VIETNAM ACADEMY OF AGRICULTURAL SCIENCES

FIELD CROPS RESEACH INSTITUTE

CENTER FOR AGRARIAN SYSTEMS RESEARCH AND DEVELOPMENT

SUMMARY REPORT

RAPID VALUE CHAIN APPRAISAL OF MAIZE AND TEMPERATE FRUIT IN SON LA PROVINCE

Ha Noi, December 2009

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1. Objectives of the Value Chain Appraisal

Analyse the existing value chain for maize and temperate fruit in Son La Province and identify potential intervention points to improve the linkage of farmers to market with the overall objective of increasing income for small households.

2. Methodology

- Participatory market research at community level. This activity was jointly conducted with other project partners.
- Rapid value chain appraisal
    - For the maize value chain, 40 producers were interviewed in both Mai Son and Moc Chau District; 15 traders and collectors were interviewed in total from Mai Son, Moc Chau and Hoa Binh Districts.
    - For the plum value chain the study focuses on Moc Chau District of Son La Province. 20 producers were interviewed, with almost all living in Pieng Sang Village, Phieng Luong Commune, Moc Chau District. 10 traders and collectors working in Moc Chau town, Son La were also interviewed.

3. Participants

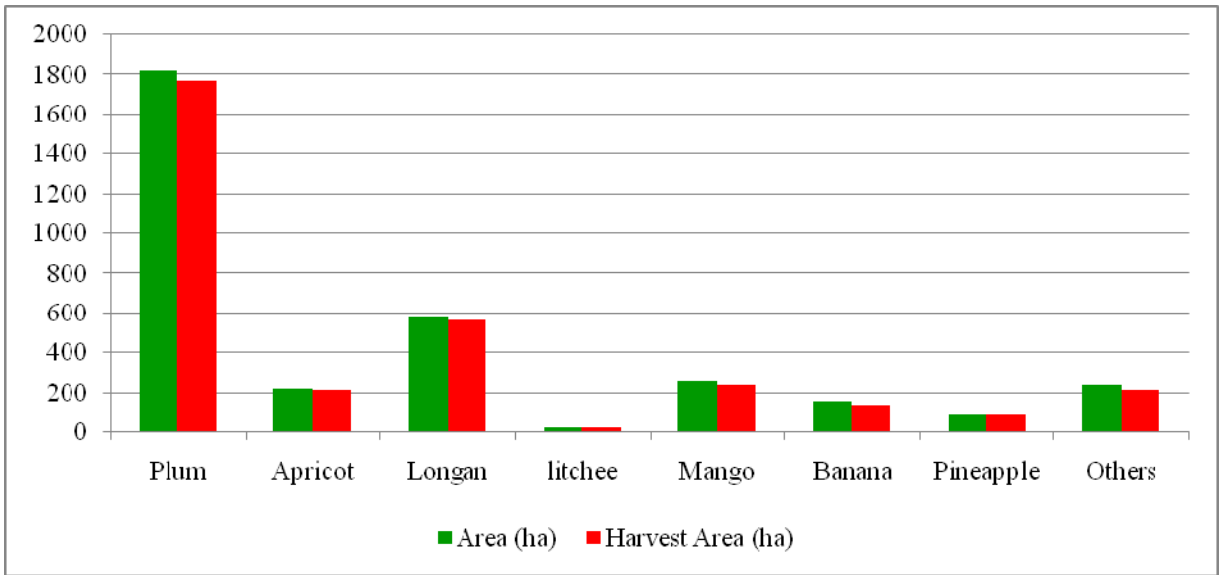
- 2 researchers of CASRAD,
- 1 teacher from Hanoi University of Agriculture
- 1 teacher from Northwest University
- 2 local cadres
- 2 international experts

