1. INTRODUCTION

Nepal is an agriculture country with with 65.5% actively population engaged on agriculture and contributing more than 27.1% GDP of the country (MoAD, 2017/18). Government of Nepal, has given emphasis for the promotion of high value but low volume cash generating crops. Fruit crops are important crops for vital nutrients and vitamins. Because of the climatic variations, different fruits are grown on the altitudinal basis. Moerover, we can grown tropical to temperate type of fruits since we are gifted with 4 physigoraphic/horticultral zone. The total productive area coverage under fruits is 120023 with annual production of 1177640 metric tonnes with productiviey of 9.81 t/ha in whole Nepal (MoAD, 2018/19). The major fruit transaction is carried out in Bagmati province because of its highest population of about 5529452. Not only this, this province is centre of attraction to tourist. Thus, commercial fruit farming being practiced in this province from the long time.

2. RATIONALE OF THE STUDY

Nepal enriched with climatic variation as well as biodiversity resources has the potential to grow different types of crops i.e. Tropical to temperate fruit crops. Despite this Nepal imports large quantity of fruit investing of billions of currency. Eventhough the farmers are enganged in commercial fruit cultivation and the support from grovernment has intense positive impact of increment in yield i.e. 9.81 mt/ha in 2018/19 (MoAD, 2018/19). With the education and health awareness among the consumers have led the increased demand every year which compelled the country to invest more money on importing the fruits from outside the world. In order to be in line with the increaed fruit demand, there needs to motivate the farmers on fruit cultivation and Bagmati province need to utilize the marginalized steep lands on commercial fruit production. The farmers will be convinced once they get acquainted with cost of the production alogn with the B'C ratio of specific commodity. The study related to production cost analysis of major fruits grown thorughout the Bagmati province was carried out which will be helpful to design and implement the eco-friendly improvised technologies at Bagmati province in order to motivate the farmers towards orcharding enterprises.

3. OBJECTIVES

- To identify production cost analysis of major fruits (papaya, banana, sweet orange, mandarin orange, kiwi and lime) fown at Bagmati province.
- To identify the gross margin of major fruits (papaya, banana, sweet orange, mandarin orange, kiwi and lime) fown at Bagmati province.
- To prepare the report which will be helpful to design and implement the eco-friendly improvied technologies at Bagmati province.

4. MATERIALS AND METHOD

4.1. LOCATION OF THE STUDY

The districts were selected on the basis of fruit zone which representing the whole province. Four districts, Chitawan, Sindhuli, Ramechhap and Dolkha, representing the whole provinec were selected.

4.2. TARGET CROPS

The study included the major commercial fruits grown throughout the Bagmati province. The major emphasis was given to the papaya, banana, sweet orange, mandarin orange, lime and kiwi which has been prioritized by Bagmati province as well.

4.3. DURATION OF THE STUDY: 2.5 months

4.4. ACTIVITIES PERFORMED

4.4.1. Desk study: A thorough desk study was done to collect all the necessary materials and information related to this study. During this study provincial profile, district profile, and other available national, regional or district level data, policies and programs were reviewed thoroughly.

4.4.2. Data collection: Both primary and secondary data were collected in the study period. The primary data were collected through household survey, key informants interview and focused group discussion. Secondary data were collected from various national repositories, district profiles and all other valid sources. For primary data, the questionnaire was designed and pretested. it was then subjected to M water portal, which a data entry software (as our data collection was paperless). The questionnaire was then deployed to M water surveyor installed in mobile phone of enumerators. they were then trained to use the software. after that, they collected information from 135 respondent (35 from each four district). The final batch students of B.Sc.Ag. from Institute of Agriculture and Animal Science were selected as the enumerators. As the study was focused mainly on production cost analysis of major fruits (papaya, banana, sweeet orange, mandarin orange, lime and kiwi), the respondents were selected on the basis of the specific growing farmers with the close coordination with Agriculture Knowledge Center (AKC) at district level. A total of 8 enumerators carried out the HH survey on 135 households.

4.4.3. Data entry and analysis: Data were collected within subjected time frame and were processed properly. The data was then entered in Ms-Excel version 2013 and imported to Statistical Package for Social Science (SPSS) version 23 and coded properly. Both descriptive and inferential analysis was done as and when needed. The data were then presented in bar diagram, tables and other options.

4.4.4. Inception and validation workshop at ADD level: After signing the agreement for the proposed study, inception workshop was held to discuss on the questionnaire, methodology being executed during the survey, selection of the respondent, district. This workshop helped to get realistic data and further helped to make the report more effective. Similary, after processing and analysis of the data, a draft report was prepared and the report was presented at Agriculture Development Directorate, Bagmati province, Hetauda for the amendment of the report. Later the

final report was prepared on the basis of the recommendations and corrections made by the workshop.

4.4.5. Report write-up and submission: A concise and draft report was prepared just before the ADD level workshop. After incorporating necessary suggestions and feedback the final report was prepared and submitted after incorporating the suggestions and feedback provided during the validation workshop.

4.4.6. Calculus of the study

Cost of production: It is reported in two forms which are described as below

Total cost: This is the summation of both variable and fixed cost, both costs in cash and kind including household labor incurred during the production process.

Cost per hectare: Cost per hectare is to be computed on the basis of "total cost" minus "value of byproduct" divided by "total number of plants" using the following formula.

$$Cost\ per\ plant = \frac{Total\ cost\ per\ hectare - Value\ of\ the\ by\ products}{Total\ nmber\ of\ plants}$$

However, as no by-products were reported to have been valued, the by-product case is not applicable at this point. So the formula will remain at this moment as:

$$Cost\ per\ plant = \frac{Total\ cost\ per\ hectare}{Total\ nmber\ of\ plants}$$

Production Condition: The cost calculation of perennial crop is different than seasonal/annual crops. Generally, the fruit crops are perennial and produce fruits after 4-5 years of plantation. During this period, farmers may make the use of land to cultivate intercrops which are seasonal in nature like cereals and vegetables. So, Upto 4-5 years, the farm is in loss position due to no production and just after 4-5 years, fruit plant start to produce fruits and the farm may proceed in profit condition. So, It is not good to calculate B/C ratio before production. There are four major components to be considered in cost calculation. They are called factors of production like Land, Labor, Capital and Management. These four factors of production were taken as a major part of cost of production calculation.

Total Variable Cost: Total variable costs are the costs at market price level and incurred both in cash or kind on items such as human labor, bullock labor, seed, manures, irrigation cost, fertilizers, plant protection aids, lease land rent, interest of the capital, Management cost and other miscellaneous cost. Level of these costs varies depending on production locations, technology and scale of production.

Human Labor: Human labor forms one of the important components of cost involved in cost of fruit crop production. It is measured in terms of adult man-day (eight working hours) in the field. Human labor is expressed in adult man-day. Generally in rural areas, woman workday and child workday is converted in terms of adult man-day, and it is being calculated as it usually practiced.

- 1.25 woman days is equivalent to One-man day; implying 1 woman day = 0.8 man day.
- 2 child-days is equivalent to One-man day; implying 1 child day = 0.5 man day.

Own Family Labor: It implies the labor contribution on farm by own family members. It is the main source of farm labor in case of small and medium sized farms. For estimating such costs, family labor has been valued as paid type of labor. Labor taken on exchange basis is also included in family labor.

Hired Labor: Hired labor is the non-family labor employed for farm work on payment on wages in cash, kind or both. On the basis of work nature, the wage rate is different between man and women.

Bullock Labor: Bullock labor inputs are measured in terms of bullock day, which means use of a pair of bullock for eight hours. Bullock services costs have been calculated at the current market rate per pair of bullock per day. The cost incurred for ploughman is separately included in the human labor. Nowadays, bullocks are being replaced by tractor in Terai and hilly areas. The tractor cost is calculated per hour basis. Beside this, for the harvesting of fruit crops, harvesting machines are being used. These machineries will help to save the time and cost compare to human and bullock labor. These machineries are very useful to increase the benefit as well as efficiency.

Manures and Fertilizers: Manures and fertilizers are measured in physical as well as value terms. The cost of fertilizers has been calculated on the basis of actual price paid by the farmers.

Irrigation: Irrigation charge or cost incurred while hiring pump-set has been taken as actual amount paid. The labor involvement in irrigating field is accounted in human labor.

Seedlings: In case of fruits, seedlings/saplings from seed or different propagation methods are purchased from government or private nurseries. The seedling price was found lower from government institutions but the quantity is very low where private nurseries have enough numbers but the price was found higher. Generally, the seedlings developed from seed will take 5 years to produce fruits but the seedlings developed from different propagation methods like cutting, layering, grafting etc will take just 3-4 years to produce fruits. The price of seedlings developed from seed and from different propagation methods is different. The seedlings developed from seed were found lower than different propagation method.

Other Material Inputs: Material inputs such as pesticides and insecticides have been taken at actual price paid have been evaluated accordingly.

Total Fixed Cost: Fixed costs are those that do not vary with size of enterprise and have no bearing upon decisions to increase or decrease production. It includes land revenue, water tax, depreciation as well as tools and implements and interest in fixed assets.

Land Tax: Agricultural land is classified into upland and lowland. The land survey has divided each type of land into 4 categories namely, Abbal, Doyam, Sim and Chahar. The land tax has been taken as actual tax paid by the farmers.

Other Tax: It includes water tax and local tax and other governmental taxes if any levied in some special areas for specific unique purpose.

Depreciation: Depreciation cost is calculated on the basis of purchase value and economic life of an asset. The economic life of an asset is provided by the company. The formula for calculating annual depreciation cost is as follows:

Depreciation Cost = (Purchase value – Scrap value)/Economic life of the farm asset.

Repairs and Maintenance: Farmers in rural areas pay a fixed amount of their main produce to local blacksmiths who provide regular services of repair and maintaining services of agricultural tools and implements in rural areas. An annual repairing and maintenance cost is calculated by using the following formula:

$$Repair\ and\ maintenance = \frac{Area\ under\ particular\ crop * fruit\ quantity\ paid}{Total\ cropped\ area} * Price/$$

Normally, payments made by the farmer for the repair and maintenance all the year round are proportioned as per the crop duration and the area of cultivation.

Interest on Working Capital: Interest on the working capital is charged cash expenses incurred are calculated based Agricultural Development Bank interest rate.

Lease Land Value: Land is another important factor for production. Generally, land leasing is not common in fruit crops but it is better to use lease land value for the calculation of B/C ratio including all factors of production. We have to include the land, labor, capital and management factors for B/C ratio calculation. Then, anyone who is interested to invest in fruit production business, they are well informed and can calculate the real cost of production including all factors of production like family labor cost, land lease value, interest of investment and management cost. In this study, land lease value of hills and mountain is estimated Rs. 1000-1500 per ropani and in case of Terai Rs. 850-1000 per kattha.

Management Cost: The previous studies of cost of production of cereals and vegetables did not include the management cost. But it is necessary to use the management cost in cost calculation because management is also an important factors of production and fruit crops are perennial in nature. The life span of fruit crop is generally 25-30 years. In this study, Rs. 1500-2000 per month is used as management cost.

Gross Income: It is the value of the total crop produce (output) including main and by-product multiplied by farm gate price.

Gross Income = Total products × Farm gate price

In case of fruit, the crop started to produce fruits after 3-5 years. Therefore, the gross income will be positive after 5 years only. During the growth period, the business has negative gross income.

Benefit Cost Ratio: This is the ratio of the value of output including by-product and the total cost of production on farm gate price.

B/C Ratio = Gross Income/Total cost

If the B/C ratio is above 1, then the farm is earning profit. If the B/C ratio is less than 1 or negative, then the farm is in loss. The fruit farm will generate positive B/C ratio after 5 years only.

Gross Profit at Farm Gate: It is the difference between the gross income to the total cost considering the product price at farm gate.

