



Solanaceous Vegetable in Temperate region of Arunachal Pradesh – A Production Cost Analysis

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ABSTRACT

Temperate region are the areas of hilly terrain where vegetable farming are really tough, and most of the people do it for their subsistence, although the farming of solanaceous vegetable is done in these areas but only for their household needs, so, it is important for an agricultural person that he should know the production cost of these vegetable for commercial production, and with much pressure on land holdings, limited resource availability with farmers and increased cost of agricultural inputs, it has become imperative for farmers to make optimum use of their resources for realizing maximum farm returns, it was observed that farmers were spending maximum budget of total cost of production on human labor, indicating the effort needed for the adoption of farm mechanization. Therefore, there is an urgent need of changing farmers attitude from traditional to adoption of improved production practices through various means of transfer of technologies for enhancing total production of the country.

1. Introduction

India being a very big country, have advantage of diverse agro climatic condition, which varies from tropical, sub-tropical, and temperate to alpine zone. which enables it to produce a wide range of vegetable crops round the year. In recent years country has witnessed tremendous changes both in the production and productivity of several vegetable crops especially in case of solanaceous vegetable *viz.* tomato, brinjal and chilli, which has increased manifold. Although, it does not fulfill the basic requirement of geometrically increasing population because of low productivity and huge post harvest losses in case of solanaceous vegetables, from farmers field to consumer hand as compared to other vegetable crops. The share of tomato, brinjal and chilli is 21% from total production of vegetables in India. The productivity of tomato, brinjal and chilli are 210, 191 and 173 q, respectively, which is far below their productivity in developed countries. The productivity of brinjal is 360 q/ha globally while in USA,

Spain and Brazil the productivity of tomato stands at 88 t/ha, 82 t/ha and 61 t/ha, respectively.

The vegetable sector considerably suffers from lack of availability of good quality seed in general and less use of hybrid seed in particular. Lack of knowledge, non awareness on good agricultural practices, poor farm management, improper harvesting practices and post harvest losses at different stages of marketing are the major bottlenecks in increasing the production and productivity per unit area. Different study have shown that overall post harvest losses in tomato, brinjal and chilli at different stages were seen to be 17.26%, Among these, soft rot bacteria is major one causing about 36% of total vegetable losses. Studied have shown that approximately 5.86, 10.59 and 0.81% loss occur at farm, market and consumers level, respectively (Singh et al. 2002). Although vegetables like tomato contribute to maximum losses upto 30 per cent after harvesting at different stages. Certain studies have been undertaken to assess the different aspect of vegetable cultivation in many parts of country. However, hardly any systematic study is available on production aspects of tomato, brinjal and chilli in temperate regions where these vegetable are grown extensively.

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The present study was undertaken in Tawang district of Arunachal Pradesh with the objective to study the production cost and expenditure share at different cultural practices in solanaceous vegetable grown in this temperate region.

2. Materials and Methods

Temperate regions in Arunachal Pradesh are Tawang, West Kameng and lower Subansiri. Tawang has a temperate to alpine region with a hilly terrain and is dominated by the Monpa tribe who practise traditional vegetable cultivation. In this study two stage stratified random sampling was used. Block and villages were selected in first stage and growers in second stage of sampling, were randomly selected for present study. Further four villages from each block and eight solanaceous vegetable growers from each identified village were selected, making a total of twelve villages and 96 farmers. The data were collected during (2012-13) through a pretested questionnaire developed for the purpose and analyzed by using appropriate statistical tools.

3. Result and Discussion

In India, average production of tomato is merely 210 q/ha, compared to the leading producing country like USA having production of 880 q/ha. However, our country has greater scope of increasing the productivity up to 600-700 q/ha. During 2013-14, world productivity of brinjal was 260 q/ha, while leading country Spain and Japan productivity was 680 q/ha and 330 q/ha. (NHB-2013). Chilli is another crop grown all over the country and are utilized in both green and dry forms. Spain is the leading chilli growing country with an average productivity of 445 q/ha, whereas in India it is merely 100.6 q/ha, but there is scope of increasing the productivity up to 200-250 q/ha. Reviewing the production and marketing of tribal area of Sidhi district of Madhya Pradesh. Soni and Ahmed (1992) found that the cost of cultivation of food grains was substantially less than Tomato, which was attributed to use of chemical fertilizers, investment on FYM and labour charges, but the cost benefit ratio in tomato was significantly higher than that of food grain crops. Thakur et al. (1994) concluded that off season Tomato production is highly profitable in hilly areas, and can be used to significantly increase the income of small and marginal farmers. Results (Table 1) revealed that the average production of tomato was recorded in this temperate region is 220 q/ha with B:C ratio of 2.42. Though the average yield of this region is slightly higher than the

