Value chain assessment report for maize, pig, plum and tea in Son La province of Northwest Vietnam

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ILRI PROJECT REPORT

Value chain assessment report for maize, pig, plum and tea in Son La province, Northwest Vietnam

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Abbreviations

ADB	Asian Development Bank
CASRAD	Centre for Agrarian Systems Research and Development
CGIAR	Consultative Group on International Agriculture Research
CIAT	International Center for Tropical Agriculture
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
DARD	Departments of Agriculture and Rural Development
EXTRAPOLATE	Ex-ante Tool for Ranking Policy Alternatives
FAO	Food and Agriculture Organization of the United Nations
ILRI	International Livestock Research Institute
MARD	Ministry of Agriculture and Rural Development
NGO	Non-governmental organizations
R4D	Research for development
VBARD	Vietnam Bank for Agriculture and Rural Development
VBSP	Vietnam Bank for Social Policies
VND	Vietnamese dong

Executive summary

This report is based on rapid appraisal methods and provides a preliminary view about understanding the constraints and opportunities in selected value chains in the Son La province in the Northwest region of Vietnam and identifies appropriate interventions to strengthen maize, pig, plum and tea value chains. This study reaffirms that the commodities chosen continue to play a critical role in smallholder livelihoods, poverty reduction and food security, and that they remain an integral part of the existing farming systems.

It should be noted that under the current changing market conditions, transformation of production systems is happening in an unsustainable way. While Northwest region is one of the poorest in Vietnam, it is not only because of poor socio-economic circumstances and inadequate rural infrastructure, but it also features a number of prominent mountains with upland terrains having poor soil characteristics and land conditions. Climatically, rainfall is relatively inconsistent and variable making the agricultural systems exposed to floods and droughts. Forests are depleting at a faster rate due to constant and indiscriminate logging and clear-cutting. Agricultural intensification is increasing pressures on the natural resource base and putting the sustainability of current farming systems into question.

Over the years, rice has been and remains the top crop cultivated in the region. Other crops such as maize and tea are expanding in the area as well as a booming livestock sector, especially pig production. Plum production is also important for ethnic minorities. Besides, despite the participation of the poor in the value chains selected, the research stresses that their involvement has not produced a significant impact in improving their livelihoods. This study emphasizes that this could have been caused by low productivity, high production, transaction and transportation costs, low profit margins both in production and marketing, low incentives to upgrade and innovate, a lack of governance and inefficient rural institutions, weak market coordination, and high exposure to environmental and other market-related uncertainties. The sustainable expansion of production requires a new form of intensive and integrated farming systems on the existing small-scale households and market oriented agricultural production. It is clear that supporting integrated crop-tree-livestock systems is essential to maximize the income from farmers' small lands, to minimize production risks, diversify sources of income and to ensure food security of rural households.

While a comprehensive value chain analysis was beyond the scope of this report, this study highlights some elements of relevant interventions that include but are not limited to:

- Introducing advanced agricultural practices and environmentally friendly technologies to improve the area cultivated and productivity per hectare
- Improving input varieties and services for production and commercialization
- Increasing the quality and safety of commodities supplied to domestic and export markets
- Refining quality management in the agro-processing chain
- Promoting alternative growing seasons in order to meet market demand, especially for maize
- Developing a clear strategy for sustaining local pig breeds and improving the quality of hybrid and extra-lean varieties

- Increasing access to dedicated agricultural credit and strengthening agricultural and veterinary services
- Building good governance and rural institutions in remote areas
- Diversifying farming activities and export markets (especially for tea)
- Strengthening vertical integration of value chain activities
- Promoting collective action and adaptive market institutions to create robust linkages with the market

It is believed that these interventions will expand opportunities for the poor, improve agricultural productivity and strengthen existing value chain linkages. It should be noted that implementing the interventions listed cannot be done in isolation but will also require strong government support and effective functioning of other components of the agricultural system and rural institutions. Hence, many questions remain open for further in-depth research.

Introduction

A majority of the population in the Northwest region of Vietnam live in rural and remote areas, with only 15% of the population living in urban areas. The mountainous areas of Northwest region are characterized by rapid population growth, increasing land scarcity, and environmental degradation. The poverty rates are high and there are limited off-farm opportunities to support the livelihoods of households. The rural poor mainly consist of people from ethnic minority communities; the H'Mong, Dao, La Hu and Cong people show the highest rates of poverty in the region (ILRI 2014). Son La province is one of the regions where the rural population heavily depends on agriculture for their income generation and pressure on agricultural land use is immense. The province has a total land area of about 1.4 million ha out of which 64% consist of agricultural land. Soil erosion and degradation are the most serious environmental problems farmers are facing in the province. Son La has a unique topography as it is partitioned deeply by a high mountain range. Mountains and plateaus cover 75% of the province. This creates several challenges in linking farmers to local and regional markets, and it requires special attention in conducting market access research in the area.

Vietnam is one of the fastest growing economies in Asia and agricultural producers have to catch up with rapid market transformations, occurring across Vietnam. Achieving food security and reducing poverty rates while keeping agricultural production sustainable remain a priority agenda for the government. Improving access to market is a key intervention target in any development program. Better market access allows rural households to move towards sustainable production, increases their income to support their families and creates a firm place in competitive markets. With this in mind, this research carried out a value chain assessment of selected commodities in Son La province of the Northwest region. Maize, tea and plums are three of the main agricultural systems of Son La. Maize and plums can be complementary to each other, allowing crop diversification, which reduces uncertainty related to production and marketing. In general, maize is the second most important crop after rice and its production boost is due to a rapidly increasing animal feed industry (Dang et al. 2004). Plum production provides additional income for poor farmers and, it is one of the main income sources especially for upland ethnic minorities. While ripe plums find their way to domestic markets, about 90% of green plums are exported to neighbouring China, which creates additional value shared among the actors of the chain. Tea is another export-oriented commodity which generates further employment opportunities along the chain. Both of these commodities have a strong potential for reducing poverty because they are planted mainly by smallholder farmers, require few resources, and can be considered as labour intensive. Pig production is a key sub-sector of the livestock industry of Vietnam. The development of pork value chains is due to growing incomes and an increasing share of pork in the diets of people. In the Northwest region, pig production is mostly a household activity which brings additional income to smallholders. Son La is one of the two provinces in the Northwest region Vietnam where pig production has been booming in recent years. Besides, due to high pressure on land, pig production is becoming an important activity for smallholders as it can be done in an intensive mode of production requiring little land.

In general, all of these commodities suffer from poor market linkages, low productivities, high transaction costs, poor quality and postharvest losses. There is a clear need to increase productivity of farmers, improve market linkages and efficiency of value chain actors under the given system. A lack of information on the status of value chains of specific commodities and analysis of their performance prevents the concerned agencies from designing

appropriate interventions to improve the efficiency and effectiveness of crop value chains. Nevertheless, improving the performance of specific value chains requires a good understanding of value chain complexities and the constraints and opportunities for development.

Through the rapid appraisal approach, this study attempted to propose interventions that can assist achieving systemic changes across selected value chains. With input, consultation, and assistance from value chain stakeholders and experts in the field, we aim to design a feasible set of research activities that will support and promote sustainable and inclusive value chains for selected agricultural commodity systems. Engaging all actors (especially poor smallholder households) into an upgraded value chain is expected to contribute to better market access, higher income, employment and poverty reduction, as well as achieving food security objectives both at micro and macro levels. This technical report presents key findings of a rapid market appraisal and outlines the current situation, identifies constraints and issues that are predominant in the maize, plum, tea and pig value chains starting from their farm gates to distribution channels and end markets. Ultimate findings of this report will be the basis for developing intervention activities to help close the gaps identified in the report.

Methodology

The value chain assessment approach provides a first look for systematically classifying strengths and weaknesses of a value chain and designing a clear set of entry points. Nevertheless, improving the functionality of the value chain requires detailed information about complexities, constraints and opportunities of the value chain under consideration. Poor access to information on the position of value chains prevents from conducting proper analysis. The choice of research methodology is a challenging step in the research process and requires considering several options taking into account the existing environment for doing better research.

Keeping this in mind, the main research tool used in the study was the LINK methodology (Lundy et al. 2012) developed by the International Center for Tropical Agriculture (CIAT). It is a useful participatory tool which helps to comprehend the current structure of the market chain and existing key business models. This methodological approach was used to collect information gathered from value chain stakeholders, including government, development and private partners during two days of focus group discussions held in Son La Province. The information obtained is synthesized to characterize value chains and associated business models and propose entry points for potential interventions related to production and marketing. The first part of the methodology concentrated on drawing value chain maps for chosen commodities. In these, value chain actors were divided into groups based on their experience and relevance to the selected commodities. Value chain mapping helped to depict the basic arrangement of the existing value chain. It provided an immense opportunity for multi-stakeholder debates and catching issues observed at each stage of the chain. The different types of actors are identified first, based on their relevance to the commodity along the value chain. Once identified, these actors are placed in the chain according to the flow of the product and business linkages. The constraints and issues associated with every type of actor are then articulated.

The first day of the workshop focused on identifying how the commodity moves from a farm gate to end markets and to observe each actor's participation in the functioning of the value chain. The second part of the methodology sketched the key business models within the chosen value chains for linking smallholder farmers to existing markets. The business model canvas developed for each commodity assists in establishing a grounded dialogue between smallholders, development and private actors and shows how business processes are linked with each other. It describes the enterprise's business and highlights bottlenecks and financial imbalances. More importantly, it identifies areas for upgrading and innovation. During both days, participants were asked to provide quantitative information where possible to enable an approximate understanding of costs, prices and margins.

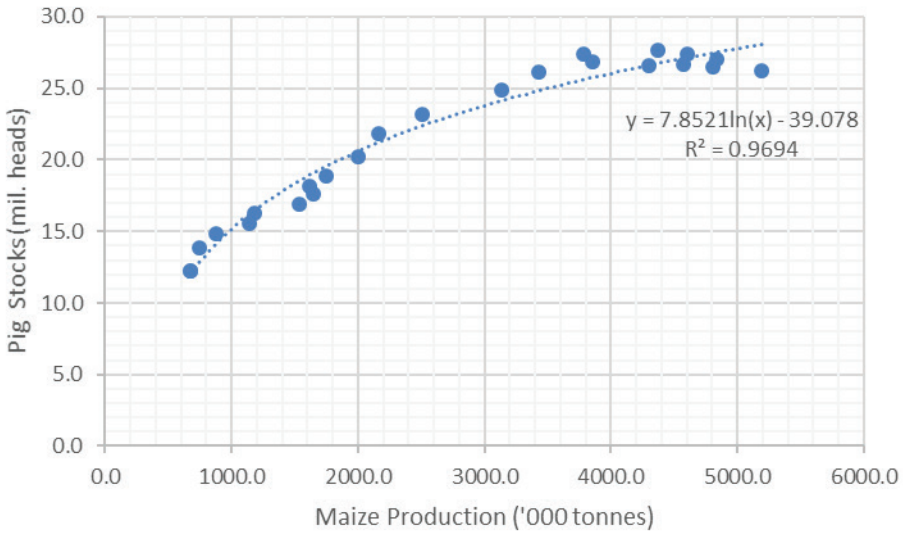
This was supplemented with secondary data and a review of existing literature related to the commodities investigated. Information obtained from site visits to Son La province during 2014 and 2015 under CGIAR research program on climate change, agriculture and food security (CCAFS) and CGIAR research program on Integrated Systems for the Humid Tropics (Humidtropics) were also utilized in the report. The value chain maps constructed were further discussed with researchers from local research institutions and extension officers during the Northwest Vietnam EXTRAPOLATE (Ex-ante Tool for Ranking Policy Alternatives) and Northwest Vietnam Research for Development (R4D) platform meetings held in December 2014 and March 2015 respectively.

Mapping of maize value chains

Background

Due to increased Vietnamese population, rapid economic growth and urbanization, the demand for meat products has grown dramatically and this in turn has put pressure on the feed industry to supply more feed to the livestock sector. Accordingly, maize production has been boosted (Figure 1) to meet the demand and high yielding maize varieties have been disseminated by government-supported programs. Intensification of the maize production system has led to devoting more land to maize and increased commercialization of maize production in the uplands (Dao et al. 2006).

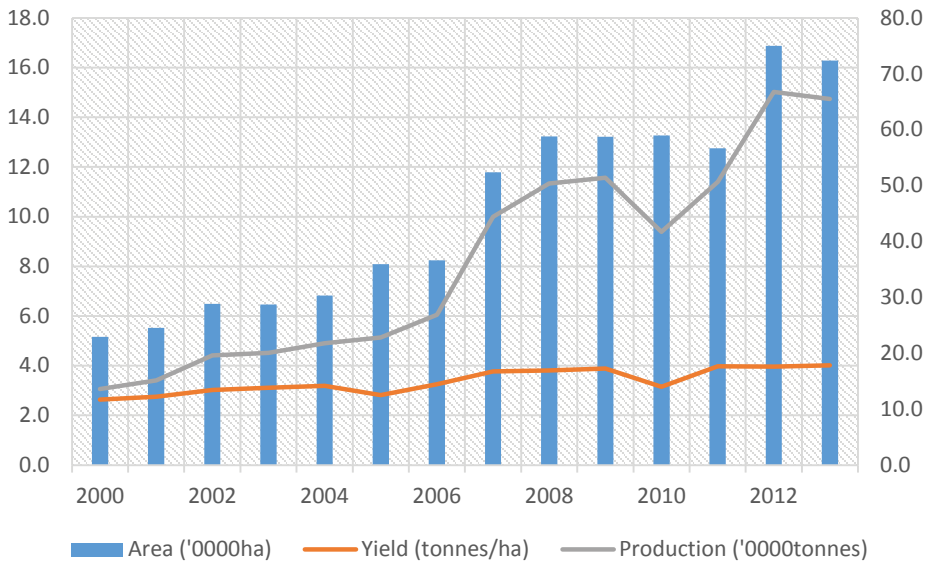
Figure 1. Maize–Pig relationship in Vietnam (1990-2013)



Source: FAOSTAT (2015)

As seen from Figure 2, maize production increased mostly because of expansion of maize fields and with slight boosts in maize yields. Basically, there are two types of maize that are cultivated in the area. Local maize has been grown for years and hybrid maize has been newly introduced as part of the province's overall agricultural development strategy. Hybrid maize yields higher productivity in comparison with local one but it is more sensitive to the climate. However, it is more suitable for producing livestock feed. Only a few farmers intercrop maize with leguminous crops and it requires less labour force in comparison with other crops. High domestic demand for maize has led to a tremendous increase in maize imports (Figure 3). However, it should be noted that there is a high demand for maize from Son La because, according to the stakeholders at the value chain assessment workshop, it is considered to be of better quality in contrast to imported maize from China. It is one of the important cash crops for ethnic minorities and a big number of poor households in the uplands. In recent years, leguminous grains have been intercropped with maize or cultivated as a rotation crop after maize (Bonney et al. 2013).

