FINANCIAL PROFITABILITY OF CAULIFLOWER PRODUCTION IN SOME SELECTED AREA OF NARSINGDI DISTRICT

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FINANCIAL PROFITABILITY OF CAULIFLOWER PRODUCTION IN SOME SELECTED AREA OF NARSINGDI DISTRICT

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CERTIFICATE

This is to certify that the thesis entitled **"FINANCIAL PROFITABILITY OF CAULIFLOWER PRODUCTION IN SOME SELECTED AREA OF NARSINGDI DISTRICT"** submitted to the Department of Agricultural Economics, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of ***MASTER OF SCIENCE(MS) in AGRICULTURAL ECONOMICS*** embodies the result of a piece of bona fide research work carried out by ***HAFSA BINTE IMRAN*,** **Registration No. 14-06291** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information, received during the course of this investigation has been duly acknowledged.

Dated:
Dhaka, Bangladesh.

Dr. Fauzia Yasmin
Supervisor
Director (TTMU), BARC
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DEDICATED

TO .....

PARENTS

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ABSTRACT

Bangladesh is an agriculturally based country. Among different kinds of winter vegetables, cauliflower is important because of its high nutritive value and higher economic return. The present study was designed to determine the profitability and resource use efficiency of cauliflower production. A purposive random sampling method was used in this study. A total of 60 cauliflower farmers four villages namely Saner bari (10), Raypura(20), Lampur(15), Joypura(15) under Palash upazilla were selected for collecting the data. Tabular technique and statistical technique such as Cobb douglas production function was used to achieve the major objectives of the study. The study showed that on average per acre gross cost of cauliflower production was Tk. 83750.77. The net return of cauliflower was tk.182512.The benefit cost ratio was found to be 2.17 implies that a cauliflower farmer could earn tk. 2.17 with the investment of taka 1.00. The study also revealed that cauliflower cultivation is profitable in the study area. The major constraints were insect infestation followed by low price in harvesting period and scarcity of healthy seedlings. Finally, the study gave necessary recommendations to improve the overall economic condition of the farmers through cauliflower production.

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INTRODUCTION

1.1 Background of the Study

Bangladesh, a country of 16.1 million people and covers a place of 1,47,570 square kilometre, is one of the predominantly agro-based developing nations in the world (WB, 2019). Since her independence in 1971, agriculture has been the core sector of Bangladesh economy, that is still contributing round 13.60 percent of the GDP and additionally providing employment to 40.6 percentage labor force (MOF, 2019, BBS, 2018). Around 84 percentage of the rural people of the country rely on agriculture for his or her livelihood directly or indirectly (LFS, 2016-17). Bangladesh has made effective and sustainable advances in agriculture mainly through government policy provision and the enterprising role and contribution of its farmers. Despite limitations in size, scale and magnitude, agriculture continues to support GDP growth through increasing rural income and employment, incentive to small and medium enterprises (SME)s including agro-based industries, and an effective blend of labor-intensive and inadequate capital-intensive manufacturing. Advanced farming yield and productivity can generate additional resources that would allow expansion of agro-supportive services. To promise sustainable and efficient contribution of agriculture to growth, there is a need to prioritize addressing the serious challenges and constrictions that this sector faces.

