ANALYSIS OF MARKETING SYSTEM FOR SWEET ORANGE IN DARCHULA DISTRICT, NEPAL

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ABSTRACT

Sweet orange is one of the major fruits grown in the mid-hills of Nepal. It ranks second among the citrus fruits in terms of area and production but farmers have yet to receive potential benefit from this enterprise, mostly due to market issues. This study analyzed different aspects of sweet orange marketing to support overcome these problems. The research was conducted in the two Palikas (Mahakali municipality and Lekam rural municipality) of Darchula district. Altogether 50 samples each were selected randomly from these two Palikas, totaling 100 samples. The collected data were processed and analyzed using MS Excel and STATA. Sweet orange was found to be highly profitable enterprises with high Benefit-Cost (BC) ratio but marketing is crucial for this. Four major marketing channels from producers to (i) Consumers; (ii) Retailers; (iii) Wholesalers and; (iv) Preharvest Contractors were observed. Among these, Producers-Consumers was the most common as well as profitable, Looking at the marketing margin (Rs. 6.81) and Producer's Share (83.49%), sales to Retailers is profitable. However, for commercial scale production role of wholesalers (only 18% of total sales volume) is found to be of utmost importance. The major problem in marketing sweet oranges is the lack of transportation and storage, which also contributes to higher level of local sales. It should be improved before promoting this enterprise and increasing acreage. Development of appropriate infrastructures for facilitating sweet orange marketing is the most for improving the performance of this sub-sector. Cooperative marketing could also be another quick alternative to bring about desirable changes.

Keywords: *citrus, cooperative marketing, market actors, market margin, producer's share, SWOT analysis*

INTRODUCTION

Nepal is an agrarian country with 57.30% of the people dependent on agriculture and allied sectors and 24.12% of the total Gross Domestic Product coming from this sector (MoALD, 2023). Fruits are also important crops and in Nepal citrus is the most

prominent fruit crop, especially for the mid-hills where it can bring significant economic changes. Geographical and climatic suitability makes it possible for citrus to be grown widely throughout the mid-hills (800-1400m above sea level) all from the eastern to western part of the country. Citrus is one of the major income generating fruit crops in the mid-hills of Nepal, grown in kitchen gardens or even commercially. It covers a large range of fruits and sweet orange along with mandarins, limes, lemons and grape fruits are some of the citrus fruit that are adaptable to varied range of area (Ghimire et al., 2006; Parajulee et al., 2021). Sweet Orange (*Citrus sinensis*; commonly known as Junar in Nepal), belongs to Rutaceae is originated from south China and is one of the most popular fruit crops among the citrus group. It is gradually gaining popularity among the farmers as well in the recent years. Sweet orange is delicious and juicy with yellow to orange-red color having its typical aroma and consists of around 10-14 segments, enclosed within the peel (Goudeau et al., 2008). Its fruits are usually eaten fresh but could be processed into juice too. Many citrus species have other types of traditional and medicinal values as well as its fruits and leaves are used during several occasions in the festivals (Bhandari et al., 2013). Sweet orange is cultivated in around 6,813 ha in Nepal with production of 46,865 mt and productivity of 10.82 mt/ha. The contribution of citrus fruits and sweet oranges in agricultural GDP is around 1.75% and 0.23%, respectively (MoALD, 2021).

Sweet oranges are one of the major citrus crops having export potentiality in the international market (Dahal et al., 2020) but the quantity of production is limited. Instead, even to meet the demand of the Nepalese consumers, the fruit is imported from neighboring countries in large quantities. For increased production and quality of fruit, sweet orange growers should consider following best plant management practices in their orchard management and also focus on post-harvest handling procedures (Sharma et al., 2021). The production and yield of citrus in Darchula is 355 ha and 9.80 mt/ha during 2020/21 (MoALD, 2021). Although Darchula district has a number of sweet orange production pockets, the productivity has not increased as per the expectation over the last few years due to several technological constraints as well as market constraints. One of the major factors is inadequate information about the price, pricing mechanisms and poor knowledge on marketing and value chain, which results in farmer's hesitation to increase acreage. Despite having the great potential of production in the mid-hill region of the country and continuous effort from the government, production of the sweet orange is not increasing. Producers are facing problems, especially regarding poor marketing infrastructures, lack of market information, lack of extension services related to marketing, uncertainty and fluctuations in price, and small-scale as well as scattered production. The marketing channel for citrus fruit are wide (Pokherel, 2011). But there is an involvement

