



Financial Profitability of Winter Vegetables Cultivation in Some Selected Areas of Narsingdi District

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Abstract: *Vegetables offer a low-cost source of nutrition relative to other food products. Vegetables are typically labor-intensive crops and thus deliver a large amount of food as well as a pledge to create expanded opportunities for rural jobs. Bangladesh's climate and soil is very suitable for growing vegetables all year round. Two upazila were picked from the Narsingdi district, namely Shibpur and Raypura. Data for the study were collected during the month of November 2019 to February in 2020. For sample collection, a random sampling technique was applied. 60 farmers were chosen for the analysis by random sampling. 21 were small, 26 were medium and 13 were large among the 60 farmers. The size of the farm was arbitrarily categorized on the basis of the land where vegetables and other crops are grown. Farmers with 0.01-0.33 acres were considered small, 0.34-1.00 acres were considered medium farmers, and those with over 1.00 acres were considered large farmers. For tabulation purposes, the collected data was scrutinized and summarized using the Statistical Package for Social Sciences (SPSS) and Microsoft Office Excel 2013. Socio-economic characteristics of vegetable farmers, description of the size of vegetable land, production methods, inputs used and returns of vegetable farmers were included in the tabular technique study. Statistical analysis has been used to demonstrate the influence of the inputs used and other associated vegetable cultivation factors. The variable cost per acre of production of Brinjal, Tomato and Country beans was calculated to be 74260, 61870 and 66680 respectively, and their corresponding fixed cost was Tk. 13713 and 13094, respectively, and 13334. The per acre gross cost of the production of Brinjal, Tomato and Country beans was Tk. Tk. 118000, 116977 as well as Tk. 120522, respectively, respectively. The gross margin per acre of vegetables picked was Tk. 179240, 155630 and 229420, respectively. The per acre net return of the production of Brinjal, Tomato and Country beans was Tk. 91267, 80666 and 149406, respectively, respectively. The undiscounted profit cost ratio per acre of production of Brinjal, Tomato and Country beans was 2.88, 2.90 and 3.70, respectively. The vegetable producers in the study areas were facing various problems which are broadly classified into production problems. Some of the production problems were inadequate capital, attack of pest and diseases, lack of quality seed, lack of availability of adequate inputs and higher cost of inputs.*

Keywords: *Vegetables, BCR, Climate, Capital, Production.*

1. Introduction

Vegetable production in Bangladesh is well diversified. Potatoes, onions, chillies, tomatoes, cabbage, cauliflower, carrots, melons, bottle gourd, brinjal, etc. are the key vegetable species grown. Farmers earn higher returns from vegetables compared to other crops (Ali & Hau, 2001; Borcz, 1992; Singh & Sikha, 1992), and provide micronutrients at a lower unit cost than other micronutrient-rich foods such as livestock (Ali & Tsou, 1997).

The vegetable sub-sector can play an important role in the shortest possible time to solve the problems of poverty and

malnutrition from two standpoints, such as economic and nutritional points of view, the significance of vegetables can be realized. Vegetables offer a low-cost source of nutrition relative to other food products. Also, small quantities of land and even homestead areas can be created. It can be grown within a short period of time and within a crop season; more than one crop can be grown. There are a large number of different varieties of vegetables which can be grown throughout the year. The greatest number of vegetables is cultivated in the winter season, in general, vegetables are labor-intensive crops and thus offer considerable promise to generate increased opportunities for rural jobs. Bangladesh's climate and soil are very suitable for growing vegetables all year round.

In addition, in order to take advantage of the opportunities arising from agricultural diversification towards vegetable farming, particularly for smallholder farmers, it is necessary to assess the benefit and income of vegetable growers of various farm sizes and, in particular, of smallholder farmers for whom it is promoted and diversified. However, taking into account the different aspects of vegetable farming and its role in the economic uplifting of the farming community and, in particular, of small farmers, the study is conducted in Narsingdi district to assess the remunerative value of vegetable farming.

