Production and Marketing of Mandarin in Putalibazar Municipality of Syangja

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Abstract— Mandarin is the most demanded citrus fruit and has been producing as the main source of income in the hilly region since mid-hills are likely to have a favorable climate. This study was conducted to analyze the production and marketing scenario of Putalibazar Municipality, Syangja. The field survey was carried out in 2021 to collect information from the mandarin growers and traders. Semi-structured questionnaires were used to collect the primary data from 75 producers,10 traders, 10 retailers, and 10 wholesalers by applying the simple random sampling method. The result shows that the majority of mandarin growers are commercial farmers. The overall mandarin producer has an average landholding of 1.05. The average area used for mandarin cultivation was 0.32. The average farm-gate price was NRS 48 and the average retail price is NRS 94. The average price spread was found 52% with producer share 51%. The market margin was NPR 46/Kg respectively. The overall average BC ratio was 2.3 indicating farmers are benefitted from their production. A Cobb-Douglas production model was run to find out the effect of different factors on the gross return of mandarin production and SWOT analysis to address strengths, weaknesses, opportunities, and threats.

Keywords— Production, Marketing, Mandarin, Price spread, Market margin, SWOT.

I. INTRODUCTION

Agriculture commenced independently in distinctive components of the globe and includes a diverse variety and Nepal has sixty six percentage of humans immediately engaged in farming (FAO , 2021). The rural zone contributes 27.6% to the country wide GDP, among which fruit contributes 7% to the total agricultural GDP (CBS, 2017). Citrus is one of the main fruit crops grown in the mid-hills of Nepal. Mandarin is an important species covering a major part of the citrus growing area globally. Mandarin occupies 65.3% and of the total citrus growing area and 67.2% of production in Nepal respectively (Pandey, et al., 2017). It covers a total growing area of 26,282 ha and has a production of 146,690 Mt (MoALD, 2017) Citrus is one of the most cultivated with higher production fruits in

the large area in Nepal. In the category of citrus fruit, orange, lemon, and mandarin are the most demanded. Citrus has been grown in 62 districts of Nepal out of them Dhankuta, Terathum, Sindhuli, Ramechhap, Dhading, Kavre, Gorkha, Lamjung, Tanahun, Kaski, Syangja, Myagdi, Palpa, Salyan, Dailekh, Baitadi, Dadeldhura are the major citrus growing districts (Adhikari, 2014). Among citrus, mandarin orange is predominant which shares about 67 percent of the total citrus production in the country (FDD, 2009).

Syangja is one of the mid-hill districts of Nepal with a total mandarin cultivated area of 1,347H production of 14776 Mt and productivity of 10.97/Ha (MoALD, 2017). Despite the great potential of production in the mid-hill region of the country and continuous effort from the government, mandarin producers are facing

problems such as poor marketing infrastructures like market information, physical facilities, marketing extension services, price uncertainty, and small scale of production. Furthermore, farmers are not organized (Pokhrel, 2011). This study conducts to explore production practices and market analysis of mandarin and the reasons for a high price for the consumer. This study can help farmers to understand different aspects of mandarin production and marketing scenarios, help the farmers in marketing research in the marketing management decision-making process.

II. MATERIALS AND METHODS

2.1 Study area, sampling techniques, and sample size

The study was conducted in Putalibazar Municipality. It lies in the Syangja district of Gandaki province of Nepal. Putalibazar Municipality has 14 wards in total and is considered as a Mandarin production Zone. 75 farmers were selected randomly from each group of each mandarin producing wards. 10 traders, retailers were selected from the Putalibazar Municipality, Syangja. Mandarin growers were divided into two categories i.e., farmers cultivating in the area less than 0.25ha (5 ropani) were small growers and the farmers cultivating above 0.25 ha (> 5 ropani) were commercial.

For the study, both primary and secondary data were collected. Primary data were collected through household survey and interview by using pre-tested semi-structured questionnaire survey among the farmers. Similarly, secondary data were collected from related publications from MoALD, annual reports of Putalibazar Municipality, books, various published and unpublished sources like journals, newspaper articles, etc.

2.2 Data analysis

. The data obtained during the study through house-hold survey and (KII) with traders, retailers was checked, arranged, revised, tabulated, and analyzed by using Microsoft Excel, different analytical tools and formulas, and SPSS.