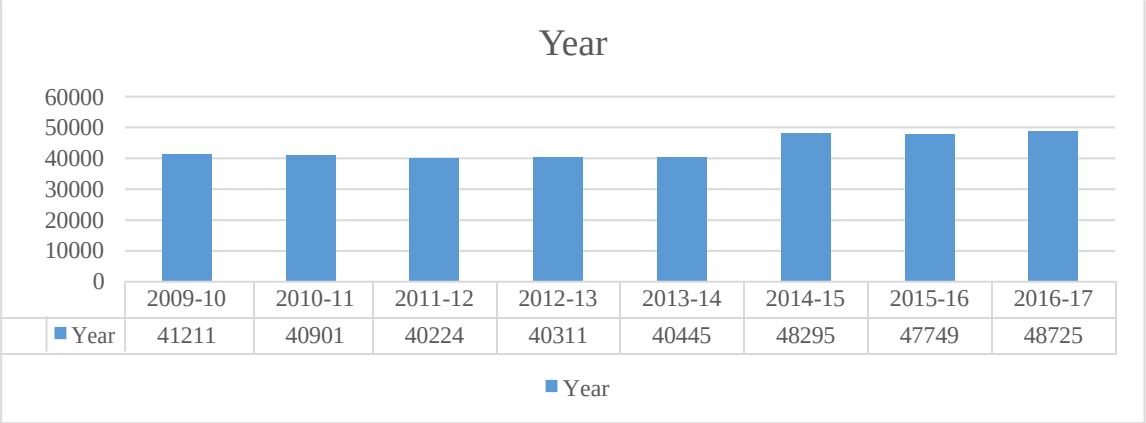
For most, agriculture is a method of food security, however it is a livelihood for a vast population in Bangladesh and a method of lowering poverty (accounting for 90% of reduction in poverty among 2005 and 2010) (World Bank, October 09,2016) and fostering sustainable economic development.

Bangladesh owns very fertile land wherein various vegetation can develop very easily. Various styles of vegetation are produced on this country. Cauliflower is a completely famous winter vegetable in Bangladesh. Cauliflower is cultivated in the cold season in nearly all components of Bangladesh. It is an annual plant this is bred via way of means of seed and seedlings. Cauliflower is an essential vegetable crop that contributes to mentionable stocks of total vegetable production. The production of cauliflower largely

relies upon on the usage of seeds, fertilizers, irrigation, pesticide, etc. The Government of Bangladesh has, therefore, supplied precedence to growth the production of cauliflower with the aid of using giving subsidy to the farmers on one-of-a-kind inputs which includes seeds, fertilizer, irrigation, etc. to achieve self-sufficiency in cauliflower production. Poverty can't be decreased to the desired stage except growing productiveness of the agriculture region and on the equal time, it's far to be assured that farmers get fair price of the crops. Natural calamities like drought, flood, cyclone, tornado, etc. are a completely everyday phenomenon that hinders the production of agriculture to a high-quality extent. Cultivable land is being decreased because of the stress of a huge population. As a result, meals protection is being threatened and the hazard of terrible human beings is being increased. Cauliflower is grown in particular as a Rabi crop all through winter. The production of greens inclusive of cauliflower is growing every day in Bangladesh. Among all of the greens produced in the country, cauliflower dominates a main proportion in phrases of general cropping vicinity and production. It grows in all of the districts of Bangladesh however plenty of cauliflower are produced in the region of Dhaka, Jeshore, Rajshahi, Rangpur, Tangail, and Kustia.

1.2 Importance of Vegetables in the Economy of Bangladesh

Vegetable production may be very suitable in Bangladesh because of fertile land and the environment. Vegetable contributes an important percentage of the full agricultural export in Bangladesh. Vegetables and plants sub-sector additionally contributes an essential percentage to the rural GDP that's close to approximately 9.71 % (Bangladesh Economic Review, 2018). More than ninety special greens are grown in Bangladesh. Vegetables are grown in approximately 0.452 million hectares of cultivated land in Bangladesh. The current production of vegetables is approximately 3.06 million MT (BBS, 2018). In the year 2016-2017, the countrywide manufacturing of winter vegetables became 1.73 million MT and the production place became 1.96 lakh hectares. In the year 2016-17, the countrywide production of cauliflower 277500 MT and the production place became 80195 acres, respectively, (BBS 2017). So, cabbage and cauliflower make a contribution 23.58% of the full winter vegetable production (Figure 1.1).



Source: BBS: 2018

Figure 1.1: Area of cauliflower cultivation of Bangladesh.