5. RESULT AND DISCUSSION

5.1. Type of fruit farming: 65% of the farmers were involved in commercial farming whereas 35% were involved in semi commercial farming.
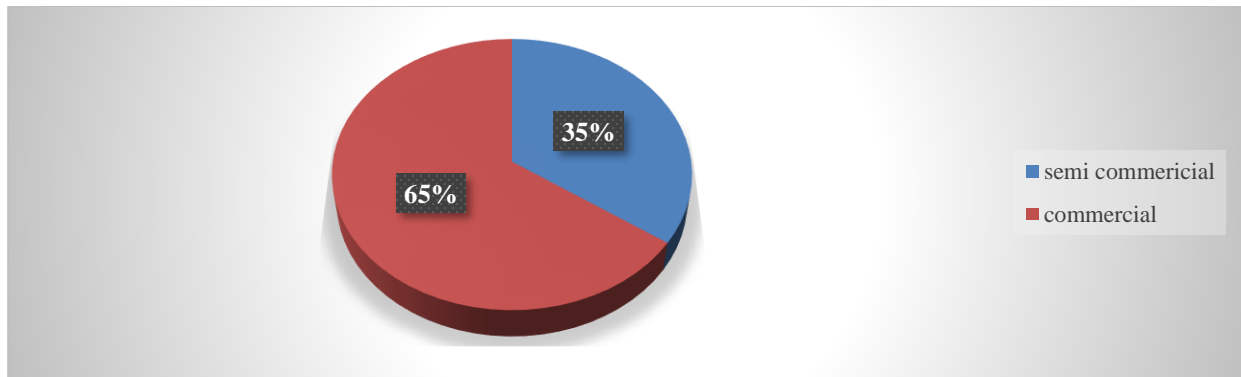
Figure 1: Type of fruit farming

5.2. Reasons for doing fruit farming: Talking about the reasons of doing fruit farming, 46.9% said it to be highly profitable, 23.5% for increasing demand, 17.3% for easy to manage , 7.1% for marginal land utilized and 4.2% for other reasons.
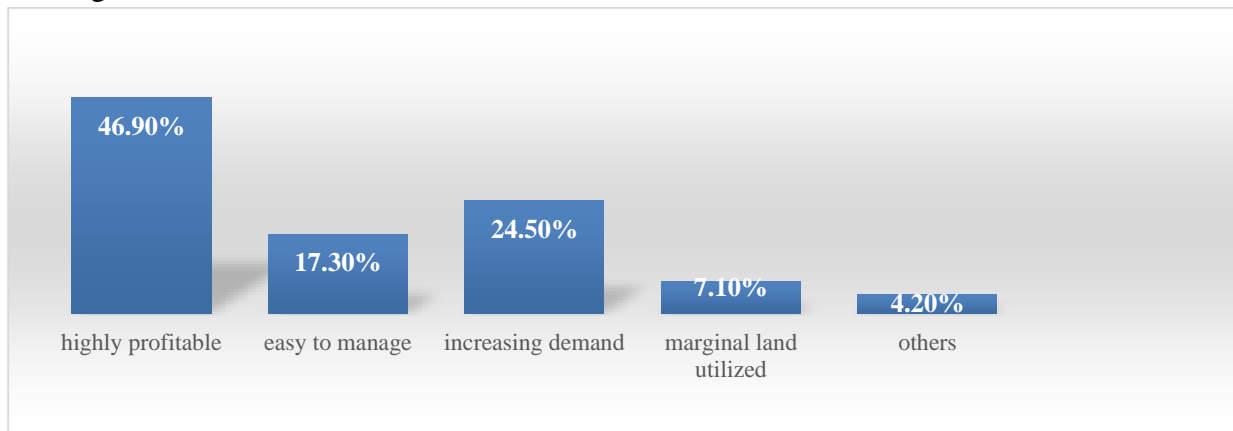
Figure 2: Reasons for doing fruit farming

5.3. Initial financial support: The most effective financial support for initiating fruit farming was government (36.9% of respondents) followed by informal sources (21.43%) and banks (20.24%). Detail is shown in figure 3.
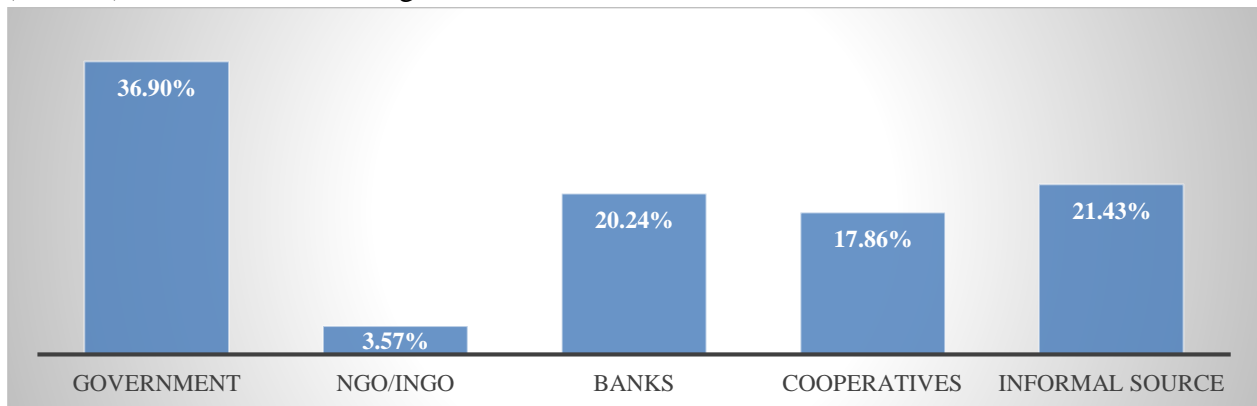
Figure 3: Initial financial support

5.4. Source of saplings: 32.7% of farmers obtained seedlings/saplings from local nurseries followed by local government (28.8%) and AKC (18.5%). Detail is shown in figure 4.
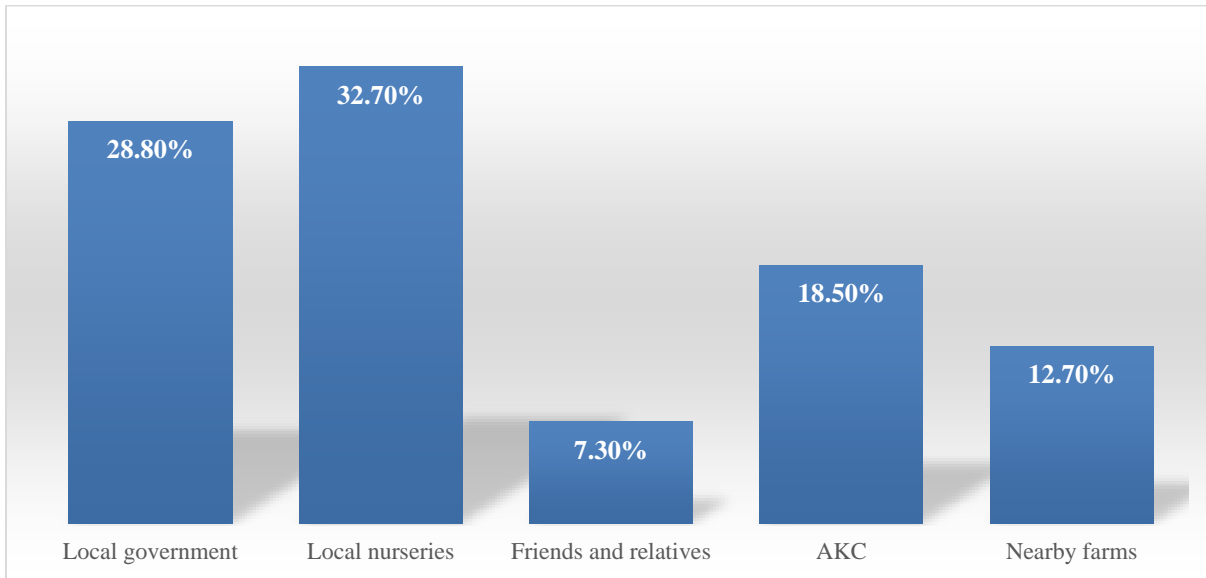
Figure 4: Source of saplings

5.5. Sapling selection and conservation: 63% of farmers have knowledge on sapling selection and conservation.
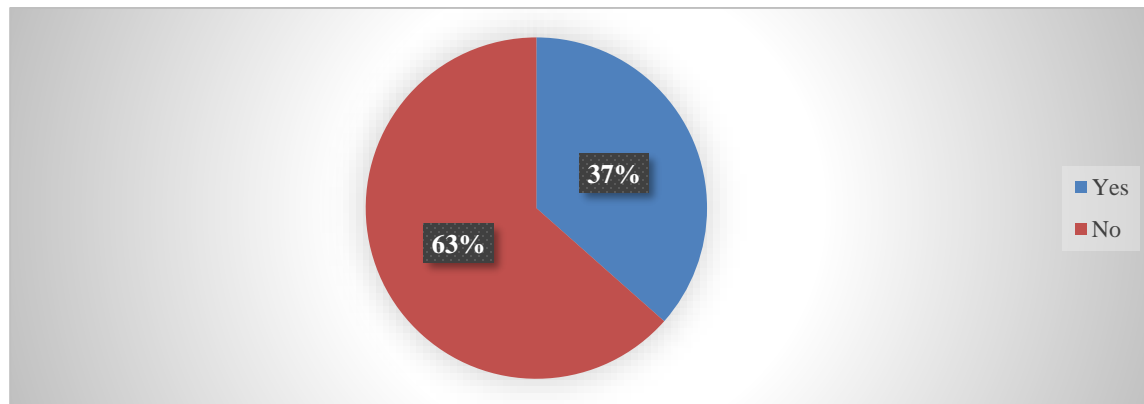
Figure 5: Sapling selection and conservation

5.6. Knowledge on source and sapling selection: 29.03% of farmers obtained information on sapling selection from government followed by NGO/INGO (25.8%) and friends (22.58%). Detail is shown in figure 6.
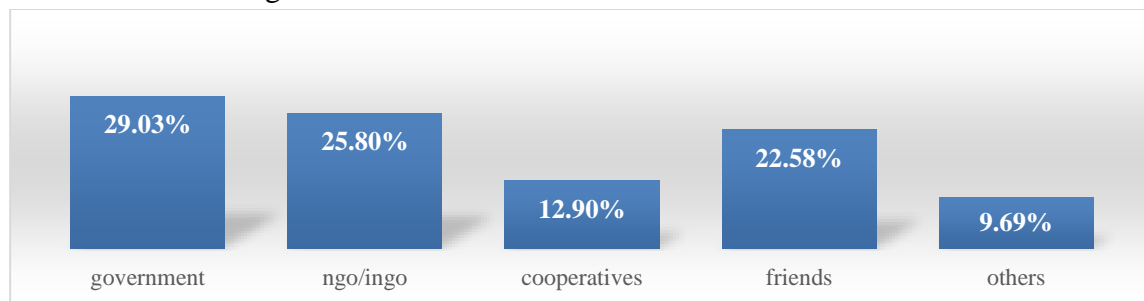
Figure 6: Knowledge on source and sapling selection

5.7. Knowledge and practicing of asexual propagation: 54% of farmers have knowledge on asexual propagation. Out of which, 88.9% are practicing it.
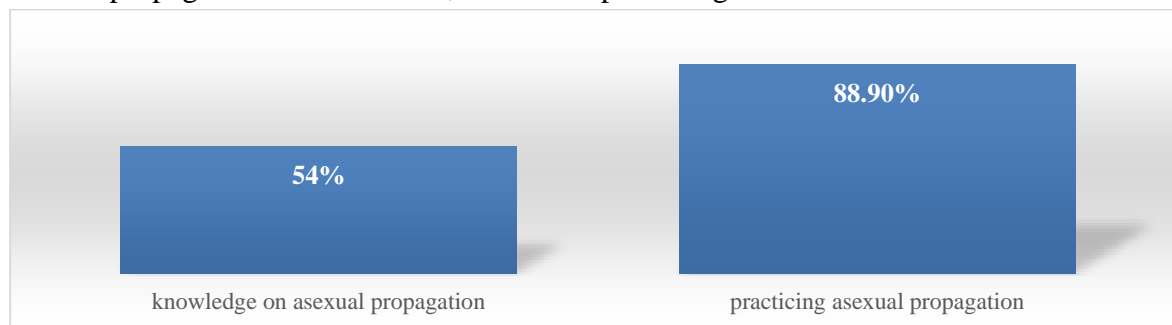
Figure 7: Knowledge on practicing asexual propagation