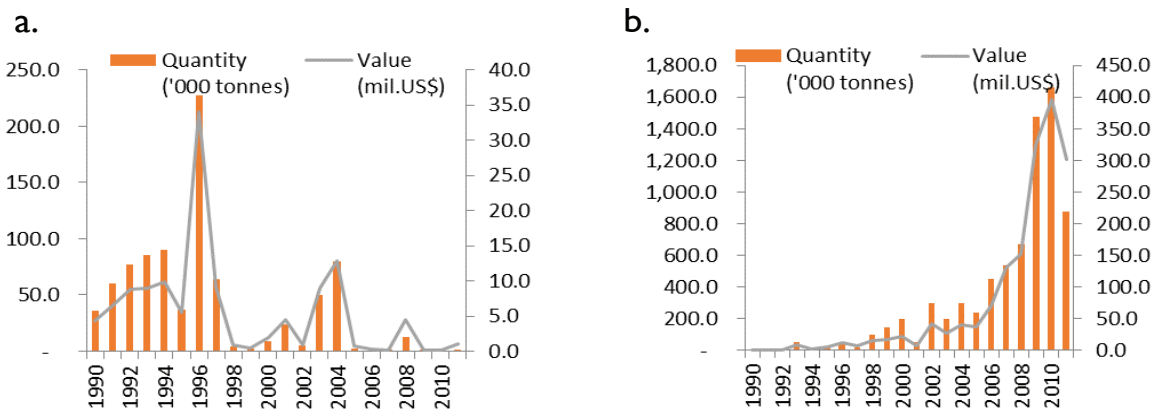
Figure 2. Area under maize, maize production and yields in Son La province (2000-13).



Source: GSO (2015)

There is a need to assess the maize value chain because under current conditions improving and strengthening the functioning of the chain has good potential to form considerable benefits to smallholder farmers (Karimov and Cadilhon 2014). The benefits can be generated from productivity gains and developments in marketing. Taking into account that there are a number of smallholders involved in maize production, a positive impact from increased productivity and market opportunities will help poor farmers to strengthen their livelihood conditions.

Figure 3. a) Export and b) Import quantity and value of maize in Vietnam (1990-2011).



Source: FAOSTAT (2015)

Value chain actors, flow of product and linkages

a. Value chain actors and their roles

- Producers

The area under which maize is grown is not evenly distributed across the districts of Son La province, partly because of unavailability of adequate agricultural land. The production is highest in Moc Chau, Mai Son and Song Ma districts,

which also have the highest share of planted area (Table 1). A majority of maize producers are small-scale farmers who depend on income generated from maize sales for their livelihoods. They grow the maize on the sloping lands which create some difficulties. In addition, most of them are engaged in mono-cropping. The poor maize growers in the uplands are extremely exposed to environmental shocks since much of the maize is grown under degraded lands (Hoang and Neefjes 2005). Besides, frequently occurring droughts are associated with climate change, which puts farmers under challenging situations by reducing yields. Under such conditions and high market demand for maize, it is important that farmers organize themselves better in terms of resource utilization and actively get involved and linked to existing markets.

Table 1. a) Area planted under maize ('000 ha) and b) Maize production ('000 tonnes) in the districts of Son La province (2010-13)

a)	2010	2011	2012	2013	b)	2010	2011	2012	2013
Son La city	3.39	3.44	3.45	3.43	Son La city	18.00	18.68	18.74	18.23
Quynh Nhai	3.18	3.68	4.17	4.35	Quynh Nhai	8.97	10.51	12.32	13.35
Thuan Chau	10.87	10.20	9.36	8.73	Thuan Chau	37.81	40.12	35.14	33.10
Muong La	14.30	14.31	14.72	13.50	Muong La	45.66	49.37	51.81	47.26
Bac Yen	12.02	13.44	13.65	11.89	Bac Yen	23.88	41.98	46.66	42.83
Phu Yen	19.35	19.44	20.16	21.03	Phu Yen	35.41	56.45	60.98	64.65
Moc Chau	38.47	36.31	36.64	22.75	Moc Chau	131.98	164.06	149.65	97.21
Yen Chau	19.17	18.64	18.72	17.87	Yen Chau	60.02	80.01	81.45	77.81
Mai Son	24.21	22.73	22.64	21.16	Mai Son	85.33	105.95	105.40	99.15
Song Ma	23.88	23.79	23.81	23.88	Song Ma	87.33	99.78	100.68	101.12
Sop Cop	1.36	1.31	1.42	2.11	Sop Cop	4.06	4.11	4.52	6.96
Van Ho	-	-	-	12.08	Van Ho	-	-	-	53.00
TOTAL	170.20	167.29	168.74	162.78	TOTAL	538.45	671.02	667.35	654.67

Source: Statistical Yearbook of Son La 2013

Note: Van Ho District was recently separated from Moc Chau district

The process of maize production can be divided into four stages involving input acquisition, planting, growing and harvesting. Land preparations begin in January and involve slashing and burning bushes left from the previous agricultural season. Seed planting depends on the rain and may start from April or May and the main harvesting season is from late August until October (Table 2).

Farmers are cash constrained and have a limited amount of money left from the previous year's sales. They rely on formal and mostly informal sources to purchase inputs: seeds, fertilizer and pesticides. While the Vietnam Bank for Agriculture and Rural Development (VBARD) and the Vietnam Bank for Social Policies (VBSP) provide subsidized credit to the poor, farmers prefer taking loans from neighbours, other farmers, relatives and friends, and pay back in the form of cash or in kind. Depending on negotiations, traders also provide inputs or advance some funding to farmers but the latter are then obliged to sell the maize to traders at a price below that of the market.

Table 2. Production calendar of maize in Son La Province

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Land preparation	—	—	—									
Planting				—								
Growing					—	—	—	—				
Harvesting								—				
Selling									—			

Source: Based on first author's own observations

Seeds are obtained from the farmers' own preservation from the previous year's harvest and from local retailers who sell seeds and other inputs. In 2013 maize yields in the districts of Son La ranged between 3 and 5 tonnes/

ha on average (Table 3). Farmers use fertilizers to keep yields above average. Fertilizers are also purchased from different local retailers, and other trader networks. Farmers frequently do not know the names of fertilizers but differentiate them by colour. It should be also noted that purchased fertilizers are in poor quality and there is no quality control mechanism. Farmers are technically inefficient and do not have sufficient knowledge in application of fertilizers under specific local soil conditions. Enlarged intensification of maize production also increases occurrence of pest-related incidence. Pesticides are purchased to be used to fight against diseases. However, poor farmers do not purchase pesticides in volumes required and face yield losses. Labour is also an important input but maize production does not require much labour during the growing season. Demand for hired labour increases during the harvesting period. Farmers employ their families and relatives first and in case of extended work hire temporary labour. The compensation is usually paid in kind with harvested maize.

Table 3. Maize yields (tonnes/ha) in the districts of Son La province (2010–13)

	2010	2011	2012	2013
Son La city	5.30	5.43	5.43	5.31
Quynh Nhai	2.82	2.86	2.95	3.07
Thuan Chau	3.48	3.93	3.75	3.79
Muong La	3.19	3.45	3.52	3.50
Bac Yen	1.99	3.12	3.42	3.60
Phu Yen	1.83	2.90	3.03	3.07
Moc Chau	3.43	4.52	4.09	4.27
Yen Chau	3.13	4.29	4.35	4.35
Mai Son	3.53	4.66	4.66	4.69
Song Ma	3.66	4.19	4.23	4.24
Sop Cop	2.99	3.15	3.20	3.30
Van Ho				4.39
TOTAL	3.16	4.01	3.96	4.02

Source: Statistical Yearbook of Son La 2013

Note: Van Ho District was recently separated from Moc Chau district

- Collectors

Local collectors have a fair knowledge about areas under maize and have developed a good relationship with maize farmers. Before the harvesting period starts, they visit maize fields and estimate the potential volume of maize, negotiate the price and in some cases pay advance money. During the harvesting period, they come to collect the harvest. Some collectors have better means of transportation, and can travel to remote areas to collect maize. In remote areas, maize is sold for lower prices because of the long distance to markets. Under joint agreement with farmers, collectors may provide hired labour to help with harvesting. Farmers work together with truck drivers sent by collectors and bring the maize to the main road to upload onto trucks. As mentioned, depending on negotiations collectors can also deliver inputs on credit during the growing season and in turn they agree on getting better price offers during the harvesting period. More importantly, during that time they also agree on an approximate volume of production to be purchased during the harvest period. In case collectors purchase maize ears, they shell them into grains with shelling machine or work with other households who have a shelling machine.

- Traders (wholesalers and drying establishments)

There are two types of traders: one is a wholesaler and another one is a private entity owning a drying facility. Small dryers are also present, but mostly work for wholesalers while big dryers are engaged in trading themselves. Wholesalers are important actors in the maize value chain who actively participate in the determination of maize prices. They estimate an indicative volume given their expectations for marketing projections and demand signals from animal feed processing companies. Wholesalers prefer working with collectors because it is too costly to work with farmers directly because of their small scale of production. They purchase grain from collectors, dry it using

drying facilities and sell to other wholesalers from other provinces or directly to animal feed processing companies in Hanoi and Hoa Binh. Each wholesaler works with a group of collectors. In case of strong long-term relationships, wholesalers pay beforehand after jointly agreeing on prices with their collectors. Wholesalers dry the maize products before selling further along the chain. Those who have a good network with animal feed companies get support from them and also have been provided quality drying machines. Big wholesalers have their own drying and shelling facilities and work with 100 tonnes per day. For example, a local wholesaler sells about 1000 to 1500 tonnes of maize annually and employs seven to ten hired labourers.

- Trading companies and transporters

Trading companies have a legal status and they are considered official agents of feed processing companies. But their contribution to value addition is much smaller than that of other wholesalers. Transporters are important intermediaries who transport maize from the uplands to the lowlands and also transport other goods from lowlands to uplands upon request. They own their trucks but their maize-related business is only seasonal for them. They may transport maize by the order of collectors and wholesalers or engage in trading themselves.

- Animal food and feed processing companies

The development of feed processing companies is conditioned by availability and access to inputs. There is always a high demand for local Son La maize from feed processing companies because, as mentioned, it is considered to be of better quality in comparison with imported maize from China. There is a big move to feed animals with processed feed as the market for livestock products expands and this creates massive opportunities for feed processing companies. Feed processing companies play a key role in the value chain because they are the main buyers of grain before it reaches livestock producers. They have storage facilities which allow them to maximize their purchases during the harvesting period when prices are low. They work closely with agents who help them connect to maize wholesalers. However, they still heavily depend on maize imports to support their yearly activity because domestic maize production does not meet the demand. Since feed processing companies have a high purchasing authority, they dictate the prices in a top–down process. Once the price for purchasing maize is set, the signal goes along the chain down to farmers via traders and collectors. In this situation it is obvious that farmers are price takers and sometimes can negotiate the price a little bit within the given price range determined by price setters.

- Animal feed agents

Agents selling animal feed are active players in lowland areas and have a good reputation in terms of connecting processors with final markets for industrial animal feed. They know where the demand is high and collaborate with retailers and big animal husbandry firms to get frequent information. Only a few of these agents specialize in industrial animal feed commercialization while others are involved in marketing a variety of other agricultural products.

- Livestock producers

Each livestock farmer belongs to the list of producers who purchase industrial feed from a sales agent located in the area. Agents have their own credit system and can sell industrial feed for credit. However, interest rates are higher depending on when the farmer has to return the due payment. Animal breeders care about quality and availability of industrial feed at the time when they require it. This creates year-round demand. Price of industrial feed plays a key role in determining what type of ration farmers choose for feeding animals. If industrial feed is too expensive, farmers choose alternative options. The maize from Son La is preferred because farmers encountered disease problems with imported maize due to toxin contaminations (Dao et al. 2010). This said, it should be noted that during the off-season, imports from China increase to cover part of the demand for maize.

b. Flow of product, information and payment linkages

It is worth mentioning that, while using a business management method for our study, we came up with the same results obtained by anthropologists Cullas and Pannier (2015) on how the maize value chain works in Son La province. The flow of product follows a logical chain which has been set up with the expansion of demand for industrial feed.

Maize in Son La is highly commercialized and producers keep only 5% of the maize harvested for home consumption; the rest is sold through the marketing channels described in Figure 4. The amount kept is usually utilized for feeding pigs and poultry or it is used as in-kind payment and bartered for other products including rice. Farmers are limited in funds and have poor production and post-harvest capacity. Therefore, once the maize is harvested it should be immediately sold because they do not have storage facilities.

Farmers have close relationships with local collectors and about 30% of the maize reaching markets is channeled via these actors. As indicated in Table 4, collectors offer stable demand. Local collectors are always in competition with big wholesalers because they cannot afford purchasing in large volumes. If farmers are ready to accept lower prices they sell harvested maize to collectors. Those farmers who are wealthy and who have transportation prefer delivering the product to wholesalers themselves. In this way they also get the margin of the collector and earn a higher income from sales. But this is not always the case; because of poor roads and conditions, farmers accept the fact that collectors are their main buyers. It should be noted that well established farmers keep the maize in the field and do not immediately harvest during the harvesting period in the expectation that prices will go up in the off-season. A shortage of maize supply to the market occurs between April and August. In this period, as mentioned, demand for Chinese maize increases.