I. FRUIT PRODUCTION AND TRADE IN SON LA PROVINCE

1.1. Fruit production

1.1.1. Fruit production based on plum systems

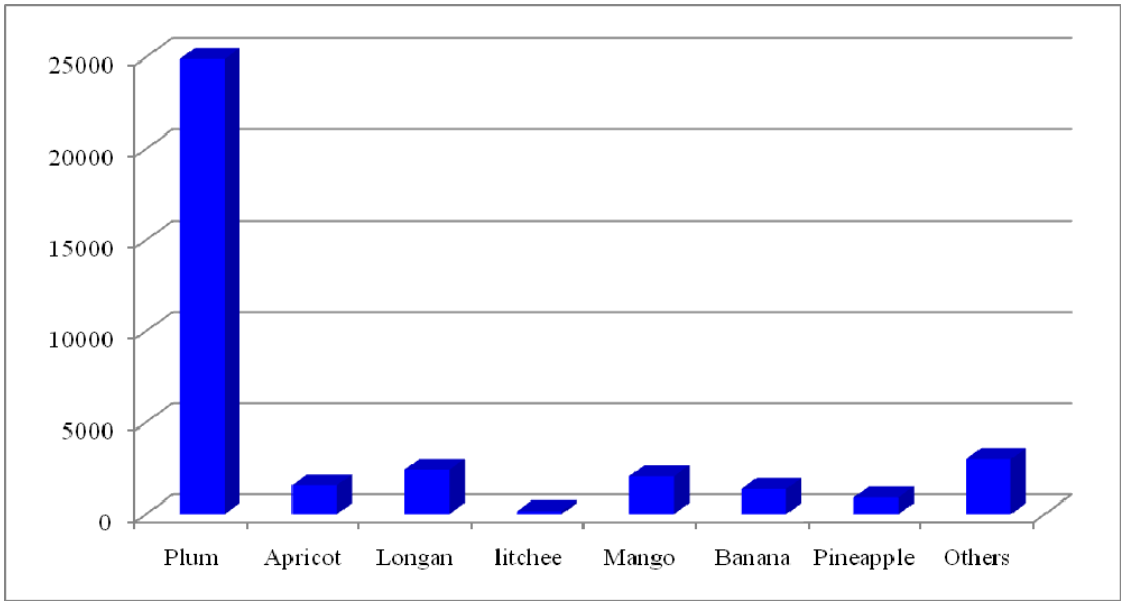
Chart 1: Area of fruits in Moc Chau district



Source: Moc Chau Department of Agricultural and Rural Development- 2009

In recent years the area planted to plum has increased slightly, however most of the plum production areas in Moc Chau are old and give low output. However if trees are less than 10 years old, it is feasible to restore the old plum gardens and apply advanced technical methods to enhance yield and improve quality. In relation to fruit production in Moc Chau, plum production has the largest area, accounting for over 50% total fruit area followed by longan with 17%.

Chart 2: Output of fruits in Moc Chau district



Source: Moc Chau Department of Agricultural and Rural Development- 2009

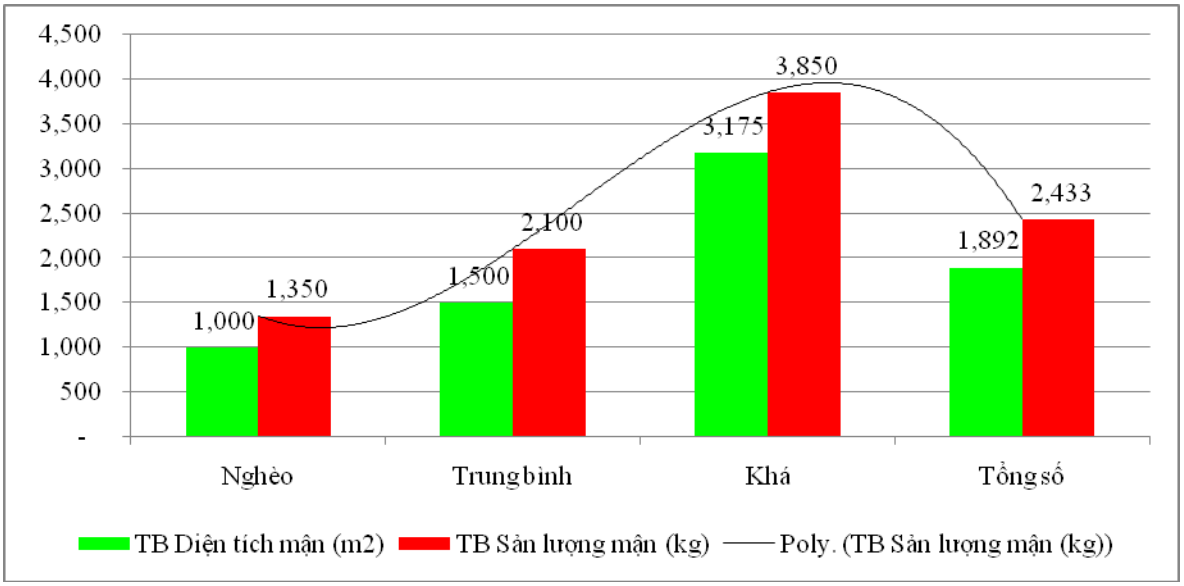
In Moc Chau district, plum production represents the highest output (tons) of all fruit grown in Moc Chau. However plum production has never contributed a large amount to farmer incomes. The reasons for this will be discussed in this report.

1.1.2. Plum production at household scale

According to survey results from 20 plum producers in Pieng Sang Village, Phieng Luong Commune, the average plum area is nearly 1000 m^2[1] for poor producers (22%) and these households have never sold plums to the market. Middle income households (58%) had slightly larger production areas of 1500m^2 on average, however wealthier households (20%) can have triple bigger area than that of the poor household, with an average area of 3175 m^2/household. A few households in Pieng Sang Village have up to 10000 m^2/household. The larger the production area the stronger the labour pressure at harvest time which may result in households harvesting early and selling green plum rather than ripe plum.

[1] Some poor household grow a few trees in the garden for home consumption and do not sell plum. The quality is usually low, and rarely do they look after plum cultivation. Therefore, this survey will focus more on those households growing plum with a larger area and who have product to sell to the market.