5.8. Purchasing seedlings and saplings: Only 14% of farmers are purchasing seedlings whereas 97.8% are purchasing saplings. 100% of farmers using saplings over seedlings were satisfied.
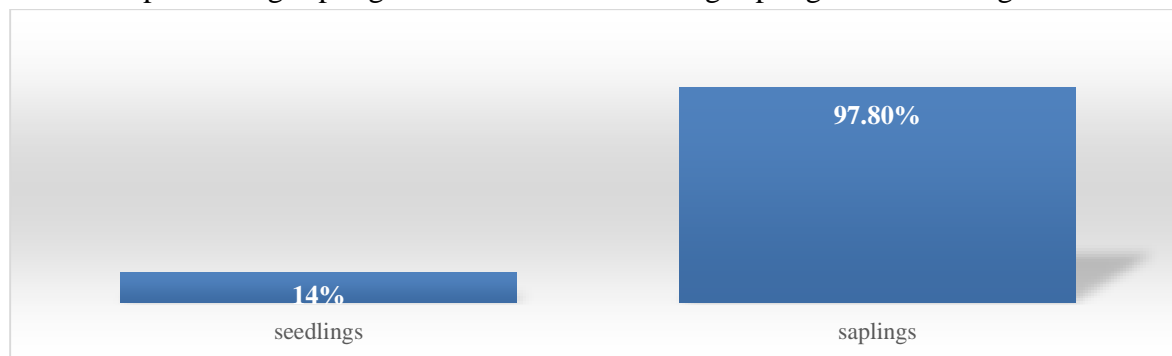
Figure 8: Source of planting material

5.9. Fruit growing status and varieties being grown: 60.65% of respondents in studied district were involved in papaya cultivation, 58.2% in banana, 65.3% in sweet orange, 68.4% in mandarin, 67.3% in lime and 76.5% in kiwi cultivation. The name of varieties of these fruits is given in table 1. Farmers usually prefer early establishing/fruiting cultivars with both high yield in terms of quality and quantity.

Table 1: Name of varieties used by the farmers

Fruits	Varieties
Papaya	Red lady
Banana	Malbhog, G9, Harichal, William hybrid
Sweet orange	Pongon, Satusma, OKitchu, Unshuii , NCPR 27 84
Mandarin	Otapongan, Okitchu, Unshuu
Lime	Golden lime, Local
Kiwi	Haywart, Local

Source: HH survey, 2021

5.10. Information (cost, income and B:C ratio) about major fruits

5.10.1.Mandarin

a. Labor requirement of mandarin

Table 2: Labor requirement of mandarin

Labor	Hired labor		Family labor		
	Male	Female	Male	Female	Total
Land preparation	5.37	3.57	1.6	1	11.54
Planting	3.86	3.25	1.6	2	10.71
Interculture	3.67	3	1	1.6	9.27
Irrigation	1	1	1.6	1	4.6
Harvesting	3.63	3	2	1.6	10.23
Packaging	1	3.29	1.6	2	7.89
Transporation/load-unload	1.93	1.33	2	1.6	6.86
Selling	1.86	1.25	1.6	2	6.71

Source: HH survey, 2021

b. Cost of cultivation of mandarin

Table 3: Cost of cultivation of mandarin

S.N.	Particulars	Units	First year			Second year		
			Quantity	Rate	Cost	Quanity	Rate	Cost
1	**Variable cost**							
a.	Human labor	Days	61	500	30500	23	500	11500
b.	Bullock labor	Days	7	800	5600	2	800	1600
c.	Pumpset/water pump	Hour	10	275	2750	15	275	4125
d.	Fencing	L.s.			0			0
e.	Layout	Days	4	1300	5200			0
f.	Sapling	Number	330	40	13200			0
g.	Manure	Kg	4500	3	13500	6000	3	18000
h.	Fertilizer	Kg			0			0
i)	Urea		25	22	550			0
ii)	DAP		18	50	900			

S.N.	Particulars	Unit	Qty	Rate	Amount	Qty	Rate	Amount
iii)	Potash		15	27	405			
i.	Plant protection	L.s.			3000			4500
j.	Bordo paste, nutrients	L.S.			4000			4000
j.	Training and pruning	L.s.						3200
k.	Equipments	number				4	800	3200
l.	Land lease value	Rs/year			20000			20000
m.	Others	LS			7850			7850
n.	Management cost	Month	12	1500	18000	12	1500	18000
o.	Interest on variable cost				17888.65			16029
p.	Total variable cost				143343.7			112004
2	**Fixed cost**							
a.	Land tax	Rs.			300			300
b.	Water tax	Rs.			500			500
c.	Depreciation (equipment)	Rs.			500			500
d.	Repair, maintenance	Rs.			500			500
3	**Total cost**	**Rs**			**145143.7**			**113804**

Source: HH survey, 2021

c. B:C ratio of mandarin

Table 4: B:C ratio of mandarin

S.N.	Particulars	Yearwise											
		1st year	2nd year	3rd	4th	5th	6th	7th	8th	9th	10th	11-15	16-25
1	Production(kg/plant)				5	17	27	45	45	50	50	50	40
2	Production(kg/ha)				1485	5049	8019	13365	13365	14850	14850	14850	11880
3	Total income	0	0		51975	176715	280665	467775	467775	519750	519750	519750	415800
4	Total cost (After third year cost increases by 10%)	145143.7	113804	125184.4	137702.8	151473.1	166620.4	183282.5	201610.7	221771.8	243949	268343.9	268343.9
5	Profit/loss		-113804	-125184.4	-85727.8	25241.88	114044.6	284492.5	266164.3	297978.2	275801	251406.1	147456.1

| 6 | B:C ratio | | | 0.37 | 1.16 | 1.68 | 2.55 | 2.32 | 2.34 | 2.13 | 1.93 | 1.54 |

From the above, table 3 and 4 it was found that the cost of mandarin was found to be NRs. 145143.7 for first year and NRs. 113804 for seccond year. The cost of production increased by 10% each year upto 10 years and remain same for about 25 years. Whereas the production starts from fourth year and production increaesd up to 15 years and then decreased by 20% and remain same for about 25 years. From the survey it was found out that B:C ratio was found to be maximum at 7th year i.e. 2.55 and about B:C ration of 1.54 was found up to 25 years of the mandarin establishment.

5.10.2.Banana

a. Labor requirement of banana

Table 5: Labor requirement of banana

Labor	Hired labor		Family labor		Total
	Male	Female	Male	Female	
Land preparation	3.12	3	1.7	1	8.82
Planting	2.27	1.5	1.67	1.25	6.69
Interculture	2.2	2.4	2.29	2.71	9.6
Irrigation	4.1	2.4	3.9	1.2	11.6
Harvesting	1.33	3	1.25	2	7.58
Packaging	2.33	3	1.33	1	7.66
Transportation/load--unload	1.46	1.1	1.8	1.4	5.76
Selling	1.86	1.25	1.6	2	6.71

b. Cost of cultivation of banana

Table 6: Cost of cultivation of banana

S.N.	Particulars	Unit	First year			Second year		
			Quantity	Rate	Total cost	Quantity	Rate	Total cost
1	**Variable cost**							
a.	Human labor	Days	70	500	35000	44	500	22000
b.	Tractor	hour	6	1700	10200	2	1700	3400
c.	Pumpset/water pump	Hour	10	270	2700	17	270	4590
d.	Fencing	L.s.			0			0

		Unit						
e.	Layout	Days	5	1300	6500			0
f.	Sapling	Number	1100	15	16500			0
g.	Manure	Kg	3000	3	9000	4000	3	12000
h.	Fertilizer	Kg						
i)	Urea		25	22	550	30	22	660
ii)	DAP		30	50	1500	40	50	2000
iii)	Potash		8	27	216	12	27	324
i.	Plant protection	L.s.			4500			4500
j.	Bordeux mixture and micro nutrients	L.S.			2500			3000
j.	Cleaning	L.s.				4	800	3200
k.	Equipments	number	4	1000	4000			
l.	Land lease value	Rs/year			25000			25000
m.	Others	LS			7500			7500
n.	Management cost	Month	12	1500	18000	12	1500	18000
o.	Interest on variable cost				18676.58			13802.62
p	Total variable cost				162342.6			119976.6
2	**Fixed cost**							
a.	Land tax	Rs.			300			300
b.	Water tax	Rs.			500			500
c.	Depreciation of farm equipments	Rs.			500			500
d.	Repair and maintenance	Rs.			500			500
3	**Total cost**	**Rs**			**164142.6**			**121776.6**

Source: HH Survey, 2021

c. Benefit cost ratio of banana

Table 7: B:C ratio of banana

		Phases		
S.N.	Particular	1st year	2nd year	3rd
1	Production(kg/plant)		8	9
2	Production(kg/ha)		7920	8910
3	Total income		277200	311850

4	Total cost	164142.6	121776.6	133954.3
5	Profit/loss	-164143	155423.4	177895.7
6	**B:C ratio**		**1.27**	**1.32**

Source: HH survey, 2021

From the above, table 6 and 7 it was found that the cost of banana production was found to be NRs. 164142.6 for first year and NRs. 121776.6 for the second year. The cost of production increased by 10% for the third year and the banana plantlets are replaed from the fourth year for high yield. Whereas the production starts from second year and is maximum on third year. Fom the survey it was found out that B:C ratio was found to be maximum at 3rd year i.e. 1.32 and about 1.27 on third year.

5.10.3. Sweet orange

a. Labor requirement of sweet orange

Table 8: Labor requirement of sweet orange

	Hired labor		Family labor		
Labor	Male	Female	Male	Female	Total
Land preparation	9.31	2	1.71	2.2	15.22
Planting	4.77	6.33	1.71	2.34	15.15
Interculture	2	5.73	2	2.2	11.93
Irrigation	1	1.33	1.72	2.23	6.28
Harvesting	4.55	4	1.71	2.2	12.46
Packaging	2	4.25	1.71	2.2	10.16
Transportation/load-unload	2.15	1.3	2.25	2	7.7
Selling	1.67	1.23	1.53	1	5.43

Source: HH survey, 2021

b. Cost of cultivation of sweet orange

Table 9: Cost of cultivation of sweet orange

			First year			Second year		
S.N.	Particulars	Unit	Quantity	Rate	Total cost	Quantity	Rate	Total cost
1	**Variable cost**							
a.	Human labor	Days	49	500	24500	20	500	10000
b.	Bullock labor	Days	7	800	5600	2	800	1600
c.	Pumpset/water pump	Hour	12	275	3300	17	275	4675

S.N.	Particular	Unit	Qty	Rate	Amount	Qty	Rate	Amount
d.	Fencing	L.s.			0			0
e.	Layout	Days	3	1300	3900			0
f.	Sapling	Number	330	25	8250			0
g.	Manure	Kg	4500	2.5	11250	6000	2.5	15000
h.	Fertilizer	Kg						
i)	Urea		22	22	484	25	22	550
ii)	DAP		28	50	1400	28	50	1400
iii)	Potash		10	27	270	10	27	270
i.	Plant protection	L.s.			7500			10000
j.	Bordeux mixture and micro nutrients	L.S.			3000			4000
j.	Training and pruning	L.s.			3000			4000
k.	Equipment	number	4	850	3400			
l.	Land lease value	Rs/year						
m.	Others	LS			7500			7500
n.	Management cost	Month	12	1500	18000	12	1500	18000
o.	Interest on variable cost				13246.22			10108.8
	Total variable cost				114600.2			87103.8
2	**Fixed cost**							
a.	Land tax	Rs.			300			300
b.	Water tax	Rs.			500			500
c.	Depreciation of farm equipments	Rs.			500			500
d.	Repair and maintenance	Rs.			500			500
3	**Total cost**	**Rs**			**116400.2**			**88903.8**

Source: HH Survey, 2021

c. B:C ratio of sweet orange

Table 10: B:C ratio of sweet orange

S.N.	Particular	1st	2nd year	3rd	4th	5th	6th	7th	8th	9th	10th	11-15	16-25
							Investment Phases						
1	Production(kg/plant)				5	18	30	40	46	48	45	45	36
2	Production(kg/ha)				1500	5400	9000	12000	13800	14400	13500	13500	10800

#		1	2	3	4	5	6	7	8	9	10	11	12
3	Total income				57,000	189,000	315,000	420,000	483,000	504,000	472,500	472,500	378,000
4	Total cost (From third year cost increased by 10%)	116400.2	88903.8	97794.18	107573.6	118331	130164.1	143180.5	157498.5	173248.4	190573.2	209630.5	209630.5
5	Profit/loss	-116400	-88903.8	-97794.2	-50573.6	70669.04	184835.9	276819.5	325501.5	330751.6	281926.8	262869.5	168369.5
6	**B:C ratio**				0.52	1.59	2.42	2.93	3.06	2.90	2.47	2.25	1.80

Source: HH survey, 2021

From the above, table 9 and 10 it was found that the cost of sweet orange production was found to be NRs. 116400.2 for first year and NRs. 88903.8 for seccond year. The cost of production increased by 10% each year upto 15 years and remain same for about 25 years. Whereas the production starts from fourth year and production increaesd up to 15 years and then decreased by 20% and remain same for about 25 years. From the survey it was found out that B:C ratio was found to be maximum at 8th year i.e. 3.06 and about B:C ration of 1.80 was found up to 25 years of the sweet orange establishment.

