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RESEARCH ARTICLE

VALUE CHAIN ANALYSIS OF MANGO (*MANGIFERA INDICA* L.) IN SAPTARI DISTRICT, NEPALSaroj Shrestha^a, Narayan Raj Joshi^b, Sunil Pandey^c^a Agriculture and Forestry University, Nepal^b Agriculture and Forestry University, Chitwan, Nepal^c Soil and Fertilizer Testing Laboratory, Gandaki Province*Corresponding Author Email: srozstha@gmail.com

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ABSTRACT

A study in value chain of mango in Saptari district of Nepal was conducted during January 2019 to June 2020 in Surunga municipality, Khadak municipality, Balan Bihul rural municipality, Rajbiraj municipality, Agni Sair rural municipality, Shambhunath municipality and Kanchanrup municipality. The study sites were purposively selected as these sites were command areas of PMAMP PIU, Saptari. Total 61 mango growers and 7 traders were randomly selected for the survey. Household survey, Focus Group Discussions and Key Informants Interviews were primary sources of data from which information was analyzed and concluded. By the virtue of increasing trend of mango production, farmers were able to produce large quantity of mango despite eminent problems of irrigation and diseases and insects. But, due to middlemen monopolized market system and negligible efforts for value addition practices like storage facility, packaging, cleaning and other processing technology, farmers were compelled to receive lower farm gate price yet retail prices of those produces were high. However on small scale, mango growers were involved in production of diversified products like Aamil, chutneys, aachaar, amot etc. of which 37.7% of mango growers sold them in the market. Producers share in short distance market was higher (45.12 %) while it was lower (31.02%) in distant market. Likewise, marketing margin in distant market was higher (Rs. 55.18) than in short distance market (Rs. 30.18). Farmer added value worth Rs. 9.76 in both proximity markets and distant markets, wholesalers added Rs. 10.18 in proximity market and Rs. 12.68 in distant market and retailers added Rs. 20 in proximity market and Rs.35 in distant market to existing value of mango suggesting immense disparity in value addition. Having immense scope for value addition, it was required to strengthen marketing system, establish processing industries, and mobilize resources to increase bargaining power of mango growers in Saptari.

KEYWORDS

Market, Middlemen, Processing, Producer's Share, Margin.

1. INTRODUCTION

1.1 Background Information

Nepalese economy heavily depends on agriculture which contributes 27.10% to total GDP of the country. It contributes 37.9 % in Province 2 (Ministry of Industries Finance and Supplies, 2019). While vast majority of farming population is based on cereal crops, pulses, vegetables etc., only few population are engaged in fruit cultivation. Cereals accounts for 49.91%, livestock 25.68%, vegetables 9.71%, forestry 8.10%, fruits and spices 7.04% of the total Agricultural Gross Domestic Product (AGDP) (MoAD, 2016). Major fruits grown in Nepal are mango, apple, papaya, guava, litchi, mandarin, sweet orange, lime etc. As the share of horticulture to the AGDP is increasing on recent years, agricultural diversification and commercialization in perennial fruit crop has drawn an attention of planners and policy makers in terms of generating the higher incomes, improving the livelihood of farmers and making them potential entrepreneur as well as creating employment opportunities and

concerning on biodiversity conservation (Acharya and Argawal, 2004). Government of Nepal has implemented Agriculture Development Strategy (ADS) from 2015 to 2035 for guiding the agriculture sector of Nepal. The ADS is formulated taking into account the conceptual framework of agriculture transformation of Nepal from a society primarily based on agriculture. This plan has identified the priority on commercialization of agriculture sector.

Mango is botanically known as "*Mangifera indica*" belonging to the genus "Mangifera" and the family "Anacardiaceae". Mango is one of the most popular tropical fruits grown commercially in 87 nations of the globe (Tharanathan et al., 2006). It is ranked fifth in production in the world. It is very popular due to its delicacy, flavor and nutrient value. Mango is considered as an excellent source of Vitamin A, Vitamin C and other vitamin as well. Being affordable, it is a cheap source of protein, carbohydrate, fiber etc. Mango is composed of 8g of protein, 5.9g of fats, 11.9g of carbohydrate and 4.2g of ash. Juice, jam, jelly, pickles, amchur, amot, pulp, powder, etc. are popular products made of mango. According

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to recent reports by UN recommends the intake of 400g of fruits and vegetables for prevention of chronic diseases of heart, kidneys etc.

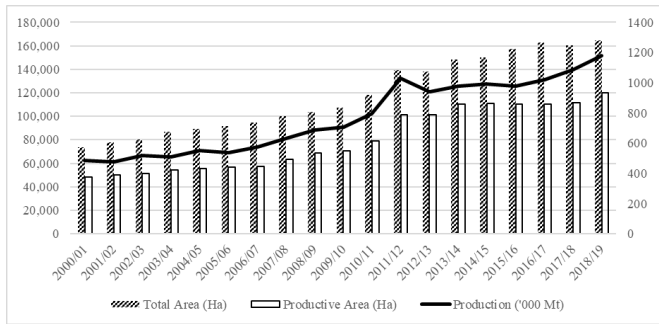


Figure 1: Trend of total area, productive area and production of fruits in Nepal (Source: (MoALD, 2018/19))

Mango is commercially produced in almost all districts of Terai of Nepal like Sarlahi, Siraha, Saptari, Rautahat, Mahottari, Sunsari etc. with Saptari being the hub for its production. Saptari district lies in Province 2 with an area of 1363 sq. km. Temperature regime remains between 7° C to 40°C and average annual rainfall remains between 1336-1835 mm. Annually, Saptari alone produces around 40,000 tons of mango from around 5000 hectares out of 7000 hectares of total mango coverage in the district with about 8 tons/ha of productivity (Republica, 2018). In 2020, the approximate productivity of mango in Saptari was found to be 18-20 ton per hectare.

1.2 Statement of Problem

In last few years, mango production in Saptari has already doubled by overcoming various problems in cultivation and management. But, the economic condition of majority of mango growers remains consistently poor. Due to low market price of mangoes, farmers are compelled to sell their produces at least prices although the production and management cost for mango is increasing. Due to lack of proper MIS, there is no transparency in valuation of prices of commodity in each actors of supply chain. As mango production in Saptari is impacted by alternate bearing, price of mango is inversely correlated with production quantity (Ministry of industries, Finance and Supplies, 2019). During On-Year, huge production of mango causes the declination of market prices as the supply is increased. Farmers are compelled to sell their commodity at lower prices which would not even cover their expenses (For commercial growers). The farm gate prices are very low. However, it is ironic to know that end consumers have to pay very high amount for the product. There is unscientific addition of value of the commodity during transition which has created the situation where both farmers and consumers are bearing injustice.

1.3 Rationale of Study

This research will provide information which are essential for development of value chain of mango in Saptari. Data will facilitate not only the farmers but also entrepreneurs, value chain actors, investors, insurance agencies and policy makers. The status of various efficiency indicators provides basis to judge appropriate resource allocations by farmers so that the effective costs can be reduced to some extent (Zucchi, 2018). As well as scope for product differentiation and diversification and enterprise integration can help farmers build strong agribusiness system. It will have the incentive force to build industrial basis of mango products which can create more opportunity for employment and entrepreneurship. It is believed to sensitize and motivate farmers, VC actors, stakeholders, policy makers etc. for value chain development for ultimate socioeconomic development. The value chain mapping will serve both analytical and communication purpose to understand the interrelationship of different value chain actors for its promotion. Mapping can also help farmers with proper channeling avoiding hassle for finding proper actor for marketing and distribution.

This research will help to understand function and dynamics of every actor at their respective value chain level, their mutual influences and impacts

on each other. Measurement of value that each actor add to mango will be done so that transparent image of value addition trend can be drawn. As well as this study attempts to find out limitations and constraints in the supply chain and the function of value addition along with the suggestions to seek out their solutions. This study will provide insight for value chain development of mango for constructing viable market structure. Policy makers and private institutions will find this study as their baseline for value chain development programs.

