SAFE VEGETABLE MARKET ASSESSMENT – NAM POUA REPRESENTATIVE SUBPROJECT IN HOUAPHAN PROVINCE, LAO PEOPLE'S DEMOCRATIC REPUBLIC

27 MARCH 2022

Sustainable Rural Infrastructure and Watershed Management Sector Project

(ADB-funded SRIWMS – Loan No. 3817 - LAO)

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ABBREVIATIONS

CIF	**Cost, Insurance, and Freight**
DAFO	**District Agriculture and Forestry Office**
Ha	**Hectare**
HPN	**Houaphan province**
HVC	**High Value Crop**
K	**Kip**
Kg	**Kilogram**
LIC-DOI	**Loan Implementation Consultant – Department of Irrigation**
LPB	**Luang Prabang province**
Mt	**Metric Ton**
PAFO	**Provincial Agriculture and Forestry Office**
PICSA	**Partnerships for Irrigation and Commercialization of Smallholder Agriculture Project**
RSP	**Representative Subproject**
SRIWSM	**Sustainable Rural Infrastructure and Watershed Management Project**
VTE	**Vientiane**
WUG	**Water User Group**
XBL	**Xayaboury province**
XK	**Xiengkhouang province**

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I. INTRODUCTION

The safe vegetables market assessment of the Nam Poua Representative Subproject (RSP) in Houaphan Province was prepared to serve as a guide for the market connections program of the SRIWSM Project. The emphasis in the assessment was on collecting and analyzing high value agricultural product market information from markets at the local, provincial, national, and export levels. The focus was on assessing the current market for selected high value crops (HVCs) that could be produced and marketed by the producers of the Nam Poua Representative Subproject (RSP) in Houaphan Province. The market assessment includes seven priority, high value crops that can be produced during the dry season at the Nam Poua RSP and marketed with relatively high and/or viable marketing margins at the different levels of the value chains.

To carry out this assessment, the LIC-DOI Agricultural Market Linkages Specialist and Expert and the LIC-DOI Team Leader/Project Management Expert collected market information on potential high value crops that have been produced or could be produced in Houaphan province and marketed profitably at various levels of the value chain. At the producer level, the Agribusiness Team visited and conducted workshops with the Nam Poua RSP and its producers, together with the PAFOs, DAFOs, and PICSA, in order to collect high value crop production preferences, cost of production, farmgate price, buyer linkages, and producer margins. The cost of collection of the local collectors and the destination for the collected agricultural crops were determined and the buyers, wholesalers or retailers at local, provincial, and national levels, were surveyed to collect prices and calculate margins at all levels. The market potential for exporting the products from these HVCs was determined based on historical global and regional export data and trends, recent export demand and supply information, Lao export information, and Lao competitiveness in the export market.

II. VALUE CHAIN DESCRIPTION

For the purposes of this market assessment, the value chains for the priority HVCs are described, initially, generically since there is little variation across HVCs. The general value chain for the HVCs involves the producer at the Nam Poua Representative Subproject producing the crop during the dry season, selling at the farmgate to the local or provincial collector who owns or hires a truck (up to 5-ton capacity) to transport the HVC to HPN or neighboring provincial markets, to traders, wholesalers or retailers in cross-border districts of Vietnam or to Vietnamese traders and wholesalers in Vietnam.

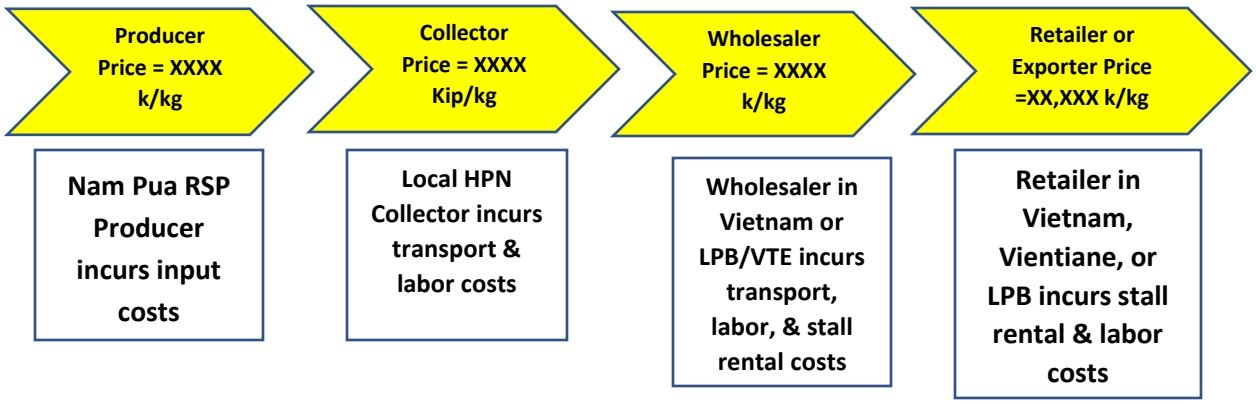

Figure 1. Generic Value Chain

The diagram above of the generic value chain does not cover the dynamics, that is, the linkages at the various levels in the value chains. The diagram that does this is the following marketing flow chart diagram.

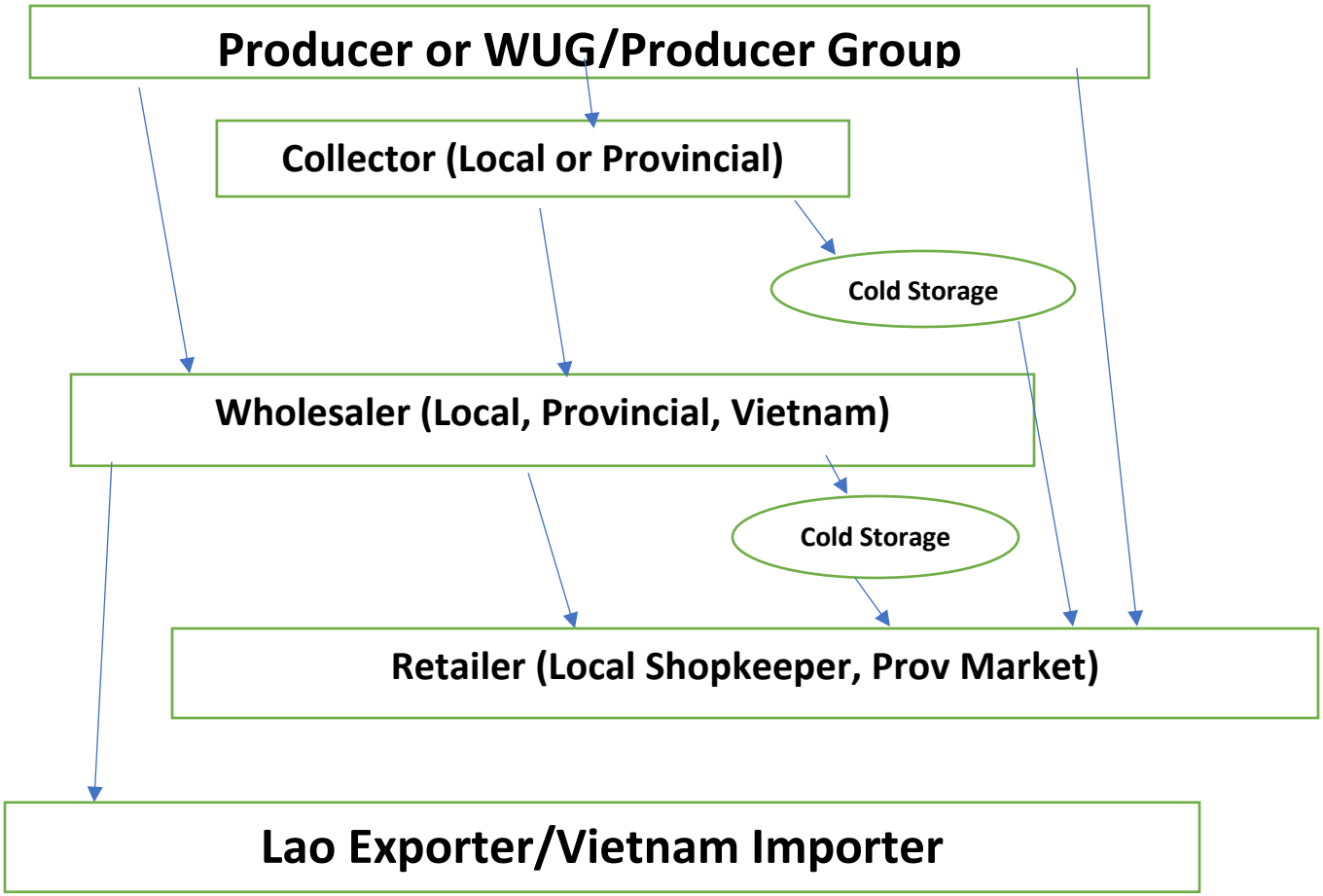
Producer or WUG/Producer Group
Collector (Local or Provincial)
Cold Storage
Wholesaler (Local, Provincial, Vietnam)
Cold Storage
Retailer (Local Shopkeeper, Prov Market)
Lao Exporter/Vietnam Importer

Figure 2. Marketing Flow Chart

This diagram shows that the margins can vary depending on how agricultural products are marketed. Volume of produce for sale has much to do with what part of the value chain one can operate at. Watermelon is a good example. If a producer group or collector transports a truckload of watermelon to a retailer in the Vientiane Capital Market, that producer group will receive a higher margin than if the sale was made to the wholesale market.

There are many margins along the value chain, including producer, collector, wholesaler, retailer, and exporter:

- Producer margin equals farmgate price minus cost of production.
- Collector margin equals price of product sold to wholesaler – cost of collection (transport, driver/labor)
- Wholesaler margin equals price of product sold to retailer – cost of wholesaling (transport, labor, rent on market stall)
- Retailer margin equals price of product sold to customer – cost of retailing (labor, rent on market stall)
- Exporter margin equals CIF price of product sold to importer – cost of exporting (transport, warehousing, handling, shipping, insurance)

For the priority HVCs, the various margins along with the costs and prices associated with each margin are given in Table 1.