5.1.4. Lime

a. Labor requirement of lime

Table 11: Labor requirement of lime

Labor	Hired labor		Family labor		Total
	Male	Female	Male	Female	
Land preparation	5	2.75	1.57	1.71	11.03
Planting	2.67	7	1.71	1.86	13.24
Interculture	1.67	7.6	1.71	1.86	12.84
Irrigation	1.5	1.1	1.71	1.86	6.17
Harvesting	6	4.2	1.71	1.86	13.77
Packaging	2.33	2.67	1.83	2	8.83
Transportation/load-unload	2.57		2	2	6.57
Selling	1.67	1	1.67	1	5.34

Source: HH survey, 2021

b. Cost of production of lime

Table 12: Cost of production of lime

S.N.	Particulars	Unit	First year Quantity	First year Rate	First year Total cost	Second year Quantity	Second year Rate	Second year Total cost
1	**Variable cost**							
a.	Human labor	Days	97	500	48500	31	500	15500
b.	Bullock labor	Days	12	1000	12000	2	1000	2000
c.	Pumpset/water pump	Hour	12	275	3300	17	275	4675
d.	Fencing	L.s.						0
e.	Layout	Days	4	1300	5200			0
f.	Sapling	Number	400	30	12000			0
g.	Manure	Kg	6800	2.5	17000	10500	2.5	26250
h.	Fertilizer	Kg						
i)	Urea		15	22	330	15	22	330
ii)	DAP		30	50	1500	30	50	1500
iii)	Potash		30	27	810	30	27	810
i.	Plant protection	L.s.			4500			7500
j.	Bordo paste, nutrients	L.S.			5000			5000
k.	Training and pruning	L.s.			3000			7500
l.	Equipments	number	4	1000	4000			
m.	Land lease value	Rs/year			20000			20000
n.	Others	LS			10000			10000
o.	Management cost	Month	12	1500	18000	12	1500	18000
p.	Interest on variable cost				21468.2			15478.45
p.	Total variable cost				186608.2			134543.45
2	**Fixed cost**							
a.	Land tax	Rs.			300			300
b.	Water tax	Rs.			500			500
c.	Depreciation of equipments	Rs.			1000			500
d.	Repair and maintenance	Rs.			1000			500
3	**Total cost**	**Rs**			**189408.2**			**136343.45**

Source: HH Survey, 2021

c. *B:C ratio of lime*

Table 13: B:C ratio of lime

S.N.	Particular	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11-15	16-25
							Investment Phases						
1	Production(kg/plant)			5	17	27	45	45	50	50	50	40	45
2	Production(kg/ha)			1800	6120	9720	16200	16200	18000	18000	18000	14400	16200
3	Total income			54000	183,600	291600	486000	486000	540000	540000	540000	432000	345600
4	Total cost (From third year cost increased by 10%)	189408.2	136343.45	149977.8	164975.6	181473.1	199620.4	219582.4897	241540.7	265694.8	292264.3	321490.7	321490.7
5	Profit/loss	-189408	-136343.45	-95977.8	18624.43	110126.9	286379.6	266417.51	298459.3	274305.2	247735.7	110509.3	241093.3
6	**B:C ratio**			**0.63**	**1.11**	**1.60**	**2.43**	**2.21**	**2.23**	**2.03**	**1.84**	**1.34**	**1.07**

Source: HH Survey, 2021

From the above, table 12 and 13 it was found that the cost of lime production was found to be NRs. 189408.2 for first year and NRs. 136343.45 for seccond year. The cost of production increased by 10% each year upto 15 years and remain same for about 25 years. Whereas the production starts from fourth year and production increaesd up to 15 years and then decreased by 20% and remain same for about 25 years. From the survey it was found out that B:C ratio was found to be maximum at 6th year i.e. 2.43 and about B:C ration of 1.07 was found up to 25 years of the lime establishment.

5.10.5. Papaya

a. *Labor requirement of papaya*

Table 14: Labor requirement of papaya

Labor	Hired labor		Family labor		Total
	Male	Female	Male	Female	
Land preparation	3.06	2.13	1.59	1.58	8.36
Planting	2.59	1.5	1.81	1.47	7.37
Interculture	4	3.05	1.71	2.13	10.89
Irrigation	4.61	1.83	2.65	1.58	10.67
Harvesting	1.79	2.41	1.89	1.69	7.78
Packaging	2.86	3.69	1.94	1.75	10.24

	3.29	1.2	1.5	1.1	7.09
Transportation/load-unload	3.29	1.2	1.5	1.1	7.09
Selling	1.56	1.23	1.74	1.29	5.82

b. *Cost of cultivation of papaya*

Table 15: Cost of cultivation of papaya

S.N.	Particulars	Unit	First year Quantity	First year Rate	First year Total cost	Second year Quantity	Second year Rate	Second year Total cost
1	**Variable cost**							
a.	Human labor	Days	60	500	30000	47	500	23500
b.	Tractor	Hour	8	1600	12800			0
c.	Pumpset/water pump	Hour	10	275	2750	15	275	4125
d.	Fencing	L.s.						
e.	Layout	Days	3	1500	4500			0
f.	Sapling	Number	1100	16	17600			0
g.	Manure	Kg	4500	2.5	11250	6000	2.5	15000
h.	Fertilizer	Kg						
i)	Urea		20	22	440	22	22	484
ii)	DAP		30	50	1500	35	50	1750
iii)	Potash		12	27	324	12	27	324
i.	Plant protection	L.s.			3000			4500
j.	Bordeux mixture and micro nutrients	L.S.			3000			4500
k.	Cleaning	L.s.			3000			2500
l.	Equipments	number	4	1500	6000			
m.	Land lease value	Rs/year			25000			25000
n.	Others	LS			10000			10000
o.	Management cost	Month	12	1500	18000	12	1500	18000
p.	Interest on variable cost				19391.32			14258.79
p.	Total variable cost				168555.3			123941.8
2	**Fixed cost**							
a.	Land tax	Rs.			300			300

b.	Water tax	Rs.	500		500
c.	Depretiation of farm equipments	Rs.	500		500
d.	Repair and maintenance	Rs.	500		500
3	**Total cost**	**Rs**	**170355.3**		**125741.8**

c. B:C ratio of payapa

Table 16: B:C ratio of papaya

S.N.	Particular	1st year	2nd year	Investment Phases 3rd	4th	5th
1	Production(kg/plant)		16	20	26	22
2	Production(kg/ha)		12800	16000	20800	17600
3	Total income		512000	640000	832000	704000
4	Total cost	170355.3	125741.8	125741.8	125741.8	125741.8
5	Profit/loss	-170355.3	386258.2	514258.2	706258.2	578258.2
6	**B:C ratio**		**4.07**	**5.08**	**6.61**	**5.59**

From the above, table 15 and 16 it was found that the cost of papaya production was found to be NRs. 170355.3 for first year and NRs. 125741.8 for the next five year. The cost of production remains same from second year to fifth year and the papa plants are replaced from the sixth year for higher yield. Whereas the production starts from second year and is maximum on fourth year and decline again on 5th year. From the survey it was found out that B:C ratio was found to be maximum at 5th year i.e. 6.61 and minimum of about 4.07 on second year.

5.10.6. Kiwi

a. Labor requirement of kiwi

Table 17: Labor requirement of kiwi

Labor	Hired labor Male	Female	Family labor Male	Female	Total
Land preparation	5.27	4.59	1.6	1	12.46
Planting	4.57	3.25	1.6	2	11.42
Interculture	4.67	3	1	1.6	10.27
Irrigation	1	1	1	1	4

Harvesting		3.63	3	2		1.6		10.23
Packaging		1	2.29	1.6		2		6.89
Transportation/load-unload		1.93	1.33	2		1.6		6.86
Selling		1.43	1.26	1.67		1.25		5.61

Source: HH survey, 2021

b. Cost of cultivation of kiwi

Table 18: Cost of cultivation of kiwi

S.N.	Particulars	Unit	First year			Second year		
			Quantity	Rate	Total cost	Quantity	Rate	Total cost
1	**Variable cost**							
a.	Human labor	Days	65	500	32500	41	500	20500
b.	Bullock labor	Days	10	1000	10000	2	1000	2000
c.	Pumpset/water pump	Hour	15	275	4125	21	275	5775
d.	Fencing	L.s.			100000			0
e.	Layout	Days	4	1300	5200			0
f.	Sapling	Number	330	250	82500			0
g.	Manure	Kg	9000	2.5	22500	10500	2.5	26250
h.	Fertilizer	Kg						
i)	Urea		15	22	330	15	22	330
ii)	DAP		30	50	1500	30	50	1500
iii)	Potash		30	27	810	30	27	810
i.	Plant protection	L.s.			4500			7500
j.	Bordeux mixture and micro nutrients	L.S.			5000			5000
k.	Training and pruning	L.s.			3000			7500
l.	Equipment	number	4	850	3400			
m.	Land lease value	Rs/year			25000			25000
n.	Others	LS			10000			10000
o.	Management cost	Month	12	2000	24000	12	2000	24000
p.	Interest on variable cost				43467.45			17701.45
p.	Total variable cost				377832.5			153866.5

2	Fixed cost			
a.	Land tax	Rs.	300	300
b.	Water tax	Rs.	500	500
c.	Depreciation of farm equipment	Rs.	1000	500
d.	Repair and maintenance	Rs.	1000	500
3	**Total cost**	**Rs**	**380632.5**	**155666.5**

Source: HH Survey, 2021

c. B:C ratio of kiwi

Table 19: B:C ratio of kiwi

S. N.	Particular	Investment Phases											
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11-15	16-25
1	Production(kg/plant)				3	10	20	30	35	40	45	45	45
2	Production(kg/ha)				720	2400	4800	7200	8400	9600	10800	10800	8640
3	Total income				90,000	300,000	600,000	900,000	1,050,000	1,200,000	1,350,000	1,350,000	1080000
4	Total cost	380632.5	155666.5	171233.15	188356.5	207192.2	227911.4	250702.5	275772.8	303350	333685	367053.5	367053.5
5	Profit/loss	-380633	-155667	-171233.15	-98356.5	92807.85	372088.6	649297.5	774227.2	896650	1016315	982946.5	712946.5
6	**B:C ratio**				**0.47**	**1.44**	**2.63**	**3.58**	**3.80**	**3.95**	**4.04**	**3.67**	**2.94**

Source: HH survey, 2021

From the above, table 18 and 19 it was found that the cost of kiwi producion was to be NRs. 380632.5 for first year and NRs. 155666.5 for the second year and and the production cost was increased by 10% each year upto 15 years and remain same for about 25 years. Whereas the production starts from fourth year year and is maximum on 10th to 15th year and later on decreased by 20% for about 25 years. From the survey it was found out that B:C ratio was found to be maximum at 10th year i.e. 4.04 and aabout 2.94 B:C ratio can be obtained upto 25 years.