of a middle-men, namely the pre-harvest contractor, who plays a vital role in wholesale buying but it also affects the overall profits since the prices are lower. It purchases the whole orchard even at the flowering stage after estimating the possible returns from the orchard. Other buyers in this sector includes collectors/assemblers, commission agents, wholesalers, retailers and exporters. Due to low network and mostly monopoly of local collectors/wholesalers, farmers could not explore other options for marketing. So, this study aims to explore market of sweet orange to understand potential market players (Kafle, 2018). Nepal has a comparative advantage in citrus cultivation as well as it has been found profitable than most other commodities. Despite this fact, marketing has emerged as a most challenging factor hindering the growth of this sector (Joshi et al., 2023). But there is a lack of studies for farmers to make well informed decisions. Knowledge of key constraints and potential is vital in this scenario. This study endeavors to fulfill this gap and provide information about the current scenario on the existing marketing channels and practices, different economic indicators like marketing margin and producer's share of these channels, and the challenges and opportunities of sweet orange sub-sector. The aim is also to test whether the choice of marketing channel significantly affects the income of sweet orange farmers or not. This study can be useful to understand different aspects of sweet orange production and marketing, thereby easing decision-making process for the farmers. The coverage of this research was in the selected sites of Darchula district but looking at the similarities in mid-hills region throughout the Nepal, it can be concluded with high confidence that it can represent most of the similar regions of Nepal.

METHODOLOGY

Site selection and sampling

This research was conducted in Darchula district of Nepal, which represents the mid-hill region and it has high potentiality for sweet orange cultivation. Darchula, one of the districts in the Sudurpaschim (Far-Western) Province, within 29° 48' 0" N latitude and 80° 34' 12" E longitude, with an elevation up to 3,589m above sea level and is one of the potential districts for sweet orange production in the Sudurpaschim province. The study was conducted in Lekam rural municipality and Mahakali municipality because of its high share in production of sweet orange within the district. It is also the working site of Prime Minister Agriculture Modernization Project (PMAMP), Citrus Zone, Darchula. Accessibility of these municipalities/rural municipalities (referred to as Palika hereinafter) also positively impacted the purposive selection of these sites for sampling. The study population was the sweet orange growers of both of the study areas. The sample size was determined to be 100 (including 4% provision for non-response) using Cochran Equation (Cochran, 1977), which is used in case the actual population size is unknown:

$$\eta = \frac{P(1-p)z2}{e2}$$

Where,

n = sample size

p = proportion of population with desired characteristics (= 0.50)

e = margin of error (=10% = 0.10)

z = value of z-statistics at 5% significance level (=1.96)

Samples are selected randomly from the list of sweet orange growers available at the Project Implementation Unit (PIU), PMAMP, Citrus Zone Office. Further the samples were proportionately distributed regardless of population size within two sites, thereby selecting 50 respondents each from both of the Palikas (Table 1).

Table 1. Sample size distribution

Palika	Sample size
Lekam Rural Municipality	50
Mahakali Municipality	50
Total	100

Data collection techniques

The primary data were collected from the household surveys conducted through face-to-face interview of sweet orange farmers. A semi-structured questionnaire was prepared and pre-tested on 5 non-sampled households and corrections made as per the observation. KoboCollect app (through android mobile) was used to collect data directly from the sampled households. Respondents were asked questions seeking answers to demographic, sociocultural, and economic aspect of the household as well as production, marketing and other relevant information regarding sweet orange cultivation.