Chart 2: Average area of plum in the households (Poor, Middle income, High, Average)



(Green = total plum area, Red = output in kg)

In general it was found that households are not very interested in plum production due to unstable prices and do not pay much attention to taking care of plum orchards to prevent insect and disease damage. Many plum garden have been cultivated for 10 – 20 years and with little attention given to production, plums are of low quality and output is also low. Poorly maintained orchards represent a key challenge for the development of plum from Moc Chau district. As shown in the photos below, plum garden fallow is on the rise as households do not consider plum as a competitive production activity when compared to other activities.

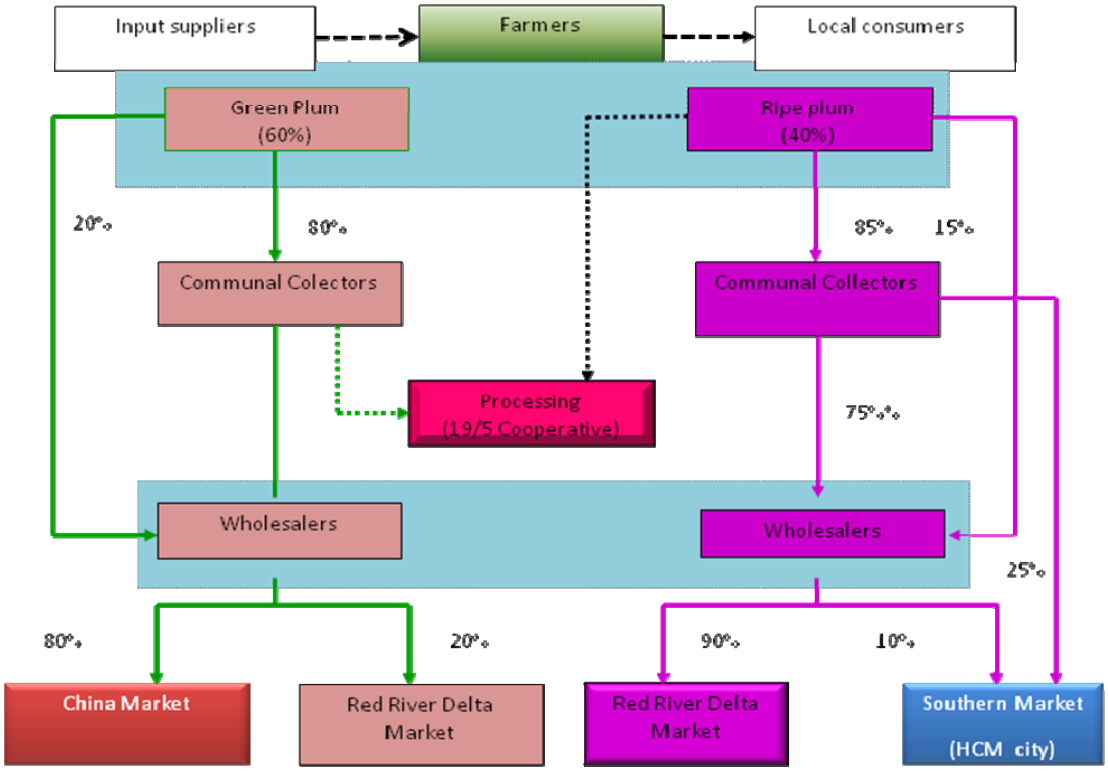
Plum garden fallow is on the rise

1.2. Plum market

1.2.1. Trading of producers

Interviews with farmers in Phieng Luong Commune found that farmers can sell two kinds of plum to market: green plums and ripe plum. Normally, green plum is harvested at the time when the fruit is immature; the skin has dark green color mingling with a little pink color and the sugar content of the plum is low. With green plum farmers usually harvest all plums at the same time and sell for a fixed price/kg. Green plums have been sold since 2006, when some traders found out about a market opportunity to sell green plums to China. In 2009, the farm gate price for green plum was 1200 VND/kg compared to 2500 VND/kg of ripe plum, with some high quality ripe plum receiving a price of 3000 VND/kg. Producers reported that they preferred to sell green plum because less labour is required and they do not have to face much risk from post-harvest losses even though the price received is 1300 – 1700 VND/kg lower than that of ripe plum. In 2009, nearly 60% of the total quantity of plums produced in Phieng Luong Commune were sold as green plum, and from this well over 80% was sold to the market in China. This volume does however vary according to the season. For example, in 2010, because of low production output, no green plums were sold to China.

Diagram 1: Market trading system in Moc Chau district 2009 (Pieng Sang Village)



1.2.2. Collector and wholesalers

5 plum wholesalers and 7 collectors were interviewed in Moc Chau town. In the season, each collector buys approximately 400 tons/season and they usually sell direct to wholesalers shortly after buying from producers. The wholesalers can buy an average 1000 tons/season, 70% of which is directly bought from producers and the remaining from collectors. Wholesalers often hire 5-10 laborers to pick plum for them and pay around 70k VND/working days.