Although Bangladesh is on course for middle income country status by 2021, agriculture remains the largest employer in the country by far; and above 45% of the population is directly employed in agriculture and around 70% depends on agriculture in one form or another for their livelihood (BBS 2016). Agriculture is the source of food for people through crops, livestock, fisheries; the source of raw materials for industry, of timber for construction; and a generator of foreign exchange for the country through the export of agricultural commodities, whether raw or processed. It is the motor of the development of the agro-industrial sector including food processing, input production and marketing, and related services. As main source of economic linkages in rural areas, it plays a fundamental role in reducing poverty, which remains a predominantly rural phenomenon. The role of agriculture is also fundamental in promoting nutritious diets, especially in the countryside where production and consumption patterns are closely linked. According to the HIES (2010) 31.2% and 21.1% of the population in rural areas lives below upper and lower poverty line respectively. However, as Bangladesh develops, and other sectors grow (such as readymade garments), the share of agriculture in Gross Domestic Product (GDP) has naturally declined. The provisional estimates show that contribution of the broad agriculture sector to GDP in 2019-20 is 13.32% (BBS 2019). The contributions of crop & horticulture, fishery, animal farming and forestry subsectors in GDP were 9.13%, 11.02%, 9.06% and 14.75% respectively (Source: BBS, Yearbook of Agricultural Statistical, 2019).

2. Literature Review

Assessment of related literatures in any research is necessary in the good judgment that it allows for an extent for reviewing the collection of knowledge & information appropriate to the future research. This knowledge & information give an instruction in designing the potential research problem & validating the new determinations.

Kumar *et. al.*, (2015) showed that an efficient marketing system ensures higher levels of income for the farmers and widens the markets for the produce by taking them to remote corners of the country. The intermediaries stored to various malpractices which aggravated the marketing problems, such as high commission charges, unauthorized deductions and lack of remunerative price for the produce, ultimately leading to increased price spread and reduced share of the product in consumer's rupee. The most common marketing channels engaged in the marketing of vegetables in Varanasi district are following: Producers-consumers, Producers-retailers-consumers, Producers-wholesalers-retailers-consumers, Producers-commission agent/arhatiya-retailers-consumers. The total marketing cost and marketing margin involved in channel-I was Rs.100, Rs.466.42 in channel-II, Rs.731.19 in channel-III and Rs.154 in channel-IV. Since the marketing cost and marketing margin in channel-III was higher, the marketing efficiency was very low for channel-III. Major problems faced by farmers was fluctuation in market prices, Failing in assessment of demand, lack of storage facilities, high cost of labor, lack of grading and packaging, high cost of transportation facility, high cost of pesticides and hence they expected that no malpractices should be followed at selling unit with proper regulation in the market, Good transportation facility, Good packing facility, Good storage facility. The major problems faced by wholesalers were fluctuation in market prices, failing in assessment of demand, Timely supply, and lack of financial assistance from any company and hence they expected providing financial assistance from companies should be followed by buyers with proper regulation in the market.

Chowdhury, A (2012) conducted a research to examine the marketing system and seasonal price variation of brinjal in selected area of Bogra district. In the study, per hectare gross cost and gross return were calculated at Tk.376942 and 673500 respectively. Net return was Tk. 296558 per hectare. Marketing cost of brinjal growers was Tk.79 per quintal. BCR of brinjal cultivation was estimated at 1.79. Marketing cost of brinjal for Faria, Bepari, Aratdar, wholesalers and retailers were Tk. 37.25, Tk. 97.74, Tk. 83.6, Tk. 119 and Tk. 138 per quintal, respectively. Net marketing margins for Faria, Bepari, Aratdar, wholesalers and retailers were Tk. 219, Tk. 470, Tk. 172, Tk. 94 and Tk. 153 per quintal respectively. Marketing cost was the lowest for Faria and net marketing margin was lowest for wholesalers compared to other intermediaries. The seasonal price variation of brinjal in Bogra market was the highest in the month of October for both wholesale and retail level. The major problems faced by them included lack of transportation and storage facilities, low

marketing price at harvest period, lack of credit facilities, lack of infrastructure facilities, lack of adequate market information, high rate of market tolls and commission, price fluctuation and low price, problem of credit sale, problems of strike and hartal.

Karim, M.S. (2012) analyzed the price behavior of rice in terms of price fluctuation, price instability, price trends and spatial price relationship of rice in different markets in Bangladesh. The results of empirical evaluation of spatial price linkage through correlation coefficients and co-integration among regional selected markets of Bangladesh using wholesale price of rice indicated that these markets were well integrated. That means, information about price changes are fully and instantaneously delivered to the other markets in Bangladesh.

Haque *et al.* (2011) conducted a study on the profitability of onion cultivation and found that onion cultivation is profitable in some selected areas of Bangladesh. In addition, they found that the benefit from the production of onions was greater than that of other competitive crops, such as mustard, groundnut, and cabbage.