1.4 Objectives

1.4.1 General Objective

The general objective of this study was to assess economic analysis of value chain marketing of mango production in Saptari district.

1.4.2 Specific Objectives

- * To find out actors of the mango value chain and construct value chain map of the district.
- * To analyze the price, cost, margins and profit sharing at each stage of the value chain of mango in the district.
- * To determine constraints of value chain marketing of mango production in Saptari district.

1.5 Scope and Limitations

1.5.1 Scope

- * This study shall provide guidelines for proper channeling of commodities.
- * Not only the farmers, but also the traders, processors, consumers, policy makers etc. will be benefited from the analysis.
- * It will enable farmers to understand current marketing paradox in mango.
- * This study will provide insights for value addition program

1.5.2 Limitations

- * Mango cultivation coverage is very large in which maintaining representative size of sample is very difficult. More number of samples would have increased the accuracy of the result.

2. CONCEPTUAL FRAMEWORK

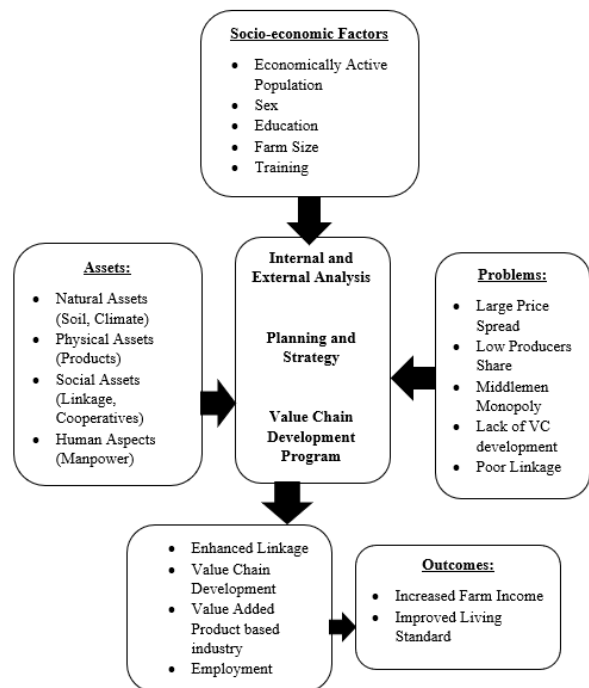


Figure 2: Conceptual framework of VC analysis of mango in Saptari district, 2020 (Source: Own Illustration)

3. MATERIALS AND METHODOLOGIES

3.1 LEE Site and Sub-Sector

The research was carried out in Saptari district of Province-2 of Nepal. The study site was purposively selected as these sites were under the command area of PMAMP, PIU, Saptari.



Figure 3: Study site of value chain analysis of mango in Saptari district, Nepal

Survey for information on farmer aspects was carried out in Surunga Municipality, Sambhunath Municipality, Rajbiraj Municipality, Rupani Municipality, Balan bihul rural municipality, Agni sair Krishna Sawaran rural municipality and Kanchanrup Municipality. Traders from Lahan (Siraha), Surunga, Kanchanrup were surveyed for relevant market information. As well as retailers from Surunga and Lahan were surveyed.

3.2 Sample size and Sampling Techniques

Out of 593 household which were under current operation areas of the zone, 61 households were surveyed as sample by simple random sampling due to contextual limitations of time and resources. For marketing and value addition aspects, 7 traders were surveyed by random sampling technique.

3.3 Research Instrument and Design

Data were collected through household survey, key informant interview, focus group discussion, rapid market appraisal, field observation and verification etc. as per the convenience and feasibility. Information (qualitative and quantitative) from related literature were used for the research. As survey instrument pre-scheduled interview questionnaires, focus group discussion and KII was developed for farmers and traders to obtain the first-hand data on mango value chain. Moreover existing facilities for post-harvest handling and value chain was analyzed along with their practical usability and impacts on farmer level. All the necessary information was collected from sample for mapping the value chain along with determination of price spread and other quantitative and qualitative aspects of value chain of mango in Saptari district. As well as margin gained by each actors was measured afterwards. Collected data was filtered, compared and documented for further analysis.

3.4 Data and data types

Qualitative and quantitative data were collected. Quantitative data were used to find out price spread/marketing margin, margin gained by each actors, value added via each actor, cost and price to which each actors are exposed to etc. Qualitative data were used to map value chain, status of value chain, scope for VC development, SWOR analysis etc.

3.4.1 Primary Data

Primary data were collected from direct interviews, HH surveys, KII, FGD etc. As well as direct observation in field, market etc. were done to verify the information collected.

3.4.2 Secondary Data

Secondary data were collected from MoAD reports, mango profile, reports available in PIU, reports and progress information published by various independent authors in Saptari. As well as journal regarding mango and marketing and value chain was reviewed for comprehensive study.

3.5 Data Analysis Technique

For quantitative data, software like SPSS and MS Excel were used for data analysis. While for qualitative data, information acquired was analytically processed and necessary conclusions were drawn based on the context and contribution made to particular actors. VC mapping along with their inter-dependence was concluded from qualitative data.

3.5.1 Social and demographic variables

Social and demographic variables like family size, age distribution, gender distribution, educational status, land holding etc. were analyzed using descriptive statistics like bar diagram, pie chart, frequency table and mean.

3.5.2 Average area, production and productivity

Average area of mango production was calculated by dividing the total area by number of mango growing households.

$$\text{Average area} = \text{Total area} / N$$

Where,

N = number of mango growing households

Similarly, average production was calculated dividing total production by number of household.

Production per household = Total production/ number of mango growing household

3.5.3 Benefit Cost Analysis

Benefit cost analysis will be done by calculating the total variable cost and gross return from the mango cultivation. Cost of production was calculated by addition of all variable costs in the production process. Gross return was calculated by obtaining income from product sale. Hence, benefit cost ratio was calculated by using formula

$$B/C \text{ ratio} = \text{Gross return} / \text{total variable cost}$$

Where,

Gross return = total quantity of mango sold* average price

3.5.4 Marketing margin

The difference between the farm gate price and retailer's price is the marketing margin which was calculated by using formula

$$\text{Marketing margin} = \text{retailer's price} - \text{farm gate price}$$

3.5.5 Producer's share

Producer's share is the price received by farmer expressed as a percentage of the retail price, i.e., the price paid by consumers. It will be calculated by using following formula

$$\text{Producer's share} = \text{Producer's price} / \text{Retailer's price} * 100$$

4. RESULTS AND DISCUSSION

4.1 Sex of the Respondents

Out of 61 respondents, 49 were male and 12 were female. This signifies the patriarchal system of family. Male is the dominant member in majority

of households. This can be correlated with the level of education and financial activity to which they are engaged to.

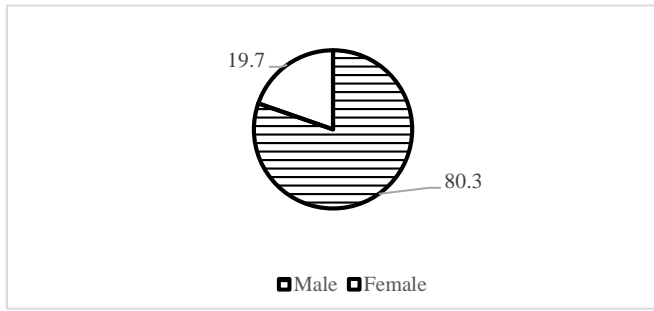


Figure 4: Sex of respondents in the survey area (Source: Field Survey, 2020)

From 7 respondents who were engaged in trading of mango, 85.7 % were male and rest 14.3% were female.

Gender	Frequency	Percent
Male	6	85.7
Female	1	14.3
Total	7	100.0

Source: Field Survey, 2020

Out of 7 traders, 6 were males and 1 was female demonstrating significant involvement of women in the profession.

4.2 Caste/Ethnicity of Respondents

Community of the study area is diverse in ethnicity. Majority of the respondents belonged to Tharu community (44.3 %) followed by Madhesi communities (39.3 %). Dalits shares 4.9 % of population while Brahmin shares 6.6% and Chhetri shares 1.6 %. Janajaati except Tharu community are in least in number. Remaining 1.6 % belonged to the community from Muslim society.