Classification and packaging of wholesalers

1.2.3. Handling and Processing activities

When it comes to grading and processing activities, some wholesalers only grade the fruit prior to transport to market. It was reported that there are five grades depending on which

markets the wholesalers will supply plums to. First class fruit which is of consistent size and colour will be sent to main wholesale markets in Hanoi and HCMC; Class 2 fruit which is of lower quality than class 1will be sent only to Hanoi; Class 3 fruit is to be sold in the rural area and Class 4 fruit is processing grade fruit which can be used for plum wine production.

In Moc Chau the 19/5 cooperative have invested in processing technology to produce plum wine and test some products made from plums such as jam. While it appears that there could be an opportunity to increase revenue generated from plum wine sold in the market, at this stage the volume of wine sold is low and the cooperative has reported that the current income generated from plum wine is insufficient to cover production cost. In the future the development of a trademark for Moc Chau plum wine and registered brand name along with marketing activities may help to increase the volume of plum wine sold and provide a viable distribution channel for plums with a good example of the potential for value adding.

Plum wine is processed in 19/5 cooperative

Discussion with president of 19/5 cooperative	Plum wine

In addition to the 19/5 cooperative, some processing companies in Hai Duong also buy green plums to produce jam, candy, and other products. They use plums as material input for their products. This may also become a potentially important distribution channel for plums in spite of the fact that its quantity currently purchased is still very low. Supply of plums to the 19/5 cooperative and the processing companies in Hai Dung may provide a good option to producers to diversify their distribution channels of Moc Chau plum.

1.3. Cost and Benefit Analysis

Table 2: Cost and Benefit of stakeholders in plum value chain

Indicator	Green Plum			Ripe plum		
	Farmer	Collector	Wholesaler	Farmer	Collector	Wholesaler
Purchasing price(đ/kg)		1050	1,250		2150	2350
Selling price (*) (đ/kg)	1050	1250	1,400	2150	2350	2650
Cost (đ/kg)	120	120	80	450	120	200
Benefit (đ/kg)	930	80	70	1700	80	100
Average quantity (kg)	2516	270000	350,000	918	130000	650000
Benefit/year (đ)	2339880	21600000	24,500,000	1560600	10400000	65000000

(*) Note: the price of plum that collectors usually buy plum at farmer's home and it much depend of location that farmer want to sell plum.

The data in the table presented above is based on the information collected from the producer and wholesaler/trader interviews conducted in Moc Chau. The selling price at farm gate for green plums was reported by collectors as 1050VND/kg on average (i.e. the price they paid to farmers) even though the price can reach 1200VND/kg if the farmer delivers the fruit to the market (i.e. includes transport costs). The price received for both green and ripe plums is reported by producers to be highly changeable from one season to another (e.g. in 2006-7 farm gate price of green plum dropped to 5-800VND/kg) which is the main reason that farmers do not want to develop plum cultivation even though these activities have the potential to contribute significant income for the household if the price is good. Based on the results of the farmer survey conducted in Pieng Sang Village, Table 3 below gives the current contribution of income generated from plum sales to household income. Overall there is not much difference between the contribution made to income by plum production for poor, medium income or wealthy households.

Table 3: Contribution of plum to household's income

Type of households	Income/household/year (1000 VND)	Income/household/year from plum (1000 VND)	% Total income
Poor	2430	405	17%

Medium	2650	530	20%
Wealthy	5500	1100	20%
Average	**3900**	**780**	**20%**

Poor, medium and wealthy were indicators that were included in the questionnaire. When we selected households to interview, the head of village helped us to select some poor, medium and rich households. We did not find out the income levels on which these classifications were based.

1.4. Post-harvest activities and plum quality

Producers usually pick up plum by hand and use simple tools such as sticks that negatively impact on plum quality.

Harvest and transportation of plum

Because harvesting of plum by hand is quite time consuming and the season for plum harvesting is short, some household and wholesalers need to hire laborers to harvest plums. However labour shortage can be a problem at this time as farmers also need labour to grow maize. For this reason producers prefer to sell plum early so they can concentrate their labor for maize growing. When harvesting green plum, producers do not pick the plum by hand but instead they use stick to beat the trees and collect the fruit off the ground.