Profitability analysis

The profitability of mandarin manufacturing from the viewpoint of an person farmer turned into measured in phrases of gross go back, gross margin, net income, and undiscounted benefit-cost ratio

Gross return: Total production x average market price

Gross margin: Gross Return – Total Variable Cost

Net profit: Gross Return – Total Costs

Undiscounted Benefit cost ratio: $\frac{Gross\ return}{Total\ cost}$

The Total cost includes sum of total fixed cost and total variable cost i.e., TC = TFC+TVC.

Market margin: Retail price- farmgate price

Price spread: $\frac{consumer\ price - net\ price\ of\ producer}{consumer\ price} * 100$

Producer share: $\frac{farmgate\ price}{Retail\ price} \times 100$

2.3 Factor affecting mandarin production

The Cobb-Douglas production function represents the relationship between two or more inputs - typically physical capital and labor and the range of outputs that may be produced. The regression coefficients constitute the pliancy of respective inputs, and its sum gives the return to scale cost. The form of CPDF used in this study is as follows:

$$Y = aX1^{b1}X2^{b2}X3^{b3}X4^{b4}Xn^{bn}e^u$$

Where Y is the total income from mandarin production (NRs. / ha), and X are the variable inputs, e error term and b are the coefficients to be determined.

2.4 SWOT analysis

Information related to mandarin production in Putalibazar Municipality was obtained from the KII with concerned personnel, through the study of Profile and Resource Maps of Putalibazar Municipality 2020; and as well as from the field survey. Then, an in depth evaluation was carried out to evaluate the internal factors (strengths and weakness) and verify the outside factors (possibilities and threats) of mandarin production in Putalibazar Municipality.

III. RESULT AND DISCUSSION

Production situation of mandarin

Table 1: Production situation per hectare

Particulars	Overall	Small Holders	Commercial producers
Total number of mandarin/ha	948	184	764
Average number of plants/ha	12.6	5.1	20.2
Average area under mandarin/ha	0.32	0.12	0.51
Production (in Tons)	3.45	1.64	5.12
Productivity (in Mt/ha)	9.56	10.2	8.9

The average area under mandarin cultivation in the study area was 0.32 ha. Among that, 0.12ha and 0.51 ha was

inhibited by small-holder growers and commercial producers along with the 5.1 and 20.2 number of mandarin trees respectively. The overall production was 3.45 and productivity was 9.56. Gautam (2020) research found 2.163 Mt overall mandarin production in the study area, 0.987 Mt and 3.645 Mt on smallholder growers and commercial producers respectively in Gulmi.

Cost of production

Here the fixed cost is excluded and only variable cost incurred in a year is tabulated. The variable cost includes the cost of seedling, manure, irrigation, labor, transportation, Bordeaux mixture, pesticides, micro nutrients, and vermicompost. Where the variable cost incurred in the study area are seedling, manure, labor, Bordeaux mixture, transportation, vermicompost and mustard cake.

Table 2: Cost of production of mandarin

Particulars	Overall (NRS/Ha)	Small holders (NRS/Ha)	Commercial Producers (NRS/Ha)
Seedling	16,560	3990	12,570
Manure			
FYM	29465	8,220	21,245
Juto	4,585	3610	975
Poultry	13008.5	580	14,428.5
Mustard cake	4,749	2,074.5	2674.5
Chemical fertilizer	495	130.35	364.65
Bordeaux Mix	53,212	1,385	51827.5
Transportation	22,437.5	14,884	7553.85
Vermicompost	780	444	336
Total Variable cost (NRS/ha)	1,50,292	35,317.5	1,14,974.5

Economic analysis

Table 3: Economic indicators displaying productivity and profitability of mandarin farming.