Rahman *et al.* (2016) carried out a report on the development of brinjal in the district of Jamalpur. Via profitability analysis and development factors, it was discovered that the production of brinjal is profitable.

Hasan *et al.*, (2014) conducted a study on profitability of important summer vegetables in Keranigonj upazila of Bangladesh and found that the cultivation of summer vegetables is beneficial. In addition, they found that the benefit from the production of summer vegetables was higher than that of other competitive crops, such as bottle gourds and cucumbers.

Venance *et al.* (2016) performed a report on variables affecting the common bean on the farm.

Profitability; the case of smallholder bean farmers in the district of babati, Tanzania and discovered With IPM, this household size had no major impact on profitability.

Considering the above perspective, the present study has been undertaken. It is expected that the present study will serve as the base for further studies. Moreover, it will contribute to the stock of existing knowledge.

3. Objectives

The specific objectives are:

- i. To know the demographics profile of vegetable growers;
- ii. To estimate the production cost and profitability of selected winter vegetables cultivation; and
- iii. To identify the constraints of winter vegetable cultivation in the study area.

4. Methodology

The experiment was carried out during the period from June to September 2019.

Methodology is the systematic steps of action that include the collection of accurate data as per research goals from the selected sample farmers. It is an important and integral part of any analysis. To a great degree, the reliability of any scientific study depends on the required methodology. In following a scientific and logical approach, the researcher gave a careful account.

Selection of the Study Area

A significant step for the conduct of any research is the selection of the study area since it implies a premise from which the relevant data will be obtained in accordance with the objectives. Narsingdi district is considered one of the vegetables growing zones in Bangladesh because of the high concentration of vegetable cultivation and processing. Two upazilas were picked from the Narsingdi district, namely Shibpur and Raypura.

The key factors behind the selection of upazila above as research are as follows:

- ❖ A large number of vegetable growers are available and vegetables are growing well and farmers in these research areas use a large portion of their land to produce vegetables.
- ❖ These villages had some identical features for vegetable production, such as topography, soil and climatic conditions.
- ❖ The cooperation of the farmers and intermediaries was highly expected.
- ❖ Simple connectivity and good facilities for communication in these villages.

The selection of an area that would provide maximum information on the marketing of vegetables in Bangladesh was an absolute necessity.

Selection of Samples and Sample Technique

Period of the study: Data for the study were collected during the month of November 2019 to February in 2020.

Selection of the sample and sampling techniques: For sample collection, a random sampling technique was applied. 60 farmers were chosen for the analysis by random sampling. 21 were small, 26 were medium and 13 were large among the 60 farmers. The size of the farm was arbitrarily categorized on the basis of the land where vegetables and other crops are

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 grown. Farmers with 0.01-0.33 acres were considered small, 0.34-1.00 acres were considered medium farmers, and those with over 1.00 acres were considered large farmers.

Sources of Data: The analysis includes data collection from primary sources. Under the following headings, various kinds of data and their origins are discussed:

Primary Data: The researcher himself gathered the primary data through personal interviews with the respondents. Care and caution have been taken in data collection to achieve data quality and reliability. The researcher made every effort to develop a good relationship with the participants who did not feel hesitant or aggressive to provide the correct details. The aims of the research were explained to each and every owner of the vegetable growers prior to the interview. As a consequence, they were persuaded that the study was solely an academic one and was not likely to have a negative impact on their business. During the collection of data, attention was also given to the mood of the vegetable growers' owners.

Preparation of Survey Schedule

The planning of the interview schedule is important for the collection of data via the survey process. According to the objectives of the study two sets of interview schedules were prepared one for farmers and another for the vegetable traders. Data on sales rates, production costs, sales prices and purchase prices, what to cultivate and what to sell and the amount of post-harvest losses of farmers, their potential advice will be faced and their potential recovery. After required correction, adjustment and adaptation, all the schedules were pre-tested and finalized.

Method of Data Collection

Generally speaking, most farmers have not retained their written papers. So the collection of data from the farmers was very difficult. Primary data was obtained from respondents via face-to - face communication. The study's goals were clearly outlined to the respondents during data collection. The investigator systematically asked questions at the time of the interview and explained the questions whenever appropriate. Farmers were asked to provide, to the extent possible, accurate information. Secondary data from various sources, such as books, journals, newspapers, and BBS records, will also be gathered for the research purpose.