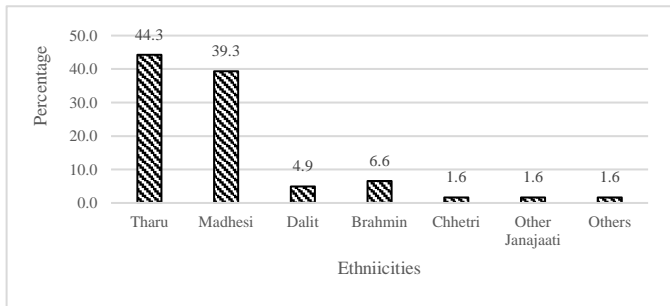


Figure 5: Ethnicity of Respondents in the survey area, 2020 (Source: Field Survey, 2020)

Out of 7 traders surveyed, 57.1 % were from Tharu community. 28.6% from Madhesi community and 14.3% from Dalit community.

Caste/Ethnicity	Frequency	Percent
Madhesi	2	28.6
Tharu	4	57.1
Dalit	1	14.3
Total	7	100.0

Source: Field Survey, 2020

4.3 Education level of respondents

Out of total respondents, 6.6 % of respondents were not literate. Most of them were literate up to SLC level (39.3 %) followed by the ones with college level education (34.4%). The respondents with education up to class 5 were 13.1%.

Education Level	Frequency	Percentage
Not literate	4	6.6
Upto Class 5	8	13.1
Upto SLC/SEE	24	39.3
College level	21	34.4
University Level	4	6.6
Total	61	100.0

Source: Field Survey, 2020

4.4 Family Size

Description	Total No. of Male	Total no. of Female	Size of the family
Mean	3.46	3.03	6.49
Std. Deviation	1.68	1.22	2.41
Minimum	1.00	1.00	3.00
Maximum	12.00	7.00	17.00
Sum	211.00	185.00	396.00

Source: Field Survey, 2020

The average family size of respondents was 6.49 with 3.46 males and 3.03 females per household. As well as for 1 economically dependent individual, there was 2.82 economically independent individuals. Thus, the population is economically active.

Description	Number of economically active aged member	Number of economically inactive aged member
Mean	4.8	1.70
Std. Deviation	1.70	1.46
Minimum	2.00	0.00
Maximum	13.00	7.00
Sum	293.00	104.00
Ratio		0.35

Source: Field Survey, 2020

4.5 Source of Income

Agriculture is the mainstream profession for respondents. Out of 61 respondents, 91.8% of them are pursuing agriculture as their primary source of income while 4.9 percent of them are engaged in services and 3.3% are engaged in business.

Profession	Frequency	Percent
Agriculture	56	91.8
Business	2	3.3
Services	3	4.9
Total	61	100.0

Source: Field Survey, 2020

Only 8.2% of them have agriculture as their alternative source of income. Service sector has been occupied by 39.3% of respondents as their alternative source of income. 18% of them pursue business as their secondary source of income while 4.9% of them rely on remittance. Remaining 1.6 % relies on muscle labor occasionally.

Profession	Frequency	Percent
Agriculture	5	8.2
Business	11	18.0
Service	24	39.3
Foreign Employment	3	4.9
None	17	27.9
Others	1	1.6
Total	61	100.0

4.6 Land Use Status of Respondents

4.6.1 Land Distribution

Average land holding of the survey area is 1.8 ha with 0.84 ha of upland and 0.97 ha of lowland per household. From 110.22 hectares of total land in survey area, 56.03 ha of land had the occupancy of mango orchards making it 50.83% of total owned land. People in the survey area have mango cultivation in 0.92 ha per household.

Table 8: Land use distribution in the survey area, 2020

Description	Total Owned Land (ha)	Total Upland Area (ha)	Total Lowland Area (ha)	Total land for mango cultivation (ha)
Mean	1.80	0.84	0.97	0.92
Std. Dev.	1.56	0.80	1.22	0.80
Minimum	0.20	0.00	.00	0.03
Maximum	6.80	3.40	6.12	3.40
Sum	110.22	51.21	59.24	56.03

Source: Field Survey, 2020

4.6.2 Intercropping in mango orchards

Mango being a perennial crop takes about 2-4 years to attain bearing stage and may take more years to reach commercial production stage. During development stage, shade loving plants can be cultivated without compromising the development of mango tree. In the survey area, 57.4% of respondents practiced the intercropping. Lime, ginger, vegetables, turmeric are major crops grown by intercropping in mango orchards. Remaining 42.6% of the respondents did not practiced intercropping.

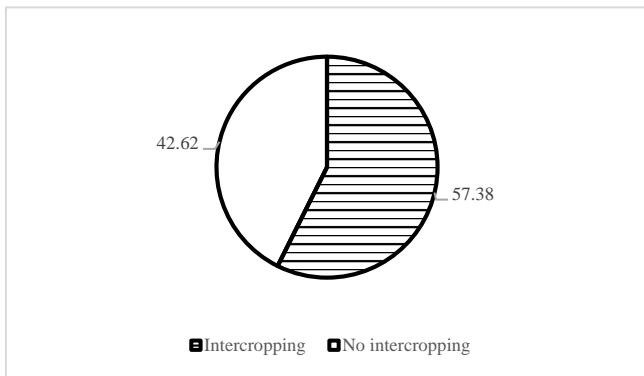


Figure 6: Intercropping in mango orchard in the survey area, 2020 (Source: Field Survey, 2020)

4.7 Farming System in Saptari

4.7.1 Major Commodity of Agriculture

Table 9: Major Commodity of Agriculture

Commodity	Frequency	Percent
Cereals	30	49.2
Mango	21	34.4
Vegetables	4	6.6
Animal Husbandry	4	6.6
Fish Farming	2	3.3
Total	61	100.0

Source: Field Survey, 2020

Out of 56 respondents whose mainstream profession was agriculture, 49.2% of them grew cereals like rice, maize etc. as their major crops whereas 34.4% of them grew mangoes for their mainstream source of income. While 6.6% of them were involved in vegetables and animal husbandry, 3.3% of them were fish farmers.

4.7.2 Crop before mango

Analyzing the shifting of agricultural commodity, 80.3 % of the respondents were found to be shifted from cereals to mango whereas 9.8 % of them used to grow vegetables in the land currently occupied by

mango. Out of them, 6.6 % were found to be utilizing their fallow land for mango cultivation.

Table 10: Crop before mango

Commodity/Crop	Frequency	Percent
Cereals	49	80.3
Vegetables	6	9.8
Fallow	4	6.6
Other fruits	2	3.3
Total	61	100.0

Source: Field Survey, 2020

4.7.3 Number of trees

Average number of trees per household was 82 while number of productive trees was 62 per household with 74.5 percent of productive trees per unit household.

Table 11: Number of trees in the survey area, 2020

Description	Total number of mango trees	No. of Productive Trees
Mean	82.2	61.8
Std. Deviation	79.5	63.2
Minimum	7	7
Maximum	300	300
Sum	5058	3770
Percentage		74.5

Source: Field Survey, 2020

4.7.4 Age of orchards

Most of the respondents had their orchards made more than 10 years ago (67.2%). Out of them, 21.3% of the respondents' orchards were 5-10 years old while 11.5% of them had orchards of 1-5 years of age.

Table 12: Age of orchards in the survey area, 2020

Age of Orchard	Frequency	Percent
More than 10 years	41	67.2
5-10 years	13	21.3
1-5 years	7	11.5
Total	61	100.0

Source: Field Survey, 2020

4.7.5 Major Varieties of Mango

Maldaha, Kalkattiya, Bombay Green etc. are major varieties grown in Saptari. Out of them, Maldaha is the prime variety with 100% coverage, followed by Kalkattiya and Bombay green with 70.5% and 60.7% respectively. These varieties are mostly irregular bearers. Their production pattern is characterized by alternate bearing. Regular bearers like Amrapali is grown by least number of farmers (24.4%). Only 8.2% of respondents grew varieties like Krishnabhog, Shari, Jardalu etc.