Particulars	Overall	Small holder	Commercial producer
Total Variable cost (NRS/ha)	1,50,292	35,317.5	1,14,974.5
Average price/kg	48	44	52
Gross Revenue	7,09,125	1,32,062.5	5,77,062.5
Gross Margin	5,58,833	96,745	4,62,088
Net Income	5,49,658	93,148	4,56,510
Benefit Cost Ratio	2.3	1.9	2.7

The average total cost/ha was found to be NRs 1, 50,292 / ha and return was NRs 7, 09,125/ha. The average BC was found to be 2.3. Similarly, the gross margin was found to be 5, 58,833/ha. The total variable cost, gross revenue, gross margin, net income and BC ratio for commercial producers was NRs 1,14,974.5, NRs 5,77,062.5, NRs 4,62,088, NRS 4,56,510 and 2.7. Similarly, small holder mandarin producers' total variable cost, gross revenue, gross margin, net income and BC ratio was found NRs 35,317.5NRs 1,32,062.5, NRs 86,443.15, NRs 96,745, NRS 93,1478 and 1.9 respectively. This result was also consistent with another study of Kristhinachnechaur and Nirmalpokhari VDCs and BC ratios were 2.57 and 3.31 respectively (Kafle, 2018).

Price spread, market margin and producer share

Table 4: Price spread

Particulars	Overall average	Small holder	Commercial producer
Farm gate price (Rs/Kg)	48	44	52
Consumer price (Rs/Kg)	100	100	100
Price spread (%)	52%	56%	48%
Price spread (Rs/Kg)	52	56	48

Overall price spread of mandarin in the study area is 52% and small holder producer 56% and commercial producer is 48% respectively. This implies that the net price of an overall average producer is NRS 48. When mandarin is sold in the market at 100 NRS to a consumer, 52% of the price spread i.e., NRS 52 occurs which is due to higher marketing cost and margins obtained by intermediaries.

Table 5: Market margin and producer share

Particulars	Overall average
Retail price (Rs/kg)	94
Average farm gate price (Rs/kg)	48
Market margin (Rs/kg)	46
Producer share (%)	51%

The market margin of mandarin in the study area was 46 Rs/kg and producer share 51% which indicates higher marketing efficiency because a market is efficient when it provides the most consumer surplus and the most producer surplus possible. Kafle (2018) supports this study as he found market margin of Kristhinachnechaur and Nirmalpokhar were 11.43 and 10.89. Similarly, the producer share was 54.42.

Production function analysis

Table 6: Regression estimates for factors affecting gross income of mandarin growers

Variables	Coefficient	Standard error	t-value	P>|t|
Constant	2.827	0.219	12.938	0.000
Log_manure cost	0.084	0.025	0.943	0.349
Log_chemical fertilizer cost	0.073	0.050	0.470	0.640
Log_labor cost	0.739**	0.053	0.738	0.000
Log_Bordeaux Mixture Cost	0.083	0.027	0.996	0.323
Log_transportation cost	0.021	0.008	0.247	0.806
R square	0.610			
Adjusted R square	0.571			
F- value	26.640			
Return to scale	1			

** indicates significant at 5% level

The explanatory power of the estimated model for mandarin production was 0.610 F ratio being highly significant and the model was a good fit. All the explanatory variables had positive coefficients which suggest there is an opportunity to work on. It is evident that labor cost showed significance at a 5% level of significance on gross returns from mandarin production. Keeping all other factors constant. 100% increase in the labor cost will increase the return by 73%. Similarly, the regression analysis reveals that the coefficient of multiple

determination was found to be 0.610. this implies that the estimated variables explained 61% of the variation in gross return of mandarin.

The sum of regression coefficients obtained from the cobb Douglas Production Function was 1 which indicated the constant return to scale in mandarin production. This implies that an increase in the cost of variable inputs would increase the amount of income from mandarin production.
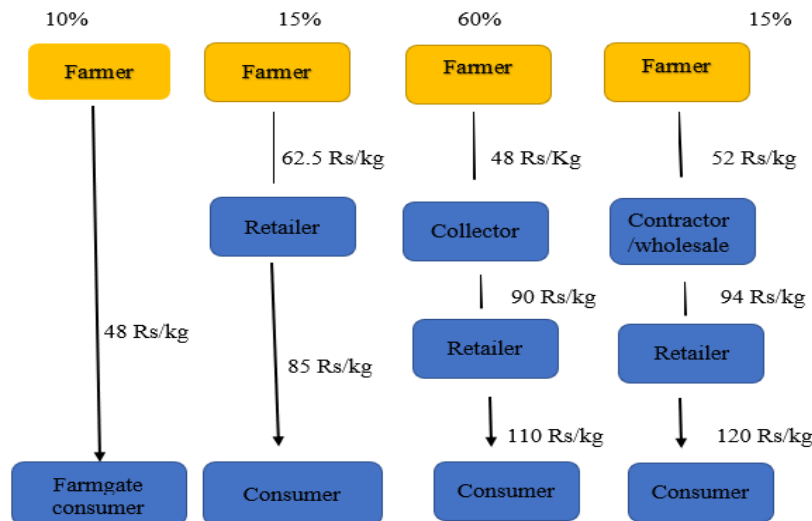
Marketing channel