Tabulation and Analysis of Data

The completed schedule was scrutinized and reviewed after data collection to prevent irrelevant details. According to the study objectives, the collected data was edited, coded and finally tabulated. In order to mitigate error data, local units (e.g. acres) were obtained and then converted to a standard unit. Finally, the average, percentage and ratio are used to evaluate and condense tabulated results. To achieve the outcome, a list of related tables was prepared.

Analytical Techniques of the Study

Processing and analysis of data: For tabulation purposes, the collected data was scrutinized and summarized using the Statistical Package for Social Sciences (SPSS) and Microsoft Office Excel 2013. In this research, two analysis methods, tabular and statistical, were used. Socio-economic characteristics of vegetable farmers, description of the size of vegetable land, production methods, inputs used and returns of vegetable farmers were included in the tabular technique study. Statistical analysis has been used to demonstrate the influence of the inputs used and other associated vegetable cultivation factors.

5. Results and Discussion

Socio-economic characteristics of the farmer’s included their age, family size, educational status, farm size, farming experience of the respondent. These are described below:

Table 1: Distribution of the farmers according to their age

Age Categories	Vegetable Farmers	
	Number	%
Young (20-35 Years)	29	48.3
Middle (35-50 Years)	17	28.3
Old (Above 50 Years)	14	23.3
Total	60	100

Source: Field survey, 2019

Table 1 Shows that age of the Vegetable farmers ranged from 20 to above 50 years. Vegetable farmers were classified into three categories on the basis of their age. Young farmers are mostly engaged in Vegetable cultivation.

Table 2: Distribution of the farmers according to their education

Education Categories	Vegetable Farmers	
	Number	%
Illiterate	32	53.3
Primary	13	21.7
Secondary	8	13.3
Higher Secondary	7	11.7
Total	60	100

Source: Field survey, 2019

Table 2 Shows that maximum farmers (53.3 %) are illiterate while primary & higher secondary have same (21.7 %). Farmers having secondary education are (13.3%). Vegetable farmers were classified into four categories on the basis of their education. Illiterate farmers are mostly engaged in Vegetable cultivation.

Table 3: Distribution of the farmers according to their Family size

Family Size	Vegetable Farmers	
	Number	%
Small (1-4)	21	35
Medium (5-6)	26	43.3
Large (Above 7)	13	21.7
Total	60	100

Source: Field survey, 2019

Table 3 Shows that Family size of the Vegetable farmers of the study ranged from 1 to above 7 persons. Vegetable farmers were classified into three categories on the basis of their family size. Vegetable farmers having medium family size (43.3%) are interest in Vegetable cultivation.

Table 4: Distribution of the farmers according to their Farm size

Family Size	Vegetable Farmers	
	Number	%
Small (0.01-0.33 Acre)	22	36.7
Medium (0.34-1.0 Acre)	28	46.7
Large (Above 7 Acre)	10	16.7
Total	60	100

Source: Field survey, 2019

Table 4 Shows that Vegetable farmer were classified into three categories on the basis of their farm size. Medium Vegetable farmers were belonging to highest percentage (46.7%).

Table 5: Distribution of the Vegetable according to their Farming experience

Faming Experience	Vegetable Farmers	
	Number	%
1 – 10 Years	29	48.3
10 - 20 Years	24	40
Above 20 Years	7	11.7
Total	60	100

Source: Field survey, 2019

In Table 5 Farming experience of a respondent was determined on the basis of involvement in the farming activities related to vegetable cultivation. Vegetable farmers were classified into three categories on the basis of their Farming experience. Highest portion of the Vegetable farmers (48.3 %) had low farming experience (1 - 10).

Table 6: Per acre cost of vegetable cultivation in the study areas

Cost Head	Brinjal	Tomato	Beans
Land preparation	3500	3450	3600
Seed Cost	1000	800	1250
Cow dung Cost	8000	6000	5000
Fertilizer (Urea/TSP/MP/Gypsum/Borax)	960	650	1280
Oil Cake cost	3000	1050	3200
Total Labor Cost	42000	38570	39600
Insecticides/Pesticides	10300	6400	7000
Irrigation	2500	2450	2550
Miscellanies cost (bamboo, net)	3000	2500	3200
Total variable cost	74260	61870	66680
Interest on operating capital	3713	3094	3334
Land value	10000	10000	10000
Total fixed cost	13713	13094	13334
Total cost= (Variable + Fixed) cost	87973	74964	80014

Source: Field survey 2019.

