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Research Article

Value Chain Analysis of Tomato in Chitwan District of Nepal

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Abstract

Tomato is the third most important vegetable after cauliflower and cabbage in terms of area and production in Nepal. In this regard, a study was carried out to explore the value chain of tomato cultivation in Chitwan district. 100 farmers were selected purposively on the basis of tomato cultivation and semi structured interview schedule were administered to collect the primary information. Along with the farmers 5 wholesalers and 10 retailers were also interviewed in the study area. By analyzing the variable cost of production, gross margin and B: C ratio (1.609) tomato production was found to be highly profitable. The value chain map shows that out of the total products, 74.8% goes to the wholesalers, 13.4% goes to the retailers, 4.4% to the direct consumers, 1.13% is used for the home consumption and 5.4% is lost during post-harvest handling. The post-harvest loss was comparatively higher in producers than wholesalers and retailers. It was found that 35% of farmers' grade on the basis of size and color and packing was done in crate by all farmers. Producer share for channel producer to wholesaler to retailer to consumers was 70.71% and market margin was 24.51% for the wholesaler and for the retailer was 15.25% and in the channel producers to retailers to consumers was 76.41% and market margin was 14.8%. Availability of land, market access and suitable agro climatic conditions were the major strength. Similarly, presence of agricultural stations such as line agencies, agro vets, high demand of the product and the employment generation were the major opportunities.

Keywords: Value Chain; Market Margin; b/c Ratio; Producer Share

Introduction

Agriculture is the major occupation of Nepalese peoples where 65.6% (2008/2009) of population are involved in agriculture. Agriculture contributes 33.1% of total GDP (MOAD, 2014/15) and vegetable contribution in AGDP is 9.71% [1]. According to the Central Bureau of Statistics (2009 - 2010) and Ministry of Agriculture Development (MOAD), vegetable crops are cultivated in only 7.3 percent of the total cultivable land in Nepal. Total worth of vegetables (excluding potatoes) produced during 2009/10 was around Rs 105 billion, which is 8.8 percent of the country's GDP [2]. Vegetables crops are cultivated in 232,295 hectares of cultivable land and total production was 2,820,527 metric tons. These total productions include 39% household consumption and remaining 61% total sale [2]. Vegetable productions in the terai, mid-hill and high hills were 55 percent, 40 percent and 5 percent respectively [2]. According to the vegetable crops survey 2009 - 2010, 55 vegetables are cultivating in Nepal [2].

Tomato (*Lycopersicon esculentum*, Mill) is the most important and widely grown vegetable in the world. It is widely accepted and commonly used in a variety of dishes as raw, cooked or processed products [1,3]. The origin of tomato believed to be in Peru, Ecuador and Andes range of Bolivia (Singh, 2010a). In Nepal, it is cultivated as winter crop in Terai and Inner Terai whereas in the mid hills, it can be produced successfully in two growing seasons-spring and rainy. Rainy season tomato is quite remunerative enterprise to the hill farmers because the supply from the Terai districts is constrained by high temperature, low fruit set and flowering; and bacterial wilt etc. (Pandey., *et al.* 2006).

Material and Methods

The method adopted in the study relied on semi-structured informal interviews with key informants and a number of participants at different stages of the market chain including the producers of the studied commodity. The Chitwan district is one of the 75th district of Nepal and is located in the south western part of Province no 3 with

Bharatpur, the fifth largest city of Nepal, as it's district headquarter. The people inhabiting the Chitwan district are predominantly peasant farmers cultivating mainly food and cash crops such as rice, maize, wheat, bean, mustard and vegetables. Though the district is the major maize producer, the cultivation of tomato is also found satisfactory. The major pocket areas of tomato production in Chitwan district are Sukranagar, Divyanagar, Ratnanagar, Chanauli, Prembasti, Darechowk, Chandi Bhyang. And for other actors like input suppliers, producers, collectors, wholesalers, retailers and consumers, major market area of Chitwan district i.e. Narayanghad were selected. All tomato grower household of Chitwan district were constituted the sample population for this research. A list of tomato producers was obtained from DADO, Chitwan. The sample of 100 producers was randomly selected from the list. Altogether 10 retailers and 5 wholesalers were purposively selected and interviewed. 3 sets of questionnaires were prepared to collect primary data. One set of questionnaire was prepared to collect information from producer regarding the production and marketing of tomato, another set of questionnaire was prepared to collect information from traders like retailers and wholesalers.