There had been 4 channels through which mandarin of Putalibazar flows from farmer to final clienti.e.,

Channel I- (farmer-farmgate consumer),

Channel II- (farmer-retailer- local consumer),

Channel III- (farmer-collector-Wholesaler/retailer-distant consumer),

Channel IV- (farmer-contractor/wholesaler-retailer-distant consumer).

SWOT analysis

Both internal factor (strength and weaknesses) and external factor (opportunities and threats) has a role in the production of mandarin and has been addressed accordingly.

Internal factors	External Factors
Strength	**Opportunities**
a. Availability of suitable climate for mandarin production, south-facing slopes with 1000- 1800 masl b. Better quality of mandarin with a juicer in nature. c. Adoption of organic farming practices to a greater extent, d. Availability of land for cultivation. e. The produce of Syangja has been recognized in the market as better quality, f. Availability of commercial experienced farmers who're able to increase gross revenue. Putalibazar is considered as a region for potential mandarin producing area	a. Scattered land and low production cause difficulty in commercial production. b. High transportation costs due to poor road facilities. c. Inadequate storage and processing facilities. d. High post-harvest loss and poor technical knowledge. e. Lack of coordination among different actors of mandarin. f. The limited capacity of farmers and their organization on marketing functions and decisions Poor functioning of collection centers due to limited facilities available.
Weakness	**Threats**

a. Increasing demand for mandarin in the national and international market. b. Better potential in Nepal as well as Japan in export due to good quality. c. Better access to market namely Pokhara, Butwal and Narayanghard d. Availability of collection center and postharvest storage facilities. e. High priority from government and non-government sectors to upgrade citrus value chain in the district.	a. Bad weather like heavy rainfall, hailstorm, and hailstones. b. Chinese and Indian mandarin with less per unit price c. Incidence of insect, pest and disease. d. The conflicting interest of market actors e. Lack of organized and assured market. f. Inadequate governmental policy for commercial mandarin producers. g. Incidence of the pandemic situation causing poor marketing.

IV.   CONCLUSION AND SUGGESTIONS

Based on the study and findings it is concluded that mandarin production in Putalibazar Municipality, Syangja was a profitable business making a significant difference in the economic welfare of farmers. It was found that there is a high Benefit-Cost Ratio (B/C ratio) and Gross margin, which show that mandarin production is a profitable enterprise. BC ratio of commercial producers was high than smallholders which indicates mandarin commercialization is highly profitable. The return to scale was found 1 which represents the mandarin production scenario is a constant return to scale. The existing marketing channels were Channel 1 (farmer-farmgate consumer), channel 2 (farmer-retailer- local consumer), channel 3 (farmer-collector-retailer-distant consumer), channel 4 (farmer-contractor/wholesaler-retailer-distant consumer). The cobb-Douglas production model was run to find out the effect of different factors on the gross return of mandarin production in the study area. All the explanatory variables had positive coefficients. Production function analysis revealed that a one percent increase in the expenditure 100% increase in the labor cost will increase the return by 73%. and with estimated variables providing 61% of the variation in gross return. Putalibazar was facing marketing and production problems such as high monopoly of traders, price fluctuation, transportation, processing, and storage are major problems. Among the different marketing constraints, the low prices offered to the producers and the second major problem was lack of processing activities. To enhance production and marketing in the study area market-oriented policy and programs should be adopted.

Mandarin growers should improve their orchard management and post-harvest handling practices for higher productivity and quality of produce. Farmers should plant recommended number of mandarin sampling which is 20 trees/ ropani and 400 trees / hectare to increase the farm production and cost efficiency. The Collection centers and cooperatives should function properly to provide a direct link between producer groups and bulk end-buyers or processors, thereby cutting out middlemen (traders) and securing a higher share of the value-added for producers. The provision of output-based incentives can encourage the farmers to increase production and marketable volume.

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