5.11. Technical assistance in fruit farming

5.11.1 Type of assistance requisition of the respondents: 63.38% requested technical assistance regarding fruit cultivation. The category of assistance requested is shown in figure 9.
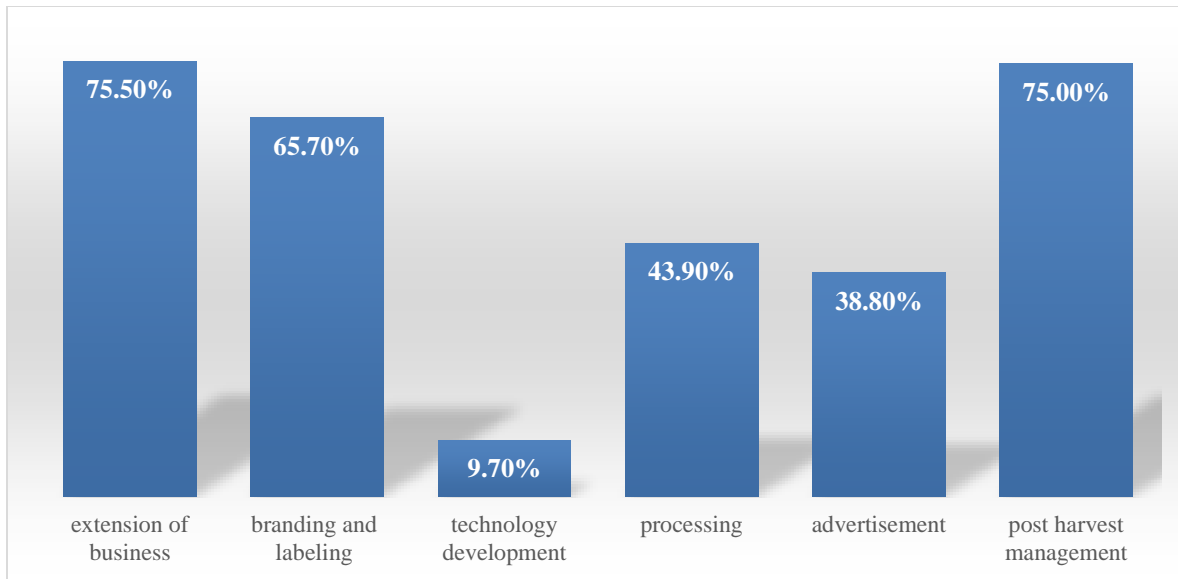
Figure 9: Type of assistance requested by farmers

5.11.2. Type of support obtained from provincial government: 66.67% of the farmers got assistance and support from provincial government. 37% of farmers have obtained trainings on fruits, 31% have obtained cash incentives, 20% have obtained technology support, 8% have obtained market information and 2% of farmers obtained infrastructure support and boring construction. Detail is shown in figure 10.
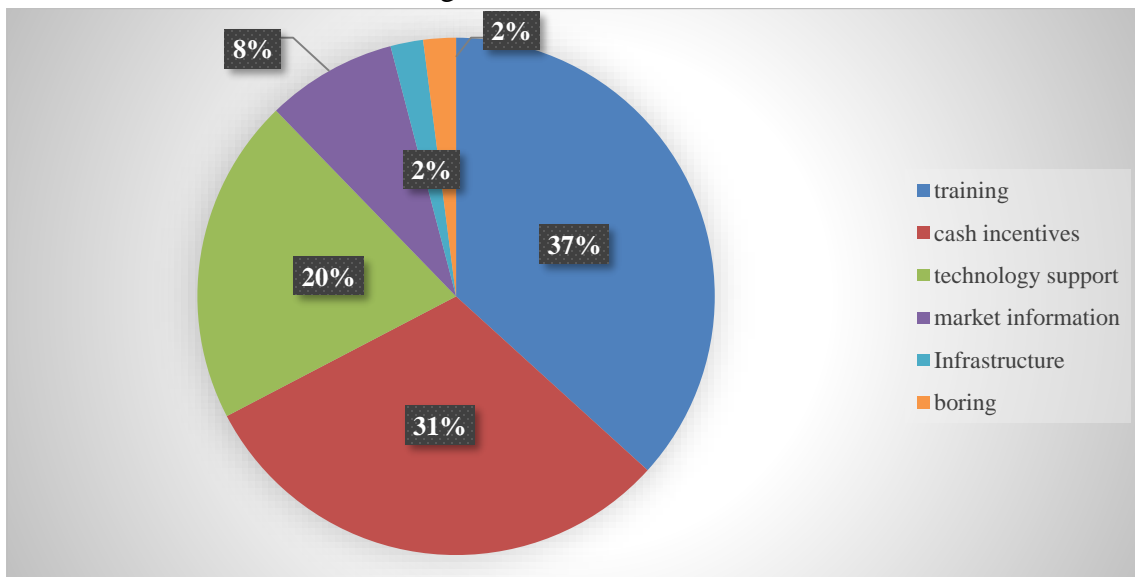
Figure 10: Type of support obtained from provincial government

5.12. Satisfaction and plan of business extension: 75.2% of respondents were satisfied with what they were doing. Moreover, 86.7% of them were having the plan of extension of their business or seeking modification.
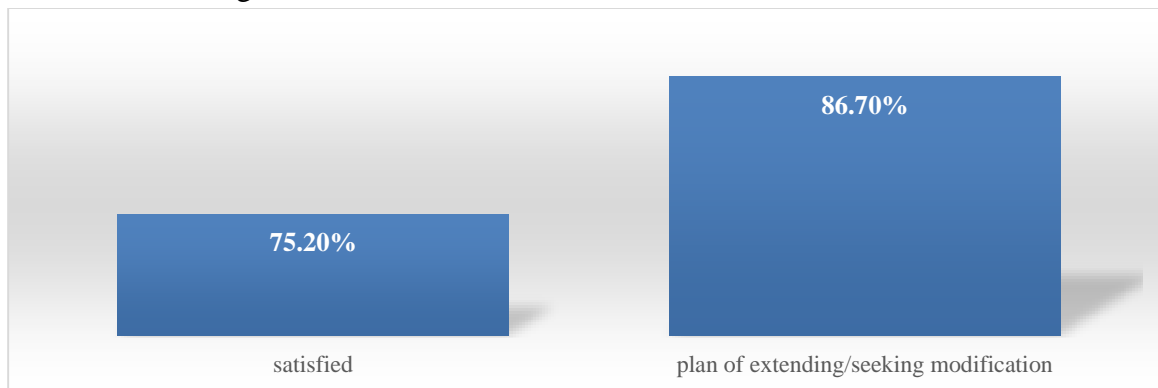
Figure 11: Satisfaction and business extension of the respondents

5.13. Ways to extending the fruit business: 43.02% were planning to increase the area, 22.58% for better postharvest handling and labeling mangement and 9.3% are diversifying the product. 3.49% were planning for being deviated. Detail is shown in figure 12.
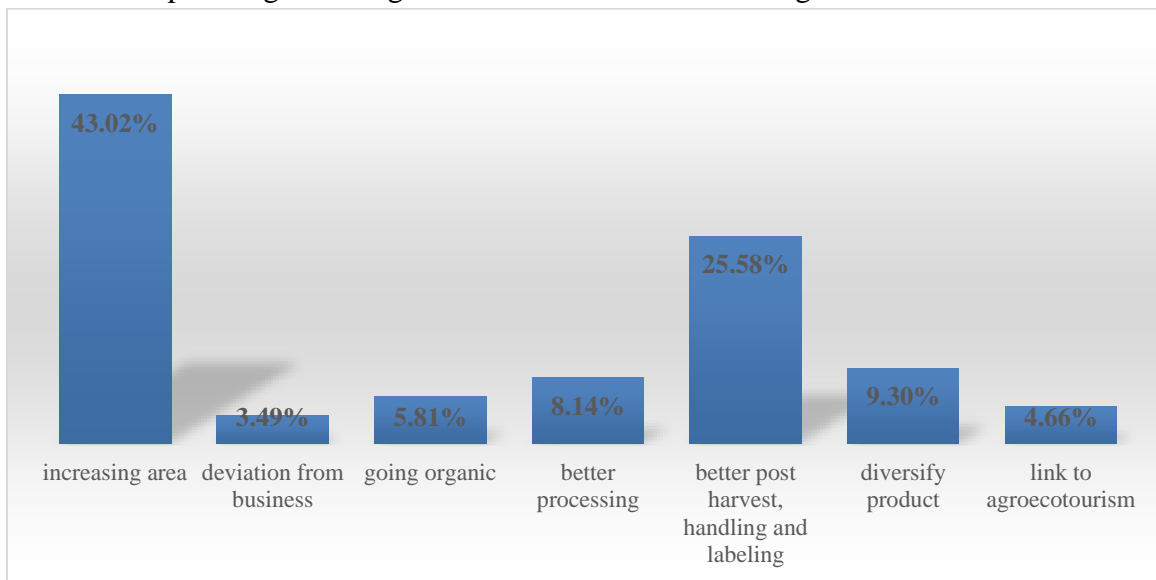
Figure 12: Ways to extending the fruit business

6. SUMMARY AND CONCLUSION

From the sruvey conducted at Bagmati province it was found out that 65% fo the farmers were involved in commercial farming whereas 35% were involved in semi commercial farming. Talking about the reasons of doing fruit farming, 46.9% said it to be highly profitable The most effective financial support for initiating fruit farming was government (36.9% of respondents) followed by other sources. 32.7% of farmers obtained seedlings/saplings from local nurseries followed by local government (28.8%) and AKC (18.5%). 63% of farmers have knowledge on sapling selection and conservation. 29.03% of farmers obtained information on sapling selection from government followed by NGO/INGO (25.8%) and friends (22.58%). 54% of farmers have

knowledge on asexual propagation. 100% of farmers using saplings over seedlings were satisfied. 60.65% of respondents in studied district were involved in papaya cultivation, 58.2% in banana, 65.3% in sweet orange, 68.4% in mandarin, 67.3% in lime and 76.5% in kiwi cultivation. Farmers usually prefer early establishing/fruiting cultivars with both high yield in terms of quality and quantity.

It was found that the cost of mandarin was found to be NRs. 145143.7 for first year and NRs. 113804 for seccond year. The cost of production increased by 10% each year upto 10 years and remain same for about 25 years. Whereas the production starts from fourth year and production increaesd up to 15 years and then decreased by 20% and remain same for about 25 years. From the survey it was found out that B:C ratio was found to be maximum at 7th year i.e. 2.55 and about B:C ration of 1.54 was found up to 25 years of the mandarin establishment.

It was found that the cost of banana production was found to be NRs. 164142.6 for first year and NRs. 121776.6 for the second year. The cost of production increased by 10% for the third year and the banana plantlets are replaed from the fourth year for high yield. Whereas the production starts from second year and is maximum on third year. Fom the survey it was found out that B:C ratio was found to be maximum at 3rd year i.e. 1.32 and about 1.27 on third year.

It was found that the cost of sweet orange production was found to be NRs. 116400.2 for first year and NRs. 88903.8 for seccond year. The cost of production increased by 10% each year upto 15 years and remain same for about 25 years. Whereas the production starts from fourth year and production increaesd up to 15 years and then decreased by 20% and remain same for about 25 years. From the survey it was found out that B:C ratio was found to be maximum at 8th year i.e. 3.06 and about B:C ration of 1.80 was found up to 25 years of the sweet orange establishment.

It was found that the cost of lime production was found to be NRs. 189408.2 for first year and NRs. 136343.45 for seccond year. The cost of production increased by 10% each year upto 15 years and remain same for about 25 years. Whereas the production starts from fourth year and production increaesd up to 15 years and then decreased by 20% and remain same for about 25 years. From the survey it was found out that B:C ratio was found to be maximum at 6th year i.e. 2.43 and about B:C ration of 1.07 was found up to 25 years of the lime establishment.

It was found out that the cost of papaya production was found to be NRs. 170355.3 for first year and NRs. 125741.8 for the next five year. The cost of production remains same from second year to fifth year and the papa plants are replaced from the sixth year for higher yield. Whereas the production starts from second year and is maximum on fourth year and decline again on 5th year. From the survey it was found out that B:C ratio was found to be maximum at 5th year i.e. 6.61 and minimum of about 4.07 on second year.