In addition, Key Informant Interviews (KII) were also conducted to collect data/information from other actors of the marketing channel viz. pre-harvest contractors, wholesalers, retailers, etc. for collecting some information regarding marketing of sweet orange. KII was also conducted with progressive farmers, stakeholders, officers and PMAMP officials who were well equipped with the knowledge and experiences about it. The information obtained from the KII was used in triangulating the quantitative data obtained from the household survey as well as for some qualitative analysis. The data on the other marketing and value chain related indices were collected from the local level

fruit collector, fruit wholesalers and fruit retailers. Information regarding the program implemented by PMAMP for citrus farmer, actors and supporters in the district in the citrus sub-sector, and existing problems and possible solutions were also recorded. Direct field observation were done at the time of household survey to verify some of the collected information viz. number of trees (bearing or non-bearing), planting distance and other management condition of orchard. The secondary data were used whenever and wherever necessary from published literature and websites.

Data analysis techniques

The data collected from KoboCollect app were downloaded. These data were refined and cleaned as well as inconsistencies were looked for and deleted where necessary. The qualitative data were mostly quantified using dummy variables to carry out the analysis or sometimes used directly to provide qualitative information about the subject matter. The quantitative data were analyzed using both descriptive methods using descriptive tools such as observation frequencies/percentages and means through the use of software like Microsoft Excel. and Regression analysis was done using STATA. Following estimates were analyzed for finding out different productivity, profitability and marketing indicators: Variable cost of producing sweet oranges; gross margin and gross returns; marketing margins; producer's share; benefit-cost ratio; etc. Besides, indexing of production and marketing problems were also done based on farmer's opinion (as per the importance given by them). Scaling was done on a 5 point Likert-Scale (1 to 5) of comprising the following options: 1 = least severe; 2 = a little bit severe; 3 = moderately severe; 4 = very severe; and 5 = the most severe (in line with: Miah, 1993) using following formula:

$$I_{imp} = \sum \frac{Si\ fi}{N}$$

Where,

I_{imp} = Index showing the Importance or Seriousness of the Problem

$\sum$ = Summation

Si = Scale Value

fi = Frequency of Occurrence of the Seriousness as per the Respondents

N = Number of the Respondents Finding the Problem as Serious in that Category

Regression analysis

A multiple regression model often referred to simply as a "multiple regression" or "ordinary least squares (OLS)" is an econometric analysis technique used to explore the relationship between a dependent variable (income from the sale of sweet oranges = Y) and two or more independent variables (Uyanik & Guler, 2013). The independent variables are the choices made by farmers in selecting different marketing channels (X_1… X_n). The regression model is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_n X_n$$ (Uyanlk and Guler, 2013)

Where,

Y = Income from the Sales of Sweet Oranges

X_1, …, X_n = Different Marketing Channels Adopted by the Farmers, which is a dummy variable (Choice of respective marketing channel =1 and Otherwise = 0)

β_0 = Constant (Coefficient)

β_1, …, β_n = Coefficients of Independent Variables

RESULTS AND DISCUSSION

Socio-economic and demographic characteristics of the sweet orange farmers

Information about the household demography is important and hence in this research some of the characteristics of the respondent households has been analyzed. The Table 2 showed that household heads comprise of both males (89%) and females (11%) who were engaged in farming of sweet orange. The findings of this research indicated that sweet orange farming is still dominated by males though gradually due to migration and other reasons females are also leading the households. However, data on household composition also showed that the population of male is lower (around 49%) than female population in the surveyed household. Around 83% of the heads were of the age group between 18-59 years of age, while 17% were above 59 years of age and none of the household heads are below 18 years of age. Analysis of the education level of respondents households showed that 7% of the heads could not read or write (are illiterate) and around 82% have education below 12 years of schooling (higher secondary level). Whereas, only around 11% of the household heads had university level education (bachelor degree or higher). The ethnic distribution showed that the society is mostly dominated by Brahmins (51%), followed by 46% Chhetris, 2% Janajatis and 1% Dalits.

Table 2. Population distribution based on various socio-economic and demographic characteristics

Parameters	Observation (%)
Gender of the Household Head	
Male	89.00
Female	11.00
Age of the Household Head	
<18 years	0.00
18-59 years	83.00
>59 years	17.00
Education of the Household Head	
Illiterate	7.00
Primary	40.00
Secondary	28.00
Higher secondary	14.00
University	11.00
Ethnicity of the Household Head	
Brahmin	51.00
Chhetri	46.00
Janajati	2.00
Dalit	1.00

Average family size of the selected sweet orange framers was 6.50 members, with minimum of 4 and up to 19 members. Females are mostly dominant with at least one female members in each household and up to 11 members (mean of 3.40 members). There is also at least one male member in the family with average of 3.10 members and a maximum of 9 members.

