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RESEARCH ARTICLE

PRODUCTION AND MARKETING CHANNEL OF POTATO IN JHAPA DISTRICT, NEPAL

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ABSTRACT

Potato farming is being practiced in Nepal from the long time. The objective of this study was to assess the production status and marketing channel of potato including its production problems and cost of production in Jhapa district, Nepal. The study was carried out in Kachankawal Rural Municipality, Haldibari Rural Municipality, Bhadrapur Municipality and Birtamode Municipality of Jhapa district. Sampling was conducted among the total of 100 registered farmers by simple random sampling method among which 60 were chosen for gathering information on production status and price variation, 30 for cost of production and 10 local collectors for the study of marketing channel. The data were analyzed using SPSS, Stata and Microsoft excel. The result of study showed that the productivity of potato was found to be 19.12 mt/ha in the study area. The gross margin was NRs. 3410/- per ropani with B: C ratio of 1.29. The main problems faced by potato growers were low returns, limited availability of quality seeds, storage problem, poor extension services, disease and insect problem and, shortage and high labor charges. The farmers didn't have problems in finding market to sell their potatoes as the local collectors collected the potatoes from the farm gate. The main markets for the potatoes were Birtamode, Siraha and Saptari. The most common marketing channel was from producer to local collector to wholesaler to retailer to ultimate consumer. Therefore, the findings suggest that, the production and income can be maximized if existing problems are minimized and resources are made available in time and used properly.

KEYWORDS

marketing channels, production status, problems.

1. INTRODUCTION

Potato (*Solanum tuberosum* L.) is one of the most widely cultivated crops of the world positioning fourth in production after wheat, rice and maize (FAO, Strenthening Potato Value Chains: Technical and policy options for developing contries.Rome,Italy: Food and Agricuture Organization of the United Nations and the common Fund for Commodities., 2010). In case of Nepal it is particularly grown from 65 masl to 4000 masl and consumed as a staple food specifically in hilly regions (Bajracharya and Sapkota, 2017). It is accepted as an important non-cereal food crop because of the composition of potato in terms of availability of carbohydrates, protein, mineral and essential amino acids which makes it a wholesome food.

Potato is a subsistence crop and is very popular among farmers playing larger roles in National GDP.It contributes about 6.57% and 2.17% in AGDP and GDP, respectively. Achieving food security is still a challenge as it is affected by multiple complex factors (Tadesse et al., 2018). Potato contributes to the national food security by supplementing grain-based diets and also its production potential and productivity is higher as compared to other cereal crops (Anwar et al., 2015). The potato is now Nepal's second staple food crop, after rice, and per capita consumption has almost doubled since 1990 to 51 kg a year (PotatoPro, 2018). Nationally, Total Production of potato in year 2016/2017 was 2730294 Metric ton with the cultivated area of 195268 ha (MoAD, 2016). In Jhapa district with the cultivated area of 14760 ha the total production of potato was 221843 metric ton (MoAD, 2016).

Jhapa is the one of the leading potatoes producing district of Nepal having productivity 15.03 t/ha which is higher than the national average of 13.89 t/ha (MoAD, 2016). But since potato is a lucrative crop having even higher production potentials. Its realized potential is more than 40 t/ha and records of 70 t/ha has been received from New Zealand (Ezeta, 2008). These potentials can be achieved only when different constraints in potato production are alleviated. Also Being the border district, the heavy

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imports of cheaper Indian potatoes in the local market coincide with the seasonal trade of local potatoes greatly determining the farm gate and market price of potatoes. Price fluctuation is another problem for the farmers. Inadequate knowledge of value chain and inefficient product flow and market information, producers are always suffering from poor share of profit from the business (Thapa, 2008).