II. PRODUCTION AND TRADING OF MAIZE IN SON LA

2.1. Maize Production

2.1.1. Production area and output of maize in Son La

Table 3: Area and output of Maize in Son La

Indicators	2004	2005	2006	2007	2008
Area (1000 ha)	68.2	80.9	82.4	117.8	114.2
Yield (quintal/ha)	31.9	28.2	32.6	37.7	38.6
Output (1000 ton)	217.8	228.0	269.0	444.0	441.3

Source: Statistical year book of Son La 2009

2.1.2. Input material supply

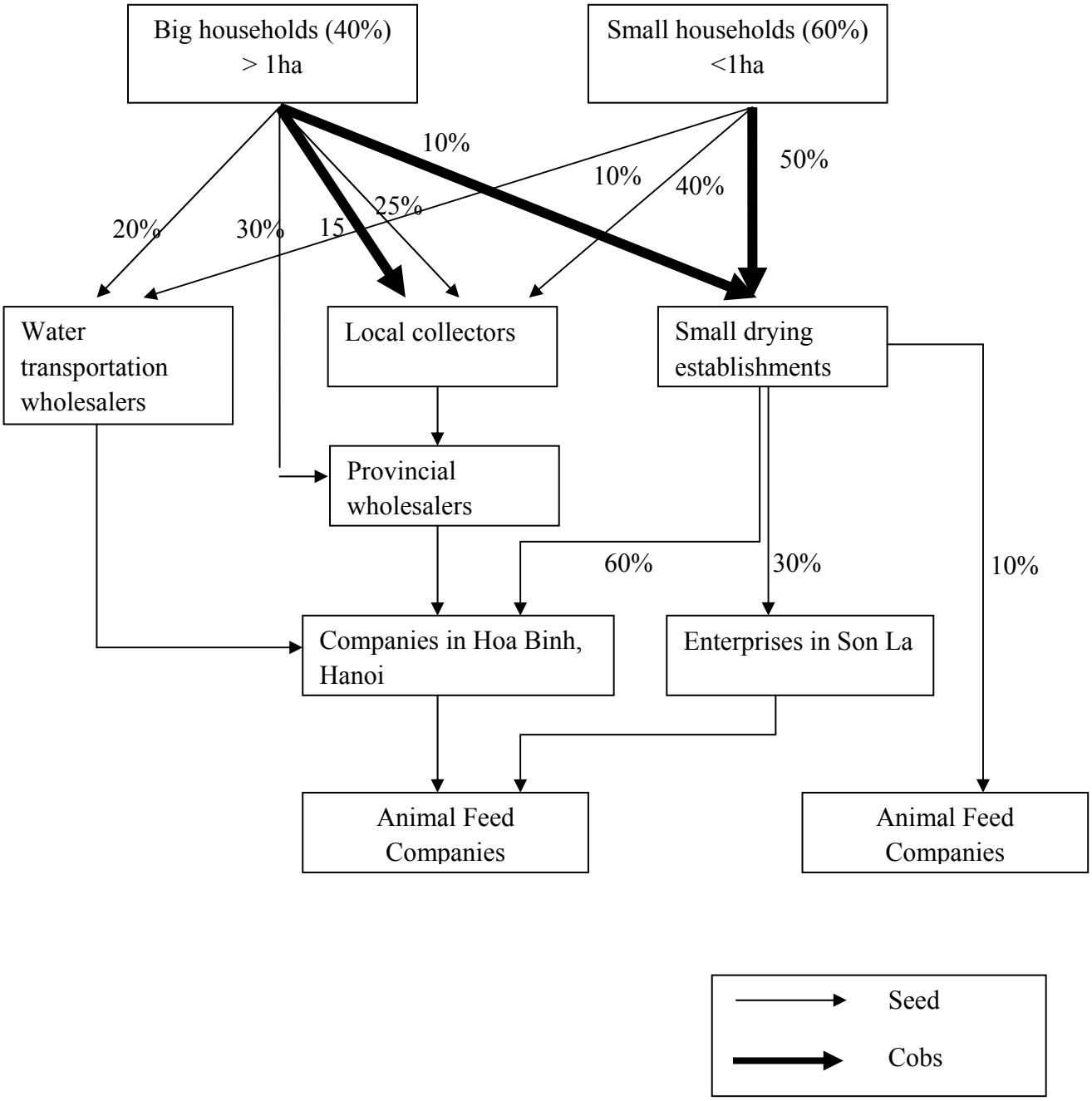
Based on the survey of 40 maize producers in Mai Son and Moc Chau, farmers were found to source inputs from two main stakeholders: private agents who operate at the village, commune, and district level or from the State agricultural material stations which are publically funded and operate at the district level or sometimes at commune level also. According to the findings from the producer survey, the total input costs for maize production can account for approximately 60% total revenue from maize sales.

2.2. Trade situation

2.2.1. Selling maize of producers

Diagram 2 below has been developed based on the findings from the 40 producer surveys conducted in Mai Son and Moc Chau districts. Interviews were also conducted with 15 traders and collectors for maize in Mai Son, Moc Chau and Hoa Binh district.