Wholesalers are big players who purchase about 55% of maize directly from farmers. Most farmers' maize fields are located a close distance to main roads and wholesalers have their own transportation to ship the purchased maize to lowlands. Farmers prefer selling to wholesalers first and only keep local collectors as a last resort. Thus, collectors keep very close contact with farmers and offer flexible contracts to encourage them to work with them.

Trade companies and private transporters purchase 10% of maize and sell directly to feed processing factories. Collectors also work closely with private transporters and sell 10% of purchased maize to them. Since private transporters are engaged in shipping different types of products, they prefer working with collectors because it is more cost effective in comparison to working with farmers directly. Wholesalers move the product further in the chain. They purchase 90% of maize from collectors and sell to feed processing factories. They have their own collectors in each village and work closely during the season and inform them about the volume they intend to purchase during the harvest time. Both collectors and wholesalers use the services of private dryers to dry maize and some of them own drying facilities, which lowers maize production costs. As specified in Table 5, there are also small and large dryers in the area who are also wholesalers. In the same manner, feed processing companies make contracts with wholesalers and trade companies and dictate volume and price of maize they are going to purchase. Animal feed distribution agents are the final actors before the maize feed reaches end users. They make contracts at the beginning of the year and agree on amount and price of feed to be purchased at a certain time. They are in competition with each other and well established agents own their own mode of transport and shops in lowland areas.

Maize farmers are not able to dictate prices, which is mostly controlled by traders (collectors and wholesalers). Farmers, especially those located in remote uplands, are not well informed about market prices and follow the prices offered by traders at the farm gate. Hence, maize production does not promptly respond to the market demands in terms of both quality and quantity. The market price of maize is not stable and depends heavily on the harvesting season of maize collected from Son La and Hoa Binh (Dao et al. 2010). When maize from Son La is available, the price goes down because of massive supply and this is a good opportunity for buyers. However, sellers, such as poor farmers, generate very low margins from the sale. As mentioned, due to the development of a domestic feed processing industry, these prices are similar to the ones dictated by factories.

Figure 4. Maize value chains in Mai Son

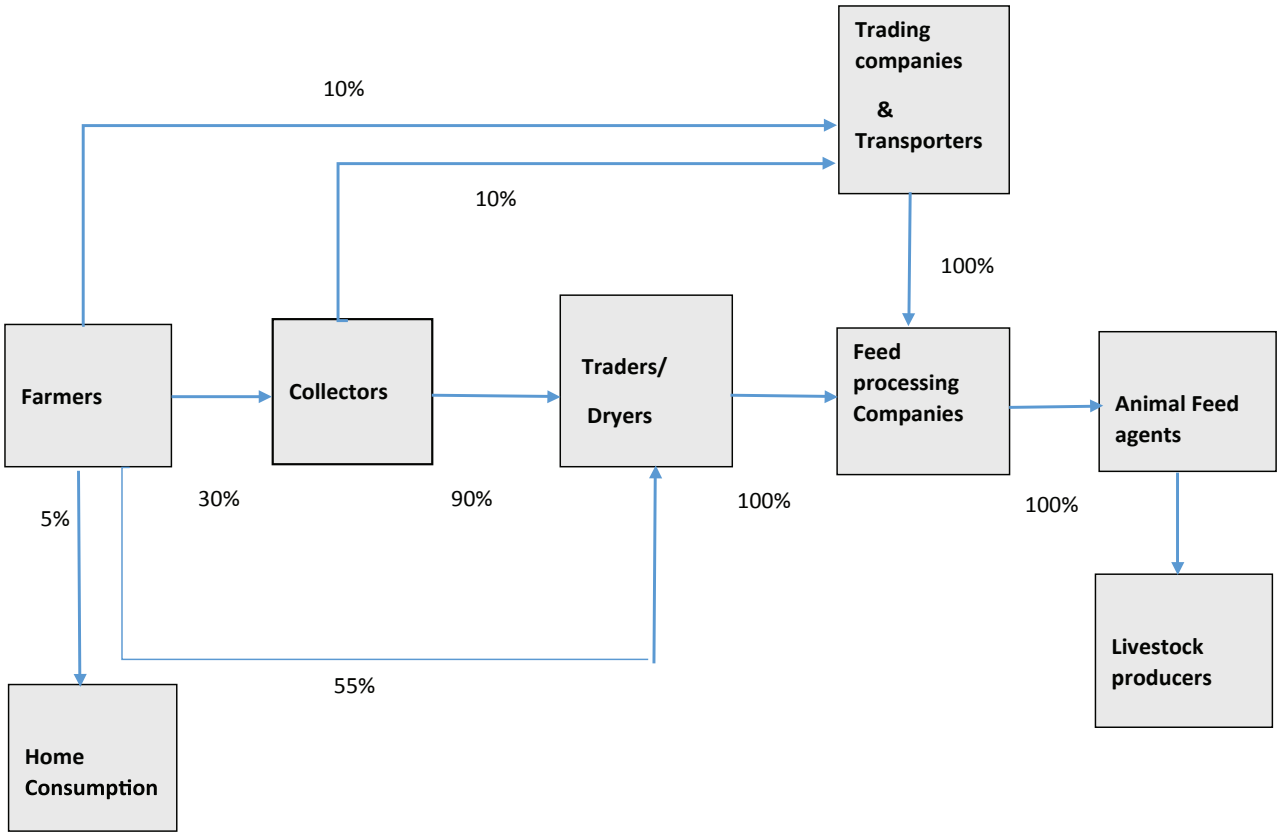


Table 4. Maize collector's suppliers-facing business model canvas

Main partner	Main activities	Value proposition	Relationships	Suppliers
Farmers Transport providers Bank for Agriculture and Rural Development	Purchase and classify maize Split and dry maize Transport Control quality to meet customers' requirements Seek for potential customers	Stable demand Reasonable price Purchase large volume Provide transport services Offer credit and input materials	Frequently exchange information about prices and quality requirements via phone calls Make agreement on price and volume of maize based on market demand Willing to pay suppliers in advance Regularly control quality of maize sold to animal feed companies	Small producers Farmers group
	Main resources		Distribution channel	
	Physical: packages, warehouses ,trucks, drying machines Financial: fixed and variable capital Labour: three family labourers and two hired labourers Others: long-standing collection network		Producers can deliver maize to collectors' warehouse, or collectors go to producers' field to collect maize Collectors pack maize in their warehouse and then transport to drying actors	
Cost structure		Revenue structure		
Labour cost for loading/unloading:VND 60 /kg Fuel cost:VND 50 /kg Asset depreciation:VND 20 /kg Promotion cost:VND 10 /kg Transaction cost:VND 10 /kg Interest rate:VND 20 /kg Transportation cost:VND 50 /kg Drying cost: (VND 80 /kg) Raw materials cost (maize): (VND 3500 /kg)		Selling price VND4000 /kg Purchasing price:VND3500 /kg Total cost for 1kg (labour, transaction, transportation, drying ,etc.):VND 300 /kg Profit/kg:VND 200 /kg Total volume purchased/year: 800,000kg Total profit/year:VND 160,000,000		

Table 5. Maize collector's customers-facing business model

Main partner	Main activities	Value proposition	Relationships	Customers
Farmers Transport providers Bank for Agriculture and Rural Development	Purchase and classify maize Split and dry maize Transport Control quality to meet customers' requirements Seek potential customers	Competitive price Stable supply with reasonable humidity Punctual transaction Good reputation	Based on the win-win principle, mutual trust and social relationships Frequently exchange information on prices and quality by face-to-face meetings or phone calls	Small drying actors (often buy maize with high humidity and do not require a lot of quality criteria like big drying actors. Sales volume makes up 20%) Big drying actors (buy maize with low humidity, strict requirements of quality criteria such as seeds of maize, grading, etc. Sales volume makes up 80%)
	Main resources		Distribution channel	
	Physical: packages, warehouses, trucks, drying machines Financial: fixed and variable capital Labour: three family labourers and two hired labourers Others: long-standing collection network		Sell directly to small drying actors Sell indirectly to big drying actors through market intermediaries	

Constraints and challenges

Maize farmers face a series of challenges that limit their overall productivity, income and marketing capabilities.

- Farmers do not get proper agronomic information and have limited access to improved production technologies (e.g. soil conservation and control measures, crop management and rotation practices) due to remoteness of their farms, which directly impacts their productivity.
- Because of market expansion for maize, its cultivation is extended to fragile and marginalized lands as well as leading to mono-cropping on steep slopes. These cause severe erosion and land degradation.
- Inadequate use of inputs (i.e. seeds, fertilizers and pesticides) under the conditions of climate and land changes cause substantial yield loss.
- Farmers are cash constrained and have limited access to credit to purchase inputs.
- Farmers have poor knowledge about post-harvest handling.
- Poor rural infrastructure and especially limited access to main roads is a big problem for upland farmers.
- Access to information about market prices is limited, which brings some uncertainties in marketing. Price determination follows the top–down approach and farmers act as price takers.
- Sales are done immediately after harvesting because of liquidity and storage constraints, which lowers farmers' benefit margins from the production of maize.
- The cropping season is mostly concentrated into one season, which causes supply shortages in the market in the off season.

Interventions

- The transportation of maize is an important activity which links chain actors with each other especially taking into account the fact that farmers' fields are located in uplands and markets are in lowland areas. There is a tremendous

need to invest in village and communal roads with the purpose of better connecting them to main roads. This will increase the chances of poor farmers' getting better information and improving their access to input and output markets.

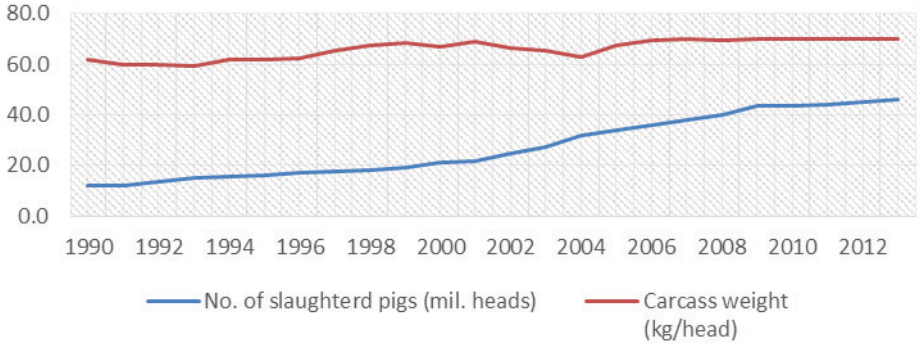
- Intervention by the government is essential to reduce the monopoly of feed processing companies to set maize prices. The prices should be determined by supply and demand in the market and to achieve that, proper functioning market mechanisms must be established.
- Cropping systems research should concentrate on investigating agronomic practices which will help to increase productivity and efficient use of resources; In this regard, developing climate-tolerant varieties and conducting research on better organization of crop management is key to sustaining increased production levels.
- As seen from the suppliers-facing business model of maize collectors in Table 4, there are some elements of contract farming in the case of the maize value chain. However, it is poorly developed and disorganized. This type of farming is beneficial both to maize producers and other value chain actors. Farmers will get the benefit of having a proper access to inputs and relevant information from contractor. They will have a better influence on prices and maize output can be negotiated at market prices or pre-fixed agreed prices.
- Feed processing companies should get involved in introducing proper post-harvest technologies and practices with the purpose of boosting productivity and quality of the maize produced. Taking into account the context of Vietnam, government intervention and decrees that stimulate these practices will be key factors in developing post-harvest capacity in the maize value chain.

Mapping of pig value chains

Background

The economy of Vietnam has gone through structural changes in the last two decades. The rapid economic growth has brought benefits to all sectors of the economy. Individuals' incomes have improved, which has led to changes in their eating habits. The consumer demand for animal products has increased, which has put pressure on the livestock sector to supply more meat. Due to the high population density and the resulting limitations in the availability of land for cropping, pig rearing has become an important activity of farm households. As can be seen from Figure 5, the number of slaughtered pigs has also increased in the country. Along this line, the importance of food quality and safety issues has emerged as a concern (Mergenthaler et al. 2009a), especially for the urban population. In the case of Northwest region and in particular Son La province, the pig sector has been affected in a number of ways (Lemke et al. 2008), making it a remarkable case study for research. Pig production plays a key role in the current farming systems of Vietnamese smallholders and in recent years pig rearing has become an important livelihood strategy. It brings additional income by providing basic financial security and pork also is the major source of animal protein for the local population. Especially in the uplands, small-scale pig rearing is interconnected with the culture and traditions of ethnic minorities. Pork has become the most preferred animal product, which has brought new opportunities for smallholders. The pig sector has become more commercialized and consumer demand for quality pork has increased (Tisdell 2009).

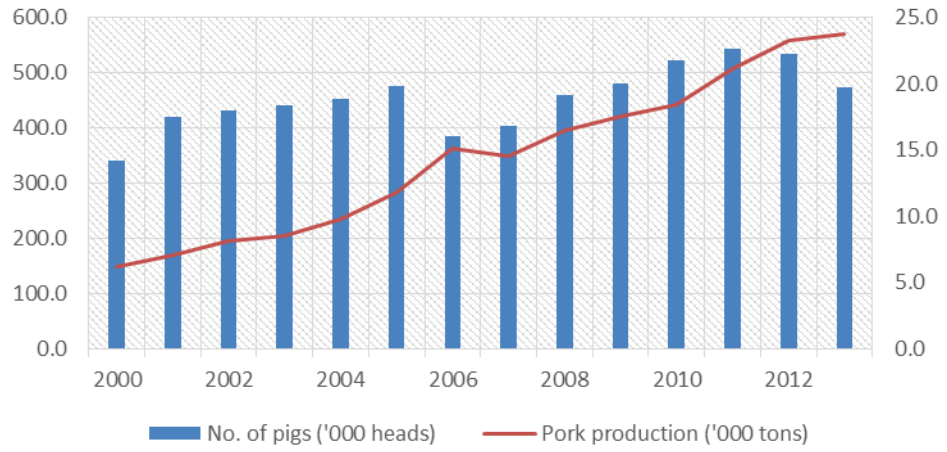
Figure 5. Number and average carcass weight of slaughtered pig in Vietnam (1990–2013).



