITTO producer imports for the UK in 2003 is approximately 250% higher than those in Germany for the same year. France holds quite steadily at 11% in its share of imports from ITTO producers. From the dollar value standpoint, France as well imports from ITTO producers a great deal more than does Germany (63% more in 2003).

Japan is the world's fifth largest importer of wood furniture and ITTO producers hold a larger share of the Japanese market than they do for the previously mentioned countries. This percentage, however, is in rapid decline over the past five years. ITTO producer share of Japanese imports of wood furniture in 1999 was 44% whereas by 2003 this had decreased to 33%. Following the peak in dollar value in the year 2000, value of ITTO producer imports to Japan declined every year until 2003. The 2003 dollar value of ITTO producer imports was approximately the same as it was in 1999. According to ITTO, this decline in ITTO producer share is attributed to the increasing gains in market share by China and other ITTO consumers.[105]

China is another leading importer of wood furniture although not nearly as voluminous as the other countries previously mentioned. The interesting point about China in respect to wood furniture imports is that virtually all are from ITTO producers.

In contrast to China, Switzerland imports virtually none (1%) of its wood furniture from ITTO producers although total wood furniture imports to the two countries are roughly similar.

While transportation costs, tariff levels and regional marketing relationships play a role in the differences in market share held by ITTO producers in the major markets for wood furniture, there is clearly a substantial opportunity for all producing countries to increase their market share for these products, particularly in the huge European market.[106]

Finally, it is worth mentioning the ITTO producers as importers as well, although ITTO producers do not make up a large share of the wood furniture import market. Total ITTO

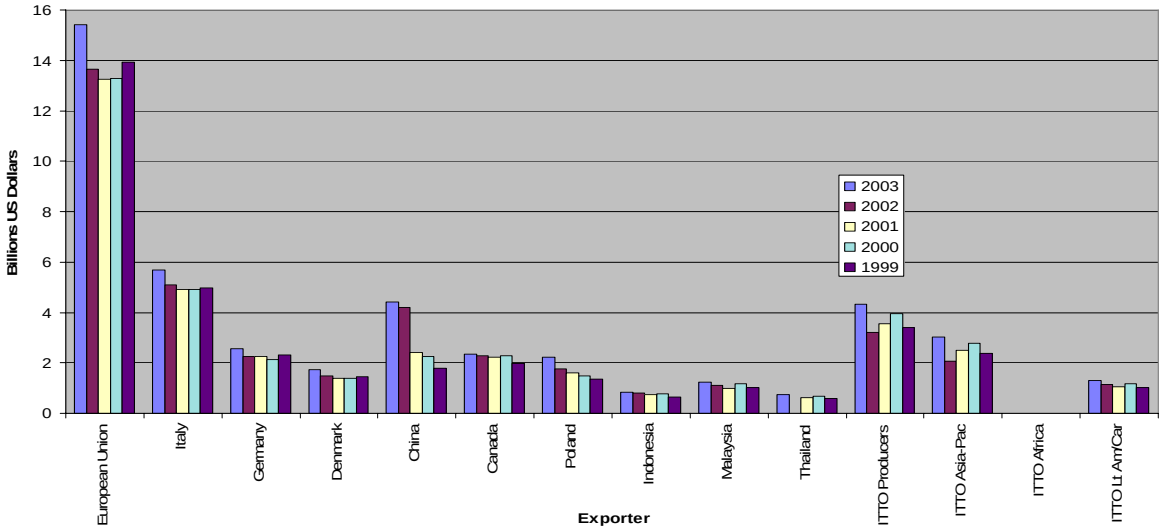
[105] ITTO
[106] ITTO

producer imports amounted to $188 million worth of wooden furniture in 2001. Mexico is by far the largest tropical importer of wooden furniture overall.

Major Exporters

Figure A12 below indicates the significant exporters of wood furniture along with the corresponding values from 1999 – 2003. ITTO producer totals presented in the data may be understated due to non-reporting or partial reporting to Comtrade by some countries.