Nepal imports substantial number of potatoes every year. Potato is mainly characterized as a high input, high output crop (Mende et al., 2014). Creating suitable production conditions can increase the yields and incomes of the farmers. Hence, the research study was for exploring the status of potato production focusing on the production problems, the selling price trend and how much the farmers were content with the potato production. Marketing is another determining component for commercial potato cultivation. One of the major factors hindering the development of agriculture sector is lack of proper and efficient marketing system. Thus, identification of marketing channel would be beneficial to farmers to dispose their product in an efficient way. Involvement of brokers in between farmers and buyer has made higher gap in between farm gate price and retailer price is the sign of inefficient marketing system. Thus, this study was conducted to address such gaps and empirical evidences which would help the concerned stakeholders in proper policy formulation and program planning regarding potato production and marketing. This in turn will help the country in achieving its potential sustainable productivity.

2. Materials and Methods

2.1 Study area and sampling procedure

Kachankawal Rural Municipality, Haldibari Rural Municipality, Bhadrapur Municipality and Birtamode Municipality of Jhapa district were purposely selected for the study. Selection of the farmers was done based on the potentiality of potato production. Sixty potato growers fifteen from each place were selected by simple random sampling technique from the study area for gathering information on production status, farm gate price variation and cultivation constraints of potatoes. Similarly, thirty farmers and ten middlemen were also selected randomly for generating data on cost of production and marketing channel respectively.

2.2 Data Collection and Analysis

The primary data for the study were collected from the farmers of the site. Secondary data were collected from various relevant literatures of different publications, government reports, proceedings, books and websites. Descriptive analysis of the obtained data was done by using SPSS and MS Excel and qualitative analysis was done in STATA 12 software.

- The gross margin was carried out by the following formula:

Gross margin= Gross return- Total variable cost

Where,

Gross return = Price of potato x Total potato production

Total variable cost = Summation of all variable costs

Variable costs = Cost of seeds, human labor, tiller charges, FYM, chemical fertilizers, pesticides, irrigation charges.

- Benefit-cost analysis was carried out using the formula:

B/C ratio= Gross return/Total variable cost

- The index of importance was compounded using the following formula:

$$Iimp = \frac{\Sigma (s \times f)}{N}$$

Where,

Iimp = Index of importance
Σ = Summation
s = Scale value
f = Frequency of respondent
N = Total no. of respondent

3. Result and Discussion

3.1 Production scenario of potato farmers in Jhapa

3.1.1 Productivity analysis

The productivity of potatoes in the study area was found to be 19.12 mt/ha (Table 1). This was higher than the productivity of Jhapa district (15.03 mt/ha) and Nepal (13.89 mt/ha) (MOALD, 2017/18) . The reasons for higher productivity in the study area might be use of higher doses of chemical fertilizers and use of poultry manure along with FYM and also use of better-quality seeds other than own reserved seeds.

Table 1: Productivity comparison of potato at different levels

Different levels	Area (ha)	Production (mt)	Productivity (t/ha)
Nepal	195268	2730294	14.03
Jhapa	14760	221843	17.95
Surveyed area	26.37	504.19	19.12

3.1.2 Labor wages trend

The labor wages for both male and female was increasing annually in the study area. The average labor wages for females were NRs. 270.83/- in 2017 and soared up to NRs. 318.33 in 2018 and NRs. 359.17/- 2019. Similarly, the male average wages also increased from NRs. 500/- in 2017 to NRs. 650/- in 2018 and NRs. 735/- in 2019 (Figure 1). Same increment in the labor wages was found in some of the district of terai region of Nepal (Subedi et al., 2019).