Source: FAOSTAT (2015)

The presence and development of successful market actors along the chain has increased pork production in Son La province (Figure 6). This in turn has brought several changes to pork value chains and has created opportunities for smallholders in terms of linking them to new destinations and markets. This has also shaped the formation of large producers, which has brought competition into the market; this requires thorough investigation. The different breed types that have appeared and their socio-economic and productivity attributes need to be studied. This section attempts to comprehend the present status of pig value chains in the study area with the purpose of increasing the meat production and improving the access to market and marketing potential for pork in Son La province in general and in Mai Son district in particular.

Figure 6. Number of pigs and pork production in Son La (2000–13).



Source: GSO (2015)

Value chain actors, flow of product and linkages

a. Value chain actors and their roles

- Producers

There are a number of breed types and breeding strategies that exist among smallholder farmers (Ieda et al. 2015). Usually, smallholders keep two to four pigs on average and the range can be from one to ten. Mai Son has the biggest number of pigs produced in Son La province (Table 6). Producers operating under different production systems can be distinguished by a semi-intensive or also known as demand-driven system on the one hand, and an extensive also known as resource-driven system on the other hand (Lemke et al. 2006). This distinction is made taking into account location, access to market and intensity of production. For example, the demand-driven production system can be observed in the mountain valley nearby towns while the resource-driven production system is more relevant to upland regions with strong slopes far away from towns. In the first production system, high-yielding breeds are popular whereas in the second system, local low-yielding breeds are predominant.

Table 6. a) Number of pigs (thousand heads) and b) Production of pigs (tonnes of live weight) in the districts of Son La province (2010–13)

a)	2010	2011	2012	2013	b)	2010	2011	2012	2013
Son La city	31.42	29.34	45.62	47.32	Son La city	3,292	3,176	4,660	4,184
Quynh Nhai	24.07	25.40	18.66	18.63	Quynh Nhai	557	677	570	985
Thuan Chau	65.20	78.96	72.93	75.51	Thuan Chau	1,368	1,397	3,603	5,464
Muong La	29.51	30.69	17.66	18.19	Muong La	754	720	420	832
Bac Yen	24.00	24.10	24.19	24.46	Bac Yen	425	420	397	415
Phu Yen	39.39	41.57	45.41	46.70	Phu Yen	2,194	2,472	2,718	3,153
Moc Chau	53.97	52.68	63.26	34.07	Moc Chau	3,444	3,856	5,624	3,272
Yen Chau	24.74	24.86	25.43	25.79	Yen Chau	1,025	1,296	1,711	1,645
Mai Son	73.49	77.46	66.06	66.62	Mai Son	3,612	4,545	4,469	7,118
Song Ma	56.52	50.75	58.48	63.60	Song Ma	2,010	2,328	2,252	3,118
Sop Cop	19.93	20.79	15.78	16.97	Sop Cop	621	655	558	640
Van Ho	-	-	-	25.80	Van Ho	-	-	-	2,238
TOTAL	442.24	456.60	453.48	463.66	TOTAL	19,302	21,542	26,982	33,064

Source: Statistical Yearbook of Son La 2013

Note: Van Ho District was recently separated from Moc Chau district

Smallholders keep different types of pigs depending on the type of pig production activity they are engaged in. They can keep breeding sows or fattening pigs (Costales et al. 2006). The majority of breed types include local, hybrid and extra lean breeds. Local breeds are raised in the resource driven production system, can consume lower quality feed and require less time or care intensity. Their adaptability to prevailing environmental conditions is high. While the input required for local breeds is lower, their growth performance and productivity are also low. In the locality, people call this type 'slow growing pigs'. Local pigs find their final destination in nearby markets.

Most hybrid and extra lean pigs are raised in the demand-driven production system. Farmers in upland areas with better access to rural infrastructure raise extra lean pigs (these animals have a high percentage of lean meat) and hybrid pigs. These are mostly market-oriented farmers who are more organized and operate under higher resource intensity. These farmers are active in the value chain because of increased profit margins and have good relations with traders and the Charoen Pokphand Company. The exchange of information is much better among pig raisers because if one smallholder gets access to a new practice, it is shared among other pig raisers in the same village. Pigs are raised in a closed and protected environment. Some wealthy farmers have contracts with technical specialists who support them in disease prevention and raising pigs safely. However, it should be noted that hybrid and extra lean pigs are exposed to higher production risk due to their vulnerability to diseases. They also require high investment in terms of feeding. Depending on the time of the year, smallholders' feeding strategies may change. For example, between September and January, availability of maize increases and this allows smallholders to mix it with feed concentrate. In the spring and summer time, the availability of maize decreases and farmers adjust to it accordingly. It is also interesting to note that after the Vietnamese New Year (between January and March depending on the lunar year calendar), households purchase younger pigs because these pigs require less feed during the maize shortage period (Hoang 2003).

The regular feed retailers also provide other services that give incentives to smallholders to purchase feed from them. However, big farmers get better terms for feed purchase and provision of services (Lapar et al. 2012). There are several big animal food selling agents in the area such as CP Vietnam, Green Hope and AF companies. CP Vietnam occupies nearly 20% of the total animal feed market share in Son La province. There are also several small animal feed selling agents existing in the area. Commercial feed is expensive and, if not wisely used, it will tremendously lower profit margins (Peters et al. 2004). Hence, smallholders use both industrial and unprocessed feed to compensate each other. It should be noted that as the scale of production increases, households tend to use more industrial feed. Poor smallholders rely more on the home-produced feed with the hope to reduce input costs.

Hybrid and extra lean breeds are considered much more profitable than local breeds and show higher production performance under favourable keeping conditions. However, local breeds have also been promoted through improving their genetic traits. They are crossbred with vastly productive exotic breeds (Berthouly-Salazar et al. 2012). While there are also village-level breeding programs (Roessler et al. 2009), lack of funds make them difficult to implement. It should also be noted that in smallholder farms, women and children play the role of pig keeping and pig feeding.

- Collectors

Collectors in the area have multiple tasks that may include purchasing live pigs, selling them and slaughtering. They usually operate at commune level and also act as a retailer in the local markets to get higher profit margins. This is in a way an interesting activity because availability of fresh pork in the local market increases thanks to the short value chain. But the volume is small, hence it is not frequently practiced.

In case of local pigs for example, traders have developed a decent relationship with hotels and restaurants and demand- or price-related information is shared via phone. This is a two-side beneficial relationship because while traders have a regular market for live pigs, hotels and restaurants also have reliable partners who can deliver quality pigs when needed.

When there is low demand, collectors and traders usually keep live pigs in their houses or rent a place for a short time. However, their preferred trading strategy is to know exactly when restaurants and hotels would need live pigs for slaughtering, which is usually a year-round demand with ups and downs. If collectors and traders are not involved

in slaughtering (not selling carcass of the pig), it is usually done in the slaughterhouses of hotels and restaurants, which in general have poor conditions and a very small area. In case they do not have a slaughtering place or facility, they usually make use of nearby slaughterhouses and pay for the service.

Collectors who are in a financially better situation are engaged in longer and more complex supply chains and act more like traders. This chain has emerged recently because of demand from urban consumers for local pigs. The main challenge that collectors face in this chain is in the transportation of live pigs and in having a sufficient number of live pigs to transport to the urban centres of Son La and Dien Bien provinces. The purchasing frequency increases in the period around the Lunar New Year in Vietnam.

- Slaughterhouses

There are also quite strong farmer-butcher relationships in pig trading. Hence, butchers also remain key actors in the chain. Butchers from within the district or province travel once in a while to communities and monitor the availability of pigs. They agree on the approximate time of purchasing 'ready to go' live pigs with producers. The prices are usually set on the spot at the moment of sale. However, if they have a good relationship, the farmer may ask the butcher to contribute to the expense of feeding the animal with the agreement that later on the butcher will get a better price. Overall, farmers are price takers and butchers estimate the price of pigs from their weight. Nevertheless, quality also plays a key role and butchers try to reduce the price, complaining about poor quality. It is also a normal practice for butchers to pay cash at a later date on the promise of giving farmers better prices. The butchers are also wholesalers of pork meat in the case of hybrid and extra lean pigs. Generally, slaughterhouses are family-based, and connected to or part of their owner's house. As indicated in Table 7, purchased pigs can be kept in the slaughterhouse for up to a week before slaughter.

The mode of communication includes phones by which the quantity and price of live pigs are agreed with farmers and collectors. Payment can be delayed or paid immediately contingent on the negotiation. Depending on market demand, the frequency of slaughter is regulated. There are also more hygenic state-owned slaughterhouses, but they are available in towns. There is a government-requirement that pigs be slaughtered in these facilities but this is usually not the case because of many obstacles, including transportation and transaction costs. Thus, most slaughtering activities happen in the backyards of butchers, which usually do not meet the requirements of government food hygiene policy. As demand for pork has increased, consumers have also started looking for quality pork. However, the pork in the market remains questionable in terms of quality and origin. It should be also noted that with rising living standards, urban customers increasingly prefer lean meat. Many butchers sell lean pork to urban customers (Lemke and Zarate 2008; Herold et al. 2010), while fatty pork is sold mostly in rural areas.

- Traders (wholesalers)

The wholesalers are usually engaged in trading large volumes to other districts and nearby provinces. Local level collectors and traders in stronger financial situations sometimes also act as traders. Wholesalers have good relations both with the slaughterhouses and retailers in final markets. Since they are engaged in transporting raw fresh meat, they are highly dependent on transportation partners and any delay may worsen the condition of the product. They are usually risk-averse actors and only transport to places if they have a definite (at least oral) agreement with retailers. If not, they sell the carcass in local markets or nearby districts. The wholesalers purchase pig meat from the slaughterhouse in the form of carcass with offal and sell it to retailers.

- Retailers

Retailers purchase full carcasses and cut them up into meat cuts. Retailers are usually hotels, restaurants, shops and supermarkets. They are also private individuals who do business in the meat market. The price of pig meat is higher in urban towns and it also depends on the quality of meat and the type of cut (Dinh et al. 2010). Vietnamese people prefer consuming fresh 'warm' pork purchased from the market and thus a large number of consumers are dependent on traditional market outlets (Lapar et al. 2009); this dependency is also a purchasing habit. The majority of cut meat is sold as fresh 'warm' meat to meet the consumer demand for fresh pork. Traditional meat retailers have good

relations with butchers and wholesalers, which also informally confirms that they are getting safe and quality pork. Competition among market retailers is high. Successful retailers have their own small meat shops and provide delivery services as well. The price is different based on which part of the carcass is on sale. Retailers compete in terms of prices and quality of the pork meat. However, the market price in Son La is not regulated and in many cases does not take quality into account. This creates no incentive to slaughterhouses to control for quality.

Flow of product, information and payment linkages

Generally, pig producers sell their pigs directly to commune collectors, district traders or butchers. There are also cases in which medium-scale producers are directly linked with consumers. The sale of live pigs is made by weighing and bargaining. The pig is slaughtered by the butcher and sold to retailers in the form of carcasses in the district or provincial markets. It is a great challenge to sell live pigs for a decent price because of unequal prices paid by traders.

In particular, linkages among producers in the uplands of Son La province and supply chain actors can be divided into two types; short and long market chains. The simplest linkage and flow of products is observed for local pigs (Figure 7). As mentioned, local pigs are mainly raised in remote and mountainous areas, which are far from urban centres and face challenges in terms of transportation. Producers are mostly from ethnic minorities with poor conditions. The organization and functioning of the market channel for this type is simple and mostly serves the demand at local level. It is frequent that poor farmers sell pigs at any age and weight during the times of cash and feed shortages (Pham et al. 2009). Hence, it is considered less market oriented and kept as a last resort and for socio-cultural activities. This is however changing with the new demand from urban consumers for this type of pig. The taste of the pork meat is playing a significant role in impacting the choices of consumers (Tisdell et al. 2009). This is creating a good opportunity for the development of a market chain for local pigs. Especially, demand for this type of pork is high during the Vietnamese holidays in which supply increases because of high demand for fresh pork and farmers get better market prices. This is a good opportunity for commune collectors who cooperate with farmers beforehand and estimate the numbers of 'ready to go' pigs during that time. The participation of the poor in this chain could contribute to enhancements in their livelihoods and to a reduction of rural poverty in the uplands. About 20% of pigs marketed are sold directly to consumers living in the producers' locality and to neighbouring producers. These pigs are usually bought for special events and ceremonies. However, the pigs are sold all year round and supply changes depending on market demand. It is interesting to note that if a farmer decides to sell pigs before the Lunar New Year holidays, it could be because of urgent need for cash. Pigs are picked up at the farm gate and payment is made in cash on the spot. On average each pig weighs around 10–12kg. About 70% is sold to local collectors who have connections with restaurants and hotels in Son La province. Local pigs have quite a bit of fat and prices for over-fat carcasses are greatly discounted. For some local pigs, longer supply chains with new market opportunities are developing in urban towns. However, it is not very clear how poor smallholders will get affected by these new arrangements. The future value chain analysis should consider further studying this chain in depth. Collectors and traders do not provide additional services to farmers and try to push the prices down for live pigs. There is no market information about prices and hence smallholders remain price takers and operate under huge uncertainty in terms of whether they will make a profit in that particular season or not.