Table 1. Prices and Margins of the Recommended High Value Crops in the Value Chains

High Value Crop	Producer					Collector			Wholesaler			Retailer			Exporter		
	Yield	COP	PP	PM	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM	COE	EP	EM
	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	million K/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Watermelon	15	1.007	5	3.935	59.025	0.1775	5.5	0.323	0.545	8	1.955	0.145	10	1.855	0.721	6.552	0.331
Cucumbers	11	11.305	4	1.028	11.308	0.400	4.75	0.35	0.145	5.417	0.522	0.145	7	2.105	0.4	7	1.19
Yard Long Beans	1	11.79	5	2.38	10.71	0.400	6	0.6	0.145	6.5	1.355	0.145	8	1.355	-	-	-
Leafy Vegetables (Cabbage)	1.59	2.15	6	3.85	6.122	6.18	6.5	0.32	7.04	8	0.96	6.65	10	3.35	-	-	-
Herbs (Cilantro)	1.5	2.08	6	3.92	5.88	6.18	6.5	0.32	7.04	8	0.96	6.64	13	6.36	-	-	-
Chili Peppers	0.98	5.26	10	4.62	4.528	10.18	11	0.82	11.54	12	0.46	10.14	16	4.86	17.3	27.4	10.66
Peanuts	3.5	1.49	3.5	2	7	4.04	5	0.96	5.54	10	4.46	10.1	15	9.86	5.3	18.135	2.835

Legend:

COP	Cost of Production Producer (Farmgate)
PP	Price
PM	Producer Margin
COC	Cost of Collecting
CP	Collector Selling Price
CM	Collector Margin

COW	Cost of Wholesaling
WP	Wholesale Price
WM	Wholesale Margin
COR	Cost of Retailing
RP	Retail Price
RM	Retail Margin
COE	Cost of Exporting
EP	Export Price
EM	Export Margin

General demand and supply of high value crops in HPN - The demand for vegetables in Houaphan province is estimated at 15,000 metric tons per year. Based on the production in 2017 (43,800 metric tons), the demand for vegetables in local market accounts for only 34% of the total production. The vegetables from Houaphan are currently sold in smaller quantities, with only a small proportion being sold in bigger lots. The main markets for the Viengxay vegetables are the cross-border districts, the demand for vegetables and fruit from Houaphan province in Thanh Hoa, Son La, and other markets in Viet Nam is strong. There is limited connection with the higher value markets in such locations as Hanoi.

The export value of crops to Viet Nam increased significantly from 2015 to 2017, and in 2017, the export value of crops from Houaphan province to Vietnam in 2017 was $440,000 accounting for 22.9% of Houaphan's total exports by value. The main agricultural export products were maize, black ginger, cucumber, watermelon, dried chilies and rice. In 2020, the total vegetable sales outside HPN province and to Vietnam, the dominant market, were estimated to have reached 21,222 metric tons of vegetables. More than 80% of the cucumbers and watermelons produced in the Nam Poua RSP were and will continue to be

- sold to Vietnamese traders who come to HPN province production areas to buy
- exported through Vietnamese agents at various border gates who sell the cucumbers and watermelons to wholesalers in various Vietnamese provincial and Hanoi markets
    - Na Meo border gate - Local HPN collectors based in the HPN province production villages buy (as per the order) about 10 metric tons per week of cucumbers and watermelons and transport the farm products to Namiao village near the border where the products are sold at the Na Meo border gate to Vietnamese traders based in Quan Son and Muong Lat districts of Thanh Hoa province
    - Pa Hang border gate - Local HPN collectors based in the HPN production villages buy the products based on the orders from the Vietnamese traders and transport the farm products to Pa Hang border gate in Sop Bao district where they sell the products to the Vietnamese traders, who travel to Son La and sell their produce in Son La, Hoa Binh and Hanoi markets

- sold at Vietnamese border trade fairs
    - there is a border trade market fair is organized in every Saturday in Namsouy and Namiao villages, in Viengxay. It is estimated that up to 1800 metric tons of cucumber and watermelon are sold annually to Viet Nam through this market fair
- taken to Vietnam border towns to sell directly to Vietnamese retailers and consumers - Vietnamese traders come to the production areas in Viengxay, and other districts, and collect the crops for the sale on the Vietnamese markets
- sold across the Vietnamese border to wholesalers and retailers in Vietnamese towns

It is expected that this amount will increase to about 35,000 metric tons by 2025. Local and Vietnamese markets (in the cross-border province districts) are the main current markets for cucumber and watermelons. The export value for cucumber and watermelon reached $44,100 and $23,300 respectively in 2017. This is a two-fold increase for cucumbers and a 40% increase for the watermelons. These data, however, need to be carefully interpreted due to the variable recording of vegetable exports to Viet Nam.

Local HPN provincial and Vietnamese markets (in the cross-border province districts) are the main current markets for cucumber and watermelons. There is already a core of entrepreneurial Nam Poua farmers and the potential to connect with higher value markets is constrained by weak market connections. There are with many small local traders but the bigger Vietnamese traders dominate the market connections. Vietnamese traders dominate the cucumber, melon and vegetable market connections, and the Houaphan traders essentially act as collectors for them. The Lao traders have to pay about KN300,000 to 400,000 per truck for border crossing fees. However, they do not pay any tax and fee to the Vietnamese authority. Small Lao traders find the border fee to be too high and prefer to sell their produce to Vietnamese traders in Lao and avoid the border fee. An example of export potential is the Moc Chau safe vegetable project. Just across the border with Viet Nam in Son La province is Moc Chau district there is a successful safe vegetable production project. Farmers in the project supply a number of Hanoi supermarkets and safe vegetable retailers. Their production and market connection development has been supported by a multi-donor project. The project farmers produced 31 metric tons in 2012 and this had dramatically increased to 420 metric tons in 2015. Farmer income from the sale of safe vegetables is about $18,000 per ha.

Vegetable production in 2017 (43,800 metric tons) supplied local markets, accounting for only 34% of the total production. During the dry season in 2018, several main crops were cultivated in Viengxay district: watermelon, chili, a local variety of cucumber, yellow melon and garlic, and long beans. Dry season crop production of cucumbers, melons and some vegetables in Nam Pua is dominated by a relatively small number of more entrepreneurial women farmers. These women farmers manage the production and the marketing of the crops. They sell to traders and may also sell at local roadside stalls and also at stalls in the Xam Neua market. The harvest season is between April and May and the yield of cucumber and watermelon is about 7 to 8 metric tons per ha.

From this point on in this Market Assessment, each of the priority HVCs, watermelon, cucumber, long yard bean, chili pepper, peanuts, leafy vegetables, herbs are described separately.

III. TARGETED HIGH VALUE CROPS

1. Watermelon

1.1 Demand and Supply

Demand: Lao watermelons have been sold in China since 2013, when they were approved for import by border trade, which generally limits transaction volumes and takes place at designated land border crossings. In 2019, Lao supplied watermelon with a value of $347.97 million, an improvement of 91% from 2018's total watermelon export of $182.1 million. The annual growth in value of Lao watermelon production between 2017 to 2018 was 23.4%.

Supply - The production of watermelon in Lao in 2019 was 1,750,312 mt produced on an estimated 94,464 hectares. There is some indication that watermelon production and market demand is growing in Laos due to, among other things, an amalgamation of contract farming and leasing, where investors from China and Mongolia engage with Laotian farmers.

1.2 Margins

Producer Margin = Farmgate (producer) price – cost of production

- Farmgate Price: 5000 Kip/kg (The higher price of KN 5,000 to 6,000 per kg is achieved at the early stages of harvest in April where the supply low, and will decrease to KN2,000 to 2,500 per kg in May when there is surplus supply.)
  Producer Margin: 3.935 Kip/kg ($5044/ha)

Watermelon farmers can receive a net income four to ten times higher than that of the irrigated rice farmers. However, watermelon farmers require to have more capital because the total production cost for watermelon is double the cost for rice production. Seeds and fertilizers make up more than 60% of the watermelon production costs, and the cost to hire labor is also high. Therefore, watermelon growing can provide a higher return but it is a capital intensive agricultural crop.

Watermelon plantations in the area studied were perceived as a high risk and high return activity. Comparison of revenues from different activities, different uses of the agricultural land[1]

- Watermelon farm – Net Income about 18,000,000 Kip/ha
  (for a household with 2 working people with their own land of 1 ha. Require around 40 full working days. 90-day cycle)
- Growing irrigated rice - Net Income about 4,160,000 Kip/ha
  (for a household with 2 working people with their own land of 1 ha. Require around 45 full working days. 90-day cycle)
- Lease land to others (1 ha) 3,500,000 Kip/ha
- Working for others (2 people, 90 days, 70,000 kip per day) 12,600,000 Kip/ha

Table 2. Prices and Margins of the Watermelon Value Chain

High Value Crop	Producer					Collector			Wholesaler			Retailer			Exporter		
	Yield	COP	PP	PM	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM	COE	EP	EM
	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	Million K/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Watermelon	15	1.007	5	3.935	59.025	0.1775	5.5	0.323	0.545	8	1.955	0.145	10	1.855	0.721	9.149	0.429

Watermelon Margins	Margin (1000 kip/kg)
Producer Margin	3.935

[1] "Impact of China's Increasing Demand for Agro Produce on Agricultural Production in the Mekong Region", BRC Research Report Bangkok Research Center, JETRO Bangkok/IDE-JETRO, 2018

Collect Margin	0.545
W/sale Margin	1.955
Retail Margin	1.855
Export Margin	0.429

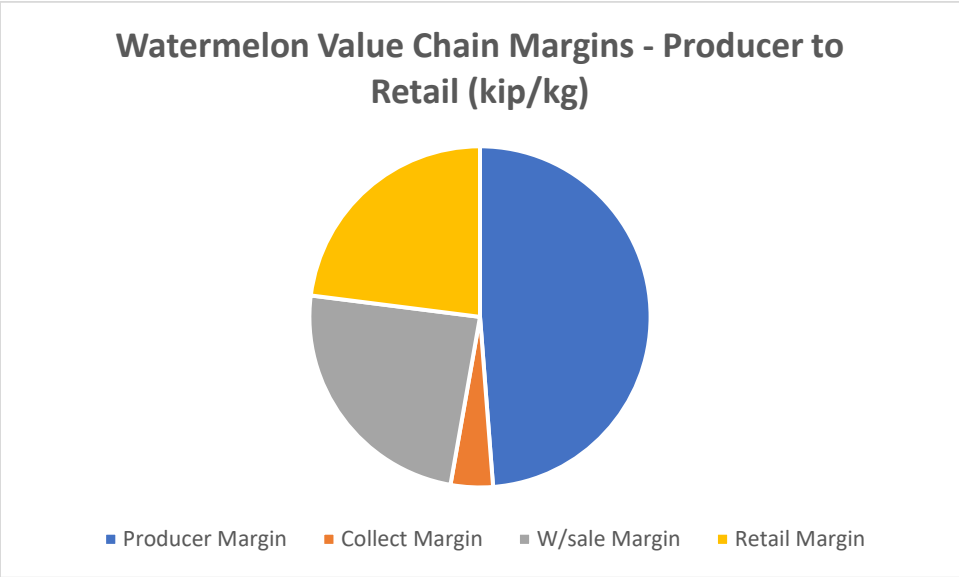

Figure 3. Comparative Margins of Producer to Retailer Levels of the Watermelon Value Chain

Collector Margin = Collector price – producer price – cost of transport (includes labor)

Collector Price: 5500 Kip/kg
Collector Margin: 545 Kip/kg

The cucumber, melon and vegetables market connections are characterized by many small collectors and traders that provide connections to local district, Xam Neua, other Lao provinces, and to Vietnamese border province markets. It is estimated that about 10 to 20% of cucumbers and watermelons are sold in local market though the spot traders and local traders.