It was found that the cost of kiwi producion was to be NRs. 380632.5 for first year and NRs. 155666.5 for the second year and and the production cost was increased by 10% each year upto 15 years and remain same for about 25 years. Whereas the production starts from fourth year year and is maximum on 10th to 15th year and later on decreased by 20% for about 25 years.

From the survey it was found out that B:C ratio was found to be maximum at 10th year i.e. 4.04 and aabout 2.94 B:C ratio can be obtained upto 25 years.

63.38% requested technical assistance regarding fruit cultivation. 37% of farmers have obtained trainings on fruits, 31% have obtained cash incentives, 20% have obtained technology support, 8% have obtained market information and 2% of farmers obtained infrastructure support and boring construction. 75.2% of respondents were satisfied with what they were doing. Moreover, 86.7% of them were having the plan of extension of their business or seeking modification. 43.02% were planning to increase the area, 22.58% for better postharvest handling and labeling mangement and 9.3% are diversifying the product. 3.49% were planning for being deviated.

7. RECOMMENDATION

We also asked them to give suggestion to the respondents which are to be incorporated by government to improve the agricultural sector as a whole. Following are the important suggestions given by the respondents:

Moreover, during the survey and field visit it was found out that the respondents are seeking for more support from provincial government with respect to:

- Automation
- Cash incentives
- Training and visits to other progressive farmers
- Development of modern farm
- Restriction to Indian products
- Electric motors and solar water pump
- Incentives
- Insurance
- Marketing
- Minimum price fixation
- Product diversification

The farmers also highlighted the need of extension services more frequently and effectively on the following topics:

- Advance farming
- Agribusiness planning
- Crop protection
- Mechanization
- Marketing strategy
- Organic farming
- Post harvest management
- Proper processing
- Varietal selection

The farmers also focused on need of training with respect to:

- Commercial cultivation

- Plant protection
- Crop protection
- Nutrition management
- Increasing shelf life
- Post harvest management
- Better processing
- Use of botanical pesticides
- Vegetative propagation

Moreover, the additional expectation of farmers for Bagmati Provincial government were:

- Bring fertilizers in time
- Ensure proper farm gate price
- Provide subsidized inputs
- Market information

8. REFERENCE

MoAD, 2018/19. Statistical Information on Nepalese Agriculture. Ministry of Agriculture Development. Agribusiness Promotion and Statistics Division. Agristatic Section, Singha Durbar, Kathmandu.

MoAD, 2017/18. Statistical Information on Nepalese Agriculture. Ministry of Agriculture Development. Agribusiness Promotion and Statistics Division. Agristatic Section, Singha Durbar, Kathmandu.

9. ANNEX
Annex 1: List of the farmers as respondents

S.N.	Respondents Name	District	Age	Family size	Remarks
1	Ganesh Bhual	Chitwan	55	6	
2	Bishnu Khanal	Chitwan	46	5	
3	Keshav Acharya	Chitwan	45	4	
4	Gud Prasad Banjade	Chitwan	53	5	
5	Kishna Neupane	Chitwan	45	6	
6	Ram Kumar Chaudhari	Chitwan	46	2	
7	Chandrakant Sapkota	Chitwan	50	8	
8	Roshan Bhattarai	Chitwan	32	8	
9	Sambhu Adhikari	Chitwan	45	5	
10	Thaneshwor Neupane	Chitwan	48	5	
11	Jitana Mahato	Chitwan	35	6	
12	Hari Adhikari	Chitwan	40	5	
13	Man Bahadur Khadka	Chitwan	48	6	
14	Krishna Devkota	Chitwan	39	5	
15	Khem bhusal	Chitwan	42	6	
16	Lokman magar	Chitwan	38	5	
17	Moti Bahadur Kunwar	Chitwan	55	5	
18	Hari Chandra Kumal	Chitwan	40	4	
19	Ram bahadur karki	Chitwan	55	8	
20	Motilal Bhatta	Chitwan	40	6	
21	Bhishma banjade	Chitwan	40	4	
22	Himkala Gaire	Chitwan	45	5	
23	Balaram Chaudhary	Chitwan	44	9	
24	Balaram pandey	Chitwan	45	4	
25	Basu Adhikari	Chitwan	40	5	
26	Himal Shrestha	Chitwan	35	6	
27	Durga timalsina	Chitwan	42	9	
28	Kabiraj sharma	Chitwan	35	5	
29	Tilakram kandel	Chitwan	45	5	
30	Shyam Gautam	Chitwan	50	6	
31	Bikram Mahato	Chitwan	43	8	
32	Nandaram bhattarai	Chitwan	48	3	
33	Bhaneshor Pokherel	Chitwan	45	5	
34	Hikmat Gurung	Chitwan	43	5	
35	Shyamlal aryal	Chitwan	52	4	
36	Lal Bahadur Khadka	Dolakha	60	7	
37	Soyam Bdr Khadka	Dolakha	53	8	
38	Gita Basnet	Dolakha	35	4	

39	Indra Maya Thami	Dolakha	50	5
40	Bishnu Sunuwar	Dolakha	53	8
41	Bhakta Bahadur Nepali	Dolakha	61	5
42	Dinesh Khadka	Dolakha	45	9
43	Devi Khadka	Dolakha	48	6
44	Pasang Tenji Sherpa	Dolakha	47	5
45	Kiran Khadka	Dolakha	41	4
46	Netra Bahadur Khadka	Dolakha	64	10
47	Rudra Karki	Dolakha	59	11
48	Olak Jirel	Dolakha	40	4
49	Bhes Bahadur Khadka	Dolakha	63	3
50	Biru Sunuwar	Dolakha	34	8
51	Khus Bahadur Karki	Dolakha	66	2
52	Lakpa Sherpa	Dolakha	69	8
53	Dan Bahadur Thami	Dolakha	44	4
54	Indra Thapa	Dolakha	40	6
55	Tara Bahadur Koirala	Dolakha	65	10
56	Raghunath Upreti	Dolakha	51	5
57	Buddhiman Tamang	Dolakha	49	4
58	Sabina Acharya	Dolakha	34	9
59	Kapil Neupane	Dolakha	51	12
60	Santoshi Budhathoki	Dolakha	41	5
61	Durga Acharya	Dolakha	38	4
62	Sarada Upreti	Dolakha	52	8
63	Bishnu Jirel	Dolakha	34	5
64	Sailendra Khadka	Dolakha	49	7
65	Atit Karki	Dolkha	47	8
66	Mina Khadka	Dolkha	45	4
67	Lalu Koirala	Dolkha	50	7
68	Hikmat Thapa	Dolkha	48	9
69	Saroj Khanal	Dolkha	49	8
70	Dinesh Jirel	Dolkha	55	5
71	Dawe Sangu Sherpa	Rammechhap	40	5
72	Bharat Kc	Rammechhap	30	4
73	Sunil Basnet	Ramechhap	35	5
74	Nor kurar karki	Rammechhap	47	6
75	Mohan Kumar Ghising	Rammechhap	64	7
76	Ramesh kumar kathayat	Ramechhap	53	6
77	Bhanu Shrestha	Ramechhap	57	7
78	Omkar Adhikari	Ramechhap	42	7
79	Panchmaya Tamang	Ramechhap	55	9

In Ramechhap and Sindhuli each farmers grow sweet ornge, lime and mandarin

80	Kaushalya Tamang	Ramechhap	47	6
81	Prem Bahadur Tamang	Ramechhap	51	7
82	Nimraj Tamang	Ramechhap	48	6
83	Laxman Tamang	Ramechhap	55	7
84	Padam Bdr Lama	Ramechhap	45	5
85	Dhal Bdr Karki	Ramechhap	51	5
86	Kiran karki	Sindhuli	26	5
87	Gita karki	Sindhuli	31	4
88	Yes lal Shrestha	Sindhuli	33	9
89	Bishnu lal Shrestha	Sinduli	57	9
90	Arjun Koirala	Sindhuli	48	5
91	Dan Bdr Thapa	Sindhuli	35	5
92	Nar Bdr Balampathi	Sindhuli	40	13
93	Lok Bdr magar	Sindhuli	40	5
94	Narayan Bdr kunwar	Sindhuli	29	6
95	Harisharan bdr Basnet	Sindhuli	33	6
96	Yogendra bdr thapa	Sindhuli	44	5
97	Yam Bdr sinhali	Sindhuli	43	4
98	Santosh bdr balampathi	Sindhuli	45	6
99	Netra Bdr Tamang	Sindhuli	49	7
100	Padam Bdr Shrestha	Sindhuli	45	6
101	Hari adhikari	Sindhuli	41	5
102	Pabitra Shrestha	Sindhuli	33	5
103	Dewakar koirala	Sindhuli	33	4
104	Puskar Prasad fuyal	Sindhuli	37	4

Annex 2: Socio economic information of respondents

A. Gender status of the respondents
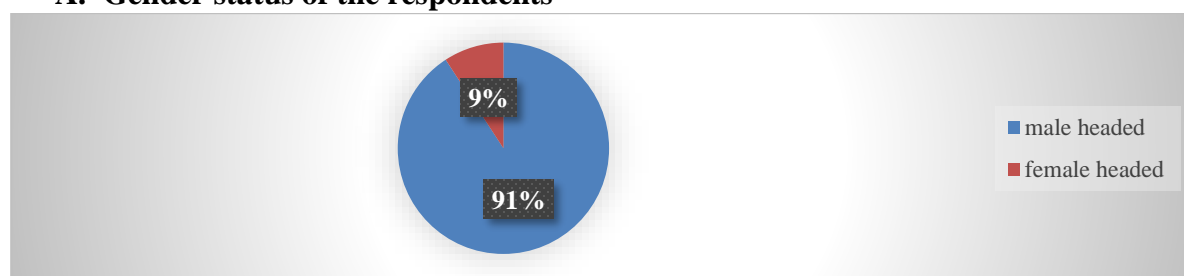
B. Type of the family of the respondents
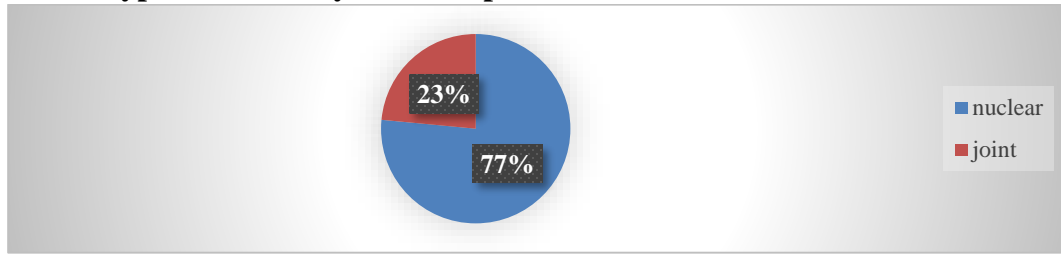
C. Education status of the respondents
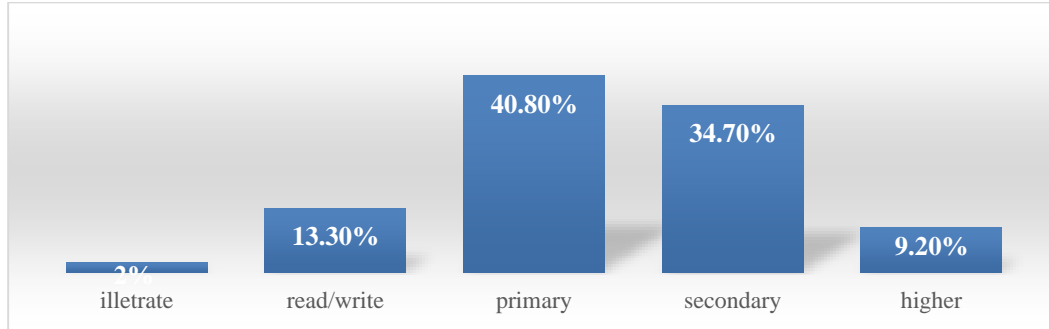
D. Ethnicity status of the respondents
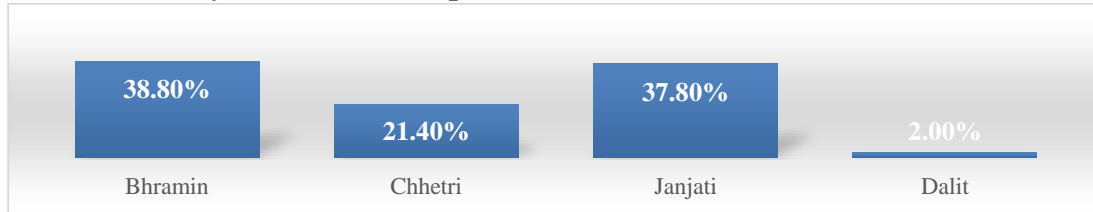
E. Religion status of the respondents
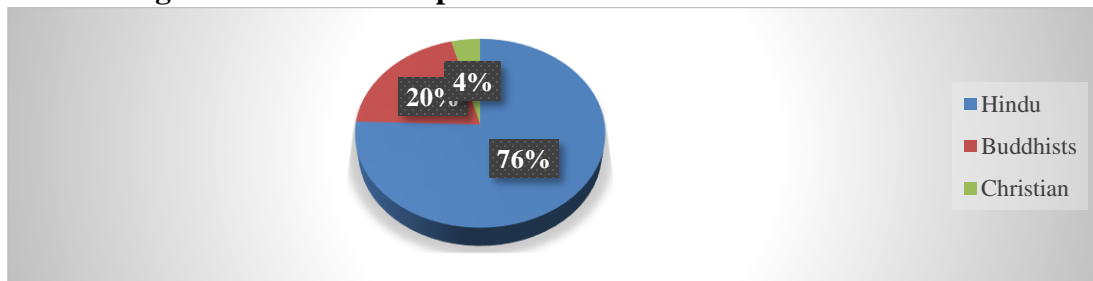
Annex 3: Problems for papaya fruit farming