In case of hybrid and extra lean varieties value chains are longer and more complex; they include a range of actors (Figure 8). In these chains, trade occurs between districts and even with nearby provinces. The majority (70%) of live pigs are sold to slaughterhouses. There are some commune level collectors who also purchase 20% of live pigs directly from producers and sell to district level traders. The rest are sold as piglets to other producers located in the area. The frequent breeding strategy of smallholders is to purchase healthy piglets from other farmers with the purpose of rearing them as fattening pigs or sows. Piglets can be obtained from within the neighbourhood or purchased from traders who bring them from other districts. CP Company also sells piglets to pig raisers and they have a good reputation in terms of quality of piglets supplied. The prices vary in accordance with weight and breed. Piglet production is difficult because sows need special attention and living conditions. Only experienced and skilled farmers get engaged in the piglet-producing business and usually these are medium and large producers. In addition, the high risk of getting poor quality pigs from various sources with uncertain product quality adds to the costs in

terms of moral hazard (Lapar et al. 2003). The slaughterhouses sell half of the pork meat to retailers operating at district and province level. It should be noted that if their animal is in poor shape leading to a poor-quality carcass, owners of slaughterhouses inform farmers about this as part of the relationship they have with farmers (as indicated in Table 7). Local meat processing companies purchase 20% of pork meat for processing (i.e. dried meat and sausages). District level traders also purchase 30% of pork meat and sell to retailers. In this chain, wholesalers play a key role not only in terms of moving product from one place to another but also in setting prices, which are then transmitted down to producers. They have good information about demand and prices and hence also play a coordinating role in trading pork meat to urban towns.

Figure 7. Pig value chains in Mai Son (local breed).

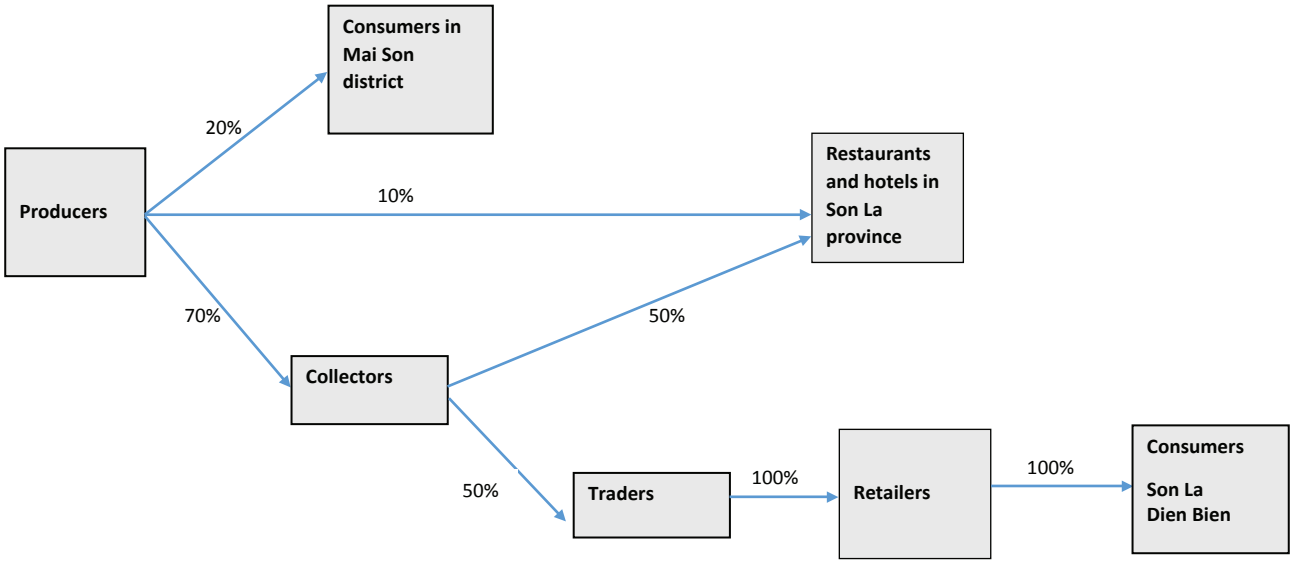


Figure 8. Pig value chains in Mai Son (hybrid and extra-lean breed)

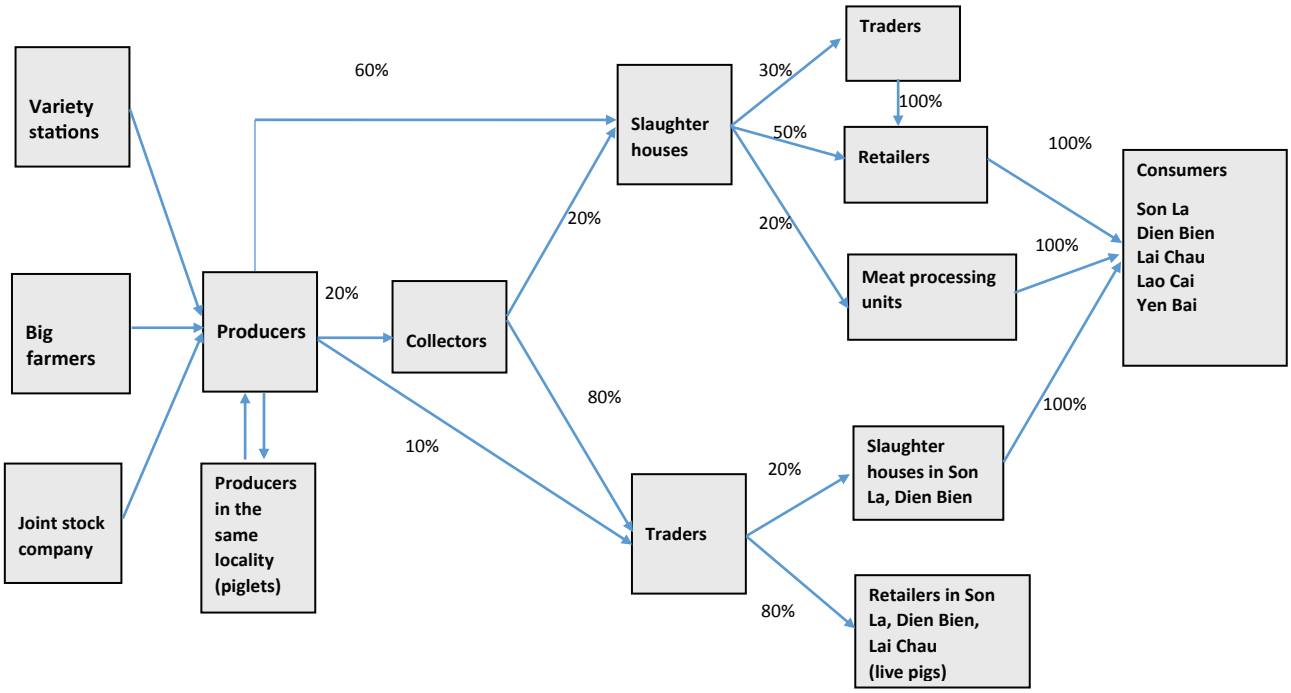


Table 7. Pig slaughterhouse's suppliers-facing business model

Main partner	Main activities	Value proposition	Relationships	Suppliers
Breed farms Input suppliers Banks	Collect pigs from farms Slaughter pigs Sell pork	Stable demand Competitive price Willing to pay at purchase Easily approachable whenever producers need to sell pigs	Provide feedback on prices and demand of pork by phone Oral agreement on prices and transportation by face-to-face meetings Feedback to farmers in case of low quality pigs	Producers and producer' groups Pig breeding farms
	Main resources		**Distribution channel**	
	Physical Land: 300 m² Slaughterhouse: 200 m² Manure storage: 200 m² Processing area: 85 m² Motor bikes Capital Fixed cost: 700 million VND Variable cost: 700 million VND Labour: five workers Others: Food safety certificate		Collect live pigs directly from farm houses Have area to keep pigs before slaughtering (pigs are kept one day to one week before being slaughtered).	

Cost structure	Revenue structure
Labour:VND12 million /month Fixed cost: (Knife+Pots:VND 18 million)+(Refrigerator+Scale:VND 12 million /3 years)+(Safety working clothing: 3 million/ year)+(motor+repair cost:VND 45 million / year) Waste treatment:VND 5million /year Operation fee:VND 1.5 million /year Asset depreciation:VND 5 million /year	Profit per day Local pigs:VND400,000 Extra-lean pigs:VND7,800,000 Hybrid:VND675,000 Total:VND 8,875,000 /day

Table 8. Pig slaughterhouse's customers-facing business model

Main partner	Main activities	Value proposition	Relationships	Customers
Breed farms Input suppliers Banks	Collect pigs from farms Slaughter pigs Sell pork	Stable supply of pork Guaranteed quality Good reputation	Long relationships (over 10 years) Make phone calls one day before transaction Cash payment Advance payment	Traders Restaurant Consumers Meat processing units
	Main resources		**Distribution channel**	
	Physical Land: 300 m² Slaughterhouse: 200 m² Manure storage: 200 m² Processing area: 85 m² Motor bikes Capital Fixed cost: VND 700 million Variable cost: VND 700 million Labour: five workers Others: Food safety certificate		- Slaughter pigs in clean condition and deliver directly to retailers, restaurants and markets - Ensure food safety during transportation.	

Constraints and challenges

- High cost of industrial feed
- Lack of access to adequate supply of good quality and appropriate breeds
- Limited access to veterinary and extension services and poor handling of animal diseases
- The hygienic management is considered to be poor; slaughterhouses and meat markets have poor hygienic conditions
- While women play a key role in pig production, their participation in trainings and in various initiatives are low
- High transaction costs in pig and pork marketing due to inefficient market systems and poorly developed rural infrastructure
- The lack of knowledge and market information places many farmers, especially the poor in remote areas, at a disadvantage
- The fresh pork meat transported is not properly packed and raises serious food safety issues
- Poor participation of smallholders in the planning and design of breeding programs (Roessler et al. 2008)
- Because of poor quality breeds, piglet mortality rates are high
- Lack of pig rearing skills and knowledge about animal health monitoring

- Poor management of pig waste
- Lack of proper understanding of the significance of housing on herd productivity
- Poor reproductive performance because of farmers' poor understanding of selection and feeding of gilts
- Lack of collaboration among authority agencies in controlling food safety, lack of controlling equipment

Interventions

- Upgrading of slaughter facilities and capacities as well as traditional market facilities
- Improving exchange of information and building a network of pig producers so that they can exchange production and market-related information
- Strengthening extension and veterinary services and creating alternative mechanisms to connect farmers with effective extension and animal health services
- Refining delivery of an appropriate pig husbandry and technology transfer package in a most efficient way
- Developing strategies for collective action (Lapar et al. 2006) and supporting other forms of collective organization with the idea of empowering farmers in input procurement and output marketing
- Establishing market-driven systems to increase the flow of information on prices and marketing mechanisms to pig farmers
- Increasing productivity by improving genetic quality of breeds and strengthening the quality control of pigs used for breeding
- Conserving local breeds and establishing government programs to develop support activities in this regard
- Developing and providing improved training for farmers, and improved housing and environmentally friendly systems for disposal of pig waste
- Providing practical on-farm training for farmers in remote areas, and direct transfer of breeding animals from research centres
- Improving rural infrastructure and access to markets is key for further development

Mapping of plum value chains

Background

There are up to 40,000 producers of plum in the Northwest region of Vietnam. Poor smallholders and ethnic minorities are the main producers and the profit generated from the sales of plum is a substantial part of their yearly income. For the Hmong ethnic minorities in Moc Chau district, the plum trees are especially important. The demand for plum production has increased due to exports to China and due to urban consumers' preference for diversity in their diet. It should be highlighted that many trees were removed because of a sharp fall in demand in the early 2000s. At that time many plum fields were converted to tea and maize fields. It is interesting to observe that the planted area in most districts is equal to the harvested area (Table 9). This means that all the orchards are currently bearing fruits and that there are no young plum orchards yet to bear fruit. This is an indicator that there has been no investment in planting new orchards or renewing the tree stock or planting new plum varieties in response to possible changes in market demand. There is no exact figure about the number of trees but it is estimated that the harvested area is about 2,400 ha. Each tree can bring 75–100kg of plums. Moc Chau remains one of the important districts with a high production volume of plums, which reached about 11,000 tonnes in 2013 (Table 10).

Table 9. The ratio of harvested area to grown area of plum (2010–13)

	2010	2011	2012	2013
Son La city	1.12	1.25	1.13	1.03
Quynh Nhai	1.24	1.24	1.08	1.04
Thuan Chau	1.05	1.07	1.12	1.13
Muong La	1.00	1.00	1.00	1.00
Bac Yen	1.00	1.00	1.00	1.11
Phu Yen	1.00	1.00	1.00	1.20
Moc Chau	1.05	1.02	1.02	1.03
Yen Chau	1.01	1.03	1.05	1.10
Mai Son	1.00	1.02	1.00	1.00
Song Ma	1.00	1.00	1.00	1.00
Sop Cop	1.00	1.00	1.00	1.00
Van Ho				1.03
TOTAL	1.05	1.04	1.04	1.05

Source: calculations based on Statistical Yearbook of Son La 2013
Note: Van Ho District was recently separated from Moc Chau district

Plum production and marketing involve a very complex value chain, consisting of two main marketing channels, one leading to China and another one to domestic markets. The plum season starts in May and continues until the second half of June. In the first two weeks of the season, farmers can get premium prices from plum sales. Subsequently, prices will go down because of availability of large volumes of ripe plums. The processing sector for

plum is underdeveloped in Vietnam. There is only one enterprise in the Northwest region of Vietnam that has small processing establishments (privately owned) producing dried plums (prunes), jams, jellies, compotes and liquors, which are mostly consumed locally.