Diagram 2: Maize trading in Mai Son & Mai Chau districts



2.3. Cost and Benefit Analysis

2.3.1. The role of maize in household's income

Table 5: The role of maize in household's income

	Small farmers (Maize area is smaller than 1 ha)		Big farmers (Maize are is bigger than 1 ha)		Average	
Source of income	Quantity (1000 VND)	Percentage (%)	Quantity (1000 VND)	Percentage (%)	Quantity (1000 VND)	Percentage (%)
Rice	2 875	14.20	3 912	8.20	3 451	9.72
Maize	11 056	54.62	35 890	75.20	24 850	69.99
Total crop's income	16 641	82.22	40 475	84.80	29 882	84.15
Total livestock's income	3 468	17.14	7 018	14.71	5 440	15.32
Non - Agricultural	131	0.65	233	0.49	188	0.53
Total income	20 241	100	47 727	100	35 511	100

2.3.2. Efficiency of maize based on production scale

Table 6: So Maize efficiency according to production scale

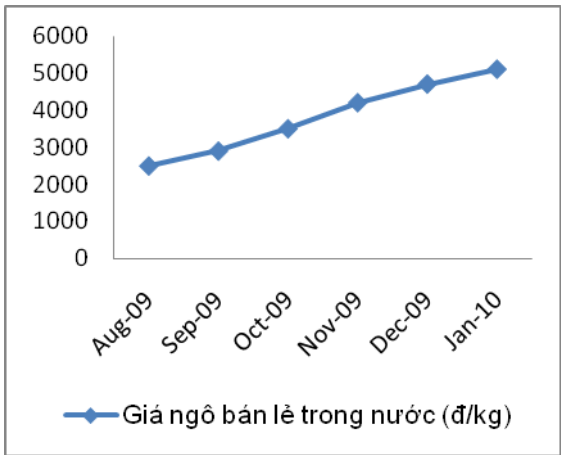
Unit: VND/ 1000 m2

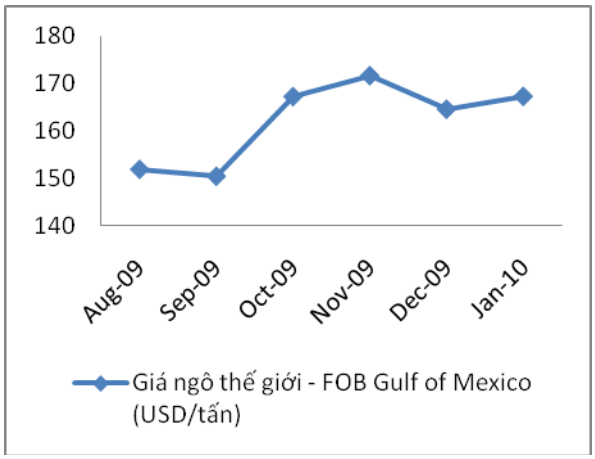
Type of cost	Small household	Big household
Seed	169 545.66	109 931.71
Urea	214 259.52	118 359.33
NPK	246 606.93	171 912.64
Pesticide	32 519.24	22 726.19
Total cost	682 939.03	427 929.87

Total revenue	1 464 319.01	1 551 072.79
Benefit	781 379.98	1 123 142.92
Time of selling	August, September	From Sep. to Dec