The average land under sweet orange cultivation was 0.12 ha (Table 3). The number of sweet orange trees per household is on average 24 of which around 15 are bearing ones. On the average, respondents have had 16 years of experience of cultivating sweet oranges, with 28% having less than 10 years, 53% having 10-20 years and 19% having more than 20 years of sweet orange farming experience. Thus, most of the households are growing sweet orange from generations and they have decades of experience growing it and agriculture is the major occupation of majority of these households where one-third of the households had no other maor source of income than agriculture. Data shows that agriculture is the major source of income from around 85% of the household though it is the only source of income of at least 33% of the households whereas 67% have alternatives sources in services, government jobs, businesses, remittance, etc.

Table 3. Analysis of family and landholding size of sweet orange farmers in Darchula district

Variable	Mean	Min	Max
Land under sweet orange (ha)	0.12 (0.07)	1	12
Farming experience (years)	16.05 (9.44)	4	50

Note: 1 ha = 20 Ropani (approximately)

Cost of production and profitability of sweet orange

Cost of production has been categorized into fixed costs that are mostly the initial investment to establish the sweet orange orchard and the recurring costs (known as variable costs) of manures, fertilizers, pesticides, labor for different intercultural operations, harvesting etc. The variable cost of sweet orange production is found to be around Rs. 9,871/ha (or Rs. 7.43 per kg or orange, which is quite low due to rare use of external inputs) and computed fixed costs comes out to be around Rs. 6,430.46/ha (Table 4). Usually, farmers were found not to invest a lot of time, money and effort in the perennial crops and in fact it it cultivated for the same reason since they assume that fruit trees need less care and maintenance. The cost of land-rent is also meager and combined it with low external input use the cost of production seems to be too low. But the production of sweet orange is somewhat normal, approximately 1,467.11kg/ha and the gross returns is around Rs. 79,213.50/ha. The gross margin comes out to be Rs. 62,911.97/ha. The benefit-cost ratio comes out to be around 5.67, which indicates it is a highly beneficial business with minimum investment but high returns. Parajulee et al. (2021) also found sweet orange farming to be a beneficial business with slightly less benefit-cost ratio of around 2.81 in the Sindhuli district of Nepal.

Table 4. Variable cost and benefit-cost ratio of sweet orange

Particulars	Per ha (Rs.)
Total variable cost	9,871.07
Total fixed cost *	6,430.46
Total cost	16,301.53
Production (kg)	1,467.11
Gross Return (GR)	79,213.50
Gross Margin (GR-TVC)	62,911.97
Benefit-Cost ratio	5.67

*Note: * Calculated based on available information from the farmers (at current price)*

Sweet orange production has been found to be profitable business with little costs to be incurred every year compared to the benefits. The high benefit-cost ratio indicates

the charm of this business although as of yet none of the sampled households seems to have adopted it as a business and had commercialized their farm. Almost all of them dedicated only a small portion of land for sweet orange cultivation, which shows the lack of dedicated efforts. This situation need to be improved if the area and production of sweet orange is to be enhanced.

Marketing system of sweet orange

Marketing system is the chain of people/organization involved from production to the consumptions (farm to fork). It involves different actors from farmers/producers to traders (collectors, wholesalers, retailers, etc.) and goes through different transporters/ distributers and reaches ultimately in the hand of the consumers.

Marketing channel in study area

The survey in the selected sites showed that there are predominantly four marketing channels adopted by the farmers (Figure 1). The four channels were:

Channel I: Producer →Consumer
Channel II: Producer → Retailer →Consumer
Channel III: Producer → Wholesaler→Consumer
Channel IV: Producer → Pre-Harvest Contractor→Consumer

The farmers (producers) were found to either directly sell to the consumers or sell to other intermediaries like retailers, wholesalers or pre-harvest contractors. Whereas, in turn, retailers directly sell to consumers but wholesalers and pre-harvest contractors usually sell to retailers and not directly to consumers. Pre-harvest contractors were even found to be selling to the wholesaler who then sells to retailers to reach to the ultimate consumers. So, the shortest possible chain in Channel I and the longest one is usually the Channel IV.