Table 10. a) Harvested area (ha) and b) Production of plum (tonnes) in the districts of Son La province (2010-13)

a)	2010	2011	2012	2013	b)	2010	2011	2012	2013
Son La city	148	150	158	172	Son La city	1,067	1,081	1,200	1,440
Quynh Nhai	21	21	24	23	Quynh Nhai	25	28	40	39
Thuan Chau	60	60	60	61	Thuan Chau	421	421	389	407
Muong La	7	7	7	7	Muong La	22	22	22	18
Bac Yen	8	8	11	9	Bac Yen	25	26	33	25
Phu Yen	25	25	25	25	Phu Yen	227	178	175	178
Moc Chau	1679	1719	1684	1286	Moc Chau	12,690	15,794	12,733	10,982
Yen Chau	438	441	441	444	Yen Chau	3,234	3,486	3,531	3,560
Mai Son	43	42	23	23	Mai Son	150	155	83	76
Song Ma	16	16	16	12	Song Ma	60	65	108	44
Sop Cop	15	15	15	14	Sop Cop	67	67	67	63
Van Ho	-	-	-	337	Van Ho	-	-	-	2,878
TOTAL	2460	2504	2464	2413	TOTAL	17,988	21,323	18,381	19,709

Source: Statistical Yearbook of Son La 2013

Note: Van Ho District was recently separated from Moc Chau district

Value chain actors, flow of product and linkages

a. Value chain actors and their roles

- Farmers

For some smallholders in the area, especially for Hmong people, profit obtained from plum sales is their only income source. On average, one successful farmer can earn VND30–40 million from an orchard. This being said, there are not many incentives to improve quality of plum orchards because of lack of resources. Two types of plums are sold in the market: green and ripe plums. In general the ratio of green and ripe plums is 40/60 or 50/50, depending on the season. Harvesting is the main activity in plum production and farmers need to make critical decisions during this period. If farmers get signals that ripe plum prices will be low in the domestic market, they aim to pick up plums while green as early as possible. Hence, selling of this crop is largely opportunistic and depends on the interaction of the price for green plums for processing (mostly export to China) versus ripe plums for fresh consumption in local markets. Input costs are a bit higher for growing ripe plums in comparison with green fruits because they stay longer on the tree and require more labour and fruit fly chemicals. Because of the old age of trees, some plum orchards produce low quality plums. Farmers are aware of it and try to sell the production from these trees when they are green. Plums are picked up manually and require hired labour during the harvesting season. While small farmers rely on family labour and get help from relatives, farmers with large volumes hire labour and pay VND 100–200 thousand/working day.

- Collectors

There are a number of small and big collectors in Moc Chau district who have developed long-term relationships with upland smallholders. Most of the time big collectors prefer working with local small collectors because of the volume they can obtain from them. They have a clear idea about location of plum orchards and have a list of plum farmers and their home addresses. Usually, collectors specialize in several types of agricultural products and their activity changes depending on the season. They make oral agreements and purchase plums directly from farmers and this happens every year. Some of them may also participate in harvesting and bring their own labour during harvesting period. Based on the volume of collection and prices offered, collectors decide when to sell to wholesalers. In general, they do not keep purchased plums long and try to sell as soon as possible because of non-availability of storage facilities.

- Wholesalers (traders)

Wholesalers play a big role in the plum value chain and work with large volumes, facing market uncertainties from time to time. They are also important because they provide price information to collectors based on market demand and supply. One big wholesaler can have export contracts of up to 1500 or 2000 tonnes of green plum to China. If there is a high demand for green plums, some big collectors also get involved in trading and work in close cooperation with truck owners.

b. Flow of product, information and payment linkages

Figure 9 describes the value chain map of plum in Moc Chau district of Son La province. Depending on the agreement between farmer and collector, farmers can deliver collected plums to the collectors' private houses or collectors may come with their trucks and pick up from the fields or farmers' houses. This is a good opportunity also for motorbike owners who provide delivery services both for farmers and collectors. Early in the season there is high demand from collectors for green plums who sell them to wholesalers, who eventually sell to Chinese wholesalers. When there is a high demand from China, farmers concentrate on selling more green plums because they will be able to sell higher volumes and avoid dealing with an uncertain domestic market situation. Farmers do not sort picked plums based on the quality and sell their entire batch as a whole. Farmers' net profit from ripe plums is twice that of green plums in a good season but this is still not enough of an incentive to specialize totally in ripe plum production.

The purchasing price of plums will not remain the same during the harvesting season and will change depending on the volume of plums available in the local markets. As shown in Table 11, collectors communicate prices to farmers by phone and make agreements beforehand. The collectors' net profit from selling green plums to wholesalers ranges between VND 500–2000/ kg, while selling ripe plums returns VND 5000–7000/kg depending on the season. While there is a significant difference between two types of plums, collectors always diversify their purchasing volume and usually, they try to sell high volumes of green plums because the quality deterioration of ripe plums is high. As indicated in Table 12, collectors use appropriate packages to keep the fruits' quality while transporting. The quality grading can occur at the border by wholesalers but it is not a frequent practice. If wholesalers purchase plums from collectors at a higher price than they expected, they force collectors to separate plums based on the quality and set varying prices according to plum grades. Ripe plums find their market in the North, South, Red River Delta and Central Vietnam. It should be noted that Ha Noi (Long Bien Market) and Ho Chi Minh City are dominant national market destinations. It is also interesting to mention that plums delivered to Long Bien Market in Hanoi are sold onward by the wholesalers to many other traders and shipped to other provinces. Usually, good quality plums that can survive long distance transportation are shipped to Ho Chi Minh City.

In the case of green plum, wholesalers work with several collectors and make agreements based on price signals they get from Chinese wholesalers. They use different modes of transportation including motorbikes, buses and trucks to pick up produce from collectors and ship it to the Chinese border. The custom declaration and plum quality inspections are conducted before plums are exported to China. Usually, brokers at the Tan Thanh International border gate provide services related to customs declaration and documentation. The service cost for a 20 tonne truck is estimated at VND one million. Wholesalers in Vietnam make agreements with wholesalers in China well before plums arrive at the border. They have a complex relationship and any oral agreement may change on the spot. Plums are graded based on quality and paid accordingly by Chinese wholesalers. Depending on the year and demand from the Chinese market, plum exports from Vietnam reach 35–40% annually and 90–95% of all exports that consist green plums. The demand highly depends on Chinese domestic plum production and demand for processed plums in China. The selling pattern can change when domestic prices for ripe plums get significantly higher. Ripe plums are marketed mainly through a number of shops and traditional wet markets. In general, they do not leave a large profit to retailers and thus, retailers are not keen to get involved in a coordinated value chain for this commodity.

Figure 9. Plum value chains in Moc Chau

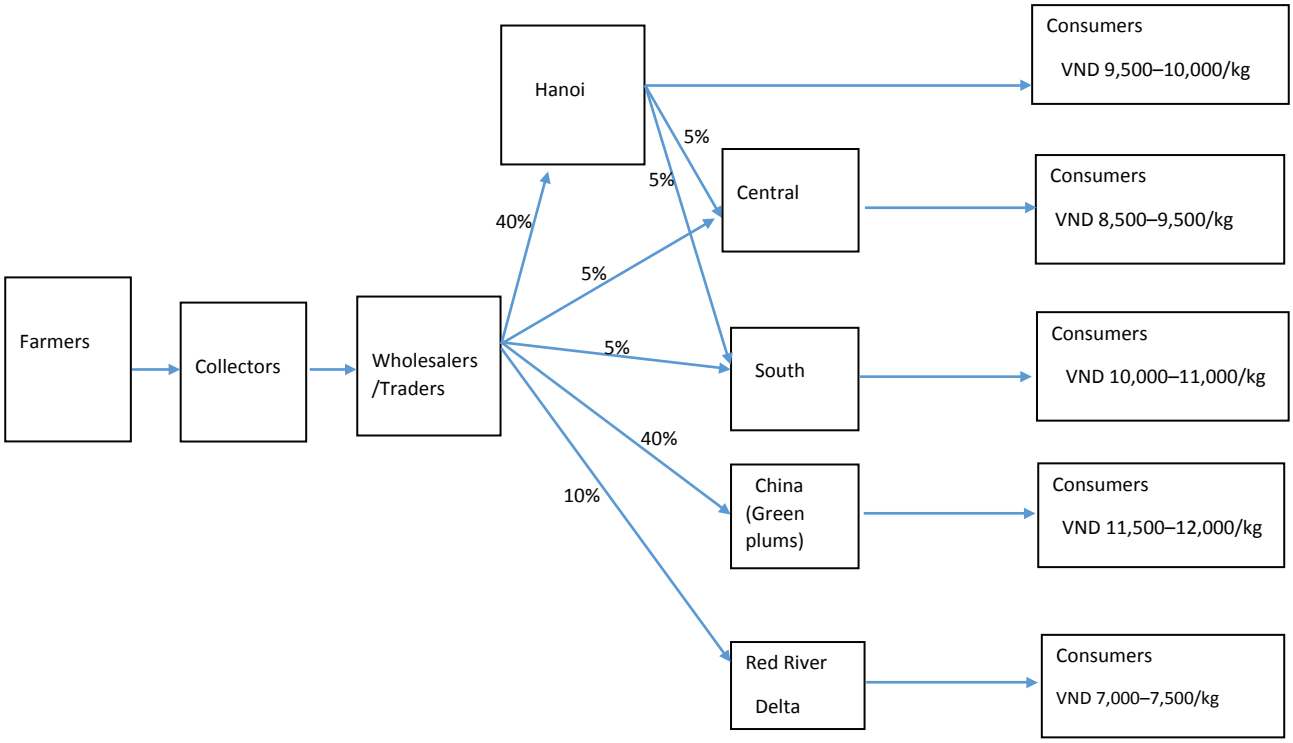


Table 11. Plum collector's suppliers-facing business model

Main partner	Main activities	Value proposition	Relationships	Customers
Small collectors Transport providers Bank Local Credit Fund	Purchase plums Grade plums (three types) + Type 1 (best) + Type 2 (medium) + Type 3 (low) sold to processing factory. Sell plums	Stable supply Competitive price Convenient locations for uploading plums to trucks Guaranteed quality with less damage during transportation Diversified quality levels to meet requirements of different markets	Randomly check quality of plums Mutual agreement on payment conditions Provide feedback on quality of plums and other factors related to trading activities	Retailers in five main markets including Hanoi, Central Highlands, Ho Chi Minh City, other provinces, and China
	Main resources		Distribution channel	
	Physical: boxes, packages, trucks, warehouse, motorbike Labour: two family labourers and five seasonal contract labourers Financial: Variable capital		Appropriately package to protect plums from damage. Control the amount of plums stored each time to ensure the quality during transportation. Directly deliver plums to clients	

Table 12. Plum collector's customers-facing business model

Main partner	Main activities	Value proposition	Relationships	Customers
Small collectors Transport providers Bank Local Credit Fund	Purchase plums Grade plums (three types) + Type 1 (best) + Type 2 (medium) + Type 3 (low) sold to processing factory. Sell plums	Stable supply Competitive price Convenient locations for uploading plums to trucks Guaranteed quality with less damage during transportation Diversified quality levels to meet requirements of different markets	Randomly check quality of plums Mutual agreement on payment conditions Provide feedback on quality of plums and other factors related to trading activities	Retailers in five main markets including Hanoi, Central Highlands, Ho Chi Minh City, other provinces, and China
	Main resources		Distribution channel	
	Physical: boxes, packages, trucks, warehouse, motorbike Labour: two family labourers and five seasonal contract labourers Financial: Variable capital		Appropriately package to protect plums from damage. Control the amount of plums stored each time to ensure the quality during transportation. Directly deliver plums to clients	

Constraints and challenges

The main challenges involve both technical production and uncertainties in marketing of the produce.

- In some orchards fertilizers are over-utilized with the purpose of boosting the productivity of plums. This however, delays development of plums and lowers their market prices because of late harvesting.
- Because of the uncertainty of plum prices, which depend highly on many uncontrollable conditions (i.e. climate, demand from China, volume of plums in the market), farmers do not put extra efforts to take care of plum trees and smallholder investment that should target improving plum orchards is very low.
- Farmers do not have an ability to absorb risk in a bad agricultural year and depend on funding which is not available. Most of the orchards have not been properly taken care of for 30 years and currently many of the plum trees are considered to be old. In recent years, many plum farmers abandoned their orchards or cut plum trees down because of poor quality of produce and switched to growing other agricultural crops.
- Collectors and wholesalers use inadequate packaging and handling practices, and they do not make proper transport arrangements. This results in quality deterioration along the chain. While the plum value chain is complex, it is not well integrated into a coordinated value chain, which has been established for other horticultural products within Vietnam.

Interventions

The key interventions in this value chain include:

- Introducing new production techniques to increase farmers' incomes, such as introducing intercropping together with maize and other crops suitable to uplands
- Additional attention should be put on introducing new production technologies and adopting innovative post-harvest techniques:

a. improving plum grading

b. packaging

c. transportation

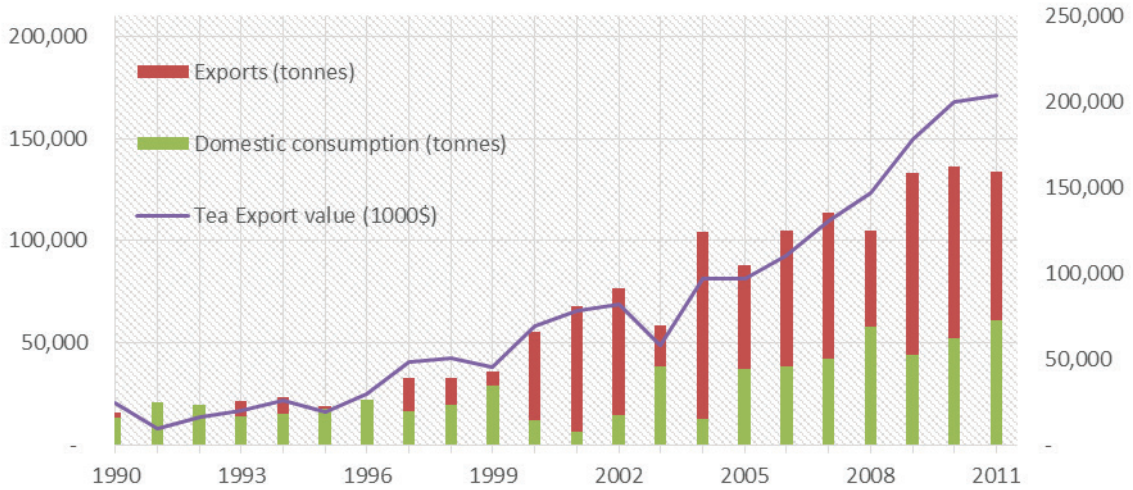
- There is also a need to expand consumer channels and networks within Vietnam because of the high nutritional value of plum
- Because of high uncertainty in the Chinese market for green plums, there is a need to invest in the plum processing industry of Vietnam, which is currently underdeveloped
- Further development of community-ecotourism in the area will help bring investment to plum orchards, which receive plenty of tourists during the flowering season

Mapping of tea value chains

Background

This chapter focuses on the value chain for tea in northwest region of Vietnam. This region is suitable for growing tea because of its mountainous topography and temperate climate (Saigenji and Zeller 2009). There are numerous motivations for selecting tea as a commodity of interest. Tea is a high-value commodity and more than 64% of the national production has been exported in the past ten years (Figure 10). It is significant because it creates additional income and employment opportunities for rural inhabitants of the northern uplands (ADB 2004). Tea is largely grown by ethnic minorities and poor smallholders. The widespread growth of the tea sector has created a sizeable labour market for tea pickers and workers in processing industries (Tran et al. 2004).