About 20 Xam Neua traders come to the production area during the harvesting season with their own small trucks to buy about 1.0 to 1.5 metric tons of products per time. The transportation cost is about KN50,000 to 200,000 per load. Some local traders

operate in the production area also transport the products to the market place in Xam Neua, Viengxay and to the border check point to Viet Nam. Traders will add KN1,000 to 3,000 per kg for their margin.

The Vietnamese traders are the market connection leaders and communicate with the Lao traders over what quantities of products are required. The Lao small traders will aggregate the vegetables for the Vietnamese traders. Business transactions occur at the market locations near to the border.

Wholesaler Margin = Wholesale price – collector price – cost of market stall rent – cost of labor

Wholesale Price: 8,000 Kip/kg (Lao Aussie Market in Vientiane on 17 August 2021 and on 5 March 2022)
Wholesaler Margin: 1.955 Kip/kg

Retailer Margin = Retail price – wholesale price – cost of transport – cost of market stall rent – cost of labor

Retailer Price: 10,000 Kip/kg (Lao-Aussie Market on 5 March 2022)
Retailer Margin: 1.855 Kip/kg

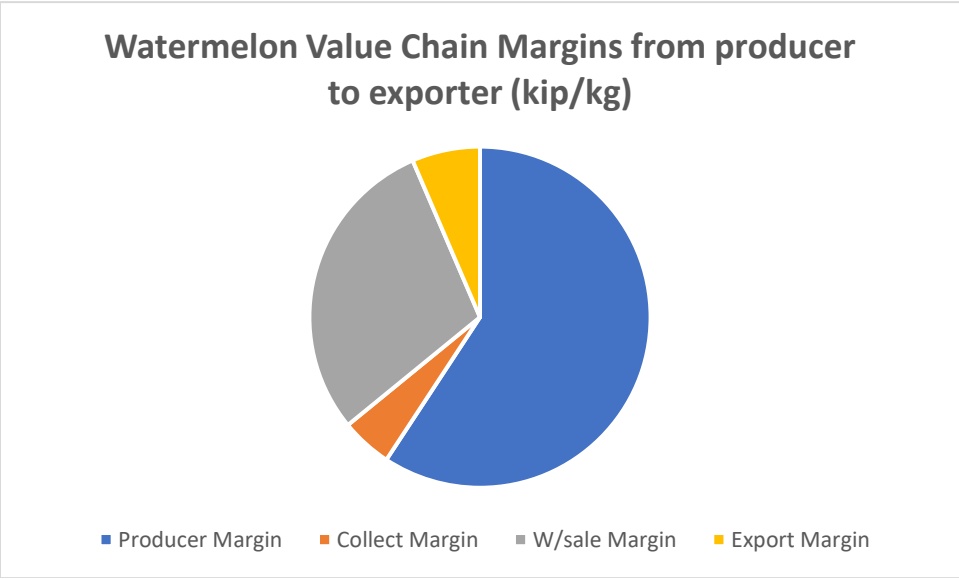

Figure 4. Comparative Margins of Producer to Exporter Levels of the Watermelon Value Chain

Exporter Margin = Export price – wholesale price – cost of shipping – cost of transport, warehousing, and packing

Exporter Price: 9149 Kip/kg

Before 2019, one kilogram of watermelon was going for US$0.50 in 2017 and US$0.51 in 2018. In 2019 the export price changed to $0.51 per kilo. The prices of watermelon in Lao (Laos) per mt for the years 2016, 2017, 2018 and 2019 were US$ 461.42, US$ 500, US$ 510 and US$ 505 in that order. The total values in export for watermelon in Lao (Laos) were US$ 102,576, US$ 147,536, US$ 182,096 and US$ 347,968 in US dollar thousand for the years 2016, 2017, 2018 and 2019 in that order. In 2020, the average melon export price amounted to $782 per mt, approximately equating the previous year.

Exporter Margin: 429 Kip/kg (for 27,600 kg truckload) = $782/mt (Global melon price the past two years) x 11700 Kip/USD/1000 – 8000 Kip/kg (wholesale price) – 0.721 Kip/kg (cost of shipping to Vietnam by tandem truck with 27.6 mt watermelons)

In some Lao northern provinces, such as, Luangnamtha Province, where much of the watermelon supply is exported to China, watermelon price is determined using the spot price in Chinese Yuan based on the Chinese market just before the harvest. When the watermelons are almost ready to harvest, the Chinese collector normally sorts the watermelons and evaluates the price based on the quality. Price is determined depending on the price in the Chinese market. Collectors together with the farmers classify the watermelon product into two classes. The Class 1 watermelon must weigh at least 3 kg, have a beautiful symmetrical shape and a smooth skin without any scratches or marks caused by insects. Class 2 watermelons weigh less than 3kg. The Chinese collectors only purchase Class 1 fruit, hence the farmers sell Class 2 fruit to local collectors at a lower price. In 2017, Class 1 watermelon achieved 1,250 kip per kg, and Class 2 achieved only 300 kip per kg. It was reported that price fluctuation is normally low, provided that the cultivation technique is strictly followed, and there is no adverse impact from the weather ("Impact of China's Increasing Demand for Agro Produce on Agricultural Production in the Mekong Region", BRC Research Report Bangkok Research Center, JETRO Bangkok/IDE-JETRO, 2018).

1.3 Seasonality, Product Quality, and Competition

Seasonality

Watermelon area planted during the short cycle from the end of December through the end of March. 17 August 2021, watermelon price at Laos-Aussie market in Vientiane was 8-10,000 Kip/kg and on 5 March, also about 10,000 Kip/kg.

Product Quality

Watermelons imported through formal channels will face strict phytosanitary requirements, including in-field pest management and monitoring, post-harvest treatment and packaging requirements. There are Laotian companies which have been approved to export watermelons to China.

Competition

The border-traded watermelons from Laos have generally performed well in China, mostly at the expense of watermelons from Vietnam, the price of which has been undercut. With the addition of new formal import channels, it is expected that the price paid by Chinese traders for Laotian watermelons could drop even further. (Produce Report “Laotian Watermelons Receive Formal China Market Access”, by Dan Siekman, 21 July 2019)

2. Cucumbers

2.1 Demand and Supply

Demand – The cucumber and gherkins market is poised to grow by USD 1.07 billion during 2020-2024, progressing at a compounded annual growth rate of almost 4% during the forecast period (Ref: Technavio, 22 June 2021). The market is fragmented with several exporting countries occupying the market. The 5 biggest exporters of cucumbers by value are Spain, Mexico, Netherlands, Canada and the USA. Combined, these major cucumber suppliers accounted for 81.9% of all cucumbers exported in 2020. So high a percentage indicates a highly concentrated set of cucumber exporters.

The total export values for Laos cucumber were US$ 212,000 (for 202 mt of cucumbers), US$ 523,000 (455 mt), and US$ 358,000 (377) in 2017, 2018, and 2019, respectively. Vietnam exported 80,000+ mt of cucumbers in 2019 to Malaysia and Singapore.

Supply – China produces 75% of the cucumbers in the world, followed by Iran, Turkey, Russia, Mexico, and Ukraine. Only Indonesia and Japan are among the top 20 producing countries.
Top producing countries:

	Country	Mt of cucumbers produced
1	China	56,240,428
2	Iran	2,283,750
3	Turkey	1,848,273
4	Russia	1,604,346
5	Mexico	1,072,048
6	Ukraine	985,120
7	Uzbekistan	857,076
8	United States	700,819
9	Spain	643,661
10	Japan	550,000
11	Poland	538,676

12	Kazakhstan	460,110
13	Egypt	457,795
14	Indonesia	433,931
15	Netherlands	410,000
16	South Korea	333,233
17	Germany	267,589
18	Cameroon	257,211
19	Sudan	240,405
20	Belarus	226,443

Top importing countries include
USA
Germany
UK
Russia
Netherlands

2.2 Margins

Table 3. Prices and Margins of the Cucumber Value Chain

High Value Crop	Producer					Collector			Wholesaler			Retailer			Exporter		
	Yield	COP	PP	PM	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM	COE	EP	EM
	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Cucumber	11	11.305	4	1.028	11.308	0.400	4.75	0.35	0.145	5.417	0.522	0.145	7	2.105	0.400	7	1.19

Cucumber Margins	Margin (1000 kip/kg)
Producer Margin	2.972
Collect Margin	0.350
W/sale Margin	0.522
Retail Margin	2.105
Export Margin	1.190

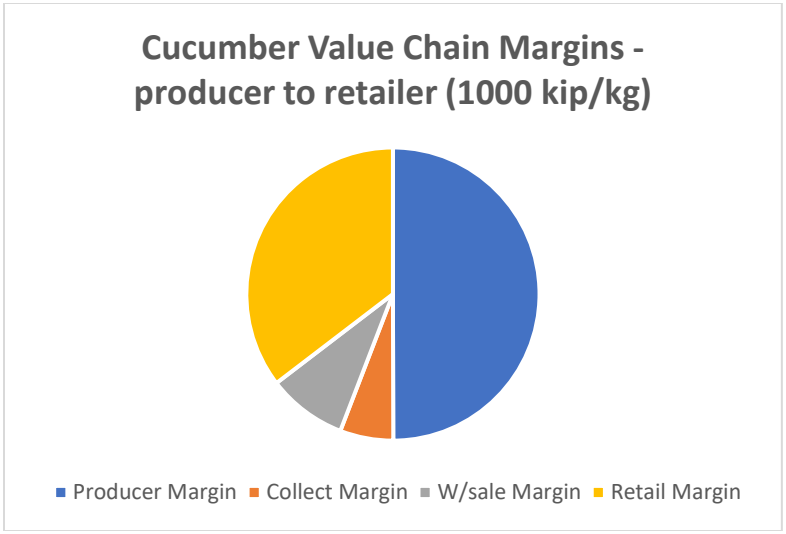

Figure 5. Comparative Margins of Producer to Retailer Levels of the Cucumber Value Chain