Table 13: Varieties of mango grown in the survey area, 2020

Variety	Frequency	Percent
Maldaha	61	100
Kalkattiya	43	70.5
Bombay (Green)	37	60.7
Dasehari	21	34.4
Amrapali	16	24.4
Others	5	8.2

Source: Field Survey, 2020

4.7.6 Farming Type

Irrigation was found to be an eminent problem of Mango growers in Saptari. Coverage of irrigation was 13.11% only while 65.57% of respondents still had to depend on rainfall for irrigation and 21.3% of them had partial irrigation facility.

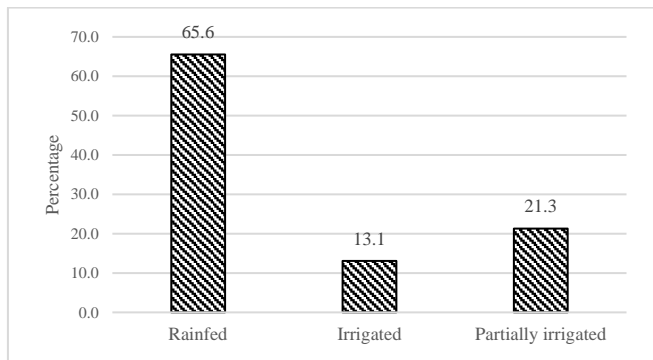


Figure 4: Farming type in the survey area, 2020 (Source: Field Survey, 2020)

4.7.7 Reason for Mango Cultivation

All 61 respondents were asked for the reason they were engaged in mango cultivation. The result is as follow.

Reason	Frequency	Percent	Rank
High Income Source	21	34.4	I
Easy to Cultivate	15	24.6	II
Favorable soil in Saptari	8	13.1	III
Long term Crop	8	13.1	IV
Traditional trend	7	11.5	V
Easy for marketing	1	1.6	VI
Financial back up for other major profession	1	1.6	VII
Total	61	100.0	

Source: Field Survey, 2020

Most of the respondents (34.4%) pursued the profession for higher income generation followed by the easiness and convenience of cultivation as it is long term crop. As well as 13.1% of them reported their reason for cultivation was the suitability of soil for mango cultivation.

4.7.8 Production Trend of Mango in Saptari

In recent years, mango production has been booming in Saptari. Over the span of decade, area of production as well as productivity of mango has increased. From information collected from respondents, mango production of 86.89% of respondents has increased over last 5 years while 8.2% of them reported the decrease in production of mango over the span of time. As well as, 4.92% of respondents' production had been constant production throughout the time.

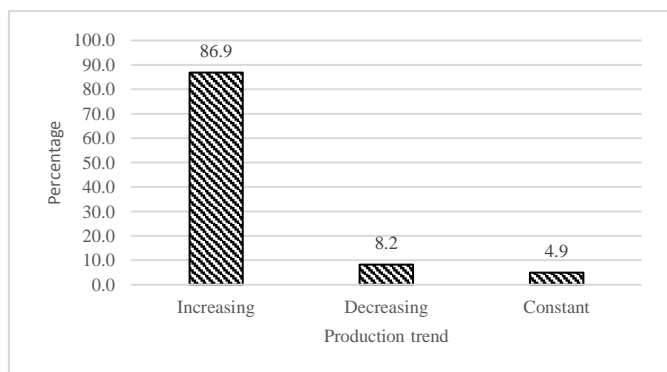


Figure 7: Production trend of mango in Saptari in last five years (Source: Field Survey, 2020)

4.7.9 Satisfaction level of Production

All 61 respondents were asked about satisfaction level of production. The result is as followed:

Satisfaction level of Production	Frequency	Percent	Rank
Strongly Satisfied	18	29.5	II
Moderately Satisfied	33	54.1	I
Undecided	6	9.8	III
Moderately Unsatisfied	4	6.6	IV
Strongly Unsatisfied	0	0	V
Total	61	100.0	

Source: Field Survey, 2020

4.7.10 Soil Test

Only 6.6% of respondents had their soil of mango orchard tested. 93.4% of them had never tested soil. This signifies the unplanned cultivation practice of farmers which may cause the incidence of diseases and insect infestations like fruit fly in the survey area.

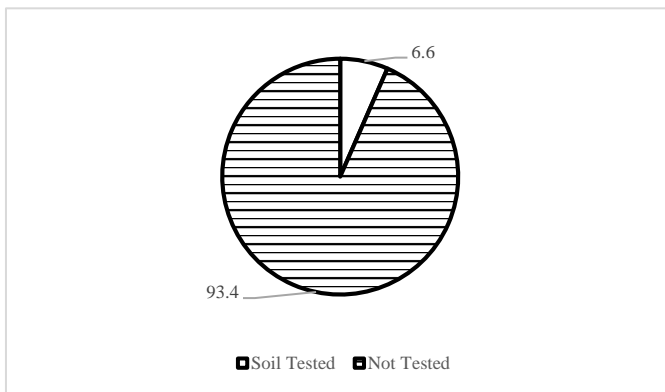


Figure 7: Soil test status in the survey area, 2020 (Source: Field Survey, 2020)

4.7.11 Training and Pruning

Most of farmers (75.4%) did not practice training and pruning in their mango trees. Only 24.6% of them had their trees pruned after harvest and incase branches are long or the shoots die back.

Pruning	Frequency	Percent
No Practices	46	75.4
Practice of pruning	15	24.6
Total	61	100.0

Source: Field Survey, 2020

4.8 Cost of Production

The average cost of production of Maldaha variety was Rs. 10.33 per kg in the survey area. More cost can be expected in the area regarding the facilitation of irrigation, input supply and farmers' perception on good agriculture practices. The average price earned by farmers are dependent on many factors like production volume, channel used for sales, stage of harvest etc. During recent off-year, farmers were able to fetch higher market price but due to low to nil production volume, they were not able to retain the profit despite of higher market price. As well as during on-year, their larger quantity of production suffered from lower farm gate price, which has again caused the less retention of profit despite larger production quantity. During on-year, farmers had to sell their products upto Rs. 15-25 per kg whereas during off-year, they could fetch upto Rs.35-40 per kg.

Description	Price of mango
Mean	24.82
Std. Deviation	6.30
Minimum	15.00
Maximum	45.00
Sum	1514.00

Source: Field Survey, 2020

4.8.1 Fixed Cost

Table 18: Fixed cost of mango cultivation in survey area, 2020

SN	Particulars	Unit	Rate (Rs.)	Qty	Amount (Rs.)
1.	Lease on land	Rs. Per ha	26000	15 years	390000
2.	Saplings	Nos.	75	100	7500
3.	Land Preparation	Per plant expense	100	100	10000
4.	Irrigation	Lump sum	5000	1	5000
5.	Equipment	Lump sum	10000		5000
6.	Miscellaneous	Lump sum	10000		5000
	Fixed Cost				422500

Source: Field Survey, 2020

4.8.2 Variable Cost

Table 19: Variable cost of mango cultivation in survey area, 2020

SN	Particulars	Unit	Rate	Qty	Amount
1.	Labor (Permanent)	Salary	8000	12	96000
2.	Labor (Temporary)	Man days	500	10	5000
3.	Fertilizers				
a.	Urea	kg	15	1.4 kg per tree	2100
b.	DAP	kg	45	0.9 kg per tree	4050
c.	Potash	Kg	30	1.1 kg per tree	3300
4.	Materials	Lump sum			8000
	Total variable cost				118450

Source: Field Survey, 2020

4.8.3 Calculation of Revenue

Table 20: Calculation of revenue in survey area, 2020

SN	Particulars	Unit	Rate	Qty	Amount
	Total cost	Rs.			144450
	Sales	Rs.	24.82	12000 kg/ha	297840
	Profit	Rs.			153390
	BC Ratio				2.062

Source: Field Survey, 2020

4.9 Price Satisfaction

All 61 respondents were asked about the level of satisfaction they were attaining from the price they were getting from the sales of their products. Result is as followed:

Table 21: Price satisfaction of mango in the survey area, 2020

Satisfaction level	Frequency	Percent	Rank
Strongly satisfied	3	4.9	V
Moderately unsatisfied	25	41.0	I
Undecided	7	11.5	III
Moderately satisfied	20	32.8	II
Strongly unsatisfied	6	9.8	IV
Total	61	100.0	

Source: Field Survey, 2020

From the price respondents were getting, 41% of them were moderately unsatisfied while 32.8% were moderately satisfied. This shows that respondents were having mixed response of satisfaction from the price.