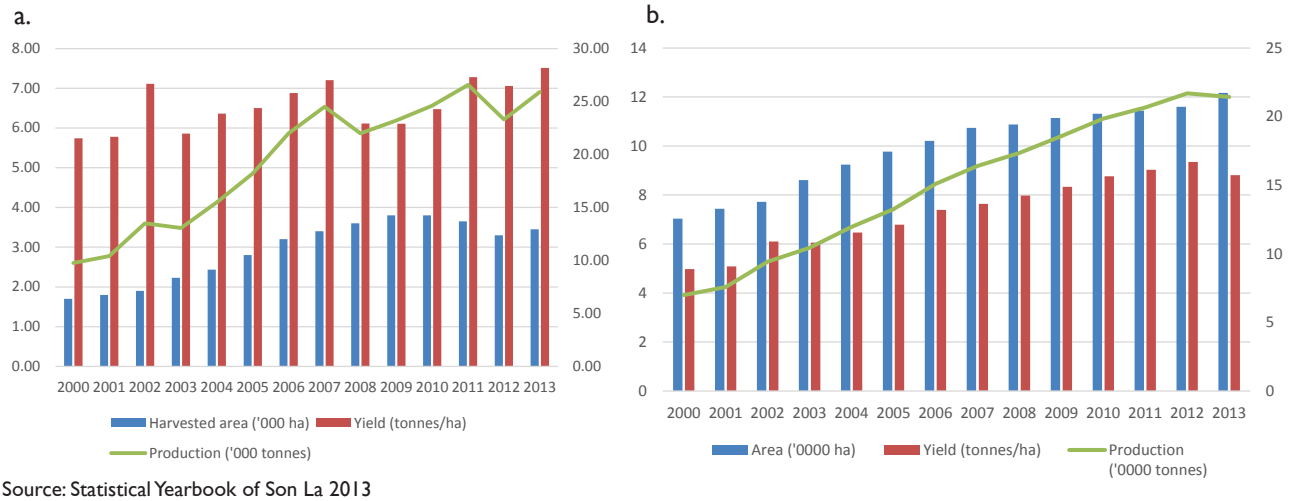
Figure 10. Tea export quantity, value and domestic consumption in Vietnam (1990–2011).



Source: FAOSTAT (2015)

The major players in the tea industry include smallholders, processors, exporters and retailers. Even though state-owned companies were influential in dictating prices and controlling the tea market, the development of private companies has increased competition in recent years. This has obviously impacted on both the conventional tea market and farmers' livelihood. It played a key role in rural development and contributed to economic growth of the country.

Figure 11. a) Harvested area, yield and production in Son La (a) and Vietnam (b), respectively (2000–13).



Source: Statistical Yearbook of Son La 2013

As Figure 11 shows, tea production in Son La province and in Vietnam in general increased over the years. While in the case of Vietnam, increase is due mostly to the expansion of tea fields, the production boost in Son La is due also to productivity improvements with yields moving up and down over the years. The provincial government issued policies to support the tea industry by providing land grants, loans and assistance in technology transfer. Despite these facts, tea productivity still remains low.

Value chain actors, linkages and flow of product

a. Value chain actors and their roles

- Producers

Moc Chau district (including Van Ho district) is the largest tea growing area in Son La (Table 13), and the tea from this district benefits from a relatively good reputation in Vietnamese urban markets. Tea growing households are mainly members of agroforestry farms, which belong to state or joint-stock companies. Their products are closely connected to factories or companies, which lease land to them. The enterprises support farmers in capital, agricultural inputs such as fertilizers, seeds, plant protection drugs and different types of machines used for tea production. As compensation, farmers sign a contract to sell their whole tea harvest to the relevant factories. There are also small tea processing factories with several constraints in the marketing of their products.

Despite a trend towards more plantation style vertical integration in Vietnam, smallholders still produce large amounts of tea and play a key role in the tea value chain (Wenner 2011). The development of private sector traders and processors has enlarged the size of the tea market and formed a large scope for the poor to expand their production. Tea farming is essentially a family business, which requires year-round work because it is harvested multiple times in a year. Generally, there are three ways of starting a tea plantation; sowing tea seeds, planting small tea shrubs coming from a nursery, or vegetative propagation by planting cuttings from a mother tea bush into the ground. On average each smallholder has around 0.5 ha for the cultivation of tea and production from this field can reach up to 10 tonnes. Tea farmers are not price setters and hence highly depend on other value chain actors' actions. There are three types of smallholders existing in the context of Moc Chau tea producers; this can be also generalized to the whole of Vietnam. The first type is unlinked farmers who are independent in the tea production and marketing. The second one is those who own tea fields but make a contract with a tea processor to deliver their tea production. The third category is made of farmers who work in the lands of tea processing companies and are employed by them.

Table 13. Tea harvested area (a) and production (b) in the districts of Son La province (2010–13)

a)	2010	2011	2012	2013	b)	2010	2011	2012	2013
Son La city	3	3	3	-	Son La city	20	22	21	-
Quynh Nhai	-	-	-	-	Quynh Nhai	-	-	-	-
Thuan Chau	168	218	233	264	Thuan Chau	1,512	1,962	1,990	2,482
Muong La	-	-	-	-	Muong La	-	-	-	-
Bac Yen	83	83	83	89	Bac Yen	40	40	40	44
Phu Yen	210	210	210	210	Phu Yen	845	945	942	944
Moc Chau	2,679	2,536	2,535	1,668	Moc Chau	20,199	20,762	19,520	16,980
Yen Chau	214	214	214	233	Yen Chau	1,095	1,166	1,191	1,359
Mai Son	74	74	74	78	Mai Son	188	200	199	195
Song Ma	-	-	-	-	Song Ma	-	-	-	-
Sop Cop	-	-	-	-	Sop Cop	-	-	-	-
Van Ho	-	-	-	896	Van Ho	-	-	-	4,614
TOTAL	3,431	3,338	3,352	3,438	TOTAL	23,899	25,097	23,903	26,617

Source: Statistical Yearbook of Son La 2013

Note: Van Ho District was recently separated from Moc Chau district

While unlinked farmers are engaged in their own business and have control over production and marketing, farmers in the other two categories belong to a contract farming scheme. In the contract farming setting, the processor provides inputs, technical training, and employment-related benefits. However, the processor determines the quantity and price of the tea harvested. All the management decisions are also taken by the processor. The farmer supplies labour and has limited control over prices set. One constraint for the progress of contract farming within the tea value chain is that companies are dependent on uncertainty in the export markets and have no real strategy to promote their product in local markets. Unlinked farmers do not enjoy benefits offered by vertically integrated value chains with processing companies. In particular, poor unlinked farmers lack access to funding to purchase inputs, even though the market expansion for tea opens good prospects for them.

- Collectors

Most of the time private collectors purchase tea from unlinked farmers and sometimes from farmers under contract with a tea company. They operate at commune level and use their motorbikes (sometimes cars and trucks depending on the volume) to transport fresh leaves to private processors in the area. Since tea leaves have to be processed within six hours of plucking, collectors agree the volume and price beforehand with private processors and only process the delivery after having secured an outlet.

- Wholesalers

Private processors are often linked to domestic retailers via wholesalers, who also work with traders from other provinces. They have more capital and transportation modes and an extensively developed network of retailers. They mostly trade dry tea and the annual volume for one big trader may range between 10 and 50 tonnes.

- Tea processing companies

Processing companies are key players in the formation and functioning of tea value chains (ILRI 2014). They produce three types of processed tea: green, oolong and black. The black tea is produced for export and it constitutes 99% of total production (Kok 2009). The rest of the tea production is processed as green tea; 95% of this production is consumed domestically. Processed tea leaves are divided into hand rolled and crush tear curl, the latter being mechanically processed. Crush tear curl teas are of poor quality and mostly sold in the form of tea bags (Rasmussen and Rhinehart 1999). In Son La province there are 16 designated enterprises that operate in the tea processing industry; 13 are located in Moc Chau district, two enterprises in Mai Son district and one in Phu Yen district. There are also several small tea processing enterprises that operate under poor conditions. Tea products from small family

establishments usually do not ensure quality and give negative effects on the Son La tea trademark. For example, Co Do Company can purchase three tonnes of fresh tea. Its final tea products consist of green tea and mountain oolong tea accounting for 90% and 10%, respectively. The total dried tea production of this company is 600 tonnes/ year.

- Domestic retailers

Dry tea retailers work within several types of outlets to distribute their wares, of which the main ones include traditional markets, supermarkets, teahouses and tea bars. For instance, teahouses are located in crowded places and there is immense competition to provide better tea among owners of teahouses. Supermarkets are the main end points in which prices are transparent, quality assured and shopping is very convenient. Tea processing companies have their own retailers in urban areas and they have good contacts in terms of getting to know prices and volumes of the product available.

b. Flow of product, information and payment linkages

Figure 14 describes the tea value chain map for Moc Chau district. In the contract farming business, based on the contract between farmer and factory, farmers have to sell all their production to the factories. Tea processing factories invest in farms, provide agricultural inputs and machinery. For example, households who have a contract with Co Do Tea Company are responsible for supplying 1.5 tonne/ha of tea leaves, of which 150kg is not paid for (Table 14). If a farmer is able to exceed the quota, he can sell additional volume for higher prices to the tea processing company or in the domestic market via collectors. Usually, farmers are able to reach 2 tonnes/ha. Those households who do not have a contract with a factory (unlinked farmers) are able to sell their products to collectors who do not grade tea quality and pay a fixed amount for the whole harvest (VND 6000 /kg). For example, if the tea is sold to a processing company, it is graded into two categories (Grade 1 and Grade 2) and paid differently (Grade 1 receives VND 6500 /kg while Grade 2 gets VND 4000 /kg). There are also some cases where contract farmers do not sell the tea directly to tea companies but negotiate with local collectors for better prices. However, this link is not very clear and requires an in-depth study along the chain. Tea companies concentrate on export markets but also try to diversify their market by selling around 30% of their production to the domestic market (Table 15). In the second channel, non-contract farmers sell fresh tea mostly to collectors (who may sell to large or small processors) or directly to small-scale processors. Alternatively, they may process tea leaves at home and then sell dry tea to wholesalers. Transactions in this channel are based on market principles rather than on a coordinated value chain (no formal integration with other actors). Local collectors work closely with private processors and each processor has a preferred collector. Local collectors are especially active in hilly areas where farmers do not have direct access to private processors. This chain leads to the domestic market in which wholesalers play a key role in purchasing ready tea in mass amounts and bring it down to lowland areas. Usually, wholesalers have oral agreements with whom retailers they work. Sometimes they bring the product to the wholesale market directly and sell at the price determined by the market or at a pre-agreed price with the retailer.

Figure 12. Tea value chain map in Moc Chau.

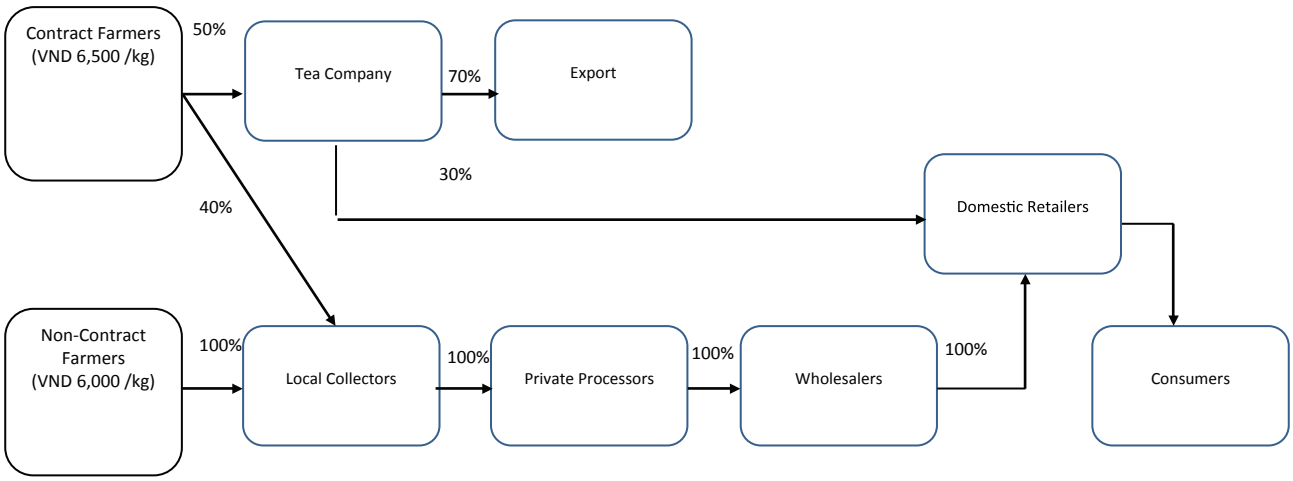


Table 14. Tea company's suppliers-facing business model

Main partner	Main activities	Value proposition	Relationships	Suppliers
Farmers Input suppliers (fertilizers, pesticide, etc. Transport providers Bank	Manage land allocated to farmers Provide technical training to farmers Purchase fresh tea leaves Process and sell tea	Willing to pay VND 500 /kg higher than market price. Provide technical trainings Offer micro-credit to farmers in need, especially to those who develop new tea production area. Contract farmers have to sell a minimum of 1.5 tonne of fresh tea per ha (grade 1 only) to the company	Daily communication with producers to purchase tea in harvesting season. Regular meetings before harvest season to exchange information on volume and prices Timely resolution of conflicts with producers, e.g. disagreement about volume and price of fresh tea	Contract farmers Large (>1 ha): 10% Medium (3000m²–1 ha): 70% Small (<3000 m²): 20%
	Main resources		Distribution channel	
	Physical Trucks Factory and equipment Warehouses Tea land area: 200 ha Labour: 20 regular labourers Financial: variable capital		For small producers: they have to deliver fresh tea to company using their motorbikes For larger producers: company has a truck to collect tea in the field at the time of harvest. Fresh tea is stored in warehouses of company prior to processing. After processing, tea is packed in various boxes and then transported by truck to port (for export market) and retailer stores (for domestic market)	