Figure A12: Major World Furniture Exporters, 1999-2003



For example, by the end of 2003, eight out of 56 ITTO members had not provided 2003 data to Comtrade. As of 2005, for the years 1999-2003, ITTO African producer countries Democratic Republic of Congo, Congo and Liberia had not provided any trade data to Comtrade whatsoever. Similarly, Cambodia, Myanmar and Vanuatu in Asia-Pacific had not reported any data to Comtrade for any of the five years between 1999 and 2003. According to the Comtrade database, Lao has not reported trade data since 1974.

Regardless of inconsistencies between export and import data, the trends are similar. The economic slowdown of 2001 is also evident in the export data. According to wood furniture exports, there was an actual decreased in dollar value of the goods exported in 2001 as compared to the previous year. The rebound did occur in 2002 and an 18% increase was posted from 2002 to 2003; exactly the same increase as indicated in the import data for world wood furniture imports.

Nearly half of the world's wood furniture exports emanate from the EU. There is a slight trend for the share of EU exports to be decreasing in the five-year period. In 1999 the EU share of world wood furniture exports was 53%. There was a steady decline through to the year 2003 in which the EU's share of world exports declined to only 46%.

This decline can perhaps be attributed to a few factors. The increase in Polish exports to the EU was already discussed above. Secondly, the weakened position of the dollar against the Euro impacts exports to the US. Finally, and significantly, there is a movement of furniture production to Southeast Asia, particularly China. This trend will be discussed below.

Italy remains the world's dominant wood furniture exporter. Italian export growth had been sluggish up until 2003. After experiencing a slight decline in 2001, Italian exports were barely above 1999 levels by 2002. Italy finally enjoyed a strong year in 2003 with exports in excess of $5.5 billion, an 11% jump from 2002. A significant share of Italian exports goes to other EU countries as well as the US.

The big mover in wood furniture exports is China. Chinese exports of wood furniture are growing at a blistering pace. According to UN Comtrade data, wood furniture exports from China have increased by an amazing 146% from 1999 to 2003. China has overtaken Canada as the second most significant wood furniture exporter in the world and with such rapid growth China is poised to take the number one spot from Italy soon.

China has competed fiercely – and successfully – for share of high-value markets such as Japan and, particularly, the lucrative US market. The US$2.4 billion of exports in 2003 to the US accounted for 53% of Chinese wood furniture exports, as reported by China. Interestingly, the US reported to have imported nearly US$5 billion from China in the same year. The import data reported by the US is most likely a more trusted figure than the export report by China.

Regardless of the dollar value, the enormous growth of the Chinese world export market has been fueled by its furniture trade relation with the US. The percentage increase in trade to the US from 1999 to 2003 was 143%, nearly identical to the reported export growth for Chinese world wood furniture exports.

With the dollar declining against the Euro, US importers have looked to less expensive options in Asia. Many companies from USA, Taiwan, Singapore and other traditional Asian producers continue to establish furniture and other SPWP joint ventures in southern China because of the low wages and a policy towards encouraging downstream timber processing.[107] China, in turn, is establishing partnerships in even lower wage countries such as Vietnam.

Many US manufacturers outsource to China the production of semi-finished components or the whole piece, buy them from local manufacturers (known as the Original Equipment Manufacturer, OEM) and finish them to high US market standards. It is estimated that 90% of Chinese exports to the USA are from OEMs.[108]

[107] ITTO
[108] ITTO

Although Canada has enjoyed solid export growth in the overall SPWP category, the export growth of wood furniture is not increasing as rapidly. Canada has lost share in the US market to China in recent years. Canada still increased wood furniture exports by 20% from 1999 to 2003. Although this is modest growth for a five-year period, it is still stronger than in the German market where the five-year period saw export growth of only 12%.

In contrast to Canada and Germany, traditionally strong wood furniture exporters, Poland, as already discussed in this study, has shown itself to be an up and coming world competitor. If current trends continue, Poland will soon surpass both Canada and Germany in taking the number three position in world wood furniture exports.

The top ITTO producer exporters in the wood furniture industry are Malaysia, Indonesia and Thailand. In the world market in 2003 these three countries ranked 7th, 12th and 13th respectively.