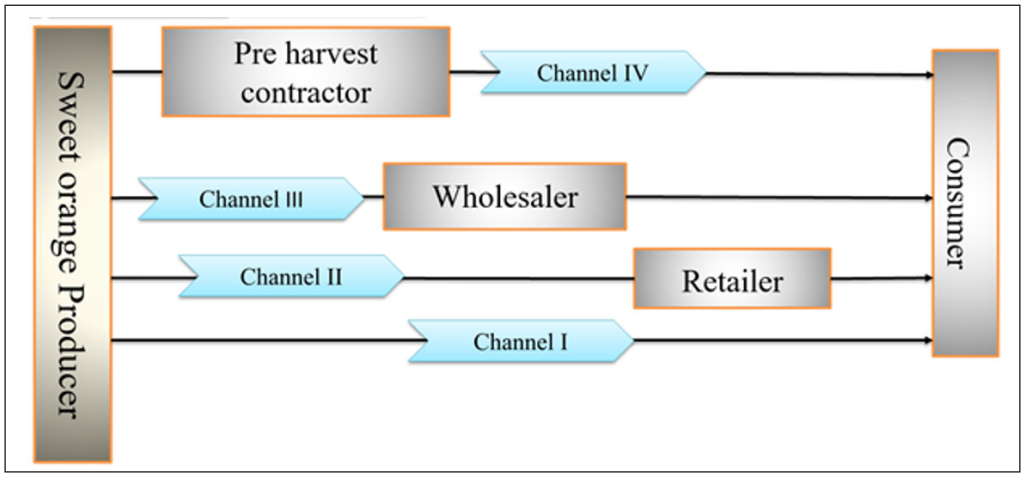

Figure 1. Map showing marketing channels of sweet orange at Darchula district

Market information

Information about the price, product demand and supply, seller and buyers, etc. comprise the market information. It is essential to have up to date knowledge about the market as well as timely access to such information so as to reduce the risk of losing income/profits. The access about the market information among farmers is found to be low (24%). In the study area, more than half (52%) of the farmers received such types of market information via their friends and/or neighbors (Figure 2), who in turn may also have difficulties accessing such information due to lack of appropriate sources. Some of the farmers (45%) were found to contact appropriate sources (e.g. wholesalers, retailers, or even their known persons) through phone inside or outside the district to know about market condition at these specific locations. Newspaper was mostly unavailable in the district and television does not have any programs to update about agriculture and marketing of agriculture products. However, a small proportion (around 3%) rely on radio for such information though frequency of such information flow through radio is low. Due to the lack of probe question, this research is unable to know whether the person using phones access market information through websites, call centers, ans so on. There is also no information whether phone is used to obtain messages about market information, which is available in some places and provided by government or other organizations.

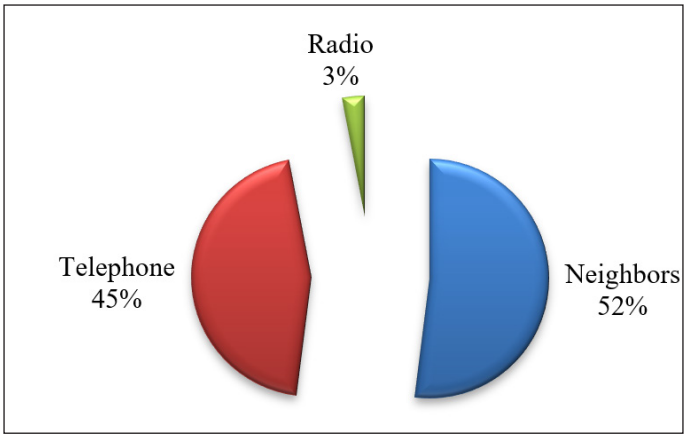

Figure 2. Means of market information used by sweet orange producers

Grading

Some of the farmers in the research area sell their sweet oranges to the collector before harvesting. Those farmers who did not sell to the collector before harvesting were found to harvest it themselves but the grading practices were not common at the farm-gate. However, this study shows that about 82% of the farmers does discriminate price based on different characteristics of the fruit, which can be considered as a form of grading.