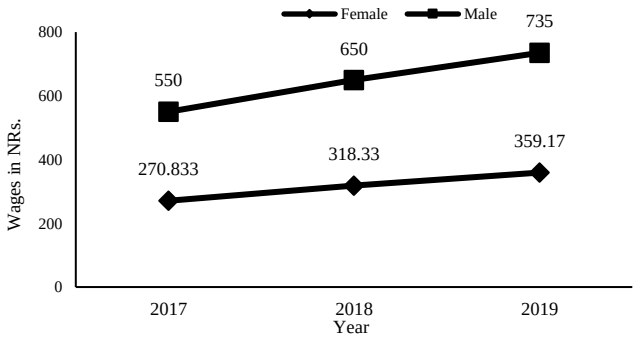

Figure 1. Labor wages increase trend from 2017 to 2019 in Jhapa

3.1.3 Cold storage access

The study showed that most (88.3%) of the farmers didn't have the access to cold stores. Only few (11.7%) of the respondents had access to cold storage and stored the potatoes to sell them in offseason (Figure 2). Cold stores were not available in the potato producing area. Thus, the potatoes were stored in cold stores located outside the study area in Damak and Birtamode.

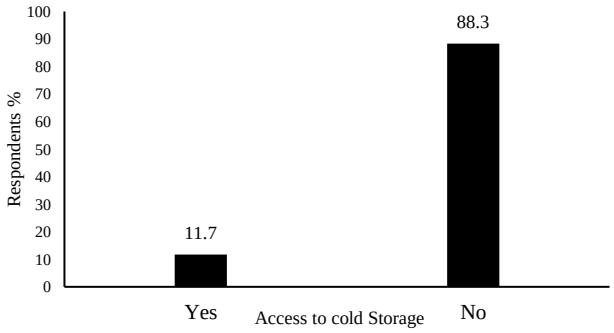

Figure 2: Access of respondents to cold storage in Jhapa 2019

3.2 Production constraints of potato growers

The study revealed that different problems constrained the farmers in producing potatoes in the study area. According to the index ranking low returns was ranked as the most severe problem followed by limited availability of quality seed tubers, storage problem, poor extension services, disease and insect problem in the study area. According to a study, the main constraints of potato production in Asia and Pacific

regions were lack of suitable varieties technical constraints, disease and insect pest problems, lack of reliable and affordable source of good quality seed, poor linkage of farmer to market, indiscriminate use of fertilizers and pesticides and lack of post-harvest technology (Ezeta, 2008). The farmers demanded increasing agricultural subsidies to reduce cost of production in the study area. According to one of the studies in terai region of Nepal lack of availability of improved seed was found to be the main problem followed by high incidence of disease and pest (Subedi et al., 2019).

Table 2: Rank order constraints faced by potato farmers in Jhapa

Particulars	Index	Rank
Low returns	0.77	I
Limited availability of quality seed tubers	0.73	II
Storage problem	0.67	III
Poor extension services	0.65	IV
Disease and insect problem	0.59	V

3.3 Cost of production

3.3.1 Cost of potato cultivation

Potato is a labor intensive and heavy nutrient feeding crop. Hence, it needs higher level of inputs for its successful cultivation. The cost of production gives knowledge about the profitability of the farmers and how they manage the resources in general. For the cost of production, variable inputs like seed, human labor, tractor charges, organic manure (FYM and poultry manure), chemical fertilizers and irrigation costs were analyzed. Among the costs, the highest cost incurred was for human labor (30.26%), followed by organic manure (27.7%), seeds (15.34%) and chemical fertilizers (13.2%). The total variable cost was found to be NRs. 11,733/- per ropani (Table 3). The average cost of production per hectare for potato cultivation was NRs. 197,186 in Baglung (Bajracharya and Sapkota, 2017).

Table 3: Input costs in potato cultivation in Jhapa

Cost items	Total
Human labor	3550(30.26)
Seed	1800(15.34)
Tractor charge	750(6.39)
Organic manure	3250(27.7)
Chemical fertilizers	1550(13.2)
Pesticides and hormones	800(6.81)
Irrigation cost	33(0.28)
Total variable cost	11733(100)

Figure in parenthesis indicates percentage

3.3.2 Benefit-cost analysis

The results showed that the average per kg cost of potato production was NRs. 12.28/- and the selling price was NRs. 15.84/-. The average cost of production was recorded at NRs. 11733/- and gross margin at NRs. 3410/- per ropani. This resulted the B:C ratio of 1.29 in the study area (Table 4). This showed that one rupee spent on production yields 29 paisa benefit from potato. This showed that potato production was quite profitable in the study area if unnecessary input costs were deducted. As in study of potato in Baglung also found potato as a profitable crop with B:C ratio of 1.44 (Bajracharya and Sapkota, 2017).