Cost structure (1000 tonnes/year)	Revenue structure
Purchasing fresh tea leaves: 3000 tonnes x VND 6500 /kg = VND 19.5 billion Collecting, transporting: 3000 tonnes x VND 500 /kg = VND 1.5 billion Processing: 3000 tonnes x VND 1500 /kg = VND 4.5 billion Packaging and transporting to sell: 15 times x VND 20 million /time = VND 300 million Total cost: VND 25.8 billion	(3000 tonnes of fresh tea leaves equivalent to 600 tonnes of dried tea – conversion rate of 5/1) 1. Total revenue: 600 tonnes x VND 55,000 /kg = VND 33 billion 2. Total profit: VND 33 billion – VND 25.8 billion = VND 7.2 billion /year

Table 15. Tea Company's customers-facing business model

Main partner	Main activities	Value proposition	Relationships	Customers
Farmers Input suppliers (fertilizers, pesticide, etc. Transport providers Bank	Manage land allocated to farmers Provide technical training to farmers Purchase fresh tea leaves Process and sell tea	Supply high quality tea (First grade tea) Apply quality control standards Competitive price Diversified tea products Convenient distribution locations	Buy and sell tea by contract Have long-standing relationship	Contract farmers Large (>1ha): 10% Medium (3000m²–1ha): 70% Small (<3000m²): 20% Domestic wholesalers Retailers Importers
	Main resources		Distribution channel	
	Physical Trucks Factory and equipment Warehouses Tea land area: 200 ha Labour: 20 regular labourers Financial: variable capital		Transport high-quality green tea to Hai Phong port to export Package and sell tea to wholesalers, retailers in Hanoi and other provinces Deliver tea products by trucks of company	

Constraints and challenges

The study observes that tea farmers face a number of constraints:

- Pesticides are highly used, which has raised several health issues for both farmers and consumers, and has a negative impact on the surrounding environment.
- While contract farmers get agricultural training from tea processing companies, unlinked farmers still lack proper knowledge on cultivation and post-harvest handling activities.
- Access to improved technology is limited both to contract and unlinked farmers.
- There has been increased deterioration of land quality over the years, with no investment to improve soil conditions.
- While farmers have access to privileged credit, they still do not want to obtain it because they fear they may not be able to repay the money.
- Tea farmers are price takers and highly dependent on prices set by traders and tea processing companies, which limits their ability to forecast and increase profit margins.
- Processors use low levels of technology and upgrading is usually by scale of operations rather than by new technology adoption.
- Export volumes may change at any time, hence, the situation is very uncertain for exporters, which limits their ability to play an active role in world tea markets.
- Overall tea quality is low and emphasis is more on volume rather than on quality, which does not allow to capture new export markets.

Interventions

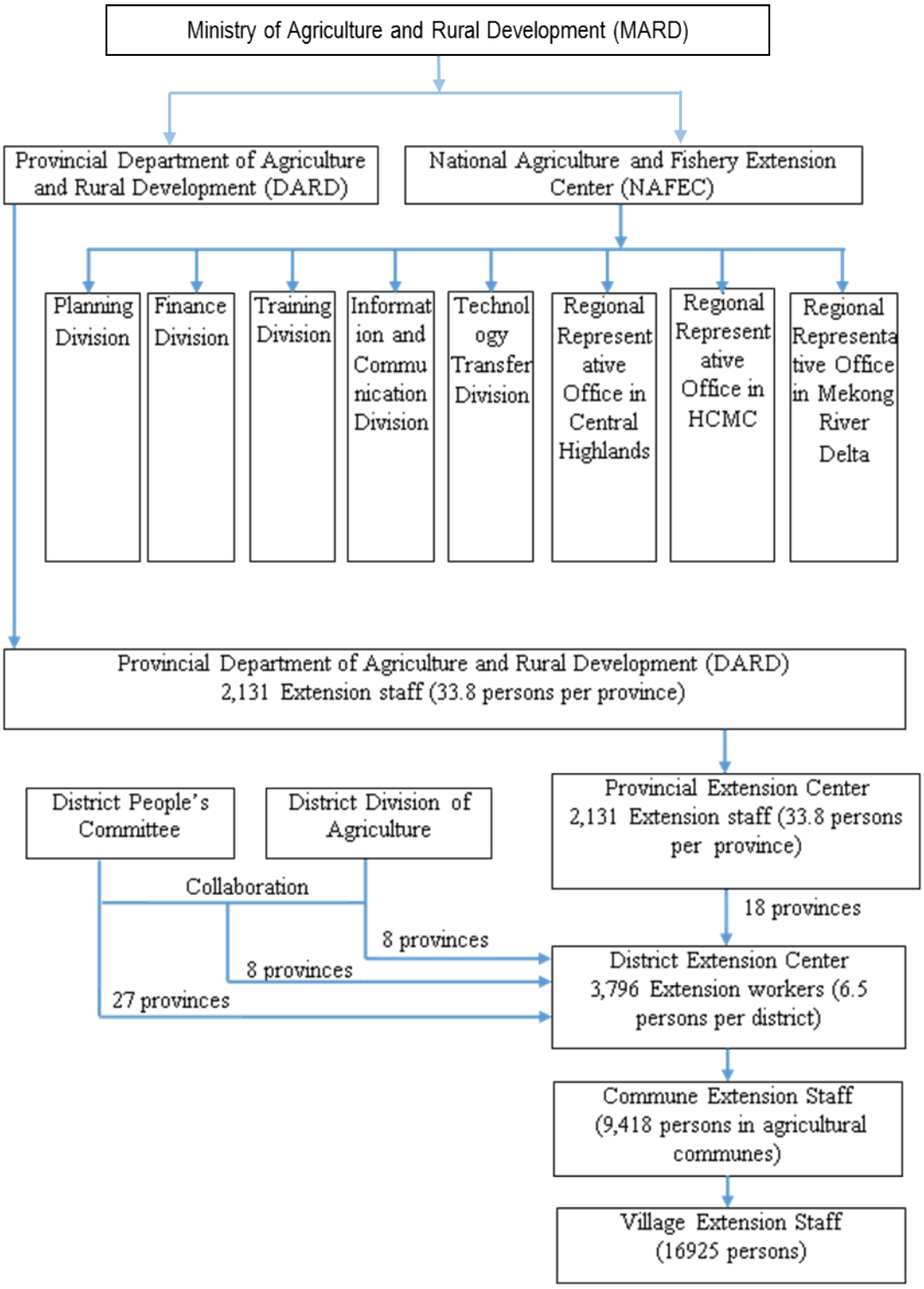
- The use of chemicals should be limited and the introduction of organic agriculture principles would bring new opportunities and markets for both farmers and processors.
- The quality of the tea produced and processed by tea companies should be improved by introducing new technologies in the field and in the processing process.
- Focus should be towards addressing coordination and institutional problems surrounding tea value chains and stronger linkages should be created, especially those which support poor farmers.
- Extension support, especially to unlinked farmers, is key to keep poor households in tea production.
- Because of volatile export markets, there is a need to develop the domestic market and improve branding of local tea.
- Export markets should be diversified.

The partner network around the value chains

Extension services

Provision of extension services is under the responsibility of the Extension Department of the Ministry of Agriculture and Rural Development (MARD) and the provincial and district Extension Services. The government extension service (Figure 13) plays a key role even though there are also research institutions, enterprises and local and international NGOs that provide short-term extension services to farm households. Extension services focus on providing agricultural trainings, field trials and introducing new technologies. Extension officers also provide information related to changes in policy and guidance in crop cultivation and livestock rearing. While both private and public sectors participate in the provision of animal health, it is primarily under the shoulders of the public sector, which is structured from the national to the commune level (ILRI 2014). In this regard the subordinates of the Department of Animal Health within MARD provide animal health services and veterinary medicines. Veterinary officers' tasks include implementing animal disease control activities, supplying livestock vaccines and conducting animal quarantine campaigns, among others. Feed and veterinary drug providers also deliver services to support livestock producers. In the case of tea farmers, VINATEA and their factories provide extension services to contracted farmers while unlinked farmers get support from provincial departments of agriculture and rural development (DARDs). In the areas studied, access to extension and veterinary services is difficult and service is mostly in the form of providing training courses. Because of the difficulty and high cost of traveling to upland hills, provision of these services minimal. Research institutions and NGOs also provide extension services, which is typically done by introducing innovations in agricultural and livestock production. However, due to limited funds and the short lifecycle of projects, scaling up and transferring knowledge is difficult. It should also be noted that prevailing support is more targeted to rice-producing farmers while other crops and especially livestock producers have difficulty in accessing farming information. It is clear that to develop both extension and veterinary services, more funds and external support in terms of developing new ways of delivering services would be required.

Figure 13. Structure of agricultural extension system in Vietnam.



Source: National Agriculture and Fishery Extension Center (NAFEC)

Input providers

The primary input providers are companies that produce or import various types of inputs. They do not get engaged in a direct relationship with farmers but mostly conduct field demonstrations on how to use inputs if they are new to the area. Input providers set up their linkages with distributors (sales agents) in districts and shops located in the

small town centres and close to main roads. Commune and village level retailers purchase from distributors and sell to farmers. It should be noted that most of the inputs in Son La province are supplied to farmers through private trading systems. In mountainous areas transportation costs are high and thus increase the total input cost. Besides retailers, distributors also work closely with extension workers, collectors and village leaders to introduce inputs to farmers. Input supply has emerged as another big constraint for most of the farmers, particularly those in remote upland areas. Due to relatively high input costs, farmers often request to defer their payment. They also engage in formal and informal credit transactions to purchase inputs, which is one of the reasons they need to sell their output right after the harvest. While this mode of payment is advantageous for those farmers who are cash constrained, such farmers end up paying higher prices for inputs. This type of payment is offered by collectors who have very close relationships with farmers. Price of input materials like fertilizer, pesticides or new varieties are expensive and unaffordable for the poorest of the poor and for the poor, who account for a high proportion of the districts' entire population.

Agriculture-related associations

a. Farmer organizations

Farmer organizations have been created by the government and their performance is regulated by the State. Their operations cover various aspects of collective agricultural support and advisory services. Vietnam Farmers' Union is among the most well-known and there are also small-scale farmer clubs, groups and cooperatives. In general their roles are similar to extension providers but they have very limited funding. They get involved in policy dissemination and forming linkages among social groups. Their role also includes strengthening the bargaining power of farmers. Ideally, they need to play a key role in reducing transaction costs and coordination problems. In the case of the areas studied, farmers' wanted that these types of organizations help them obtain credit and provide more in-depth and demand-driven agricultural consultation. However, because of inadequate funding, these organizations limit their activity to sharing knowledge already existing in the local area. It is also the case that sometimes banks give loans to farmers via farmer unions. This, however, should be studied further to get a better idea of the scope of this activity.

b. Vietnam Women's Union

The Vietnam Women's Union aims to increase the capacity and skills of rural women and promote gender equality. In the areas studied, this organization has helped women to get agricultural training and improve access to credit. However, there is a need to develop strategies in the areas studied, which would connect girls and women belonging to ethnic minority groups to the activities of this organization.

c. Village Management Board

Village management boards play a significant role in village-level decision making, and they consist of village leaders who represent the village members. The board reports to commune authorities and all agricultural activities or action should are channeled through this network. Especially in the hilly parts of the areas studied, village heads have significant roles in guiding and leading those involved in agriculture.

d. The Vietnam Tea Association

It is a commodity-specific association which provides services in technology transfer, promotion of trading and agricultural training for tea producers. They also have a role in advising government about tea development policies and regulations. They organize tea-related social activities with communities.

Finance institutions

State-owned banks are major credit providers in Son La province. The Vietnam Bank for Agriculture and Rural Development (VBARD) and the Vietnam Bank for Social Policies (VBSP) are the two dominant rural credit providers.

In the areas studied, farmers can get access to VND 5 million on average, with a range of VND 500,000 to 20 million. Women's and Farmers' Unions also provide credit but the loan amount is insignificant. In general, few producers have access to credit and cumbersome borrowing procedures are the main obstacles to obtaining the amount desired in the areas studied. Hence, significant numbers of smallholders cannot meet the conditions required to access credit. Poor farmers are also fearful of taking loans because of the high risks of not being able to refund the amounts borrowed. Access to low-interest credit should be enhanced to mitigate farmers' risk of being caught in a poverty trap linked to the uncertainty of incomes from maize, where credit is mainly needed to finance inputs.

Recommendations

- Extension services should be moved towards demand-driven and market-oriented support rather than top–down enforcement of planned activities.
- There is need to strengthen linkages between research and extension to deliver innovations and technology transfer.
- Increased investment to increase knowledge of extension and veterinary officers and provision of short-term trainings with the support of local and international Non-governmental organizations (NGOs). It is also necessary to increase the number of available field officers for more effective and supportive services.
- Promotion of collective action in the form of farm clubs and farmer organizations to support farmers and get better access to rural credit.
- Terms and conditions of credit and subsidy guidelines should be simplified, which should include enhanced access to low interest rural credit for the poor.
- Credit and subsidy policies should be restructured in a way to support the introduction of new technologies and improved agronomic practices. For example, rather than only financing input costs, it is more innovative to finance the cost of adopting new technologies and practices.
- International NGOs need to contribute to develop capacity of not only extension and veterinary services but also work closely with farmer organizations at the grassroots with the purpose of reaching those who really need support in the fields.
- It should be recognized that rural development projects should include extension support packages via which trainings and introduction of innovations and technology transfer related activities could be organized.

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