For instance, 58% graded them based on size (Figure 3). Damage from insect-pest, color and appearance, and perceived sweetness of taste as per the past experience also affects the pricing of the fruit and hence could be considered a sort of grading practices of the farmers. After farmers all other value chain actors grade the fruit based only on the size. The pre-harvest collector practices the grading system: they grade the sweet orange in three categories (big, medium, and small). Wholesaler also grades the sweet orange into four groups (extra big, big, medium, and small). Retailers were found to grade into two groups viz. big and small. Asad et al., (2019) reported the grading of citrus in three categories viz. big, medium, and small.

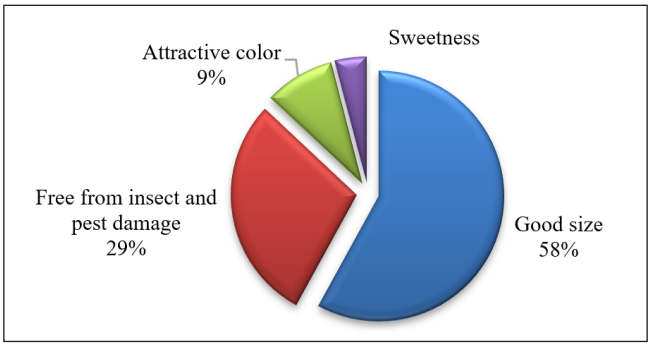

Figure 3. Grade of sweet orange

Packaging

Packaging is also one of the most important factor for maintaining the quality of sweet orange. Retailers of Darchula were still adopting traditional methods of packaging, such as doko (bamboo baskets). About 81% of producers package the sweet oranges with packaging materials. The majority (46%) of packaging is done on sacks made from jute, plastic or paper (Figure 4). Doko (32%) is also a common packaging medium followed by a simple plastic bags (21%) and cartoons (1%). Seid et al. (2013) and Dessalegn et al. (2016) reported sacks as becoming the major fruit packaging material in South Wollo Zone, Ethiopia.

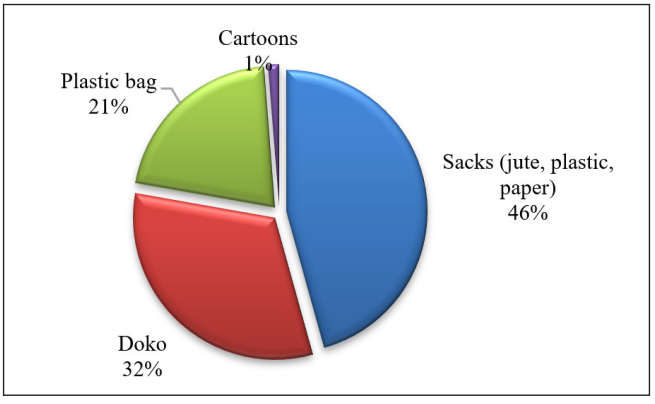

Figure 4. Packaging materials

Mode of selling

Generally two types of selling (marketing) practices exists in the study areas: (i) non-contract system: selling to the consumers, wholesalers or retailers without any contract and (ii) contract system: selling to the pre-harvest contractors. The non-contract system of selling sweet orange was the most commonly preferred system of selling. Majority of the respondents (93%) were found to practice the non-contract system of selling in comparison to the pre-harvest contract system of selling (7%) as shown in Figure 5. Selling directly to the consumers still comprise more than half of the sales made by the farmers in the selected sites.