To fix the issues of food production and providing a balanced diet, vegetables play a vital role. Vegetables not only meet domestic requirements but also meet the important source of income for the farmers and traders. To recover people from malnutrition, the intake of vegetables dietary to be increased. Vegetables play a significant position in dietary improvement, employment generation, meals and financial security of the people of Bangladesh. Cauliflower production technology in homestead area by rural housewives is growing day by day (Begum, 2001).

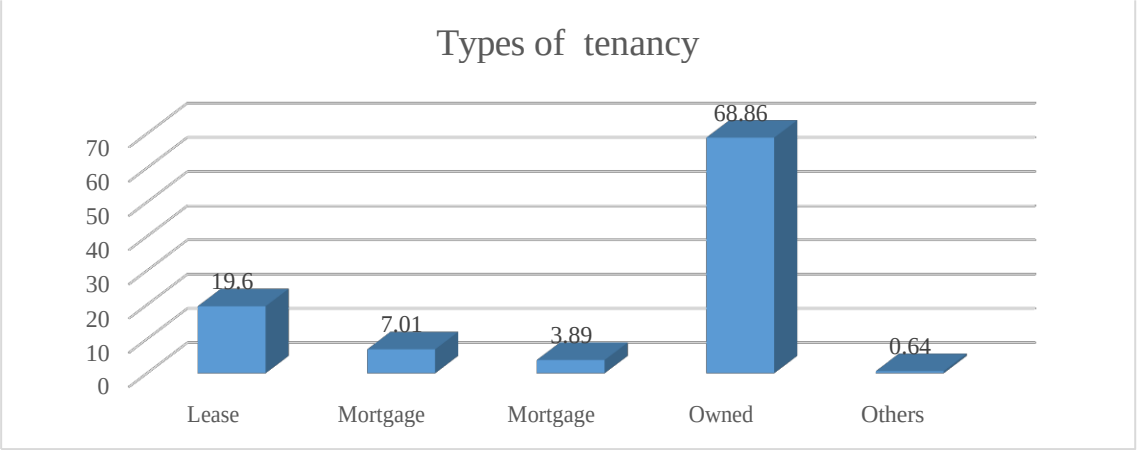
1.3 Cauliflower Production in Bangladesh

Cauliflower is grown on many one-of-a-kind varieties of soil however does fine in rich, well-tired soil with a high moisture-protecting capacity. High humus content in the soil will give better aeration and water penetration. If soil is low in organic matter, strong or green manures can be supplied. Cauliflower grows best in impartial or slightly acid soil (pH 6.0 to 6.5). Well-drained, sandy loam soils are applicable to early types, while loamy and clay loam soils are applicable to late ones because they may be to a point tolerant of bad drainage (Akter , et. al. 2011). Good soil preparation is important when planting cauliflower. The pleasant manner to fix soil conditions is to have a soil test performed. Crop agriculture in Bangladesh is restricted each year through challenges, including a) Damage of Arable Land, b) Population Growth, c) Climate Changes, d) Inadequate Management Practices ,e)Unfair Price of Produces, and f)Insufficient Investment in Research. In Bangladesh, approximately 80,000 ha of arable land are going out of production each year. The loss is alarming and needs to be addressed right now. The land use policy of the authorities have to be up to date and carried out right

now to prevent similarly lack of arable land (Mondal, 2010). In general, cauliflower is not hard to grow, however it is sensitive to extreme temperatures. Primarily a cool-weather crop, cauliflower could now no longer produce heads in warm weather and is frost-tolerant only as a mature fall crop. Most cultivators want approximately three months of cool climate to mature. To grow cauliflower successfully, the important thing steps are to select the proper cultivar for weather, plant on the right time, and offer a regular deliver of moisture. It grows satisfactory in a cool wet weather and may be very hardy to frost. It may be very sensitive to temperature relying on types so, choice of sorts relies upon at the time of planting. Its increase is best at a temperature of approximately 15°C to 25°c. Temperatures beneath this and above are not applicable for it. In Cauliflower, harvesting is performed relying at the adulthood of the pinnacle and call for in the marketplace. Normally harvesting is performed when the pinnacle is firm. After the look of head harvesting can be performed 90-a hundred days after seedling. If costs are high in the marketplace harvesting is performed in advance when the pinnacle is small. Proper grading is accompanied earlier than heads are sent to the marketplace.