4.10 Supply Chain

4.10.1 Input Supply

Among 61 respondents, 4.9% of them did not buy mango saplings from nurseries. They managed saplings by themselves either from seeds or propagating by vegetative methods by themselves. As well as, 6.6% of them bought saplings from government nurseries like Naktajhij farm etc. Remaining 88.5% relied on private nurseries for orchard establishment.

Table 22: Source of saplings in Saptari, 2020

Type of nurseries	Frequency	Percent
Private nursery	54	88.5
Government Nursery	4	6.6
Self-Managed	3	4.9
Total	61	100.0

Source: Field Survey, 2020

4.10.2 Location of Nurseries

Lahan facilitates as the major input as well as output market for mango growers in Saptari. Among all respondents, 49.18% of respondents acquired saplings from nurseries located in Lahan and 32.78% of them got from nurseries located in Surunga. Remaining 18.03% of them either managed their saplings from government nurseries or other locations like Rupani, Kalyanpur etc.

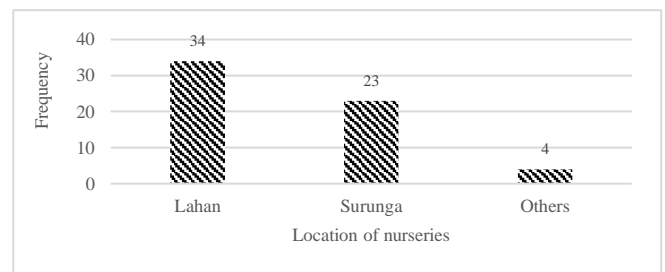


Figure 8: Location of nurseries in the survey area, 2020 (Source: Field Survey, 2020)

4.10.3 Fertilizers and Pesticides

Fertilizers and pesticides are very important input materials for mango cultivation. Fertilizers are required for proper development of plants to attain healthy mature tree as well as development of flowers and fruits. Pesticides are equally important to protect mango from plant diseases and insect pests. Almost half of respondents (49.2%) relied on input materials provided by agro vet situated in Surunga Municipality, Lahan Municipality, Rupnagar etc. while 13.1% of them did not buy fertilizers and pesticides from any other parties. They rather managed to prepare pesticides using organic products like cow urine, herbals etc. For use as fertilizers, they used farmyard manure. Only 4.9% of them were able to enjoy supplied input materials provided by PIU, Saptari. With 18 respondents reported to forbid the use of fertilizing and spraying pesticides in mango orchards, 29.5% of them did not involve in transactions related to fertilizers and pesticides in mango. Remaining 3.3% of respondents managed fertilizers and pesticides from other regions/sources like India and other regions beyond Saptari and Lahan.

Table 23: Input suppliers in Saptari, 2020

Input suppliers	Frequency	Percent
Self-Made	8	13.1
Agro Vet	30	49.2
PIU Saptari	3	4.9
Not practiced	18	29.5
Others	2	3.3
Total	61	100.0

Source: Field Survey, 2020

4.10.4 Harvesting Technology

Harvesting method is important factor for post-harvest life of fruits.

Method which may harm fruits physically reduces the post-harvest life drastically. In the survey area, 78.7% of respondents used the method that includes net/scoop mounted long stick for harvesting. This method is comparatively safe in comparison to traditional method (shaking, picking, hammering with stick etc.) which had been done by 19.6% of the respondents. Only 1.6% of them used modern method including net spread at the bottom of the trunk below canopy.

Table 24: Harvesting technology in Saptari, 2020

Harvesting Method	Frequency	Percent
Scoop mounted stick	48	78.7
Traditional: Hand, stick, shake	12	19.6
Net spread under canopy	1	1.6
Total	61	100.0

Source: Field Survey, 2020

4.10.5 Cleaning

Fruits marketability is widely considered on the basis of its appearance. Mango after harvest produces sap if snapped at immediate tip of mango. This sap sticks to mango peel and produces unattractive black spots on mango skin. So, cleaning is important to give produces alluring appearance. At farmers' level, 90.2% of respondents did not practice cleaning of mango. Only 9.8% cleaned their produces.

Table 25: Cleaning practice in farmers level in the survey area

Response	Frequency	Percent
No Cleaning Practice	55	90.2
Cleaning Practice	6	9.8
Total	61	100.0

Source: Field Survey, 2020

Out of traders, 57.1% of traders used to clean mangoes after harvest. Remaining 42.9% did not practice cleaning of mangoes.

Table 26: Cleaning practice in traders' level in the survey area, 2020

Response	Frequency	Percent
Cleaning Practice	4	57.1
No Cleaning Practice	3	42.9
Total	7	100.0

Source: Field Survey, 2020

4.10.6 Cold Storage

In the command area as well as in the survey area, no any cold storage facility was available. This has caused the circumstances where post-harvest loss of produced mango is very high by creating the window period of post-harvest life of mango shorter. This created the situation where massive supply of mango at shorter window period making the price of mango very less. Bargaining power of farmers had been compromised.

4.10.7 Packaging Practice

Packaging is an important supply function. It not only protects fruits from external harmful environment but also provides better looks and appeal to the products consequently promoting marketability of fruits. Among 61 respondents asked about their practices, 73.8% of respondents were not practicing packaging. Only 26.2% of them practiced packaging of harvested produces.

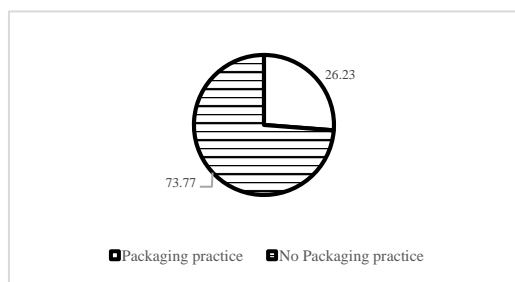


Figure 82: Packaging practice in Saptari, 2020 (Source: Field Survey, 2020)

At traders' level, all of them practiced packaging. Among them, 57.1% used plastic crates for packaging while 28.6% of them practiced packaging in polythene. Likewise, 14.3% of them practiced packaging in wooden crates.

Table 28: Types of packaging at trader's level in the survey area, 2020

Type of packaging	Frequency	Percent
Plastic Crates	4	57.1
Polythene	2	28.6
Wooden Crates	1	14.3
Total	7	100.0

Source: Field Survey, 2020

4.10.8 Transportation Technology

In the survey area, most of the farmers trade their mango even before bearing time. They sell their products in pre-determined contracts. In such cases, transportation was facilitated by traders themselves which represents 72.13% of respondents. Rest of the others had to transport their produces by some means of transportation. Among remaining respondents, only 6.56% used to hire tractors, 13.11% used cycle, 1.64% used thela, and other 6.56% used cycle for transportation.

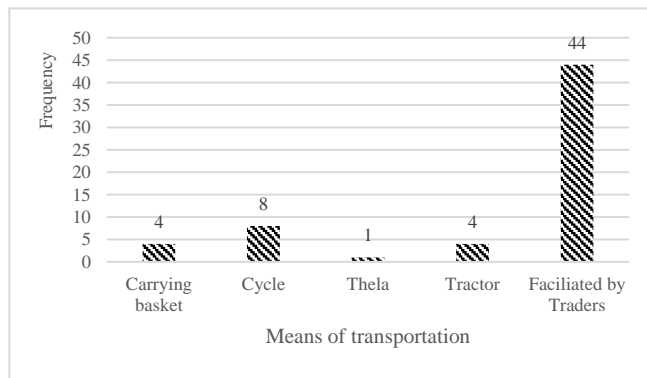


Figure 83: Transportation means in the survey area, 2020 (Source: Field Survey, 2020)

4.10.9 Transportation cost

For proximal market like Lahan, Surunga, Rajbiraj, Biratnagar, it cost about Rs. 1 to 2 per kg irrespective to precise distance consideration. For markets like Hetauda, it cost about Rs. 4 per kg. Likewise for distance market like Kathmandu, it cost Rs.7.5 per kg.