For the analysis of the study area and the population, descriptive statistical tools were used. The information collected from the field were first coded and entered into the computer. Data entry and analysis was done by using computer software packages like Statistical Package for Social Science and Microsoft Excel. Different statistical tools like mean, frequency and standard deviations were used for the analysis. Basically, value chain mapping, cost of production, gross margin, producers share, marketing margin etc. were analyzed to study the economics of tomato production and marketing.

Results and Discussion

Social measures

Among the total farmers surveyed 88% households were males whereas the remaining 12% were females. Among the total wholesalers, all respondents were male whereas in case of retailers, 6 were males and the remaining were females. People of age group 15 to greater than 60 were involved in tomato production out of which 48% were active population and 52% were dependent. Active population are those who are engaged in tomato production and earning activities whereas dependent are those who depend upon the economically active populations. Different ethnic groups such as Brahmin, Chhetri, Janajati, Madhesi and Dalits were involved in the tomato production out of which highest percentage is shared by Brahmin i.e. 53% and the least share is by Dalits sharing only 2%. Though education plays an important role in production, postharvest handling and marketing, in our research education did not significantly affect the level of production. Among the 100 farmers 24% of the household head were illiterate, 49% of people have gained their primary schooling, 24% of have gained secondary schooling and the remaining 3% have gained inter and above knowledge.

Economic measure

Figure 1: Cost of production of farmers of Chitwan district, 2017.

Female labor has highest share on cost of production followed by Cow dung cost, transportation cost, male labor cost, pesticide cost, land rent and irrigation. According to "Value Chain Development Plan for Tomato" Wage was recorded to be the highest cost component that comprise of 56.49% of total cost, followed by land rent, manure and staking (27.64%), seed (6.73%), pesticide (4.81%) and fertilizer (4.3%). The above concluded data supports to our research [4]. Here female wage share is higher than male because most of the male are migrated abroad and feamle should perform their responsibility in their absence.

Problem during tomato cultivation

Farmers faced difficulty during production to marketing. Severe incidence of insect and disease occurrence was the major problem followed by low technical knowledge, insufficient farm labor, irrigation and fertilizer during production. According to report published by NARC, production constraints for tomato production are poor technical knowledge among farmers, limited availability of quality seeds, limited availability of wage labors, crop damage due to climatic change, fruit dropping, viral and fungal disease and the pest such as white fly, fruit borers and loppers [5].

Due to the unavailability of storage facilities over ripening and decaying were the major problems during postharvest handling. Among the total production 5.4% were lost during post-harvest. The major problems faced by farmers during marketing were price variation and

low farm price followed by unavailability of storage facilities. According to report published by NARC, lack of storage facilities, limited facilities for processing, value addition of fresh tomato, higher market competition of domestic tomatoes with the tomatoes imported from India and lower bargaining power of the producers [5].

Harvesting

Tomato was harvested manually at red, pink and yellow stage depending upon the purposes. To sell to distant wholesalers, tomato was harvested at yellow stage whereas for the local wholesalers and retailers tomato was harvested at red and pink stage.

Grading

Farmers grade tomato after harvest to increase the value of tomato so that it can fetch high price in the market. 97% farmers grade on the basis of size and remaining 3% farmers grade on the basis of color. Grading also helps to avoid post-harvest loss. Grading on the basis of color or maturity stage will help eliminate overripe fruits which will easily produce ethylene to hasten the ripening [6].

Market margin and Marketing Channel and market Analysis

There are three different channels to bring tomato from farmer's field to consumers' hand. They are

I. Producer → Wholesalers → Retailers → Consumers
II. Producer → Retailer → Consumer
III. Producer → Consumer

In the first channel, price spread is 15.25 and producers share is 62.88%. In the second channel price spread is 7.96 and producers share is 76.41%. Similarly, in the third channel, producer share is 1005 as there in no middle man. There was a huge gap between the price received by the producers and the price paid by the consumers [5].

Market margin in first channel for wholesaler is 24.51% and that of retailer is 15.27%.