1.4 Status of Cauliflower

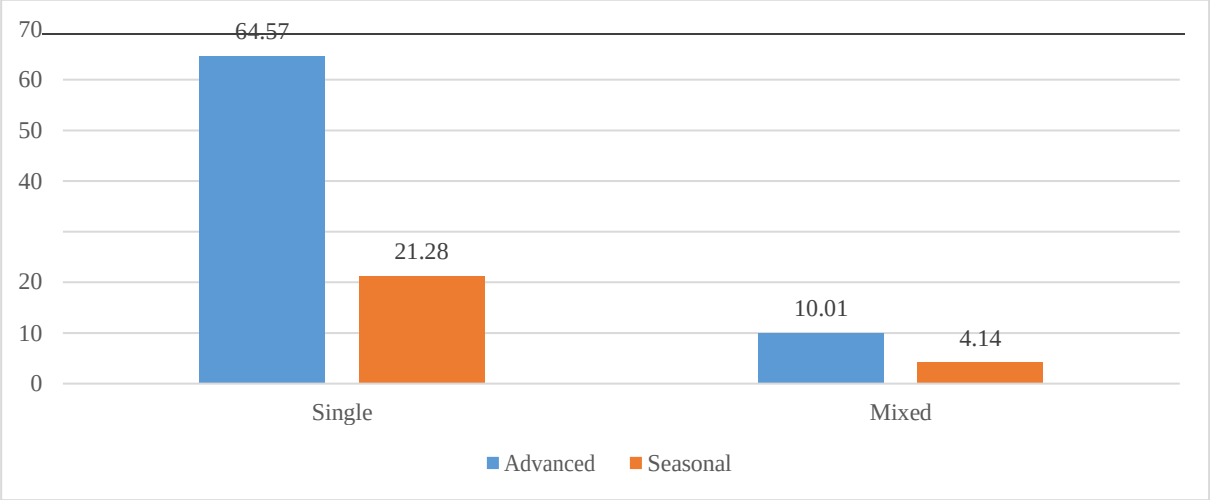
The yield of cauliflower relies upon the variety, developing season and management practices, Hybrid cauliflower yields up to 40 tons in line with hectare. The yield of early varieties tiers among 12 to fifteen tones/ha. The yield of late season types is set 25 to 28 tones /ha. Farmers of Bangladesh are growing cauliflower following indigenous methods with the poor yield rate. The reasons behind such low yield because of loss of excessive yielding variety and method of production practices followed by the local growers. The yield of cauliflower may be accelerated by adopting enhance production technology like proper plant spacing. Although cauliflower is an important vegetable crop of Bangladesh, its production technology have now no longer been standardized from the scientific and economic point of view. Therefore, research desires to bring development in production technology in addition to thinking about an economic return. If nature favors, farmers get a moderately good harvest.



Source: BBS 2015

Figure 1.2: Percentage distribution of cauliflower cultivation area by tenancy

The Figure 1.2 indicates that acres of land are under cauliflower crop of which an vast majority of 68.86 percentage is owned land, rent land 19.60 percentage, mortgage land 7.01 percentage, share cropland 3.89 percent and other land 0.64 percent.



Source: BBS 2015

Figure 1.3: Percentage distribution of cauliflower producing area by cultivation type & farming time.

Figure 1.3 shows that out of total acres of land an overwhelming majority 86 acres are used for single cropped area trailing far behind by mixed cropped area of 14 acres of land.