In order to calculate the cost of purchased inputs, prevailing market price was used and for that of home supplied inputs the opportunity cost considered. The bank rate of 10 percent per annum was used to calculate the opportunity cost of operating capital. The most significant factor was overall labor in the manufacturing process. For Brinjal, Tomato and Country beans, the average per acre labor needed was 42000, 38570 and 39600 TK. respectively, respectively. Tk. was the per acre cost of human labor for tomatoes, cauliflower and cabbage. 61320, 53400 and 56040, respectively, respectively.

Land planning costs were used mostly for land preparation. For the cultivation of Brinjal, Tomato and country beans, the expense was Tk. 3500, 3450 and 3600 respectively, respectively. The cost of seed per acre for Brinjal, Tomato and Country beans was Tk. 1000, 800 and 1250 respectively, respectively. A big requirement of the production of Brinjal, Tomato and Country beans is fertilizer. In the study areas, four types of fertilizer were primarily used by farmers, namely Urea, TSP, MP and Gypsum. The cost per acre of these fertilizers has been estimated at Tk. 960, 650 and 1280, respectively. The oil cake cost per acre was estimated at Tk. 3000, 1050 respectively and 3200 respectively. The per-acre cost of cow dung was Tk. 8000, 6000 and 5000 for the production of Brinjal, Tomato and Country Beans. The irrigation water expense per acre amounted to Tk. For Brinjal, Tomato and Country Beans, 2500, 2450 and 2550, respectively. The cost per acre of miscellany (bamboo, net, etc.) amounted to Tk. 3000, 2500 and 3200, respectively for Brinjal, Tomato and Country beans. Insecticide costs per acre amounted to Tk. 10300, 6400 and 7000 for the production of Brinjal, Tomato and Country Beans. The cost per acre for land use was Tk. 10000 for the production of Brinjal, Tomato and Country Beans in the study region. The interest in operating capital per acre was Tk. 3713, 3094 and 3334, respectively, Brinjal, Tomato and Country Beans.

Table 7: Per hectare costs and returns of producing Brinjal, Tomato, Beans

Particulars	Brinjal	Tomato	Country Beans
Average yield (M. Ton)	8450	14500	9870
Per unit price (Tk.) (Kg)	30	15	30
Gross return (Tk.)	253500	217500	296100
Total Variable cost (Tk.)	74260	61870	66680
Total Cost (Tk.)	87973	74964	80014
Gross margin (Tk.)	179240	155630	229420
Net return (Tk.)	91267	80666	149406
BCR (Undiscounted)	2.88	2.90	3.70

Source: Field survey 2019.

The variable cost per acre of production of Brinjal, Tomato and Country beans was calculated to be 74260, 61870 and 66680 respectively, and their corresponding fixed cost was Tk. 13713 and 13094, respectively, and 13334. The per acre gross cost of the production of Brinjal, Tomato and Country beans was Tk. Tk. 118000. 116977 as well as Tk. 120522, respectively, respectively. The gross margin per acre of vegetables picked was Tk. 179240, 155630 and 229420, respectively. The per acre net return of the production of Brinjal, Tomato and Country beans was Tk. 91267, 80666 and

149406, respectively, respectively. The undiscounted profit cost ratio per acre of production of Brinjal, Tomato and Country beans was 2.88, 2.90 and 3.70, respectively.

6. The Constraints and Opportunities of Vegetable Cultivation

The problems and constraints faced by the respondent farmers and solutions to those problems as suggested by them are discussed here. Constraints and opportunities are discussed below.

Problems Faced by Farmers

The vegetable producers in the study areas were facing various problems which are broadly classified into production problems. Some of the production problems were inadequate capital, attack of pest and diseases, lack of quality seed, lack of availability of adequate inputs and higher cost of inputs. Marketing problems were related to transportation cost, lower price of vegetable, shortage of marketing facilities etc. There were some major production problems faced by farmer identified according to opinion given by them. Those were as follows:

Higher Inputs Cost

One of the most significant problems faced by producers in their vegetable cultivation has been the high cost of inputs in the study field. Table 6 shows that about 85 percent of manufacturers have faced this challenge. Within the production problem faced by the farmer, this problem is marked as the rank-1.