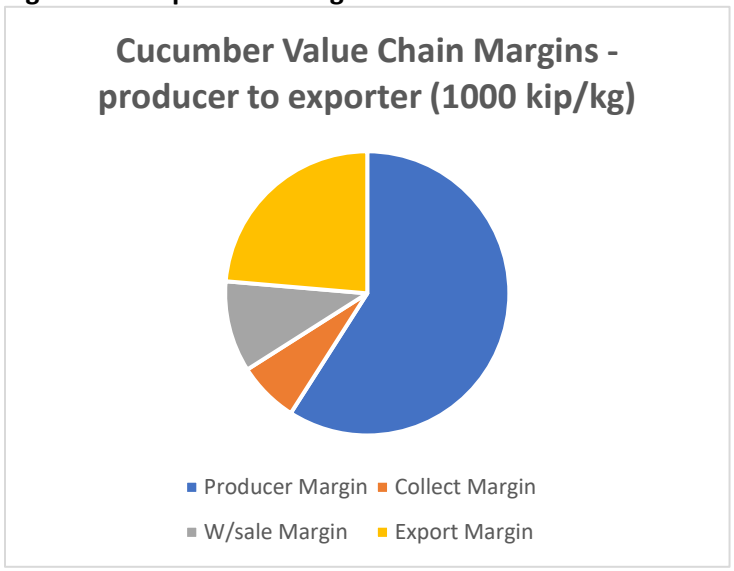

Figure 6. Comparative Margins of Producer to Exporter Levels of the Cucumber Value Chain

Producer Margin

Farmgate Price: 4000 Kip/kg

Producer Margin: 1028 Kip/kg ($966/ha)

Collector Margin

Collector Price: 4750 Kip/kg

Collector Margin: 350 Kip/kg

Wholesaler Margin

Wholesale Price: 5417 Kip/kg

Wholesale Margin: 522 Kip/kg

Retailer Margin

Retailer Price: 7000 Kip/kg

Retailer Margin: 2105 Kip/kg

Exporter Margin

Exporter Price: 7000 Kip/kg ($0.60/kg)

Exporter Margin: 1190 Kip/kg

The export prices for one kg of Lao cucumber were US$1.05 in 2017, US$1.15 in 2018, and $0.95 in 2019. In 2022, the approximate price range for Vietnam cucumber is between US$ 1.01 and US$ 1.11 per kilogram. In Laos, the price range is between US$ 0.95 and US$ 1.15. Vietnam's import price for cucumber in 2019 was US$0.86 per kg.

2.3 Seasonality, Product Quality, and Added Value

Seasonality

Houaphan's altitude provides the opportunity for out of season crop production for Hanoi and other markets. Temperate vegetables capitalizing on the higher altitude in Houaphan (above 1000 metres) can be exported to higher value retail markets in Son La, Thanh Hoa and Hanoi with better cool chain transportation.

Product Quality

Vietnamese traders report that the quality of the Houaphan vegetables is uneven. The size of the watermelons varies too much and the consumers find the taste varies. There are no quality assurance systems in place for the vegetables and fruits produced in the RSP. For the markets in the province and in Viet Nam there is no requirement for QA. There are however, regular random checks for chemical residues for the rice, fruits and vegetables sold in the provincial markets. These results have shown that the rice, fruits and vegetables produced in Houaphan province have low chemical residues and conform to the national standards. But if the vegetables and fruit are to be sold to higher value markets then the farmers and the traders will need to produce certified and traceable vegetables, melons and cucumbers that can be sold in the Hanoi supermarkets and safe food retail outlets.

Added Value

Improvements in post-harvest technology (grading and packaging) will be an option to create value for the vegetables. Cool store facilities are lacking and limit the opportunity for the traders to aggregate their products, assemble larger loads, and be more efficient with their logistics and timing of delivery to markets. Small cool storage may enable the traders to better target higher value markets especially if combined with a market connection cool chain transport network.

3. Yard Long Bean

3.1 Demand and Supply

Demand – The local, provincial, and national demand for long yard beans is all year, as the yard long bean is a mainstay in the diet of the Lao people.

Supply - The supply is less during the wet season as, with most vegetables, the yard long bean cannot tolerate too much water. Shaded cultivation of vegetables is a way of preventing excess water from inhibiting the growth and survival of the vegetables.

3.2 Margins

Table 4. Prices and Margins of the Yard Long Bean Value Chain

High Value Crop	Producer					Collector			Wholesaler			Retailer		
	Yield	COP	PP	PM	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM
	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	million K/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Yard Long Beans	4.5	2.62	5	2.38	10.71	0.400	6	0.6	0.145	6.5	0.355	0.145	8	1.355

Yard Long Bean Margin	Margin (kip/kg)
Producer Margin	2.380
Collect Margin	0.600
W/sale Margin	0.355
Retail Margin	1.355

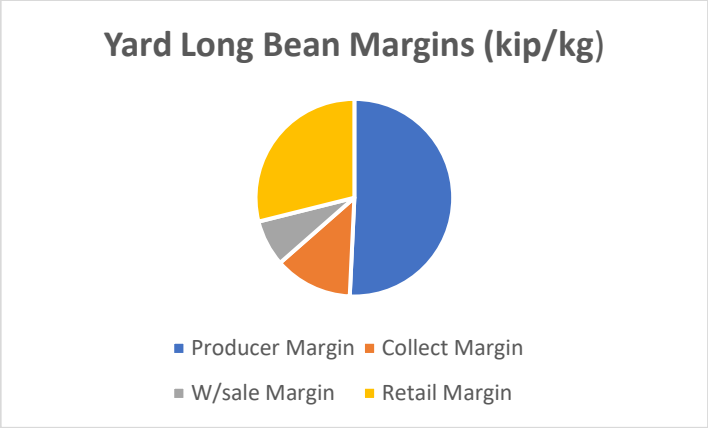

Figure 7. Comparative Margins of Yard Long Beans Value Chain

Producer Margin

Producer Price = 5000 Kip/kg

Producer Margin = 5000 Kip/kg – 2620 Kip/kg = 2380 Kip/kg ($915/ha)

Collector Margin

Collector Price = 6000 Kip/kg

Collector Margin = 6000 Kip/kg – 5000 Kip/kg – 400 Kip/kg = 600 Kip/kg

Wholesale Margin

Wholesale Price = 6500 Kip/kg

Wholesale Margin = 6500 Kip/kg – 6000 Kip/kg – 145 Kip/kg = 355 Kip/kg

Retail Margin

Retail Price =7000 Kip/kg

Retail Margin = 7000 Kip/kg - 6500 Kip/kg – 145 Kip/kg = 1355 Kip/kg

3.3 Seasonality, Product Quality

Seasonality – Yard long beans, and other beans, such as, the common bean, can be produced all year using appropriate and viable production technologies.

Product quality - Quality of the yard long beans is maintained by using appropriate and viable storage and handling technologies.

4. Peanut

4.1 Demand and Supply

Demand - In 2020, the 7 countries that consumed the most peanuts were China, India, Nigeria, USA, Indonesia, Vietnam, and Brazil.

Country	Consumption (million mt)
China	17.371
India	5.628
Nigeria	3.000
USA	2.314
Indonesia	1.311
Vietnam	0.670
Brazil	0.330

The top five importing countries of peanuts were China, Netherlands, Indonesia, Germany and Russia who imported (in total value) 51.4% of total imports. Overall spending on imported peanuts expanded by 170.6% over the 5-year period starting in 2016 and increased by 23.6% year over year since 2019. Below are the 20 highest importing countries as measured by the highest dollar value worth of peanuts imported during 2020, for any peanuts regardless of whether shelled or not.

1. China: US$835.6 million (20.3% of total imported peanuts)
2. Netherlands: $537.1 million (13.1%)
3. Indonesia: $336.9 million (8.2%)
4. Germany: $213.6 million (5.2%)
5. Russia: $189.6 million (4.6%)
6. United Kingdom: $177.2 million (4.3%)
7. Vietnam: $151.1 million (3.7%)
8. Canada: $147.9 million (3.6%)

9. Mexico: $143.5 million (3.5%)
10. Poland: $98.2 million (2.4%)
11. Italy: $85.7 million (2.1%)
12. Spain: $75.3 million (1.8%)
13. Algeria: $68.7 million (1.7%)
14. Thailand: $68.1 million (1.7%)
15. Malaysia: $67.9 million (1.7%)
16. France: $65.7 million (1.6%)
17. Australia: $41.4 million (1%)
18. Belgium: $40.3 million (1%)
19. South Africa: $39.7 million (1%)
20. Ukraine: $39 million (0.9%)

By value, the listed 20 countries bought 83.2% of globally imported peanuts in 2020. Among the top importers, the fastest-growing peanuts importers since 2019 were mainland China (up 159.8%), United Kingdom (up 42.7%), Australia (up 37.5%) and Vietnam (up 35.6%). Those countries that posted declines in their imports of peanuts were led by: Mexico (down -5.9%), Indonesia (down -3.5%), South Africa (down -3.4%), Russia (down -3%) and Italy (down -1.5%).

The following countries paid the lowest average unit prices for imported in-shell peanuts in 2020.

1. Burkina Faso: US$11 per ton (down -86.4% from 2019)
2. Mali: $37 per ton (down -50%)
3. Guinea: $85 per ton (down -3.4%)
4. Honduras: $91 per ton (2019 data unavailable)
5. Niger: $123 per ton (up 41.4%)
6. Kenya: $143 per ton (down -89.9%)
7. Timor-Leste: $158 per ton (2019 data unavailable)
8. Liberia: $191 per ton (2019 data unavailable)
9. Ghana: $212 per ton (up 34.2%)
10. Botswana: $267 per ton (down -85.2%)
11. Burundi: $346 per ton (2019 data unavailable)
12. Philippines: $364 per ton (up 58.3%)
13. Zambia: $411 per ton (up 927.5%)
14. Laos: $450 per ton (2019 data unavailable)
15. South Africa: $508 per ton (down -29%)

16. China: $569/ton

There were 5 double-digit reductions in average unit price paid per ton for in-shell peanuts from 2019 to 2020, namely, with low-cost importers Kenya (down -89.9%), Burkina Faso (down -86.4%), Botswana (down -85.2%), Mali (down -50%) and South Africa (down -29%).