The graph also shows that the hybrid type cauliflower is grown the highest 75.53 percent in seasonal time and the lowest 24.47 percent in advance farming.

1.5 Nutritional Value of Cauliflower

Cauliflower is low in fat, however excessive in nutritional fiber, folate, water, and nutrition C, owning a excessive dietary density. (Ministry of Planning , 2014) Cauliflower, Brassica oleracea var. botrytis L. belonging to own circle of relatives Brassicaceae (Cruciferae) is a completely famous cold vegetable Rabi crop cultivated specifically in Bangladesh. Typically, most effective the head (the white curd) of aborted floral meristem is consumed, whilst the stalk and surrounding thick, inexperienced leaves are utilized in vegetable broth or discarded. Cauliflower is low in fat, however excessive in nutritional fibre, folate, water, and nutrition C, owning a excessive dietary concentration. Cauliflower carries numerous phytochemicals, generally taking place in the cabbage own circle of relatives that can be useful to human health. An excessive consumption of cauliflower has been related to decreased danger of competitive prostate cancer

Table 1.1 Nutritional Values per 100 g

Nutrient component	**Amount**
Energy(mg)	25kcal/100g
Potassium(mg)	299 mg
Phosphorus(mg)	44 mg
Sodium(mg)	30 mg
Calcium(mg)	22mg
Magnesium(mg)	15mg
Iron (mg)	0.42mg
Zinc(mg)	0.27mg
Manganese(mg)	0.15mg

Vitamins	B_1	0.05 mg
	B_2	0.06 mg
	B_3	0.507 mg
	B_5	0.667 mg
	B_6	0.184 mg
	B_9	57 mg
	C	48.2 mg
	E	0.08 mg
	K	45.5 mg
Fat		0.3 mg
Protein		1.9 mg
Carbohydrates		5g

Source: USDA 2020

1.6 Justification of the Study

Agriculture sector continues to play a vital role in the economy of Bangladesh. It attained its modest growth and experienced in slow changeover since independence. Now, the government of Bangladesh has placed much importance on vegetable production to meet the nutritional requirement for growing population and for increasing employment opportunities and income of farmers. In this context, cauliflower may be considered as an important winter crop, which may provide such opportunities. For giving importance on the production of these vegetables, related and adequate information on different aspects of production of these vegetables at farm level are required. Such knowledge of production is also essential to make appropriate decision by the growers especially when several alternatives are open to them.

However, little systematic economic research on these vegetables have been undertaken either by the government or private organization in order to satisfy the demand of extension workers, policy makers, research personnel, NGO officials and the farmers. Therefore, the present study is an effort to analyze the relative profitability and resource use efficiency of cauliflower production. The result of this study will be helpful to the planner for making effective and careful plan to extension personnel that are directly involved in the different agricultural development programs and help them to learn about various problems of cauliflower. Therefore, they will be able to give suggestions to the farmers relative to various aspects of cauliflower production.

1.7 Objectives of the Study

a) To identify the socio- economic characteristics of cauliflower farm households
b) To measure the profitability of cauliflower producing farms
c) To estimate the factors affecting and resource use efficiency of cauliflower production
d) To identify the major constraints associated with production of cauliflower.

1.8 Outline of the Study

This study consists of eight distinct chapters which have been organized in the following sequences. Chapter 1 describes introduction of the study. Relevant review of literature is presented in Chapter 2, methodology in Chapter 3, Socioeconomic characteristics of the sample farmers have been presented in Chapter 4. Chapter 5 presents costs, returns and therefore profitability of cauliflower farming. Chapter 6 provides factors affecting and resource use efficiency of cauliflower production. Chapter 7 provides constraints of producing cauliflower faced by the farmer. Chapter 8 furnishes an executive summary of the overall study with policy recommendations.