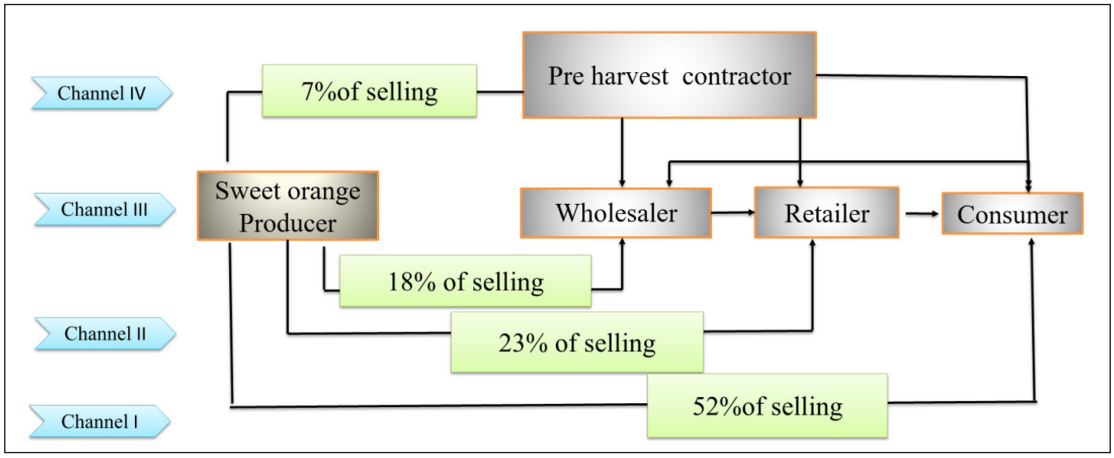

Figure 5. Mode and volume of selling of sweet orange from different channels in the study area

Marketing margin and the producer's Share

Lower marketing margin but the higher producer's share on the price paid by the consumers is the indication of the better marketing efficiency. Table 5 shows overall marketing margin of the different channels adopted by the farmers. Due to the nature of the Channel I where farmers directly sell to the consumers, thereby raising no question of marketing margin (with 100% producer's share and 100% marketing efficiency). It is also interesting to know that more than half of the sales are done through this channel. However, if the volume of production increases, there may be no other option to adopt any of the three other channels since direct sales to consumers will be increasingly difficult. Among the three other channels, Channel II provides the best option for the farmers with their 83.49% share on the sales price (marketing margin is as low as Rs. 6.81/kg). Channel III follows it with 75.28% producer's share. The least beneficial channel seems to be Channel IV where the producers are getting only around 61.37% of the price that the consumers pay. It shows that shorter the channel, higher is the share of producer, lower is the marketing margin and hence higher is the marketing efficiency. These values were

slightly higher than that of Karki (2018) who calculated marketing margin of mandarin at two sites viz. Kristhinachnechaur and Nirmalpokhar to be around 11.43 and 10.36 with the producer's share around 52.43% and 56.40%, respectively.

Table 5. Marketing margin and producer's share

Parameters	Channel I	Channel II	Channel III	Channel IV
Farm gate price (Rs/kg)	32.62	34.44	33.50	32.00
Retail price (Rs/kg)	32.62	41.25	44.50	52.14
Marketing margin (Rs/kg)	-	6.81	11.00	20.14
Producer's share (%)	100	83.49	75.28	61.37

Problems in the production/marketing of sweet orange

Indexing of problems of sweet orange production was done to understand the underlying constraints. The Table 6 indicates lack of irrigation to be the major problem in the production of sweet oranges (with the highest index of 0.97). Other production problems were insect-pest and diseases (0.70), unavailability of input (0.67), poor variety and planting material (0.53), and inadequate technical assistance (0.23). Joshi et al., (2023) also reported that poor irrigation facilities to be a major production constraint for citrus (mandarin) production in the Darchula district.

Table 6. Indexing the production problems

Problems	Index	Rank
Lack of irrigation	0.97	I
Insect pest and diseases	0.70	II
Unavailability of input	0.67	III
Variety/planting material	0.53	IV
Inadequate technical assistance	0.23	V

There are several problems that hinder marketing of the sweet oranges, resulting in a monetarily loss and reduction of profits. Table 7 ranked the problems faced by the farmers in marketing of sweet oranges, based on their perception. According to the farmers, difficulty in transportation (with the index value of 0.96) is ranked as the major problem in the marketing of sweet oranges, followed by a lack of storage facilities (0.82) and a low price (0.54). Parajulee et al. (2021) also reported that the major problem was a lack of transportation in marketing. Post-harvest loss and lack of incentives for appropriate grading and packaging are also other problems in marketing.