The following countries paid the highest average unit prices for imported in-shell peanuts (change from 2019)

1. Mozambique: US$14,000 per ton (2019 data unavailable)
2. Nigeria: $9,000 per ton (2019 data unavailable)
3. New Zealand: $4,857 per ton (up 42.9% from 2019)
4. Ireland: $4,333 per ton (down -3.7%)
5. Maldives: $4,300 per ton (up 97.8%)
6. Bahamas: $4,143 per ton (up 42%)
7. Somalia: $4,000 per ton (2019 data unavailable)
8. Malawi: $3,803 per ton (down -18.3%)
9. Norway: $3,167 per ton (up 14.7%)
10. Gibraltar: $3,000 per ton (up 9.1%)
11. United States: $2,667 per ton (2019 data unavailable)
12. Switzerland: $2,654 per ton (up 7.8%)
13. Seychelles: $2,400 per ton (down -52%)
14. Slovenia: $2,306 per ton (down -16.3%)
15. Moldova: $2,250 per ton (up 58.7%)

The 5 double-digit accelerations in terms of higher average unit prices paid in 2020 compared to 2019 were experienced by importers in Maldives (up 97.8%), Moldova (up 58.7%), New Zealand (up 42.9%), Bahamas (up 42%) and Norway (up 14.7%).

Peanut consumption in Laos is relatively high, with current production in Laos far below the quantity demanded. The main export market is Thailand, with some traders (from Lao Nam) selling directly to Pakse and Vientiane. The Lao Nyam Agricultural Products Trader Association reported that, in 2015, their members' dry peanut trade volume was 2,000 tons; the price offered to farmers was 12,000 Kip to 13,000 Kip per Kg of nuts (husked/milled) (approx. 1.5 USD/kg) with the conditions of moisture being less than 14%. The harvested peanut must be sun-dried to reduce the moisture content.

Peanuts from HPN province are marketed locally with possible exporting to Vietnam. Peanuts with shell are sold as washed or unwashed, shelled with skin or without skin. Value addition (3 times the peanut price) to peanuts includes producing snacks with sugar cane.

Supply - . The global supply of peanuts has grown by 20% in the past 10 years. Global groundnut production will rise by 2.3 y/y to 50.7M tonnes in 2022. The top 5 producing countries of peanuts were China, India, Nigeria, USA, and Sudan who produced 69.6% of the total. In 2020, exports of peanuts were worth a total US$3.93 billion. The top 5 exporting countries of peanuts were Argentina, India, USA, Brazil and Sudan who sold 71.4% of the total peanuts exported.

Country	%	Production (ml mt)	Export % (ml mt)
China	36%	(18.2 ml mt)	7%
India	13%	(6.8 ml mt)	29%
Nigeria	9%	(4.8 ml mt)	
USA	6%	(2.9 ml mt)	18%
Sudan	5%	(2.5 ml mt)	

Below are the top 20 countries that exported the highest dollar value worth of peanuts during 2020, regardless of whether the shipped peanuts were in-shell or shelled. Among the top exporters, the fastest-growing peanuts exporters since 2019 were: Myanmar also called Burma (up 312.2%), Sudan (up 147.7%), Argentina (up 98.7%) and South Africa (up 71.2%). Four countries posted declines in their exported peanuts sales namely: mainland China (down -22.3%), Madagascar (down -18.6%), Belgium (down -15%) and Nicaragua (down -7.4%). (Hyperlink: https://www.worldstopexports.com/top-peanuts-exports-imports-by-country-plus-average-prices/)

1. Argentina: US$860.4 million (21.9% of total exported peanuts)
2. India: $749.3 million (19.1%)
3. United States: $573.4 million (14.6%)
4. Brazil: $318.9 million (8.1%)
5. Sudan: $304.6 million (7.7%)
6. Netherlands: $234.6 million (6%)
7. China: $204.9 million (5.2%)
8. Senegal: $197.6 million (5%)
9. Nicaragua: $89.7 million (2.3%)
10. Vietnam: $65.9 million (1.7%)
11. Malawi: $39.6 million (1%)
12. Germany: $31.5 million (0.8%)
13. Belgium: $25.7 million (0.7%)
14. Israel: $23.2 million (0.6%)
15. South Africa: $16.8 million (0.4%)
16. Uzbekistan: $16.5 million (0.4%)

17. United Arab Emirates: $9.5 million (0.2%)
18. Myanmar: $8.6 million (0.2%)
19. Madagascar: $8.27 million (0.2%)
20. Turkey: $6.28 million (0.2%)

By value, the listed 20 countries shipped 96.3% of globally exported peanuts in 2020.
The production of peanuts in Laos was
2013-14 on 6720 ha
2014-15 on 5694 ha
2015-16 on 6497 ha

4.2 Margins

Table 5: Prices and Margins of the Peanut Value Chain

High Value Crop	Producer				Collector			Wholesaler			Retailer			Exporter		
	Yield	COP	PP	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM	COE	EP	EM
	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Peanut	3.5	1.49	3.5	2.01	4.04	5	0.96	5.54	10	4.46	10.1	15	9.86	10.721	18.135	7.414

Peanut Margin	Margin (1000 kip/kg)
Producer Margin	2.014
Collect Margin	0.960
W/sale Margin	4.460
Retail Margin	9.860
Exporter Margin	7.414

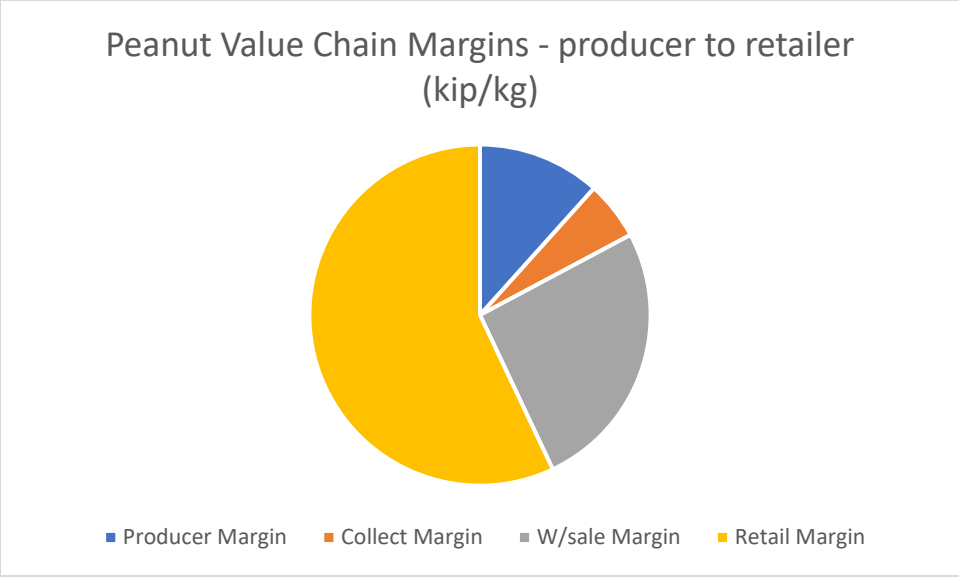

Figure 8. Comparative Margins of Producer to Retailer Levels of the Peanut Value Chain

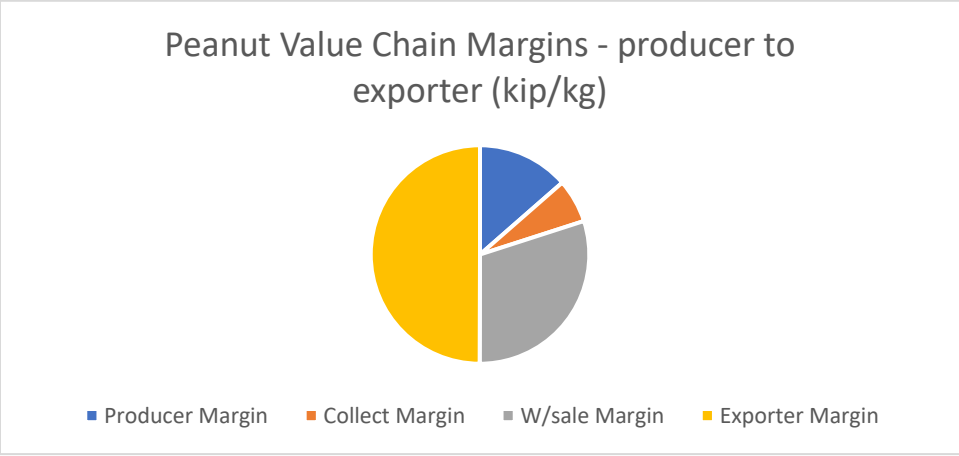

Figure 9. Comparative Margins of Producer to Exporter Levels of the Peanut Value Chain

Peanuts are typically cultivated in small areas and have a high labor requirements, making the crop suitable for poorer households with limited land. Mechanical tools to reduce such are reportedly available in Thailand and could be introduced on a trial basis. Due to peanut capacity to fix nitrogen, peanuts require less nitrogen-containing fertilizer and improve soil fertility, making them valuable in crop rotations,

Producer Margin

Farmgate Price = Kip 3500/kg

Margin = Kip 2014/kg ($429/hectare)

Collector Margin

Price = Kip 5000/kg; margin = Kip 960/kg

Wholesaler Margin

Price (unshelled, unwashed) = Kip 6000/kg ($0.52/kg); margin = Kip 455/kg. The wholesale price in Lao kip is LAK 5102 per kg. The average wholesale price US$ 510/mt in Pakse and Vientiane (Ref: Selina Wamuchii, March 2022).