CHAPTER II

REVIEW 0F LITERATURE

CHAPTER II
REVIEW OF LITERATURE

Review of literature is substantially vital for any scientific research. It aids to identify prevailing facts gap of any research area. Many Studies on profitability and advertising and marketing of various agricultural commodities had been made in Bangladesh. But a very few research had been made to address the troubles of marketing and suggest to measures for the development of Cauliflower production, profitability and marketing in Bangladesh. Some of the research which can be relevant to this study are reviewed on this section. This chapter also could discuss the previous study concerning vegetable cultivation in our country and the world. Significant research concerning vegetable cultivation are mentioned below.

Kumar (2017) carried out a study to recognize the gap between knowledge and adoption level regarding the package of practices of cauliflower cultivation. It turned into found that higher knowledge found in fertilizer management with a mean percent score of 86.66, was ranked first and lowest in soil treated with a mean percent rating of 50.41, it was ranked in fifteenth. The highest adoption was found in fertilizer management with a mean percent rating of 79.58, it was ranked in first and lowest adoption was found in soil treatment with mean percent rating of 47.08, it was ranked in fifteenth.

Ahmed (2001) carried out a comparative economics study of potato and cauliflower production in a selected region of Comilla district. The study was undertaken to research the comparative profitability of potato and cauliflower production. 60 families had been selected of which 30 were potato and 30 were cauliflower farmers. It was found that per hectare gross return of potato and cauliflower had been Tk.102761.38 and Tk. 186643.60 respectively. It showed that production of cauliflower was more profitable than potato on the premise of full costs and cash costs.

Saha (2012) examined the economic analysis of homestead vegetables production in selected regions of Netrokona district. The major findings of the study discovered that production of selected homestead vegetables was profitable. Per acre gross cost of production of cucumber was highest followed by cabbage and tomato in which farmers

earned the highest profit from tomato followed by cabbage and cucumber. Per acre benefit cost ratio of tomato, cucumber, and cabbage were 1.97, 1.63 and 1.95, respectively.

Islam (2000) executed a study on economic analysis of winter vegetables like cabbage, brinjal, radish and tomato in three villages of Sadar thana under Mymensingh district. However, he showed that for producing those winter vegetables, per hectare cost was the highest for cabbage followed by radish, brinjal and tomato. On the other side, per hectare yield was the highest for brinjal followed by cabbage, tomato and radish which were tk.80240.00, tk. 60540.00, tk. 45353.00. and Tk. 44751.90 respectively.

Somajpoti et al. (2016) attempted to study the economic analysis of cauliflower and cabbage production in selected regions of Sylhet district. A total of 45 farmers were randomly selected from three villages namely Dighirpar, Basantagaon and Paschimdarsa at Sylhet Sadar Upazila in Sylhet district. The major findings of this study revealed that production of the selected homestead vegetables were profitable. Per acre gross cost of production of cauliflower and cabbage were Tk. 93860.55 and Tk. 92135.8, respectively and the corresponding gross returns were Tk. 229407.4 and Tk. 230800, respectively. Per acre net returns of producing cauliflower and cabbage was Tk. 135546.85 and Tk. 138664.2, respectively. Benefit-cost ratios of cauliflower and cabbage manufacturing acre-1 were 2.44 and 2.50, respectively. The farmers earned the maximum profit from cabbage production. The results of Cobb-Douglas production function model indicated that acre-1 gross returns were significantly influenced by the use of human labour, tillage operation, seeds, fertilizers, manure, irrigation and insecticides. Some essential policy recommendations were arisen which are: input and price support, and motivation and training programmes have to be arranged by different government and nongovernment organizations and public-private partnership have to be emphasized for creating scope to enhance the overall financial condition of the farmers through homestead vegetable farming.

Islam and Nayeem, (2020) attempt to examine the economic analysis of cauliflower production in selected regions of Mymensingh district. A total of 100 farmers was randomly selected from three villages TrishalUpazilaof Mymensingh district. The major findings of this study found out that production of the cauliflower was profitable.