Indonesia is an interesting case. Although the data indicates increasing exports in the five-year period, recent reports indicate that Indonesian wood products have become less competitive in the international market. Factors contributing to this trend are increasing costs of production and the negative image associated with the tremendous incidence of illegal logging in Indonesia. High transportation costs (as logging operations increasingly must locate to remote areas where infrastructure is very limited) and various (official and unofficial) levies are among the leading factors that have increased the costs of production. Many of the wood product manufacturing subsectors still have overcapacity, and investments to increase capacity or enhance efficiency are limited.
The lower annual allowable logging (within production forest areas) and ongoing illegal logging practices continue to disrupt the performance of the wood products industry including furniture. Although the wood product industry is concentrated mainly in Kalimantan, political instability in several parts of the country such as Aceh, Maluku and Papua also contributes to declining wood industry performance.[109]

Add to the already existing concerns in Indonesian the recent tsunami in late 2004. Although Indonesian furniture manufacturers believe the tragic tsunami that struck parts of Indonesia in December has had no impact on their ability to manufacture and import furniture to the U.S. and other parts of the world at this time, they're not so certain about the future.

"In this short period of time since the tsunami, we think the disaster has not had any impact on our business," says M. Arief, marketing manager for Medulla Perkasa, a furniture designer and manufacturer of household, office and hotel furniture located in Sukoharjo, Central Java, Indonesia. "We are 1,000 kilometers away from Aceh where the earthquake/tsunami took place," says Arief. "We didn't even know that such a disaster happened in Aceh until we saw it on television. Also, at this time we get our raw material from an area close to Java. But I cannot tell you what will happen in the long

[109] www.hardwoodmarkets.com

period. No one knows how the tsunami will affect the Indonesian economics in the long term."[110]

The affect of the tsunami may also be felt by other ITTO producers unfortunate enough to have been in the wake of this tragedy. According to Malaysian reports, the furniture industry there escaped unscathed. As is the case in Indonesia, however, it is too early to determine the extent of the toll this disaster will have on the wood processing industry in the tsunami ravaged region.

Table A7 displays the leading ITTO producer exporters from 1999 – 2003. Note that Thailand did not report its export activity in 2002 to Comtrade. The Thai total in the chart, therefore, is understated. It is safe to assume that one could add 25% to the figure listed in the table thereby bringing the Thai total up to approximately $3.3 billion, enough to surpass Mexico as the third leading ITTO producer exporter. The exports from Malaysia, Indonesia and Thailand go predominantly to the US followed by Japan (see Table A*).

Table A7: Top ITTO Producer Exporters, 1999-2003, Cumulative ($1000)

Reporter Title	Trade Value
Malaysia	$5,507,697
Indonesia	$3,809,553
Mexico	$3,189,514
Thailand	$2,650,199
Brazil	$2,132,956

Source: UN Comtrade

Table A8: Export Partners for Malaysia, Indonesia and Thailand, 2003 ($1000)

Partner Title	Trade Value
USA	$1,000,449,412
Japan	$473,888,675
UK	$211,301,804
Australia	$147,617,414
Singapore	$101,401,347
Other partners	$890,597,754

Source: UN Comtrade

After a healthy 18% gain in exports from the Asia-Pacific ITTO producers from 1999 to 2000, exports dropped 10% in 2001. This decline was a result of two dynamics. The US, the largest recipient of Asia-Pacific wood furniture exports, experienced an economic slowdown in 2001 while at the same time China competed strongly against the traditional Asia-Pacific exporters.

The apparent drop in exports from 2002 to 2003 is explained by the lack of Thai information in the Comtrade database. Factoring back in the assumed export data from Thailand brings the 2002 export figure up to approx $2.7 billion. In 2003 the region posted another positive gain. Overall, from 1999 to 2003, the Asia-Pacific region claimed a gain in wood furniture exports of 27%. This matches closely with the growth rate of the big three producers in the region – Malaysia, Indonesia and Thailand.

According to ITTO, the breakdown of SPWP exports – half of which are wood furniture – between the main tropical regions is unlikely to change significantly in the medium-term, as countries in all three regions continue to express their desire to further expand downstream processing capacity.[111]

[110] www.modernwoodworking.com
[111] ITTO

Approximately 70% of Malaysian furniture is manufactured from rubberwood. Malaysia has been successful in penetrating high value markets with its rubberwood furniture. Regulations in this country favor further processing, restricting exports of raw rubberwood, although the restrictions have been relaxed due to imbalances in domestic supply and demand.