In the second channel, market margin for retailer is 14.8%.

The cost of tomato collection in Chitwan district in the first channel for wholesaler is Rs. 1.67 and for retailer the cost is 2.28% whereas in the second channel collection cost for retailer is Rs. 2.96. This finding of our research is supported by the book "Value Chain Development Plan for Tomato" which includes the cost during collection, packing, storage and transportation is Rs. 2.5 per kg [4]. According to the report of NARC, market margin of about 17 to 25% taken by the agrovets from selling of Srijana tomato seed collected from private seed companies and the margin to them was higher up to 56% while collecting, packing and selling seeds directly from farmers group [4].

Benefit/Cost ratio

The observed B/C ratio of our research was 1.609 which signifies that the business is worth pursuing.

Benefit stream	Cost stream	B/C ratio
218294.75	135676.73	1.609

Table 1: Benefit - Cost ratio.

Value chain map

The agricultural value chain is defined as the whole range of goods and services necessary for an agricultural product to move from the farm to the final costumers or consumers. It involves different actors with their different functions.

In figure, the linkages are shown vertically from bottom to top. The left-hand block lists the major function of the chain, which includes input supply, production, collection and marketing [7-18].

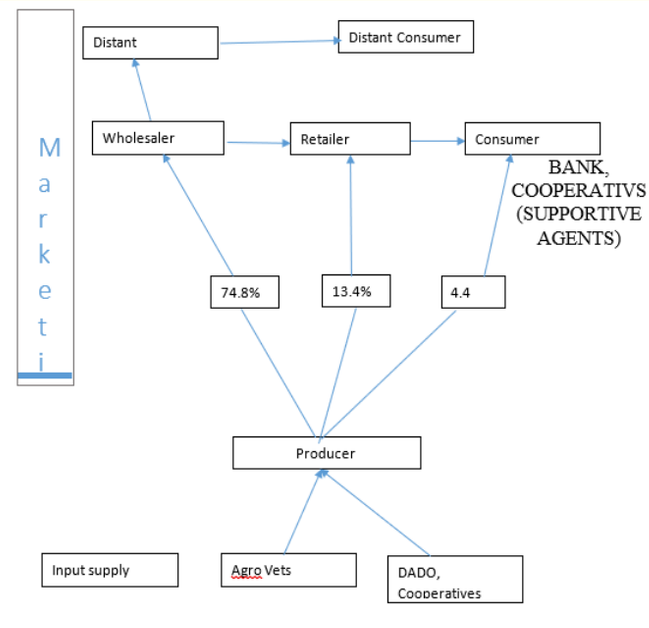

Figure 2: Tomato Value chain showing flow of product.

Conclusion

The above study concludes that among the total farmers surveyed 88% were males whereas the remaining 12% were females. Males are engaged in decisive roles whereas females are used in the supportive

roles. In the surveyed area people of the age group 15 to greater than 60 were involved out of which 48% were active populants whereas the remaining 52% were dependent.

The value chain map shows 74.8% goes to the wholesalers, 13.4% goes to the retailers, and 4.4% to the direct consumers, 1.13% is used for home consumption. The B: C ratio was found to be 1.609 which shows that the tomato product is worth pursuing. The post-harvest loss was comparatively higher in producer's level than other value chain actors which are 5.4%.

Producer share for channel producer to wholesalers to retailers to consumers was 70.71% and market margin was 24.51% for the wholesaler and for retailer was 15.25% and in the channel producers to retailers to consumers was 76.41% and market margin was 14.8%. 3 types of value channel were found Producers to Wholesalers to Retailers to Direct consumers, Producers to Retailers to Direct Consumers and Producers to Direct consumers.

Different problems were seen which has severely affected the production process. Among them insect problems were the major one followed by disease problem, low technical knowledge, insufficient farm labor, irrigation and fertilizer.

Due to the unavailability of storage facilities over ripening and decaying were the major problems during postharvest handling. Various problems were seen during the process of marketing which includes price variation, low farm price, communication with traders and transportation problems.

Availability of land, market access and suitable agroclimatic conditions were the major strength. Similarly, presence of agricultural stations such as line agencies, agrovets, high demand of the product and the employment generation were the major opportunities.

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Volume 2 Issue 7 July 2018