Benefit cost ratios of cauliflower was 2.44. The farmers earned the maximum profit from cauliflower production. The outcomes of Cobb-Douglas production function indicated that three main input factors namely labor value, seed cost and fertilizer cost have been significantly encouraged the production of cauliflower. This study also identified some problems faced through farmers for producing cauliflower like bugs affect, lack of capital, lack of nice seeds, lack of storage facilities, marketing issues. Thus, more studies and extension service can be followed to solve the problems in order to increase production and ensure the nutritional food value in Bangladesh.

Magsi et al. (2016) shredded in order to explore the profitability of Cauliflower crops grown in different seasons. For the purpose, primary data were randomly gathered from 120 Cauliflower farmers, together with 60 respondents from each season. Results found out that almost all of the growers were between 36-50 years of age, with 8-15 years of farming experience. Results further exposed that almost all of the growers (65 percent) were tenants and they used to pay the high marketing cost in comparison to the production value, due to the identical vegetable marketing system in the observe area. Although, the physical productivity of the crop was perceived higher in the winter season, however the profitability in price per bag was recorded higher in summer season.

Islam et al. (2018) carried out a research to examine the cost and return of vegetables farmer and trader, their issues in farming and trading in the context of Bangladesh's winter vegetables. Bean and Cauliflower are being taken purposively to unearth the real picture as both are widely cultivated in the winter season in rural Bangladesh. Mainly primary data, collected through a structured questionnaire, have used to perform the research. According to the study, the average per unit net margin of a farmer from Bean and Cauliflower production was BDT. 17.76 and BDT. 2.93 respectively where per unit cost of Bean and Cauliflower turned into BDT. 10.76 and BDT. 5.66. The study discovered that the timely availability of fertilizer and insecticide, affordable price of each fertilizer and pesticides can growth vegetable production. On the other hand, most vegetable traders recommended that infrastructure improvement can mobilize vegetable trading. The study also recommended that improving transportation facilities, timely availability of fertilizer and insecticide with reasonable price and transforming

the conventional supply chain to commercial one might growth production so as to the net margin of both farmers and traders.

From the above discussion it is clear that numerous studies were conducted in Bangladesh concerning the issue related to comparative profitability of vegetable production mainly on bottle gourd, cucumber, brinjal, tomato, potato, carrot, bean, snake gourd, bitter gourd, radish etc. While some of the research focus on the effects of input to the production process, others gave importance on the resources use efficiency of different inputs used. It reveals that a very few research was conducted on cauliflower production and all of them were analyzed the profitability combined with other vegetables. Moreover, there is no enough research which conducted only on cauliflower production and covered all aspects. Therefore, this study was an attempts to analyze the profitability, input output relationship, and resource use efficiency of cauliflower production in a wider aspect.

CHAPTER III

RESEARCH METHODOLOGY

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RESEARCH METHODOLOGY

3.1 Introduction

The reliability of a particular study finding depends to a great extent on the appropriate methodology used in the study. Methodology is an integral and indispensable part of any study. Improper methodology frequently leads to misleading result. So, careful concerns are needed by an author to follow a scientific and logical methodology for carrying out the study. The author has great responsibility in describing clearly what types of technique and system is to be accompanied in choosing the study areas, the sources of data and the analysis in addition to interpretations to arrive at a meaningful conclusion. This chapter presents a detailed sequential step of research work, for instance, selection of study areas, choice of study period, sources of data, processing of data and analytical techniques.

3.2 Sources of Data

The present study required primary and secondary data. Primary data were collected from farmers and the secondary data were obtained from Google, different research websites, SAU E-Library, Various Published sources , Bangladesh Bureau of Statistics(BBS), Department of Agricultural Extension(DAE) and other NGO`s in Bangladesh.