Like Malaysia, Thailand has also linked the development of its furniture industry to its rubberwood resources, with all new sawmill licenses now contingent on use of this material. The ban on logging in Thailand's native forests imposed in 1991 has increased its dependence on imports as well as on former rubber plantations for wood supplies.[112]

The US, Canada, the EU and Japan have proposed eliminating tariffs on wood furniture completely by 2005 which, if implemented, will further boost exports from ITTO producer countries. In contrast, some developing countries retain high import tariffs on SPWP, partially accounting for the relatively low import levels for producer countries.

Wood Furniture Prices

As mentioned in this analysis, there has been tremendous downward pressure on furniture pricing over the past several years. China has undercut the world prices and caused many changes in the industry. The Chinese prices have been so low that in October 2003, 27 US furniture makers and four unions filed an antidumping petition with the US Department of Commerce and the US International Trade Commission seeking to ebb the flow of imports from China.

According to ITTO, real prices for semi-finished dining table tops, windsor chairs, and top grade rubberwood table tops were severely affected by the Asian financial crisis. Prices for the first two products, in particular, plunged by 40% and 25%, respectively, between mid-1997 and mid-1998 to $29 per piece and $8 per piece. Prices of these products remained steady in 1999 and early 2000 but declined gradually until late 2001 to bottom out at $17/piece and under $7/piece. These prices reflected new lows since ITTO tracking began.

Prices for these two products improved slightly in the first half of 2002 to $18/piece ($20/piece nominal) and $7/piece ($8/piece nominal), respectively, and remained largely unchanged up to the end of 2003.

Manufacturers of these rubberwood furniture components were absorbing the increasing costs of rubberwood raw material in 2002 and 2003. Domestic prices for rubberwood logs rose due to a shortage of supply and furniture manufacturers were unable to pass on the costs to importers.

The prices of the Malaysian furniture parts tracked by ITTO are presented in Table A16. These data are current to March 7, 2005.

[112] ITTO

Table A16: Malaysian Wood Furniture Component Prices, March 7, 2005

Semi-finished:	FOB each
Dining table	
Solid rubberwood laminated top:	2.5' x 4'
with extension leaf:	US$21.5-22.5ea
As above, Oak Veneer:	US$31-33ea
Windsor Chair:	US$8-9.0ea
Colonial Chair:	US$11.5-12.5ea
Queen Anne Chair (with soft seat)	
without arm:	US$14-15ea
with arm:	US$18.5-19ea
Rubberwood Chair Seat	
27x430x500mm:	US$2.15-2.30ea
Rubberwood Tabletop:	per Cu.m FOB
22x760x1220mm	
sanded and edge profiled	
Top Grade:	US$520-525
Standard:	US$480-490

Source: ITTO

The lesson learned from the pricing trends is that competition in the tropical wood furniture industry is fierce and efficiencies are critical. The entry of Chinese producers into the global market has permanently changed the landscape of the industry.

Lao's Wood Furniture Scenario

The Asia-Pacific ITTO producer wood furniture situation tells the story of what is going on all around Lao. Vietnam, not an ITTO member, is also an interesting point of reference. Although Vietnam has not reported data to Comtrade, one can see the strong growth through mirror data (see Table A9). The success of Lao's neighbors does not guarantee success for Lao. For example, Cambodia, an ITTO producer, did not fare nearly as well as Vietnam according to the data in Table A10.

Table A9: World Wood Furniture Imports from Vietnam, 1999 – 2003

Period	Trade Value
2003	$713,667,693
2002	$442,000,044
2001	$311,999,957
2000	$290,372,196
1999	$204,408,886

Source: UN Comtrade

Table A10: World Wood Furniture Imports from Cambodia, 1999 – 2003

Period	Trade Value
2003	$442,007
2002	$111,214
2001	$795,971
2000	$942,926
1999	$615,472

Source: UN Comtrade

Although Lao does not have the market connections of the big exporters, Lao does have strong trade relations with Thailand and, importantly, China. Leveraging these relationships could allow Lao to enter into outsourcing agreements with these countries. According to the growth in demand for wood furniture world wide, coupled with the exploitation of lower wages and minimal restrictions, the wood furniture industry in Southeast Asia is expected to remain strong.