2.3.3. Change of maize price of international and domestic price

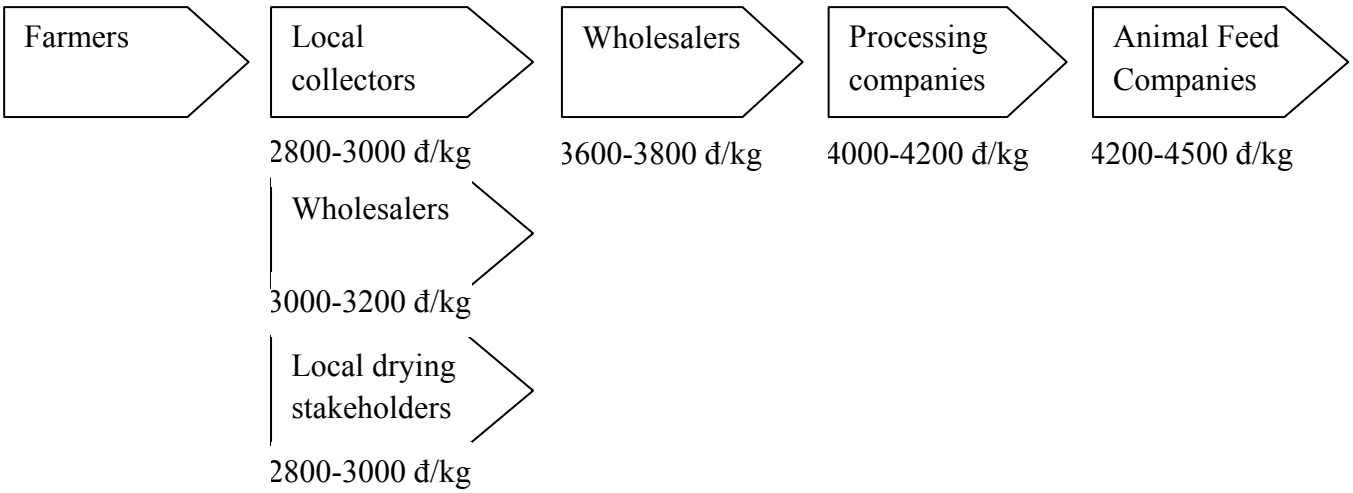
Table 5: Maize price change





2.4. Cost and benefit of stakeholders in Maize value chain

2.4.1. Change in value added in stakeholders



2.4.2. Cost and Benefit of stakeholders in Maize value chain

Table 7: Cost and Benefit of stakeholders in Maize value chain

Indicators	Farmers	Local collector	Water transportation wholesalers	Small drying stakeholders	Big collectors	Processing company
Purchasing price (đ/kg)		3 000	3 100	3 000	3 600	4 000
Selling price (đ/kg)	3 000	3 600	3 600	3 750	4 000	4 600
Cost (đ/kg)	1 416	400	450	650	380	575
Profit/kg (đ/kg)	1 584	200	50	100	20	25
Total quantity /year (1000 kg)	9,639	250	1 800	1 200	20 000	30 000
Benefit/year (1000đ)	15 268	50 000	90 000	120 000	400 000	750 000

2.5. Post harvest technology and maize preservation

2.5.1. Farmers post harvest practices

Post harvest technology is very simple with significant losses occurring during drying and storing; nearly 60% quantity of maize may be attacked by insects 2 months after harvesting.

2.5.2. Post harvest practices of stakeholders

Some collectors have developed their own method to preserve maize effectively and report that maize can be stored for up to one year without insect damage.

In Son La Province there are also some private drying machines, that are used to dry corn that is supplied to an Animal Feed Company. These machines can dry 10 tons maize each time which takes up to 8 hours. Each machine can dry 1000 to 1200 tons per year. However, the total drying capacity of machines in Son La currently only meets 10% of demand for drying maize and the rest of the maize either has to be dried at home or transported to Hoa Binh and Hanoi where larger drying machine can meet the demand for maize quality.

Drying machine and packaging technology

2.6. Constraints in Maize value chain

2.6.1. Difficult circle of maize production

2.6.2. Difficulties in production

- **High production cost**

Table 8: Production cost based on different payments

Unit: VND/1000m2

	Pay in credit (80% of producers surveyed)	**Pay in cash**	**Differences**
Variety	206 114	118 251	87 863
Fertilizer	260 417	135 441	124 975
NPK	297 000	182 447	114 553
Pesticide (*)	-	33 615	(33 615)
Total cost	764 150	483 547	280 603
Total revenue	1 575 000	1 575 000	-
Profit	810 850	1 091 453	(280 603)

(*) For producers who buy inputs on credit, they reported that they do not use pesticide in maize production practice. Even for those producers who bought inputs in cash, pesticide usage is not common and it can be seen to contribute only a small amount to total production cost.

- **Lack of post harvest preservation technology**
  - Lack knowledge on how to preserve maize effectively.
  - Low capacity of drying machine within province
  - Maize is preserved at an individual household level so the quality is not consistent.
- **Difficulties in trading**
  - Majority of producers buy inputs on credit and then get locked in to selling maize to private input suppliers.
  - Nearly 30% of producers harvest maize when it is immature with high humidity content so the price received is very low.
  - Lack of market information, producers do not know how to bargain with other stakeholders.
  - Poor transportation systems resulting in difficulties in selling maize.
- **Difficulties in accessing service providers**

Table 9: Compare form of service providers

Packaging supplying services	Payment in cash
Easy to access input and output service	Difficulties in access input service
Have to pay risk cost of 3 -5% higher than normal price	Do not have to pay interest rate due to buy in credit
Supply source is stable	Much dependency on market
Price of maize is higher than market price	Market price

III. RECOMMENDATIONS TO DEVELOP MARKET FOR MAIZE AND TEMPERATE FRUIT IN SON LA PROVINCE

3. 1. As for maize value chain

1) Production system improvement

- Set up model of sustainable maize production on sloping land which aims to reduce soil erosion.
- Construct farmer's organization to take advantage of collective action, buy input as a group and sell maize together that will help reduce transaction cost.
- Provide farmer's organization with market information on maize and material inputs
- Provide farmers with information about season schedule and technical protocol of some main maize variety such as VL10, NK888,…
- Experiment with the potential of 3 maize seasons per year in some area in Mai Son district.

2) Quality improvement

- Ask processing companies to provide suggestions on how best to improve maize quality, especially in relation to the storage and drying of maize post harvest. Maize is usually severely attacked by insects two months after harvesting and can result in significant losses therefore farmers feel pressured to sell maize right away after harvesting.
- Some companies require higher maize quality such as CP Company (fixed humidity levels etc), and are ready to buy maize with higher price but the quality must be consistent and meet requirements. Therefore, it is necessary to improve the drying system in order to improve maize quality and meet customer demands.
- Training for farmer's organization and other stakeholders is required on technical protocol and effective post harvest practices.
- Experiment with the development of a high quality maize based technical protocol

3) Strengthening capacity of small farmers to participate in the market

- Linkage of small farmers together to sell maize collectively aiming to take advantage of economy of scale, and link to some stakeholders to have sustainable contract for selling product.
- Design and disseminate market information newsletter to forecast the market orientation in domestic and international market.