4.10.10 Type of business

Mangoes are usually sold before they proceed to fruit bearing age. They are sold at flowering age. In the survey area, 62.3% of them used to sell their mangoes on contracts. Remaining 37.7% used to sell mangoes after maturity stage is attained.

Table 28: Types of business in the survey area, 2020

Type of business	Frequency	Percent
Contract Trading before fruiting	38	62.3
Sold after maturity	23	37.7
Total	61	100.0

Source: Field Survey, 2020

4.10.11 Marketing Channel

In the survey area, contract farming is major form of business model. So, majority of respondents (55.7%) dealt with wholesalers for selling their produces while 29.5% sold their products to retailers and local vendors. Only 14.8% of respondents sold their products directly to end customers.

Table 29: Marketing channel used in survey area, 2020

Value Chain Channel	Frequency	Percent
Farmers--Wholesalers--Retailers--Consumers	34	55.7
Farmers---Retailers/Local vendors--Consumers	18	29.5
Farmers---Consumers	9	14.8
Total	61	100.0

Source: Field Survey, 2020

4.11 Value Chain Analysis

4.11.1 Value Addition by product diversification

4.11.1.1 Product diversification

Mango has immense scope for product diversification which can add value to the products. Products like juice, jam, jelly, pulp, powder, pickles, dried pickles, aamil, amot etc. fetches higher value. All 61 respondents were asked if they were involved in production of materials beyond fruit. Each one of the respondents was involved in production of diversified products. In the survey area, major diversified products were achaar (dried and wet), aamil, amot etc. But, none of the respondents were involved in products with higher value like juice, jam, pulp etc.

Table 30: Diversified products in survey area, 2020

Products	Frequency	Percent
Aamil	61	100
Achaar	58	95.08
Amot	56	91.8
Chutney	50	81.97

Source: Field Survey, 2020

4.11.1.2 Sales of Diversified Product

All the respondents were asked if they used to sell their diversified products like aamil, chaar etc. Among 61 respondents, 62.3% of them are involved in sales of diversified products while remaining 37.7% of them are had been using these products for home consumption.

Table 31: Percentage sales of produced diversified commodity in the survey area, 2020

Response	Frequency	Percent
Home Consumption of diversified products	38	62.3
Sales of Products	23	37.7
Total	61	100.0

Source: Field Survey, 2020

Out of every respondents who used to sell the diversified products, aamil was the major commodity of trade. Other products like achaar, chutney etc. was limited to home consumption.

Aamil being the prime commodity of trade was sold in two ways:

- Barter System
- Monetary Exchange
- Barter System

Barter is a system of trading goods or services between two or more parties without monetary exchange (Kenton, 2019). It is the classical system of transaction where two parties suffice their commodity utility by mutual exchange of their respective goods. In the survey area, majority of mango growers who involved in production of aamil used to barter their products in the exchange of salt. The proportion with which aamil of certain volume was exchanged with salt volume varied on the consideration of mango production. During off-year, unit kilogram of aamil was exchanged with 3-5 kilograms of salt. During off year, it was proportionate with 1-2 kilograms of salt.

- Monetary Exchange

The price per unit kilogram of aamil yielded about Rs.60 to Rs. 100 during

off-year. Likewise during on-year, it went down to Rs. 20 to Rs.40 per unit kilogram.

4.11.2 Processing technology

In the survey area, there were no processing facilities available. Although the production quality and quantity held the potential for industrial processing of mango, lack of processing technology had caused the setback in the development t of value chain in mango cultivation.

4.11.3 Marketing Margin

4.11.3.1 For Proximal Markets

Average Farm Gate Price of mango: Rs. 24.82
 Average Market Price (Retailer Level): Rs. 40
 Marketing Margin: Rs. 55 – Rs. 24.82 = Rs. 30.18
 Producers share: (Rs. 24.82/Rs. 55)*100 = 45.13%
 Marketing margin for proximal market was Rs. 15.18 that implied producer’s share in the total value of commodity was 45.13% which was comparatively significant. This indicates that farmers have somewhat greater authority for margin.

4.11.3.2 For Distant Markets

Average Farm Gate Price of mango: Rs. 24.82
 Average Market Price (Retailer Level): Rs. 70
 Marketing Margin: Rs. 80 – Rs. 24.82 = Rs. 55.18
 Producers share: (Rs. 24.82/Rs. 80)*100 = 31.02%
 Marketing margin for distant market was Rs.45.18 implying 35.46% of producer’s share in total value of mango. Producer’s share was comparatively less. This indicates the monopoly of middlemen in the value chain. Table 32: Marketing margin and producer’s share in different markets.

Table 32: Marketing margin and producer’s share in different markets

Market type	Farm Gate Price (Rs.)	Retailer’s Price (Rs.)	Marketing Margin (Rs.)	Producer’s Share (%)
Proximal Market	24.82	55	30.18	45.13
Distant Market	24.82	80	55.18	31.02

Source: Field Survey, 2020

4.11.4 Value Addition

4.11.4.1 For Proximity Markets like Lahan, Rajbiraj, Surunga etc.

Table 33: Value addition in proximal market in the survey area, 2020

VC actors	Cost per Unit kg (Rs.)			Revenue per Unit kg (Rs.)	Value Added (Rs.)
Farmers	15.06			24.82	9.76
Wholesalers		Transport + Labor	Total	35	10.18
	24.82	2	26.82		
Retailers	35			55	20
Total					39.94

Source: Field Survey, 2020

At farmers’ level, it cost farmers Rs. 15.06 for production of 1 kilogram of mango which they sold at average price of Rs. 24.82 with 9.76 margin on every kilogram. At wholesalers’ level, it cost them Rs. 26.82 along with transportation and labor which they sold at about Rs. 35 per kilogram claiming Rs. 10.18 margin. Retailer keeping Rs. 20 margin, sold mangoes at Rs. 55 which they bought at Rs. 35 per kilogram. This analysis showed that farming level community had more control and claim over the margin in mango.

4.11.4.2 For Distant Markets like Kathmandu

Table 34: Value addition in distant market in the survey area, 2020

VC actors	Cost per Unit kg (Rs.)			Revenue per Unit kg (Rs.)	Value Added (Rs.)
Farmers	15.06			24.82	9.76
Wholesalers		Transport + Labor	Total	45	12.68
	24.82	7.5	32.32		
Retailers	45			80	35
Total					57.44

Source: Field Survey, 2020

In distant markets, farmer’s margin and revenue were same as in local market channel. At wholesalers’ level, Rs. 12.68 was added and at retailers’ level Rs. 35 was added.

4.11.5 Value chain Mapping

Value chain map is the schematic illustration of a commodity from input suppliers through producers, processors, traders to final consumers along with the value addition of the product throughout the chain. In the survey area, 55.7% of the produced mango was traded to wholesalers as well as 29.5% of them was traded to retailers. Around 14.8% of mango was directly sold to consumers from Saptari, Lahan etc. Around 1.64% of mango was exported to India.