Table 4: Total production, revenue, gross margin and B:C ratio of potato production in Jhapa

Particulars	Values
Total variable cost (NRs./ropani)	11733
Production (kg)	956
Average cost of production (NRs./kg)	12.28
Average selling price (NRs./kg)	15.84
Total revenue (NRs.)	15143
Gross margin (NRs.)	3410
B:C ratio	1.29

3.4 Marketing of potatoes

3.4.1 Potato collection

It was found that both the farmers and the local collectors contacted each other to fix the prices and sell the potatoes. The local collectors provided poly sacks to the farmers to pack the potatoes and came later to collect them. The study area was well accessed to road facilities and the local collectors were abundant. So, the farmers didn't have problems in marketing their potatoes. The potatoes were collected from farm gate in road accessible farms while in inaccessible farms the farmers poached the potatoes to the road accessible areas. The potato collection peak period was February 2nd week to March 2nd week which stretched to early January to Late March. Usually, the potatoes were collected at farm gate at 15-16 NRs/kg.

3.4.2 Market

The local collectors collected the potatoes in bulk and supplied them to markets outside the district in Morang, Siraha, Saptari, Sunsari, Kathmandu markets. The main markets were Siraha and Saptari. Also bulk volumes of potatoes were sold to the local markets in Bhadrapur, Birtamode, Budhabare, Surunga and Damak.

3.4.3 Marketing channel

The marketing channel of potatoes in the study area was found much developed through local collectors. But there was no intervention of other governmental or non-governmental organizations in potato sales. The local collectors sold the potatoes directly to the wholesalers, hotels or to the secondary traders in season. Bhadrapur, Birtamode, Budhabare, Surunga and Damak. Sometimes the potatoes were sold to cold store owners by the local collectors. Multiple handling up to 5 different handlers were found from the farm to the final consumers which affected the prices and quality of potatoes.

Table 5: Main marketing channels prevailing in the area

Channel	Marketing channels
I	Producer – Consumer
II	Producer – Retailer- Consumer
III	Producer – Wholesaler – Retailer – Consumer
IV	Producer – Local collector – Wholesaler – Retailer – Consumer
V	Producer - Local collector - Secondary trader - Wholesaler - Retailer – Consumer
VI	Producer – Local collector- Cold storage owner– Wholesaler – Retailer – Consumer
VII	Producer – Local collectors – Secondary trader – Commission agent – Wholesaler – Retailer- Consumer

4. Conclusion

The results showed that the study area had huge potential for potato cultivation. The productivity of the study area was comparatively higher (19.12 mt/ha) than the district (15.03 mt/ha) and national average (13.89 mt/ha). The gross margin analysis and B: C ratio was comparatively low due to higher cost investments that can be increased with provision of soil testing, trainings and awareness campaigns for judicious input application. Pricing of the potatoes was highly influenced by the volume of sale and the imports from different districts and mainly India in the national market. Among different problems of potato production, low returns, limited availability of quality seeds, storage problems, poor extension services, disease and insect problem and shortage and high labor wages were the major problems.

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Author Contribution

Suraksha Baral: Participated in research design, data collection, data analysis, manuscript preparation.
Sushmita Bhatta: Participated in data collection and data analysis and manuscript preparation.
Sudarshan Adhikari: Participated in data collection and data analysis.
Saratendra Bajal: Participated in manuscript preparation and review.

Conflict of Interest

The authors declare that they have no conflict of interest.
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