Problems	Magnitude	Rank
Unavailability of planting material	Medium	VIII
High cost of seed/saplings	High	IV
Poor quality of planting material	Medium	II
Unavailability of fertilizer	High	IV
High cost of fertilizer	High	V
Labor shortage	Medium	VII

High cost of labor	High	VI
Lack of irrigation	Low	X
Inadequete technical service	High	III
Lack of modern knowledge	High	I

Annex 4: Problems for banana fruit farming

Problems	Magnitude	Rank
Unavailability of planting material	Medium	IX
High cost of seed/saplings	Medium	VI
Poor quality of planting material	Medium	VIII
Unavailability of fertilizer	High	II
High cost of fertilizer	High	IV
Labor shortage	Medium	X
High cost of labor	Medium	V
Lack of irrigation	Medium	VII
Inadequete technical service	High	III
Lack of modern knowledge	High	I

Annex 5: Problems for sweet orange fruit farming

Problems	Magnitude	Rank
Unavailability of planting material	Low	VIII
High cost of seed/saplings	Low	X
Poor quality of planting material	Low	IX
Unavailability of fertilizer	Medium	VI
High cost of fertilizer	Medium	II
Labor shortage	Low	VII
High cost of labor	Medium	I
Lack of irrigation	Medium	III
Inadequete technical service	Medium	V
Lack of modern knowledge	Medium	IV

Annex 6: Problems for mandarin fruit farming

Problems	Magnitude	Rank
Unavailability of planting material	Low	X
High cost of seed/saplings	Low	IX
Poor quality of planting material	Low	VIII
Unavailability of fertilizer	Low	VI
High cost of fertilizer	Medium	III
Labor shortage	Low	VII
High cost of labor	Medium	I
Lack of irrigation	Medium	V
Inadequate technical service	Medium	IV
Lack of modern knowledge	Medium	II

Annex 7: Problems for lime fruit farming

Problems	Magnitude	Rank
Unavailability of planting material	Low	X
High cost of seed/saplings	Low	IX
Poor quality of planting material	Low	VIII
Unavailability of fertilizer	Medium	VI
High cost of fertilizer	Medium	IV
Labor shortage	Medium	V
High cost of labor	Medium	II
Lack of irrigation	Medium	V
Inadequete technical service	Medium	III
Lack of modern knowledge	Medium	I

Annex 8: Problems for kiwi fruit farming

Problems	Magnitude	Rank
Unavailability of planting material	High	I
High cost of seed/saplings	High	II
Poor quality of planting material	Medium	VIII
Unavailability of fertilizer	Medium	VI
High cost of fertilizer	Medium	V
Labor shortage	Medium	IX
High cost of labor	Medium	VII
Lack of irrigation	Medium	X
Inadequete technical service	High	III
Lack of modern knowledge	Medium	IV

Annex 9: Challenges in fruit production
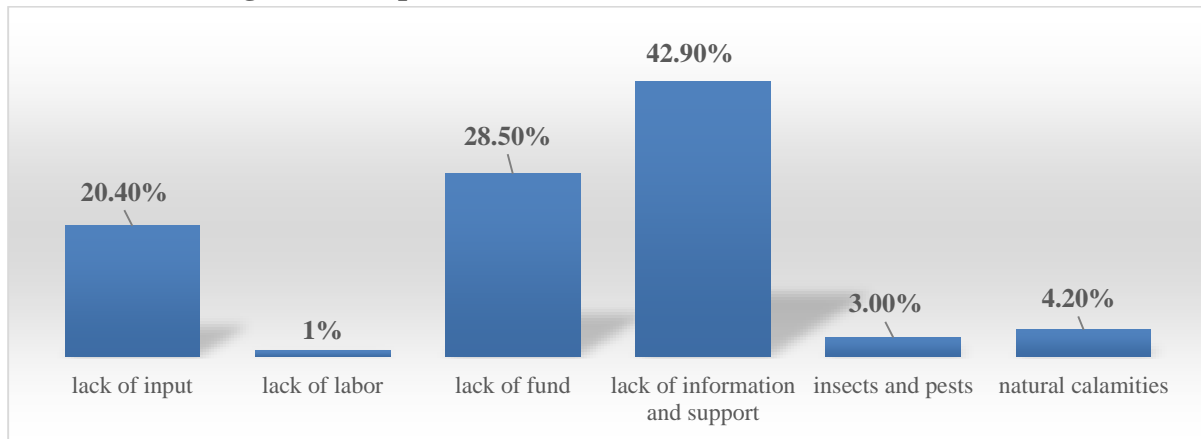
Annex 10: Challenges in fruit processsing

52.38%	33.33%	13.09%	1.20%
lack of knowhow	lack of facilities	lack of support	others
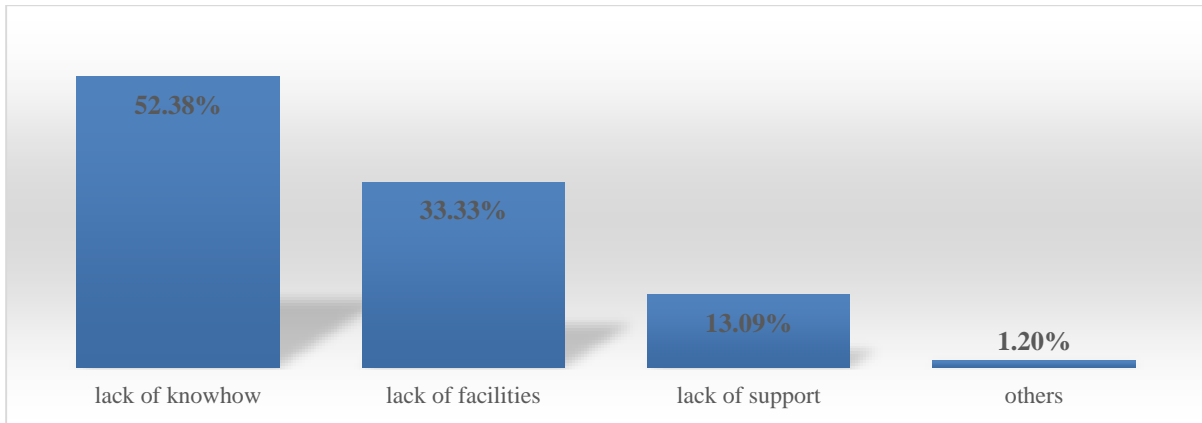
Annex 11: Challenges in fruit marketing

12.50%	63.54%	13.54%	10.42%
no market information	middlemen	unorganized market	others
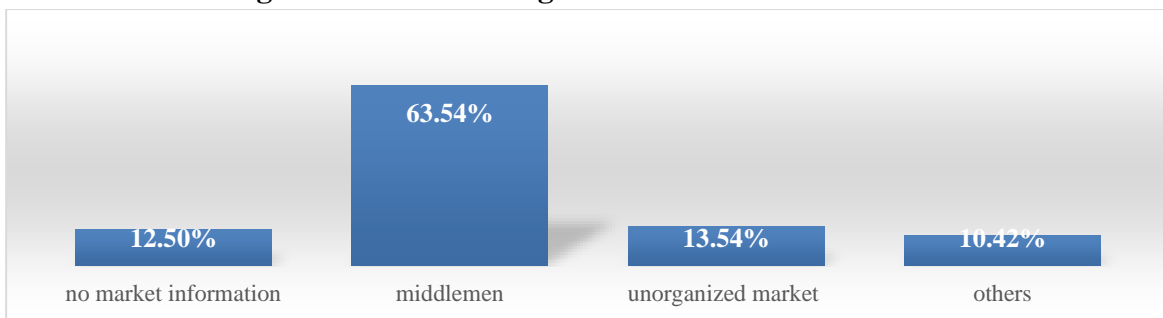
Annex 12: Price of fruits to local collectors

- cheap
- medium
- expensive

73% — 24% — 3%
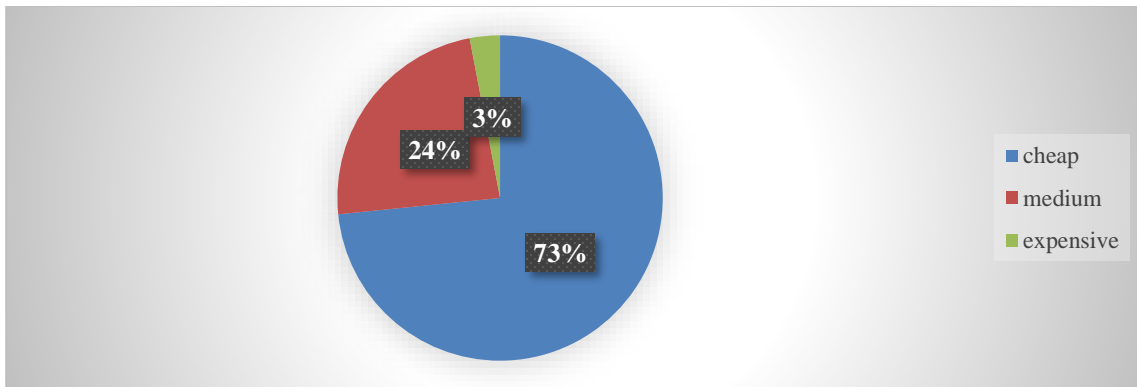
Annex 13: Price of fruits given by brokers