Attack of Pest and Diseases

The problem of pest attacks and diseases has also affected vegetable growers. Attacking pests and diseases decreases crop yield and raises production costs. Table 6 indicates that about 82 percent of producers (out of 60 farmers) have been adversely affected by their production of vegetables.

Inadequate Capital

There were capital constraints for the farmers of the study area. A huge amount of cash money was needed for vegetable cultivation to buy different inputs such as human labor, seed, fertilizers, pesticides, etc. Since input requirements were high, the cost of vegetable production was high. Managing the required capital on the part of the producers was difficult. Table 6 shows that about 75% of producers (out of 60 farmers) were confronted with insufficient capital as a production issue.

Lack of Quality Seed

One of the most significant drawbacks of vegetable production in the study area was the lack of quality seeds. Study area farmers said they were tricked by purchasing so-called hybrid seeds from local markets and from seed dealers. As a result, they were given a low vegetable yield. Table 8 shows that about 70% of producers (out of 60 farmers) complained that during the vegetable planting season, good quality seeds were not available on the market.

Table 8: Production Problem Faced by Farmers in Production of Vegetable

Problem faced by producers	Percent	Rank
Higher input cost	85%	1
Attack of pest and diseases	82%	2
Inadequate capital	75%	3
Lack of quality seed	70%	4

Source: Field Survey, 2019

Marketing Problems

There is various marketing problem faced by supply chain actors. Some major problems are discussed below.

Lower market price of vegetable

All of the sample farmers indicated that low prices were a big vegetable marketing issue. Around 95 percent of producers (out of 60 farmers) have faced this problem in Table 7. This is the top classified marketing challenge faced by farmers.

7. Conclusion

Vegetables are widely cultivated in the Narsingdi district of Shibpur and Raypuraupazilla. Vegetable production was, however, more productive than any other production of crops. Based on the results of the report, the management practice obviously concludes that there is considerable scope to improve vegetable productivity. Expanded cultivation of vegetables will increase the standard of living. The vegetable business was not found to be sufficiently effective in the study field. The results of the report, despite some limitations, indicate that farmers can obtain a positive net return from vegetable cultivation. Production of crops like vegetables can play a crucial role in meeting farmers' cash needs in the context of income generation and poverty alleviation. The results of the study also showed that vegetable trading is a lucrative venture for various intermediaries. The profit was higher for retailers than for other intermediaries and the profit was considered to be fair.

8. Recommendations

It was evident on the basis of the study's findings that vegetables were productive enterprises and could generate income earnings and job opportunities for Bangladesh's rural people. But some problems and constraints were revealed in order to achieve the goals listed above. Therefore, policy makers should take the requisite steps. Some policy recommendations that are likely to be useful for policy formulation may be advanced, according to the results of the report.

On the basis of the findings of the study, the following specific recommendation may be made for the development of vegetable sector.

- a) Because most vegetable farmers are technically efficient with current production technology, improved production technology methods with adequate storage capacity should be implemented.
- b) Operating capital is a concern for resource-poor farmers in the area of research. An institutional credit program targeted primarily at small and medium-sized farmers should be initiated. A commercial bank should be encouraged to provide loans at low interest rates in order to allow farmers to operate on a commercial basis.
- c) Since vegetables are a productive business, institutions of government and concern should have an effective extension program to expand their area and development.
- d) Cropping patterns based on vegetables should be created and disseminated to those areas of Bangladesh where their development is acceptable.
- e) The Government should take the necessary steps to reduce the prices of inputs which have a major positive impact on yield. The net advantage of vegetable growers will be increased.
- f) During harvesting or just after harvesting, vegetable farmers had to sell their goods at low prices. A suitable storage scheme should be built so that farmers are not forced to sell their goods during the harvest period at low prices.

9. Scope for Further Study

Although the aim of the present study is to provide some useful information for the guidance of farmers, traders, policy makers and researchers, it is not free of criticism. This research could not cover certain significant areas due to limited time and money. Of course, the limitations of the current study open avenues for further studies, which are given below:

- a) For better understanding, a broad-based analysis in this field may be undertaken not only to analysis the relative profitability of vegetables, but also with other crops.
- b) A further analysis can be carried out by taking into account the difference in seasonal prices and the post-harvest depletion of vegetables in the various value chains.
- c) Studies of other vegetable varieties can be carried out individually to determine their comparative profitability.

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