Price (shelled, with skin) = Kip 19,000/kg; margin = Kip 12,965/kg

Retailer Margin

Price (shelled, unwashed) = Kip 10000/kg; margin = Kip 4855/kg ($0.42/kg)

Price (unshelled, with skin) = Kip 30000/kg, margin = Kip 2855/kg ($0.25/kg)

Exporter Margin

Price (unshelled) cfr Rotterdam $1550/mt

In June 2016, the average import price of Lao peanuts in Thailand was Baht 27/kg (US$0.77/kg) as compared to peanuts from China (Baht 50/kg, $1.42/kg), Vietnam (Baht 33/kg, $0.94/kg), Myanmar (Baht 50/kg, $1.42/kg). The average unit price paid by global importers of in-shell peanuts was $907 per ton in 2020. That dollar amount reflects a -18.5% decrease from the average tonnage rate of $1,113 during 2019. The 2021-22 global prices as represented by the monthly average price of Argentina (the global leader in exports of peanuts) shelled peanuts were as follows (Ref: https://www.indexmundi.com/commodities/?commodity=peanuts).

Table 6. Monthly Average Prices of Argentine Shelled Peanuts in 2021-22

Month Year	Price (USD/mt)	Change from previous month price
Aug 2021	1,443	-

Sep 2021	1,476	2.28%
Oct 2021	1,539	4.28%
Nov 2021	1,552	0.84%
Dec 2021	1,475	-4.98%
Jan 2022	1,480	0.31%
16 Mar 2022	1,550	

Total export value, price, and quantity of exported raw peanuts from Laos were

2015 2000 mt to Torkhek Songmek Lao-Thai border
2016 US$ 14.788 ml (US0.77/kg) = 19,205 mt
2017 US$ 3.577 ml (US$1.46/kg) = 2450 mt
2018 US$ 5.234 ml (US$1.34/kg) = 3906 mt
2019 US$ 7.559 ml (US$0.51/kg or $510/mt) = 14,822 mt
(compared to $1113/mt (2019 and $907/mt 2020)) average global shelled peanut export prices)

Laos exports of raw peanuts to Thailand was US$7.33 Million (@0.51/kg) during 2019, according to the United Nations COMTRADE database on international trade.

4.3 Seasonality, Product Quality, Value Added

Peanuts are planted as a rotation crop in place of rice, after the rice is harvested. The legume nourishes and aerates the soil and fixes the nitrogen. The shells make great compost.

Low prices paid for Lao peanuts is a result of the peanuts being of mixed varieties and grades, and poor post-harvest treatment. There is considerable potential to increase the market value of Lao peanut production through improving these factors. If all traders promoted the use of a standard variety of peanut and volumes were able to be secured then additional price margins are likely to be gained from their Thai buyers.

Whole peanuts can be dry roasted, boiled, baked or eaten raw as a snack food. Peanuts are also ingredients to make peanut oil, peanut butter and peanut flour. See Sae Lao Project on peanut butter. https://www.saelaoproject.com/environment/rice-peanut-farming/

Farmers can mill their well dried peanut at villages which have milling facilities or can have them milled free of charge by traders at their warehouses.

Peanut sales are made at the Lao-Thailand border crossing with Thai traders who then bulk up supply before sending truck loads to the main Thai markets. This approach depresses the price that Lao traders are able to attain. A more in-depth value chain study needs to explore the nature of these Thai traders and identify opportunities for Lao traders to trade directly to the main Thai markets.

Little-known industrial uses for peanuts encompass paint, varnish, lubricating oil, leather dressings, furniture polish, insecticides, soap and cosmetics. Peanut shells go into making plastics, wallboard, abrasives, rayon cellulose used for paper, mucilage and fuel.
There are a number of high-quality peanut varieties available from Koen Kaen in Thailand that could be field tested in Lao Ngam. Any program to introduce standard varieties should be led by the traders based on their market assessment.

5. Chili Pepper

5.1 Demand and Supply

Demand – The global chili pepper consumption peaked at $4.2B (about 780,000 mt) in 2017, and then declined to $4.1B (752,000 mt) in 2018. The countries with the highest volume of pepper consumption in 2018 were Viet Nam (166,000 mt (valued at $904 ml)), India (86,000 mt (valued at $506 ml)) and the U.S.A. (68,000 mt (valued at $374 ml)), with a combined 41% share of global consumption, followed by another 33% by Bulgaria, Indonesia, China, Singapore, Malaysia, Sri Lanka, Germany, the United Arab Emirates and the UK. The countries with the highest levels of pepper per capita consumption in 2018 were Bulgaria (7.641 kg per capita), Singapore (5.288 kg per capita) and Viet Nam (1.724 kg per capita). Market performance is forecasted to decelerate, expanding with an anticipated compounded annual growth rate of +1.2% for the seven-year period from 2018 to 2025, which is projected to bring the market volume to 840K mt by the end of 2025.

Global imports totaled 414,000 mt (valued at $2.1 billion) in 2018, picking up by 8.6% against the previous year. The total import volume increased at an average annual rate of +2.9% over the period from 2007 to 2018; the trend pattern remained relatively stable, with somewhat noticeable fluctuations being observed in certain years. the major importing countries of chili peppers were the USA (75,000 mt, valued at $391 million), distantly followed by Viet Nam (35,000 mt), Germany (32,000 mt) and India (31,000 mt), together creating 42% of total imports. The following importers - the United Arab Emirates (16,000 mt), the UK (13,000 mt), France (11,000 mt), the Netherlands (11,000 mt), Spain (10,000 mt), Japan (9,500 mt), Pakistan (8,200 mt) and Russia (8,000 mt) - together made up 21% of total imports. From 2007-2018, Viet Nam was the fastest growing pepper importer in the world, with a compounded annual growth rate of +21.5% (Ref: Global News Wire – Research and

Markets, World Pepper Market 2020: Historic Review of 2007-2018 with Projections to 2025**).** Over the period under review, global pepper imports attained their maximum in 2018 and are likely to see steady growth in the near future.

In Laos, the demand for chilis in the major markets in Laos is primarily for fresh red or dried red chili peppers, with much being imported from Vietnam.

Supply -Around 34.5 million ton of green chillies and around 3.9 million ton of dried chillies were produced worldwide in the year of 2016. China was the world's largest producer of green chilli, providing half of the global total. Global pepper harvested area peaked at 622,000 hectares in 2007. Based on 2018 figures, pepper production increased by +55.4% against 2012 indices. The pace of growth was the most pronounced in 2016 with an increase of 11% against the previous year. Global production reached 758 mt (produced on 570,000 hectares) in 2018 and is likely to continue its growth. The general positive trend in terms of pepper output was largely conditioned by a tangible increase of the harvested area and a resilient expansion in yield figures. The countries with the largest volume of pepper production in 2018 were Viet Nam (273K mt), ~36% of the total, Indonesia (88K mt), 12%, and Brazil (80K mt), 11%. Global average pepper yield amounted to 1.3 mt per hectare in 2018. In general, the yield increased from 2007 to 2018 at an average annual rate of +4.0%.

Global exports in 2016 and in 2018 totaled 398,000 mt and 392,000 mt (valued at about $2 billion, and about 52% of the total world pepper produced in 2018), respectively. The largest 3 exporting countries (exporting 64% of the total) were Viet Nam which exported 142,000 mt (valued at $743 million), Brazil (73,000 mt, valued at $243 million), and Indonesia (36,000 mt, valued at $200 million). Other exporting countries included India (17,000 mt), Germany (16,000 mt), Sri Lanka (15,000 mt), Malaysia (12,000 mt), Mexico (8,400 mt), the Netherlands (7,500 mt), France (6,800 mt) and the U.S.A. (6,800 mt).

India, the world's biggest exporter of red chilis, shipped out 578,800 mt in 2021, up nearly 8% from a year ago. (Ref: https://economictimes.indiatimes.com/news/economy/foreign-trade/red-chilli-pepper-prices-surge-on-crop-damage-in-top-exporter-india/articleshow/90047378.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)

5.2 Margin

Table 7. Prices and Margins of Red Chili Pepper Value Chain

Hogh Value Crop	Producer				Collector			Wholesaler			Retailer			Exporter		
	Yield	COP	PP	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM	COE	EP	EM

	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Chili Pepper	0.98	5.26	10	4.62	10.18	11	0.82	11.54	12	0.46	10.14	16	4.86	17.3	27.4	10.66

Chili Pepper Margin	**Margin (1000 kip/kg)**
Producer Margin	4.623
Collect Margin	0.823
W/sale Margin	0.455
Retail Margin	4.855
Export Margin	10.657

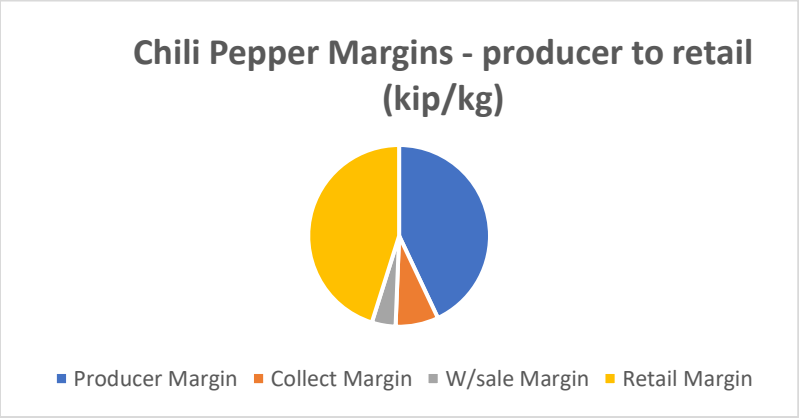

Figure 10. Comparative Margins of Producer to Retailer Levels of the Chili Pepper Value Chain

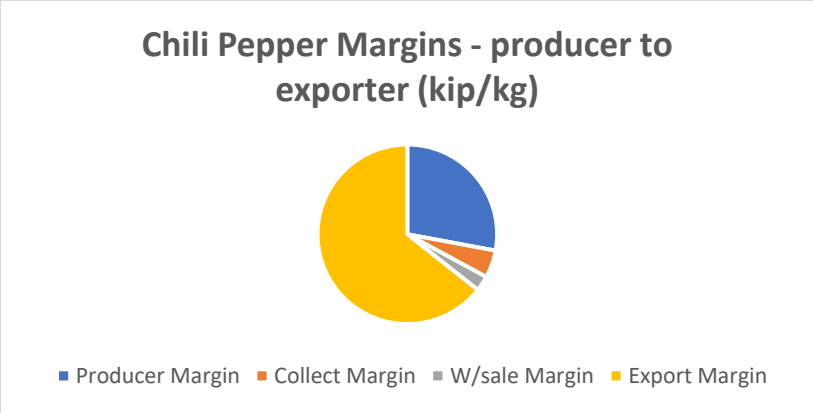

Figure 11. Comparative Margins of Producer to Exporter Levels of the Chili Pepper Value Chain

Farmgate Margin

Price: Kip 10,000/kg

Producer Margin: 4623 Kip/kg ($385/hectare)

Collector Margin

Price: Kip 11,000/kg

Collector Margin: Kip 820/kg

Wholesaler Margin

Price: Kip 12,000/kg

Wholesaler Margin: Kip 460/kg

Retailer Margin

Price: Kip 16,000/kg (Note: Lao Red chili pepper with stem: Kip 16,000/kg (Ref: Mrs. Koong: Lady retailer mobile # 55334100 - Non Kha New Market on 5 March 2022)

Retailer Margin: Kip 4860/kg

Exporter Margin

Price: Kip 27,400/kg

Exporter Margin: 10,660/kg

As of March 7, 2022, the prices of red chili peppers were surging as output in top exporter India were set to drop by a fifth from a year ago, hit by an invasive pest attack and damage from unseasonal rain in key southern producing states. Lower production has boosted prices by 80% in

four months to a record high and prices are likely to stay high through the year, forcing overseas buyers to shell out more at a time when the prices of fuel and other food ingredients are also soaring.