- cheap
- medium

90% — 10%
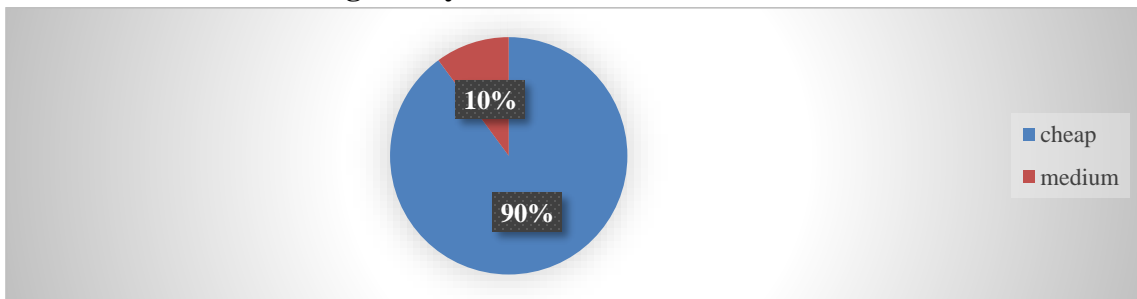
Annex 14: Price of fruits given by wholesalers
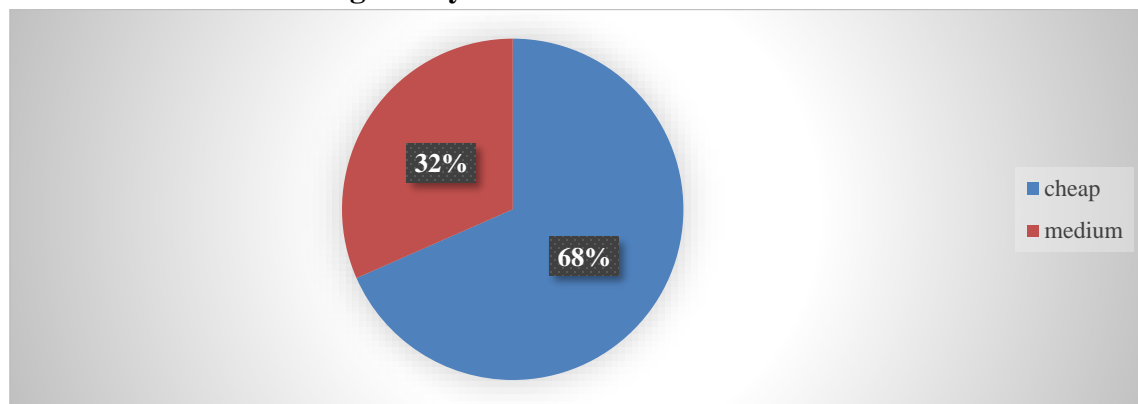
Annex 15: Response of farmers satisfied with yield, challenges in searching buyers and conducive environment prevailing
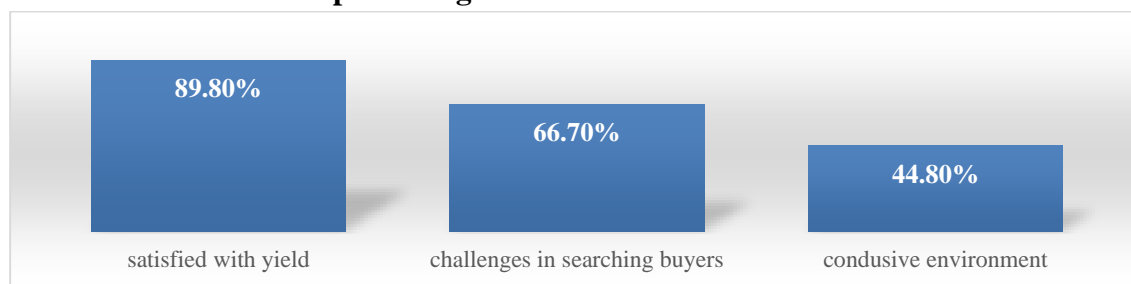
Annex 16: Descriptive statistics of sociodemographic variables of respondents

Variables	Mean
Age (years)	45.38
Distance from all season main road(km)	2.91
Years of farming	15.84
Land possession (ropani)	69.25
Non irrigated land	17.51
Cultivated area (ropani)	58.64
Livestock unit	7.28

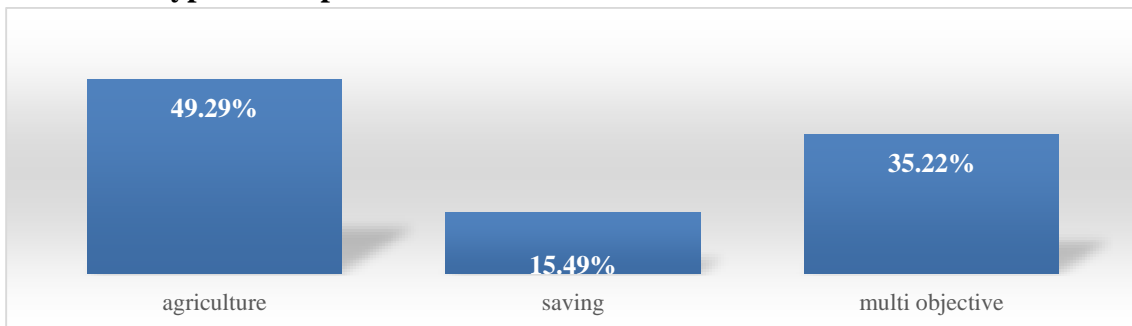**Annex 17: Source of HH income**
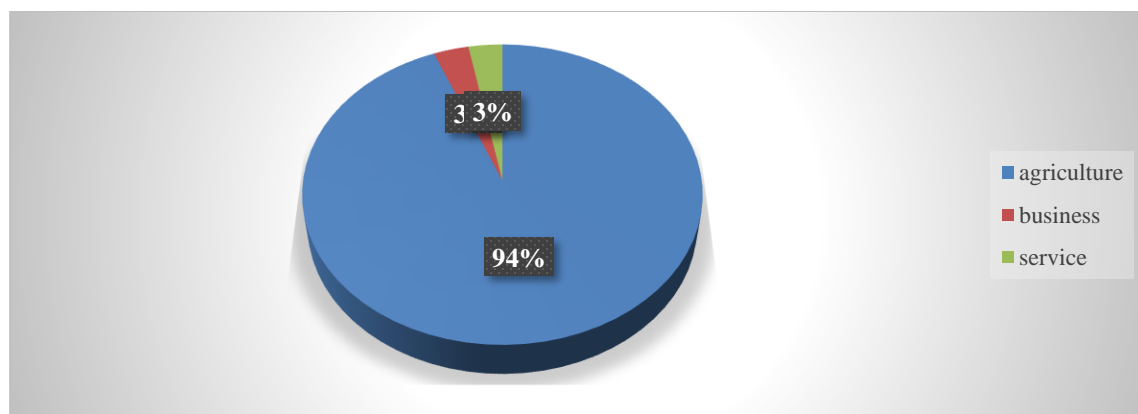
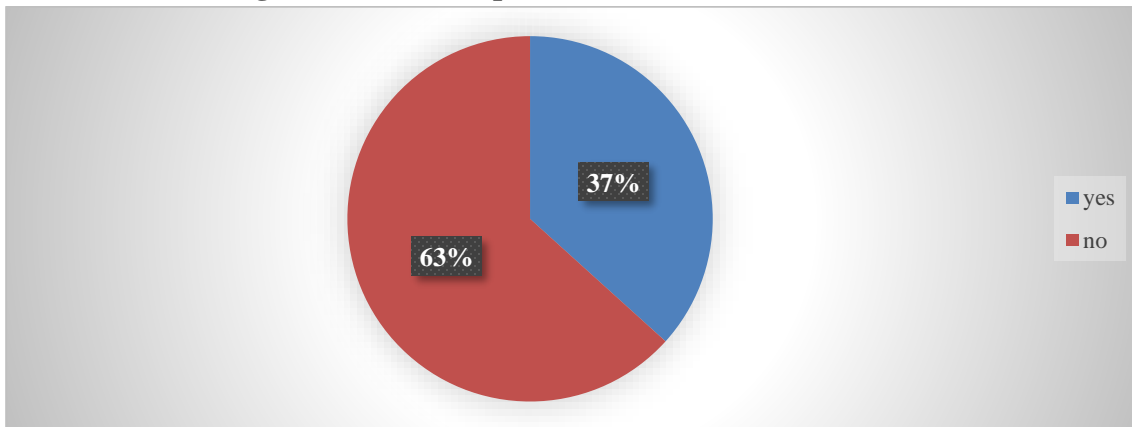**Annex 18: Land ownership status of the respondents**
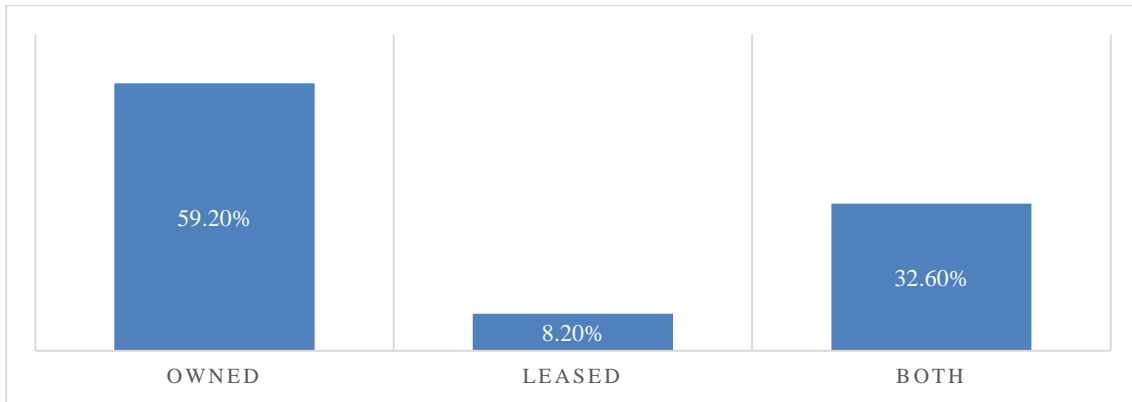
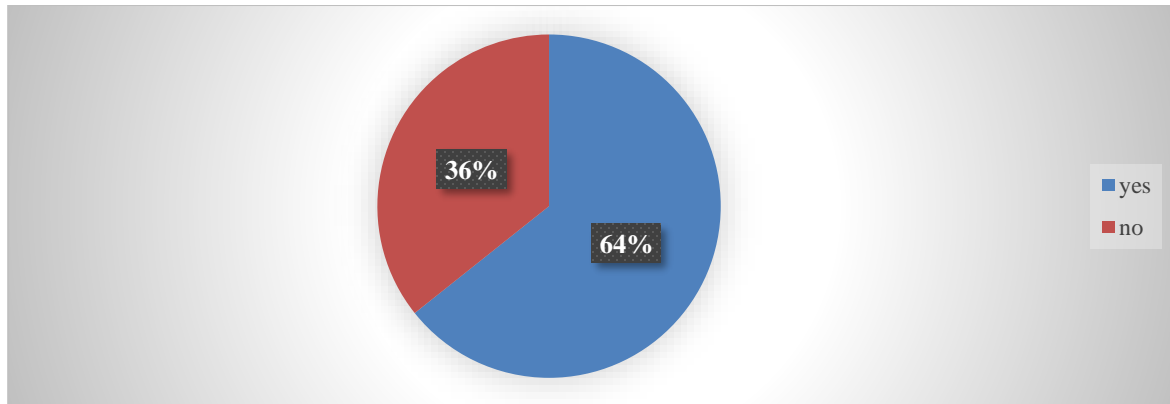**Annex 19: Cooperative involvement of the respondents**
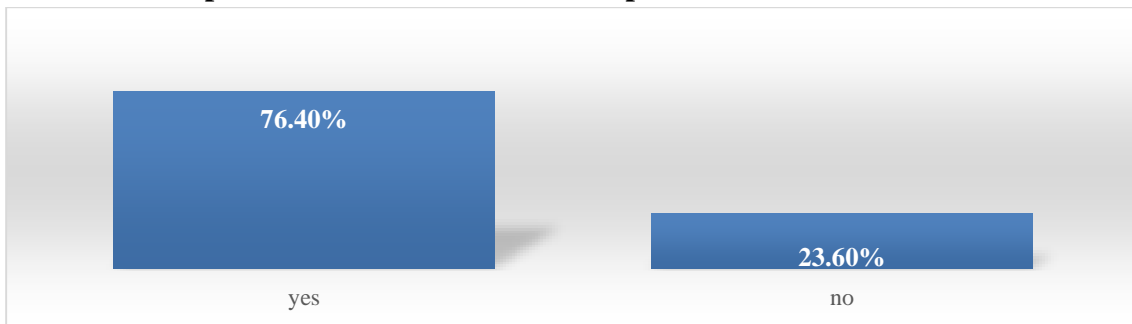
Annex 20: Types of cooperative

Annex 21: Training status of the respondents

Annex 22: Marketing distance

Annex 23: Challenging in peneterating market

Annex 24: Ratings of current governemt work by the respondents