As mentioned, Lao has not reported trade data to UN Comtrade since 1974. There are, however, two sources of

information indicating Lao's activity in wood furniture exports. First, in keeping with the data source used to this point, mirror data using world imports of wood furniture from Lao according to the UN Comtrade database are listed in Table A11.

There is no recognizable trend in the data as reported in the table and overall the value of the trade is insignificant. Most of the imports were reported by other Asian nations followed closely by Australia. No other countries report significant imports from Lao including Thailand, Lao's most active trade partner.

Table A11: World Wood Furniture Imports from Lao, 1999 – 2003

Period	**Trade Value**
2003	$411,831
2002	$399,838
2001	$998,100
2000	$624,023
1999	$990,350
Total	$3.424,142
Reporter Title 1999-2003	**Trade Value**
Other Asia, nes	$1,304,259
Australia	$1,092,337
Denmark	$246,309
Japan	$184,566
Thailand	$180,419
Other reporters	$416,252

Source: UN Comtrade

Another source of information is the EU Statistical Tradeflow Database. According to these statistics, imports from Lao to EU countries, prior to expansion, are presented in Table 12.

Again, as was the case with Comtrade data, there is no noticeable trend in reported EU import data for wood furniture originating from Lao.

Table A12: Wood Furniture Imports to EU-15 from Lao

Year	**Value in Euros**
1997	58,380
1998	114,540
1999	142,620
2000	32,450
2001	59,360
2002	73,730
2003	70,520

Source: EU Statistical Tradeflow Database

Competitive Analysis Brief

The following is extracted from a UN-ECE analysis in 2002. As per the analysis in the previous pages, this brief can be read as summary of the data found in the analysis above. Many of the points are confirmations of what was already reported and some are logical extensions thereof.

Competitive Environment: Drivers

- Government policies to add value, taxes on primary products, investment incentives.
- Technological developments in the processing of plantation species and lesser-used species.
- Foreign direct investment.
- Wage and cost advantages.
- Rapidly growing domestic/regional markets.
- Improved shipping services.
- Specific export & import promotion programs.

Competitive Environment: Challenges

- Growing out-sourcing of semi-finished products.
- Tightening certification and labelling requirements on furniture (e.g. the USA in the next 2-3 years).
- Substitution pressure from new materials (natural fibres and synthetics).
- Higher potential supply for more diversified plantation wood products.
- Product standards and design.
- Consolidation of distribution.

Competition

- 50+ US-furniture plants closed by mid-2001.
- High-end producers with customization and rapid delivery will survive.
- Manufacturers transform into assembly, finishing lines or distributors/marketers.
- Out-sourcing of semi-finished products and components from China, Asia-Pacific and Latin America.
- Still capture most of the value-adding potential in design, distribution and marketing functions.

Competitiveness

- From comparative advantage to competitive advantage.
- In Europe: flexible but efficient production with the highest technological quality, superior design, innovative market promotion, and swift distribution with minimal stock-keeping.
- In the tropics: moving from original equipment manufacturing (OEM) towards original design manufacturing (ODM) and ultimately to original brand manufacturing (OBM).

Market Access

- Trade liberalization has reduced tariff escalation (= higher tariffs for value added products).
- EU, Japan and USA apply no import tariffs on FPWP from GSP countries, for most other countries 2-6%.
- Eliminate tariffs on wooden furniture completely by 2005.
- Generally tropical producers retain higher tariffs to protect their industries.

End-Use Markets

- Consumer market.
- Commercial and industrial enterprises (contract furniture).
- Institutional buyers (office & public premises furniture).

On Certification

- In 1st and 2nd segment, the role of intermediaries (sourcing agents, brokers, importers, wholesalers, retailers, etc.) is essential.
- Complex consumer market involves large corporations, who manage supply chains (IKEA, Home Depot, B&Q) and a lot of medium and small-scale operators.