Bangladesh, China, Indonesia, Malaysia, Nepal, Sri Lanka, Thailand and the United States accounted for the bulk of India's exports of $1.3 billion in 2021. Wholesale prices in India's biggest spot market of Guntur have risen to 180,000 rupees ($2,340) per mt from about 100,000 rupees in November (2021). In 2018, the average chili export price amounted to $5,214 per mt, going down by -14.2% against the previous year. The global export price peaked at $8,660 per mt in 2015; however, from 2016 to 2018, export prices remained at a lower figure. Prices varied noticeably by the country of origin; the country with the highest price was the Netherlands ($8,605 per mt), while Mexico ($2,602 per mt) was among the lowest. In general, the pepper import price, however, continues to indicate noticeable growth. Prices varied noticeably by the country of destination; the country with the highest price was the United Arab Emirates ($8,027 per mt), while Viet Nam ($2,485 per mt) was among the lowest. From 2007 to 2018, the most notable rate of growth in terms of prices was attained by the United Arab Emirates, while the other global leaders experienced more modest paces of growth (Ref: Global News Wire).
https://economictimes.indiatimes.com/news/economy/foreign-trade/red-chilli-pepper-prices-surge-on-crop-damage-in-top-exporter-india/articleshow/90047378.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

5.3 Seasonality, Product Quality, Value Added, and Competition

Lao red chili peppers are more expensive (Kip 20,000/kg) during the wet season (June – Dec). Red chili peppers are the preferred color of chili peppers by Lao and international consumers. The same size of chili that is green sells for a discount compared to red chili peppers. Part of the problem with selling Laos chili peppers is that there is typically a significant percentage of green colored peepers being sold.

Dried red chilli pepper can be stored for up to one year, but best consumed before 6 months.

In the dry season, Thai and Vietnamese red chili are the most significant competitors for Laos red chili in the main markets of Vientiane. The dried red chili pepper from Vietnam was selling at the VTE Capital market for Kip 45,000/kg on 5 March 2022, while the Laos fresh chili pepper was selling for Kip 10,000/kg. The Laso chili pepper retailer stated that Laos dried red chili is preferred by the Laos consumer but also is much more expensive (Kip 100,000/kg).

Part of the difference between the Lao and the Thai (and Vietnamese) red chili is the extent or % of red chilis being sold. In the case of Thai chilis on 5 March in the TTL Wholesale market, the small green/red mixed chili pepper price was 28,000 Kip/kg, the large green/red chili pepper was 30,000 Kip/kg; and the large mostly red chili peppers' price was 37,000 Kip/kg.

6 Leafy Vegetables – Cabbage

6.1 Demand and Supply

Demand - The global cabbage market revenue amounted to $39.4B in 2018, dropping by -3% against the previous year. This figure reflects the total revenues of producers and importers (excluding logistics costs, retail marketing costs, and retailers' margins). The market value increased at an average annual rate of +3.1% from 2007 to 2018; the trend pattern indicated some noticeable fluctuations being recorded throughout the analyzed period. The most prominent rate of growth was recorded in 2010 when the market value increased by 14% year-to-year. Global cabbage consumption peaked at $43.7B in 2016; however, from 2017 to 2018, consumption failed to regain its momentum. The country with the largest volume of cabbage consumption was China (33M mt), comprising approx. 45% of total consumption. Moreover, cabbage consumption in China exceeded the figures recorded by the world's second-largest consumer, India (9.2M mt), fourfold. The third position in this ranking was occupied by Russia (3.7M mt), with a 5.2% share. The countries with the highest levels of cabbage per capita consumption in 2018 were Romania (57 kg per person), South Korea (46 kg per person) and Ukraine (39 kg per person). Driven by increasing demand for cabbage worldwide, the market is expected to continue an upward consumption trend through 2025. Market performance is forecast to retain its current trend pattern, expanding with an anticipated CAGR of +1.4% for the seven-year period from 2018 to 2025, which is projected to bring the market volume to 80M mt by the end of 2025.

In 2018, the global exports of cabbage and other brassicas totaled 2.5M mt, surging by 7.2% against the previous year. The total export volume increased at an average annual rate of +3.4% over the period from 2007 to 2018; however, the trend pattern indicated some noticeable fluctuations being recorded over the period under review. The most prominent rate of growth was recorded in 2011 when exports increased by 16% year-over-year. Over the period under review, global cabbage exports reached their maximum in 2018 and are likely to see steady growth in the near future. In value terms, cabbage exports amounted to $1.7B in 2018. Over the period under review, the total exports indicated a resilient expansion from 2007 to 2018: its value increased at an average annual rate of +3.4% over the last eleven years. Global cabbage exports attained their peak figure in 2018 and are expected to retain its growth in the near future. China was the largest exporter of cabbage and other brassicas in the world, with the volume of exports reaching 990K tonnes, which was near 39% of total exports in 2018. The U.S. (220K tonnes) ranks second in terms of the total exports with a 8.7% share, followed by the Netherlands (8.3%), Spain (6.2%) and Mexico (5.7%). Canada (85K tonnes), Poland (84K tonnes), Italy (72K tonnes), Germany (66K tonnes) and Macedonia (57K tonnes) followed a long way behind the leaders.[2] Exports from China increased at an average annual rate of +7.0% from 2007 to 2018. At the same time, Macedonia (+11.5%), Spain (+9.3%), Mexico (+6.1%), Canada (+5.6%) and the Netherlands (+3.1%) displayed positive paces of growth. Moreover, Macedonia emerged as the fastest growing exporter in the world, with a CAGR of +11.5% from 2007-2018. The U.S. and Italy experienced a relatively flat trend pattern. By contrast, Germany (-2.2%) and Poland (-3.7%) illustrated a downward trend over the same period. While the share of China (+21 p.p.), Spain (+3.9 p.p.), Mexico (+2.7 p.p.), the Netherlands (+2.4 p.p.), Macedonia (+1.6 p.p.) and Canada (+1.5 p.p.) increased significantly in terms of the global exports from 2007-2018, the share of Poland (-1.7 p.p.) displayed negative dynamics. The shares of the other countries remained relatively stable throughout the analyzed period. In value terms, the largest cabbage markets worldwide were China ($398M), the U.S. ($344M) and the Netherlands ($194M), with a combined 54% share of global exports. Spain, Mexico, Italy, Canada, Poland, Germany and Macedonia lagged somewhat behind, together accounting for a further 32%.

Supply - In 2018, the amount of cabbage and other brassicas (a genus that includes cabbage, swede, rape, and mustard) produced worldwide stood at 73M mt, picking up by 1.7% against the previous year. The total output volume increased at an average annual rate of +1.4% over the period from 2007 to 2018; the trend pattern remained relatively stable, with only minor fluctuations being observed in certain years. The pace of growth was the most pronounced in 2011 with an increase of 6.8% against the previous year. Global cabbage production peaked in 2018 and is expected to retain its growth in the near future. The general positive trend in terms of cabbage output was largely conditioned by slight growth of the harvested area and a relatively flat trend pattern in yield figures. In value terms, cabbage production totaled $40.5B in 2018 estimated in export prices. In general, the total output indicated prominent growth from 2007 to 2018: its value increased at an average annual rate of +1.4% over the last eleven years. The trend pattern, however, indicated some noticeable fluctuations being recorded throughout the analyzed period. Based on 2018 figures, cabbage production decreased by -11% against 2016 indices. The pace of growth appeared the most rapid in 2010 when production volume increased by 26% year-to-year. Global cabbage production peaked at $45.5B in 2016; however, from 2017 to 2018, production failed to regain its momentum. In 2018, approx. 2.5M ha of cabbage and other brassicas were harvested worldwide; therefore,

[2] Transport Costs and Prices in Lao PDR Unlocking the Potential of an Idle Fleet (2018 World Bank pub)

remained relatively stable against the previous year. The harvested area increased at an average annual rate of +1.3% over the period from 2007 to 2018. In 2018, the global average cabbage yield totaled 29 mt per ha, approximately reflecting the previous year. Overall, the cabbage yield continues to indicate a relatively flat trend pattern.