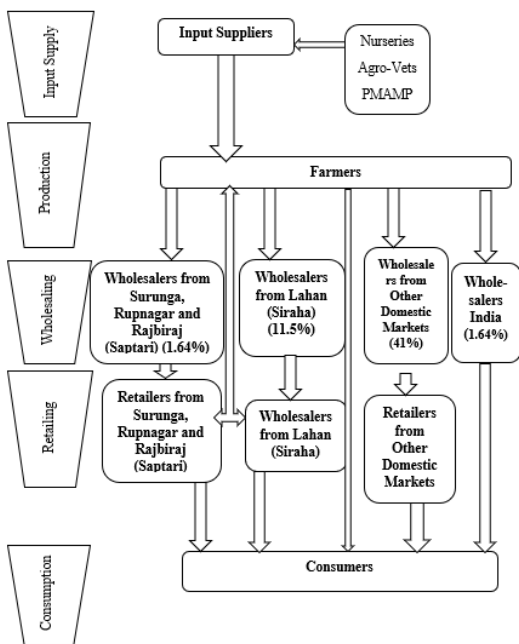


Figure 9: Value chain map of mango of Saptari district, 2020

4.11.6 Value Chain Actors

4.11.6.1 Input Suppliers

Input suppliers have paramount role in mango value chain in Saptari. Quality saplings, fertilizers, pesticides, micronutrients etc. are provided by input suppliers.

Agrovets: Agro-vet supplies fertilizers, pesticides, micronutrients etc. essential to be applied for mango production. They also provide materials for spraying, harvesting and ripening mangoes. They are also sought for materials required for liming, Bordeaux mixture, pheromone trap etc. Lahan serves the major input markets. Likewise, there were big agrovets in Surunga, Rajbiraj and Rupani as well.

Nurseries: Nurseries are the vendors of saplings. In Saptari, due to large demand of mango saplings, there were many large nurseries. During the

study, there were 3 authorized nurseries under PMAMP which dealt transactions around 5 lakhs rupees per years.

4.11.6.2 Collectors

There were no specific collectors in Mango supply chain in Saptari. Collection was done by mostly by traders and retailers, and rest were collected by farmers.

4.11.6.3 Wholesalers

Wholesalers had major deal with supply chain of mango in Saptari. From farmers, 55% volume of mango was collected by wholesalers and traded among retailers in various domestic and non-domestic markets. Wholesalers were involved in contract farming where they in advance dealt with farmers and fixes the price on assumption of productivity and paid the price after they sold the fruit.

4.11.6.4 Retailers

Retailers are the end traders that deals with end consumers. In the survey area, retailers dealt with 29.5% of mango produced by farmers. They were the major factor for price determination in the area. Taking into consideration about the post-harvest loss risk of mango, they had been monopolizing market as per the circumstances.

4.11.6.5 Consumers

Consumers are ultimate destination of any commodity. They are the price bearers. In the survey area, only 10-20% of the produces were consumed. They were largely sold in other domestic markets with larger consumption regions like Kathmandu, Pokhara, Hetauda etc. as well as some regions of Bihar, India.

4.11.6.6 Enablers

PMAMP: Prime Minister Agriculture Modernization Project has been operating in Saptari for about 3 years. In order to increase the production and productivity of major agriculture commodities by mechanization and modernization of agricultural practices for development of better economic growth of farmers, PMAMP was launched.

Major Programs in PIU Saptari:

- * Expansion of production area: Subsidize 50% for sapling distribution.
- * Training and Recommendation: Subsidize 100%.
- * Small Irrigation Program: Subsidize 50% for tube well construction.
- * Barn Improvement: Subsidize 50% for construction of improved shed with collection tank for urine and dung.

Municipalities Office of Command Area: There had been very few collaborations between farmers and local governance of survey area. Although, they have been assisting financially as well as by material support for Mango fair in the command area.

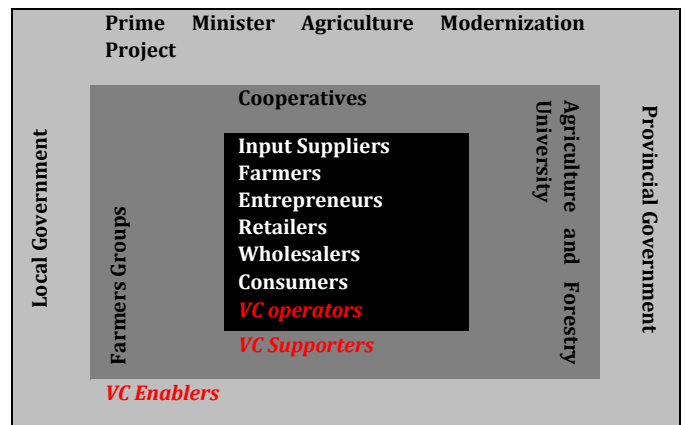


Figure 10: Actors in mango value chain in Saptari, 2020 (Source: Own Illustration)

4.12 Problems in Mango Cultivation

Problems in mango cultivation were identified by field visits for problem identification and prioritization, FGDs and KII. Altogether two categories of problems were identified, one being production problems and the other being value chain or marketing problems.

4.12.1 Production Problems

Five problems were identified by survey, FGDs and KII and the identified problems were asked to rank from P1-P5 where P1 means highly prioritized while P5 means least prioritized. Among 5 problems insects pests held highest priority along with lack of irrigation. Similarly, labor shortage had also been prioritized problem of mango production in Saptari. Lack of fertilizers and PH loss held 4th and 5th position.

Table 35: Production problems in the survey area, 2020								
SN	Problems	Frequency					Index	Rank
		P1	P2	P3	P4	P5		
1.	Diseases and Insect Pests	15	26	18	2	0	0.777	I
2.	Irrigation	25	15	12	5	4	0.770	II
3.	Labor Shortage	20	13	22	4	2	0.748	III
4.	Fertilizers and Other Inputs	1	5	3	29	23	0.377	IV
5.	Post-Harvest Loss	0	2	6	21	32	0.328	V

Source: Field Survey, 2020

Table 36: Marketing and Value chain problems in the survey area, 2020											
SN	Marketing Problems	Frequency								Index	Rank
		P1	P2	P3	P4	P5	P6	P7	P8		
1.	Monopoly of Middlemen	27	14	12	5	3	0	0	0	0.867	I
2.	Lack of Processing Technology	18	15	9	12	3	3	1	0	0.791	II
3.	Low market price	13	12	14	1	11	3	5	1	0.7418	III
4.	Lack of proper commodity market	3	15	16	17	21	5	1	0	0.7029	IV
5.	Transportation Problems	1	1	2	8	29	13	7	0	0.4836	V
6.	Lack of Proper Post-harvest Technology	0	3	5	3	12	22	15	1	0.4324	VI
7.	Poor Market Intelligence	1	3	1	5	12	30	1	8	0.3185	VII
8.	No infrastructure for Export	0	0	3	1	1	6	1	49	0.1722	VIII

Source: Field Survey, 2020

(Here, P implies priority level. P1=1, P2=0.875, P3=0.75, P4=0.625, P5=0.5, P6=0.374, P7=0.25 and P8=0.125. Each options was assigned with priority points where P1 means highly prioritized while P5 means least prioritized. Indices were obtained by calculating average of priority points. Rank was assigned in descending order of obtained indices)

4.13 Price Trend of Mango

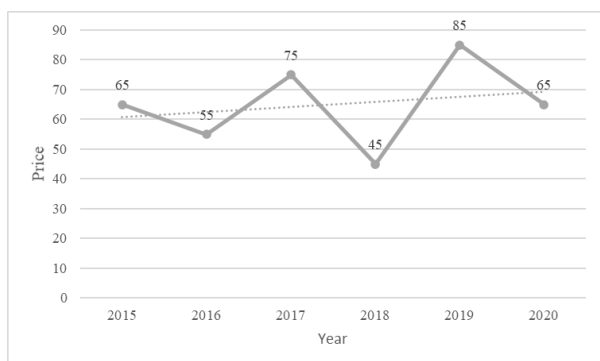


Figure 11: Wholesale price trend of Maldaha variety of mango

(Here, P implies priority level. P1=1, P2=0.8, P3=0.6, P4=0.4 and P5=0.2. Each options was assigned with priority points where P1 means highly prioritized while P5 means least prioritized. Indices were obtained by calculating average of priority points. Rank was assigned in descending order of obtained indices)

4.12.2 Marketing and Value chain Problems

Eight problems from survey, KII and FGDs were identified and respondents were asked to rank those problems from P1 to P8 where P1 means highly prioritized while P8 means least prioritized. Among 8 problems, monopoly of middlemen held the highest priority signifying the low producers share in valuation of price of commodity. This has caused the centralized value addition in trade links causing very low margin for farmers and high price for end customers. Similarly, there were no any processing plants in the survey area which had limited the immense scope of product diversification of mango products and collateral value addition. Low market price was evidently hampering the economics of growers which was the result of unscientific pricing strategy. Similarly, lack of proper market for transactions of mango was also a significant problem of the survey area. In case of transportation, most of the management was done by traders themselves, but for those respondents who used to sell mangoes in local markets, transportation was troublesome. Similarly, lack of proper post-harvest technology had caused the shortening of mango supply window which caused massive flow/supply of mango causing decline in mango price. As well as, there was poor market intelligence among farmers which had caused the lack of market dynamics for better market price.