3.2. As for plum value chain

1) Revigorating old plum garden

Currently many plum gardens in Moc Chau are poorly cared for with low productivity however there is the potential to intervene to improve yield and quality of plum if the trees are less than 10 years old. Given the low level of interest shown by producers in plum production at present, it is unlikely that recommending the development of new orchards will be well received unless benefits can firstly be demonstrated from revitalizing the old orchards. Firstly, technical staff should select potential plum orchards in Pieng Sang Village that present a good opportunity for demonstration to other farmers. They should gain support from farmers to begin technical interventions to improve the productivity of the orchards. Attention should also be given to improving the harvesting practices for plum. Secondly, fruit produced from these trial orchards could be sold to selected market outlets that are part of a higher quality chain in Ha Noi and Hai Phong. Thirdly, the project can compare the effectiveness of the improved orchard to those that have not been supported by technical interventions to prove that reinvigorating old orchards can be help increase incomes for farmers. Finally, expansion of this model will need to occur to other orchards in Pieng Sang village and then other villages. As for planting new plum areas, as suggested above, this is not recommended because the land area is limited and the local authorities do not want to expand plum production area.

2) Establishment and application of Farmer Business School

There is potential to support the establishment of farmer business schools for plum as this model allow farmers to both produce plum and sell it into a higher value, higher quality chain. Farmer business schools would help farmers to not only focus on the technical aspects but also on marketing issues, so this would help producers to develop a better understanding of the kind of plum that the market demands and how they could deliver this.

Some intervention activities in 2010 for Plum Value Chain

Time	Activities	Expected outcomes	Pesonel/organizations
28/04 – 05/05	**Stakeholder conferences and promoting plum**	Have purchasing contract between producers and wholesalers, Identify most important market for each type of plum, Demand for packaging and labeling, Discussion the way to share responsibility and banefit of stakeholders and farmers, Have Video Clip advertising Moc Chau plum.	CASRAD/TBU (Son, Hung, Binh)
	Objectives		
	1. Identify stakeholder's demand for plum in Moc Chau		
	2.Collect information about potential stakeholders willing to cooperate with farmers to development plum market		
	Location and steps		
	1. This conference will be organized in Moc Chau		
	2. Invite representatives of retailers, collectors and wholesalers in Moc Chau to attends		
	3. Invite producers in Pieng Sang and those are intervened by PPRI		
	4. Representatives of Local staffs including agricultural department and agricultural extension offices.		
	5. Contact with reports of VTC16 channels, a new channel specialized in agriculture and rural development, to make Video Clip promoting Moc Chau plum.		
5/5 – 15/5	**Consumer research in Ha Noi Market aims to identify the consumers demand for:**	Recommend strategy to intervene to meet the market demand including package, quality, quantity,…Identify type of plum quality including green plum, semi ripe plum, ripe plum for	CASRAD/HUA (Tung, Son, Hoan supported by Tiago and Marlo)
	1. Appraising the preference of consumers on quality of plum including the level of ripe, taste, package, label, certificate of origin,…		

	2. Identifying Price level that consumer willing to pay for each level of plum quality.	each kind of market	
	3. Assessing Moc Chau plum in comparison with other plums of Bac Ha, Ha Giang,…		
	4. Researching wet market and wholesale market in Ha Noi to estimate total supply for plum, and identify what kind of plum sold in Hanoi currently as well as where they are from.		
	Market research in China aims to:		
	1. Identify potential market as regards quality and quantity.		
	Indentify what is China market demand for plum and its objectives for processing or fresh consumption.		
	2. Identify what products are made from plum and how its price and initial information about processing technology is.		
	3. Indentify capable of contracting production area with processing company for green plum market.		
15/05 – 20/05	**Organize degustation conference in Ha Noi**	Have full information about demand of consumers in Ha Noi market for quality of Moc Chau plum	CASRAD (Son, Hoan, Tung, Hung supported by Tiago)
	1. Intensively assess the demand of consumers for Moc Chau plum		
	2. Compare Moc Chau plum to other plums over the country		
	3. Conference will be taken place in 3 hours in La Thanh hotel (please recommend appropriate location)		

	4. Participants include representatives of consumer's association in Ha Noi, related agencies and potential consumers		
	5. Retailers and wholesalers in Ha Noi		
20/05 – 10/6	**Providing plum for some shops and super market in Hanoi to sell and identify its profit in comparison with that sold by other distribution channels**	Moc Chau plum is sold in some shops in Hanoi, its price is higher than that sold in other place	CASRAD/PPRI (Son, Hoan, Hung)
	1. Use plum that is pick in garden following technical process of PPRI		
	2. Providing plum for selected shops in Ha Noi		
	3. Following up the capacity of selling plum here		
10/06 - 20/06	**Research demand for processed products made from plum in domestic market comprising 19/5 cooperative and some processing companies in Hai Duong**	Research and promoting processed plum	CASRAD/HUA (Hung, Hoan)