Table 7. Problems associated with sweet orange marketing in the study areas

Problems	Index	Rank
Lack of transportation	0.96	I
Lack of storage facility	0.82	II
Low price value	0.54	III
High post-harvest loss	0.35	IV
Lack of grading and packaging	0.31	V

Producer's preference market to selling sweet orange

Producer's preferences for selling sweet oranges in different markets are influenced by a combination of factors such as convenience, market dynamics, potential profits, quality considerations, etc. The choice of marketing channel also depends on it and hence is analyzed in this research. The analysis (Table 8) showed that ranking of preferred market showed that producers want to sell their fruits from their own orchard to the extent possible (with the index value of 0.77), which is somewhat similar to sales at the local market (0.76). It they are unable to sell even at the local market then only they prefer nearby towns. Selling at distant market nationally (like in Kathmandu, Pokhara, etc.) was the least preferred choice may be due to lack of networking, capital and low confidence.

Table 8. Indexing the producers preference of market for selling sweet orange

Parameter	Index	Rank
Farm gate	0.77	I
Nearby local market	0.76	II
Nearby town market	0.66	III
Nearby national market	0.27	IV

Determinants of choice of marketing channels

To understand the impact of choice of marketing channels on the income from sweet orange, regression analysis was run with the dependent variable being "income from sweet oranges". The independent variables are the choices made by the farmers in selecting where or whom to sell, that is, the marketing channels: consumers, wholesalers, retailers, and pre-harvester contractors. The study shows (Table 9) positive and significant relationships of income from sales with the choice of marketing channel comprising direct sales to the wholesalers (at 1%) followed by retailers (at 5%). This highlights need for potential strategies for improving income as well as appropriate disposal of large volumes of production by proper collaboration with wholesalers and retailers. On the

other hand, the negative relationship with pre-harvester contractors indicates the need for further investigation into their role and need of awareness raising on part of farmers for encouraging them to adopt other marketing channels. Wholesalers were found to be effective by other researchers too. Ermias, (2021) reported that the wholesaler market outlet was effective in the case of mango production.

Table 9. Multi-linear regression model for choice of marketing channels

Independent variables	Coefficients	Standard error	P-value
Choice of consumer	4695.94	3103.29	0.13
Choice of wholesaler	*** 7563.38	2400.10	0.01
Choice of retailer	** 4505.80	2126.42	0.03
Choice of pre harvester contractor	-1857.03	3767.43	0.61
Constant	5264.00	3367.43	0.12

*Note: **and*** indicates significance at 5%and 1%level, respectively; It should be noted that farmers are using one or more channels which had been used in this model as such*

CONCLUSION

Analysis of marketing channel showed adoption of four major channels by the sampled households. They are selling directly to consumers or to retailers, wholesalers or pre-harvest contractors. Due to the lack of reliable sources of market and other information they are usually approached by local intermediaries to whom they sell their products. Farmers are also interested in selling directly to the consumers and more than half of them are following it due mostly to higher margins and lesser profit share. Both the consumer and producer are benefitted in this process but if the farmers adopt commercial cultivation with bulk of production there seems to be less opportunity for it and one or other three channels must be strengthen in that case. Pre-harvest contractors is found to be the worst option with lesser producer's share, higher market margin, lower marketing efficiency and lower reliability of payments, both timely and adequately. There are several problems encountered by the farmers during marketing. Lack of transportation is the major constraint for efficient marketing of sweet orange which is lowering the producer's share by forcing them to sell in local market. Storage facility is also low and post-harvested losses are high. Due to low price, farmers cannot afford good packaging and branding of their products.

Government should invest in developing infrastructures like road and transportation as well as facilitate marketing of the products if sweet orange production is to increase in

near future. Other infrastructural development such as cold storage, irrigation, collection center, processing industries, etc. could also encourage farmers to increase their scale. Cooperative marketing can solve the problem of small-scale scattered but large number of farmers and hence it could also be promoted in this region. Cooperatives may help through access to finance and enhancing economies of scale since the farmers can collectively purchase the inputs and there is also possibility for collective marketing of outputs, enhancing collective bargaining, which in turn reduces transaction costs due to bulk volume of produce. Sweet orange has good future prospect in agriculture as well as overall development of the region.

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