country's average yield, but is still far below than the potential yield, which may be due to heavy post harvest losses, dependency on vagaries of monsoon, incidence of blight disease and poor adoption of new production technologies by the growers. Jain and Tegar (2003) studied the production and marketing of tomato in Jaspur district of Chhattisgarh at farm and market level and observed that tomato was a very profitable enterprise reaping a net return of Rs. 52,192 per hectare with 2.9 B:C ratio. B:C ratio and net return was found to increase with increase in farm size. Vegetable cultivation is labor intensive and is justified from the data presented in Table 1. The cultivation of solanaceous vegetable particularly in this hilly tract, and without availability of mechanization increases labor costs, and growers spend a maximum amount on manpower i.e., 39.34% in Tomato, 45.54% in brinjal and 42.81% in chilli. This finding is in accordance with (Rita et al. 2009), who also reported that in vegetable cultivation major chunk of cost goes to human labor due to non-adoption of mechanized farming and higher labor costs. The data in Table 1 further indicated that in temperate region, growers spend 22-27% money on chemical fertilizers and plant protection measures. The amount spent by growers on seed varied from crop to crop i.e., 6.93% in brinjal to 9.17% in chilli. Thus, the total cost of solanaceous vegetable production depends upon the cost of different inputs used. Although the farmers in these areas are using hybrid seeds of solanaceous vegetables, still the production is less, it might be due to non-availability of irrigation resources and they cultivate it as rainfed, which affect the total productivity. The data in Table 1 revealed that although the farmers were using hybrid seed, which is evident by the expenditure, farmers are spending on seed, but still the production of chilli is less than the national average productivity, it shows there is lacunae on the part of good agricultural practices. Further, management of disease and pest is a severe problem for tomato grower especially blight in tomato, where they are forced to spend up to Rs 6000/ha. Due to non availability of labor, and their cost being very high, a farmer has to spend more on the labor and non-mechanization also increases their dependency on human labor. The total cost of production of tomato, brinjal and chilli was almost the same in whole surveyed area, but the yield and variable market price makes the differences in the profitability. Varying market price and involvement of marketing channels directly influenced the net income return of the farmers (Table 1) where it varied from Rs. 1,28,050 per hectare in chilli to Rs 1,48,000 per hectare in Tomato. Calculating the cost of cultivation and cost of marketing to find out the net profitability of Tomato on different categories of farms in Ahmednagar district of Maharashtra, Khemkar (1984) revealed that per hectare cost of cultivation

of tomato was Rs 60,379, while the cost of marketing was Rs 41949. Thus, total cost of production and marketing per hectare was Rs 1,02,328 which gave a net return of Rs 26816 per hectare. The economics of production and marketing of vegetables crops were also worked out by Koshta and Chandrakar (1999) in durg district of Chhattisgarh region. They reported that the B:C ratio for Brinjal and Tomato were estimated to be 1.93 and 1.72, respectively. Labor and fertilizer/ manure were found to be major inputs in vegetable cultivation and accounted for about 23.49% and 13.23% of total production cost, respectively. Marketing cost in the form of transportation and commission charges accounted for about 20–40% of total production cost. Lack of good quality seed, imbalanced use of fertilizer, lack of cold storage facility and absence of regulated markets for vegetables were major constraints in vegetable cultivation. Therefore, increasing the production of tomato, brinjal and chilli by adopting new technologies and regulating market price need more attention for competing in markets. In order to get maximum return from any crop with the available resources, the inputs or the resources has to be efficiently and judiciously utilized. Based on the result and the feedback received from the growers during the survey following bottlenecks and improvement of solanaceous vegetable cultivation are suggested. Solanaceous vegetable being highly perishable in nature, which causes glut in the

season, need either very quick disposal or proper processing, which is still lacking in our country. India is second largest producer of vegetable in the world but 35% of produce is lost due to poor post harvest management. Solanaceous vegetable requires very specific handling and storing requirements if their quality and freshness has to be maintained. Moreover, each product needs to be stored at specific temperature and humidity levels. Modern cold storage are needed to store such products, beside it other infrastructure facility like roads , power and transportation *etc.* also need to be addressed to prevent post harvest losses of vegetables. Processing could have been a better alternative, but only 2% of produce is processed. India's share in international food trade is negligible that only 1.5%. Value addition to foods by processing is a mere 7%, against 23% in China, 45% in Phillippines and 88% in United kingdom. Marketing of vegetables is not very well organized in our country. It is dominated by more numbers of retailers and the price received by farmers is very less. Proper techniques of packaging in vegetable are still lacking. An overview of status of packaging in our country shows that about 30% losses of the marketable vegetables occur only due to improper post harvest management. Unavailability of quality vegetable seed at village level and lack of technical know-how regarding improved cultivation practices among growers are the major bottle neck in enhancing production of solanaceous vegetables.

Table 1. Production costs and net income of solanaceous crops

crop	Tomato		Brinjal		Chilli	
	Cost (Rs)	Expenditure Share (%)	Cost (Rs)	Expenditure share (%)	Cost (Rs)	Expenditure Share (%)
Seed	5000	8.19	3500	6.93	4500	9.17
Nursery Development	2000	3.27	2000	3.96	2950	6.01
Manures and Fertilizers	10,000	16.39	9000	17.82	7500	15.29
Staking	4000	6.55	-		-	-
Pesticide	6000	9.83	4500	8.91	4200	8.56
Human Power	24000	39.34	23000	45.54	21000	42.81
Irrigation	2000	3.27	2000	3.96	1900	3.87
Harvesting and marketing	8000	13.11	6500	12.87	7000	14.27
Total cost of Production	61000		50500		49050	
Av. Yield/ha	220q		263q		92q	
Av. Marketable price (Rs/Q)	950		715		1925	
Net income	1,48,000		1,37,545		1,28,050	
B:C ratio	2.42		2.72		2.61	

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