In 2018, approximately 2.3M mt of cabbage and other brassicas were imported worldwide; dropping by -10.3% against the previous year. The total import volume increased at an average annual rate of +2.4% over the period from 2007 to 2018; however, the trend pattern indicated some noticeable fluctuations being recorded over the period under review. The pace of growth appeared the most rapid in 2015 with an increase of 24% y-o-y. Over the period under review, global cabbage imports reached their peak figure at 2.6M mt in 2016; however, from 2017 to 2018, imports stood at a somewhat lower figure. In value terms, cabbage imports totaled $1.5B in 2018. Overall, the total imports indicated a conspicuous increase from 2007 to 2018: its value increased at an average annual rate of +2.4% over the last eleven years. The trend pattern, however, indicated some noticeable fluctuations being recorded throughout the analyzed period. Based on 2018 figures, cabbage imports decreased by -12.2% against 2016 indices. The most prominent rate of growth was recorded in 2011 with an increase of 16% against the previous year. Global imports peaked at $1.7B in 2016; however, from 2017 to 2018, imports failed to regain their momentum. n 2018, China, Hong Kong SAR (546K tonnes), distantly followed by the U.S. (225K tonnes), Canada (189K tonnes), Malaysia (176K tonnes), Russia (113K tonnes), Germany (112K tonnes) and Thailand (105K tonnes) represented the main importers of cabbage and other brassicas, together mixing up 64% of total imports. Singapore (64K tonnes), Japan (60K tonnes), the Czech Republic (53K tonnes), France (50K tonnes) and the UK (42K tonnes) occupied a minor share of total imports. Imports into China, Hong Kong SAR increased at an average annual rate of +6.3% from 2007 to 2018. At the same time, Thailand (+32.5%), Malaysia (+9.8%), France (+2.5%), the U.S. (+2.2%), Canada (+2.0%) and the Czech Republic (+1.2%) displayed positive paces of growth. Moreover, Thailand emerged as the fastest growing importer in the world, with a CAGR of +32.5% from 2007-2018. Singapore experienced a relatively flat trend pattern. Among the main importing countries, Thailand experienced the highest rates of growth with regard to imports, over the last eleven-year period, while the other global leaders experienced more modest paces of growth. The average cabbage import price stood at $641 per tonne in 2018, approximately reflecting the previous year. Over the period from 2007 to 2018, it increased at an average annual rate of +1.1%. The growth pace was the most rapid in 2013 when the average import price increased by 18% year over year. Over the period under review, the average import prices for cabbage and other brassicas attained their maximum at $692 per tonne in 2014; however, from 2015 to 2018, import prices failed to regain their momentum. There were significant differences in the average prices amongst the major importing countries. In 2018, the country with the highest price was Canada ($1,597 per tonne), while Russia ($315 per tonne) was amongst the lowest.

6.2 Margins

Table 8. Prices and Margins of the Cabbage Value Chain

High Value Crop	Producer				Collector			Wholesaler			Retailer		
	Yield	COP	PP	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM

	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Leafy Vegs	1.59	2.15	6	3.85	6.18	6.5	0.32	7.04	8	0.96	6.65	10	3.35

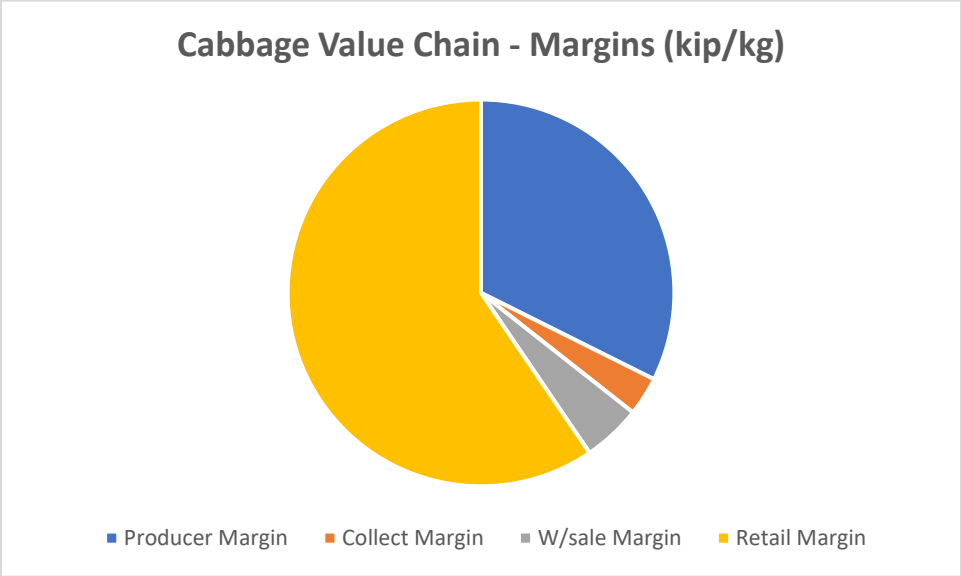

Figure 12. Comparative Margins of the Cabbage Value Chain

Cabbage Margin*	**Margin (kip/kg)**
Producer Margin	2.097
Collect Margin	0.210
W/sale Margin	0.318
Retail Margin *Export Margin probably negative	3.855

Producer Margin

Farmgate Price = 6000 Kip/kg – 2150 Kip/kg

Margin = 3850 Kip/kg ($329/ha)

Collector Margin

Price = 6500 Kip/kg

Margin = 320 Kip/kg

Wholesale Margin

Price = 8000 Kip/kg

Margin = 960 Kip/kg

Retail Margin

Price = 10,000 Kip/kg (VTE retail price at Vientiane Capital Organic market on 5 March)

Margin = 3350 Kip/kg

Export Margin

The average global cabbage export price amounted to $682 per mt in 2018, coming down by -5.4% against the previous year. If the export price (cif by tandem truck to Bangkok) paid by the international buyer was the same ($682/mt) as in 2018, and the wholesale price in Laos (Vientiane wholesale market) of cabbage paid by the exporter was 6000 Kip/kg, the cost of reefer services (as per, e.g., the Thai Reefer Service Company) would need to be about 2000 Kip/kg (2 million Kip/mt or $4718/27600 mt tandem truck capacity) in order to breakeven.

Intra-regional and intra-country transport costs - The average annual distance driven by Lao transport trucks is 55,000 kilometers. In comparison with other developing countries, Lao PDR is in the lower mid-range and is comparable to other developing, landlocked countries (i.e. Niger, Malawi, Ethiopia, Hungary, Czech Republic, etc.). The low annual mileage together with the high costs of capital and low profit margins prevent companies from investing in more expensive, yet more cost-efficient vehicles. This in turn increases variable operating costs and prevents them from competing with transport service providers from neighboring countries. This is exacerbated by the grim outlook for the transport industry. In recent years, declining transport demand together with new market entrants have led to significant overcapacity in the sector. As a result, many trucks remain idle for long periods of time.[3] Note that consolidation services (which are usually much higher than full truckload shipments). Transport prices vary greatly by the direction of transport (both in (1) and (2)). Lowest transport prices are observed on southern routes with an average of LAK 1,925 / LAK 622 per ton-km, followed by northern routes with an average of LAK 3,321 / LAK 869. The highest prices per ton/km are observed on central routes with an average of 5,057 / LAK 1,548. There are a number of explanations for this: The higher price of northern routes is likely due to the more mountainous topography and worse road condition (compared to southern routes)

6.3 Seasonality, Product Quality, and Value Added

In Houaphan, on 21 October 2021, the retail price in the capital city's main market was only 5000 Kip/kg.

The shelf life of cabbage can be extended significantly if proper cold storage conditions are facilitated. However, the pre-feasibility of this would need to be done.

Potential market premium price for organic cabbage in major Lao markets (Vientiane and Luang Prabang).

7. Herbs (Cilantro)

7.1 Demand and Supply

Demand - As the herbs are highly perishable, there is little/no opportunity for exporting from Laos. The markets demanding the herbs are limited to national, provincial, and local. The demand across these various markets is steady as these herbs are consumed on a daily basis.

[3] Transport Costs and Prices in Lao PDR Unlocking the Potential of an Idle Fleet (2018 World Bank pub)

Supply – The production of herbs takes place in all localities in Laos. Herbs are produced on a regular basis throughout the year in home gardens, on small commercial plots, on small farms, and in plastic tunnels throughout Laos.

7.2 Margins

Table 9. Prices and Margins of the Cilantro Value Chain

High Value Crop	Producer				Collector			Wholesaler			Retailer		
	Yield	COP	PP	PM	COC	CP	CM	COW	WP	WM	COR	RP	RM
	1000 Kg/HA	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG	1000 K/KG
Cilantro	1.5	2.08	6	3.92	6.18	6.5	0.32	7.04	8.33	1.288	8.478	13	4.522

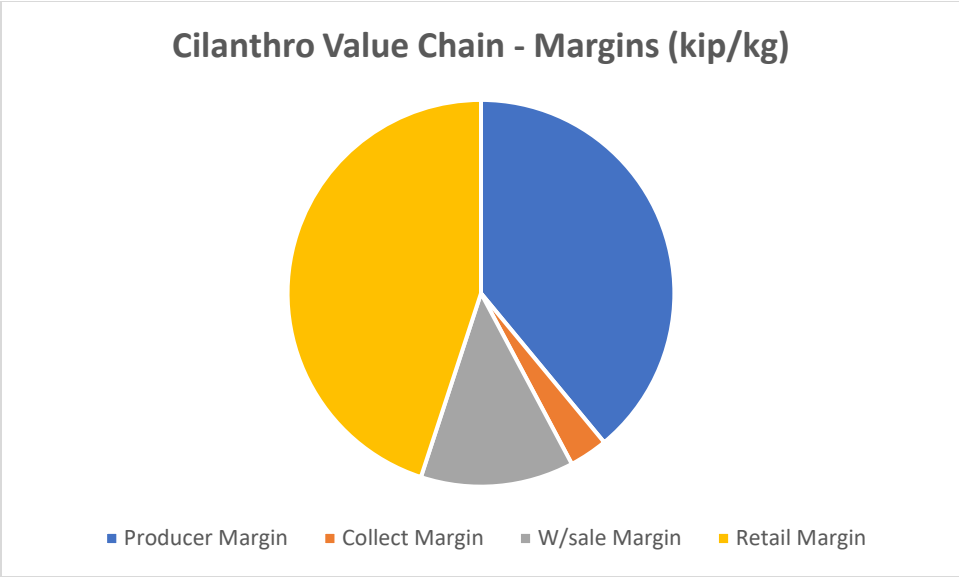

Figure 13. Comparative Margins of the Cilantro Value Chain

Producer Margin

Producer Price = 6000 Kip/kg (cilanthro bunches – 7 bundles per kg)

Producer Margin = 6000 Kip/kg – 2080 Kip/kg = 3920 Kip/kg (5,883,000 Kip/ha or $503/ha)

Collector Margin

Local Collector Price = 6500 Kip/kg

Local Collector Margin = 6500 Kip/kg - 6180 Kip/kg = 320 Kip/kg (sells to shopkeeper located within 10 kilometers from farm)

Wholesale Margin

Vientiane Wholesaler Price = 8000 Kip/kg

Wholesaler Margin = 8333 Kip/kg – 7040 Kip/kg (hires 5 mt truck to bring to Vientiane produce) = 1293 Kip/kg

Retailer Margin

Vientiane Retailer Price = 13,000 Kip/kg

Retailer Margin = 13000 Kip/kg – 8478 Kip/kg = 4522 Kip/kg

7.3 Seasonality, Product Quality, and Value Added

Cilantro (and other herbs) are produced and available from Laos suppliers all year.