Wholesale price trend of mango is dependent on the production of mango in on-year and off year caused by alternate bearing. For on-year, as the mango production is increased, supply of mango is also increased causing low market price. Similarly, during off year supply decreases and cause increase in market price.

4.14 Linkage analysis

4.14.1 Vertical linkage

Vertical linkage is the synchronization of firms at different level of value chain that provides conduits for transmission of desired quality and quantity of commodity through the supply chain. It is the coordination of successive stages of production and marketing, with respect to quantity, quality, and timing of product flows (Gulati et al., 2006). Vertical coordination is important factor for consistent and quality supply of commodity by involving in provision of seed and fertilizer on credit,

technical assistance and a guaranteed price at harvest (Maertens and Swinnen, 2015).

4.14.1.1 Contract Farming

Contract farming is a forward agreement done between producers and traders/collectors regarding the production, management and marketing of the commodity (Will, 2013). In the survey area, contract farming was eminent form of business coordinating between farmers and traders of mango. In the survey area, 62.3% of respondents were involved in contract farming whereas 37.7% involved in selling of mango after maturity of fruit.

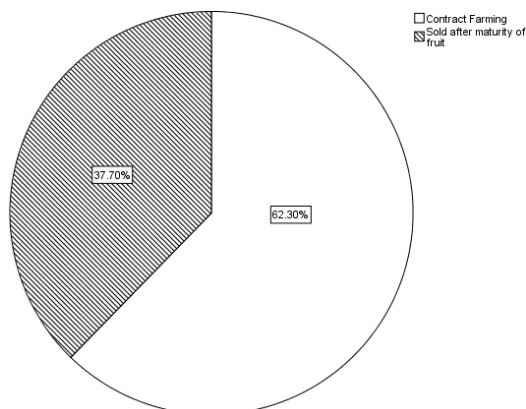


Figure 12: Contract Farming in Mango in the survey area, 2020 (Source: Field Survey, 2020)

Activities and agreements included in the contract farming:

- * Security from trespassers, vertebrate and invertebrate pests were under the responsibility of traders onwards.
- * Harvesting and sales of produces were then the responsibility of traders.
- * Some traders involved in spraying of pesticides, fertilizer application etc. in the orchard.
- * Farmers were not allowed to reevaluate their produces in case the production exceeded previous projection.

Apparently, contract farming had been one of the reason which had limited the dissemination of market intelligence among farmers. Traders had used it as a tool to hide the mechanism of value addition process depriving farmers from achieving true information on real valuation of their orchards.

4.14.1.2 Subsidized Input Supply

PMAMP had been providing 50% subsidies on saplings, materials for construction of irrigation tube-well etc. Due to this, not only the synchronization between farmers and PMAMP had been built but also the synchronization between input suppliers like nurseries, agrovets had been built which had significantly aroused the awareness of selection of novel materials for orchard establishment.

4.14.2 Horizontal Linkage

Horizontal linkage is the coordination between firms at the same level in value chain. It is like creating union of firms of same function. Horizontal coordination can be best explained at farmer's level where small holding farmers coordinate and function collectively for decreasing input costs, disseminate farmers' market intelligence, access to new technologies, access to opportunities for subsidies, enter novel market system etc. (Stockbridge et al., 2003). In the survey area as well, horizontal linkage was observed in farmers' level the most. As the area was assigned as 'Mango Zone' by PMAMP, large number of farmer's group, co-operatives as well as joint firms were established and had been operating in various programs of mango zone. By the linkage, all farmers had been unified and had been able to voice for development of mango cultivation profession in the area.

4.15 SWOR Analysis

SWOR analysis was done by conducting KII among members of Zone operating committee of PMAMP, PIU, Saptari and personnels from PMAMP. Strengths, weaknesses, opportunities and risks of mango cultivation and marketing were asked in the KII.

4.15.1 Strengths

Production:

- * Mango produced in Saptari district are regarded as superior in quality, taste and flavor.
- * Production of mango in Saptari district is massive enough to suffice industrial level of demand.
- * Being long term crop, it can provide revenue for prolonged period.
- * Mango cultivation is less labor intensive enterprise.
- * Comparative advantage over cereals and other vegetables.
- * Mango orchard allows shade loving crops for increasing farm income.

Marketing:

- * Traders of mango practices fertilization, spraying pesticides, harvesting, transportation, grading, packaging etc. which facilitates farmers.
- * Mango has immense scope for value addition practices for value addition.
- * Good demands in proximal and distant market

4.15.2 Weaknesses

Production:

- * Traditional farming system has still limited potential productivity.
- * Alternate bearing causing alternate production pattern
- * Lack of irrigation facility.
- * Negligence for fertilization and protection from diseases and pests
- * Labor shortage

Marketing:

- * Maldaha variety is the main variety grown in the area which causes voluminous supply of same variety of mango within short period of time causing decline of mango price.
- * Weak market information system
- * No synchronization among mango traders
- * Unscientific marketing system
- * Lack of transportation facility
- * Lack of cold storage facility

4.15.3 Opportunities

Production:

- * Soil, climate and alleviation is suitable for mango cultivation
- * Establishment of PMAMP, PIU, Mango Zone Saptari which facilitates farmers by subsidies, material support, training, field inspection etc.
- * Under-construction of cold storage for mango worth Rs. 17 crores.
- * Establishment and expansion of post-harvest center for post-harvest handling

Marketing:

- * Market proximity (Lahan, Rajbiraj, Udayapur, Biratnagar etc.)
- * Generous demand even in India
- * Significant demand of diversified/value added products of mango
- * Road access to major markets

4.15.4 Risks

Production:

- * Maldaha is insect susceptible variety.
- * Short post-harvest life
- * Vertebrate pest like wild boar, monkey etc.
- * Diseases like fruit drop, fruit cracking, gall etc.

Marketing:

- * Price uncertainty
- * Monopoly of middlemen
- * Export limitation

5. CONCLUSION

Saptari being famous for mango cultivation has climate, soil and other resources which motivates the production of mango in largest quantity in Nepal. Input suppliers, farmers, entrepreneurs, wholesalers, retailers and consumers are major VC actors of Saptari for mango. Although farmers have enabled themselves to almost doubled the production of mango in recent years, famers still have lower level of economy due to middlemen monopolized market system which has resulted in lower margins for farmers. Lahan, Rajbiraj, Kanchanrup, Biratnagar etc. serves as major input markets as well as the major local markets for produces. Produced commodity is sold in these markets as well as in distant markets like Hetauda, Pokhara, and Kathmandu as well other regions of the nation. Due to poor market information system and highly elastic market price, farm gate has been consistently lower than it should be and has been able to obtain low market share.

Though, the production of mango has been increasing, majority of mango growers still remain unsatisfied from the price they are being offered. Having contract type of transaction of mango produces, actual valuation has rarely been done, which has created barriers for farmers to obtain the real value of their produces. In distant market, farmers have been able to fetch considerable percentage of margin while transacting in proximal market while for distant market, marketing margin has been significantly increased causing vast differentiation between how much farmers get and how much consumers pay for same unit volume of mango. Despite almost every farmers are involved in product diversification by the production of aamil, achar, pickles, amot, etc., only 37.7% produces those products for commercial aspects. Moreover, though, mango has immense possibility of production of diversified products, there are no processing technology and proper post-harvest technology which has limited the prospect of value addition practices.

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