3.3 Collection of Data

Primary data was accomplished by direct interview with the farmers, SAO of Upazilla Agricultural Office, DAE officer of Upazilla Agricultural office. Before going to actual interview , a brief introduction about the aims and objectives of the study was given to each farmer. The questions are asked systematically in a very simple manner and the interview was recorded on the interview schedule. In order to minimize errors, data were collected in local (e.g., Maund, Bigha, Decimal etc. and later converted into standard units. After each interview, the filled in questionnaire was checked with regard to every item so that these are correct and properly recorded.

3.4 Selection of the Study Area

Selection of the study area is essential for the acceptance of research findings. For this study one upazilla which is Palash Upazilla of Narsingdi district of Bangladesh have been selected purposively. Four villages have been randomly selected from this upazilla. The study **a**reas are recognized for cauliflower cultivation. The primary data was collected from Cauliflower field, local market and agricultural extension office.

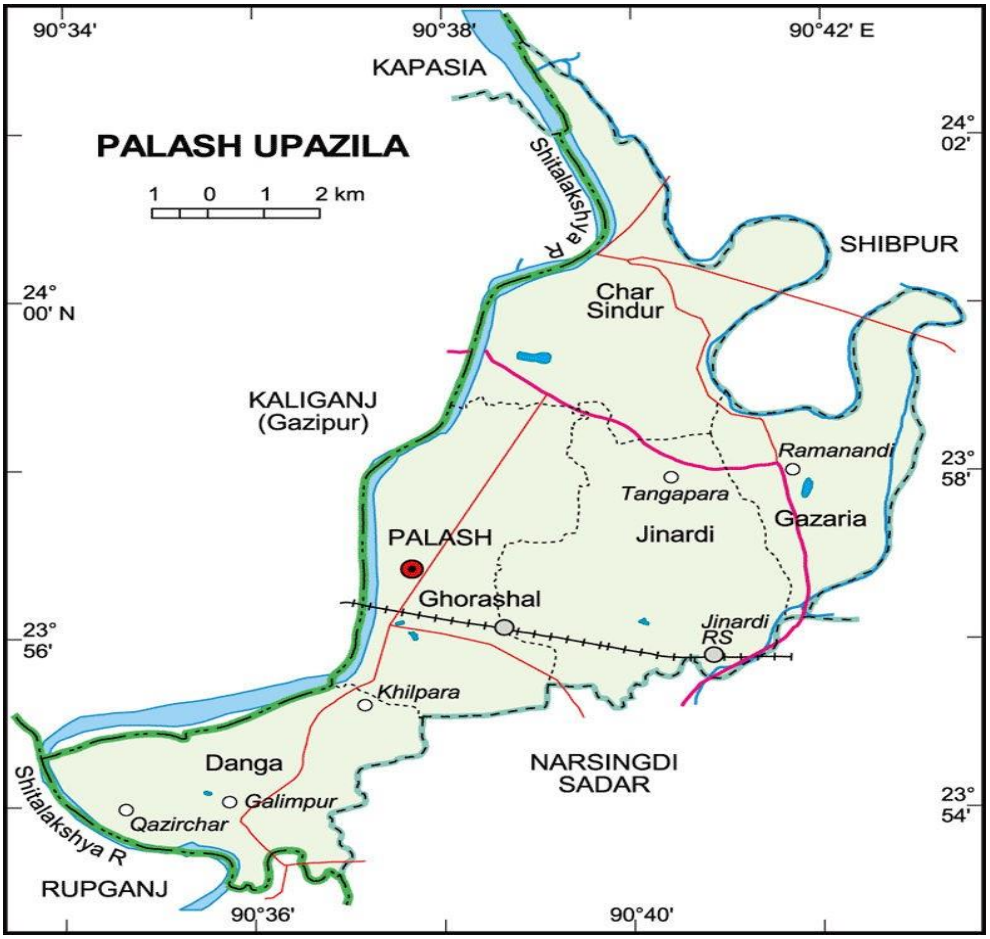
Table 3.1: Selected study areas for primary data collection

Upazilla	**Villages**
Palash	Saner bari, Raypura, Lampur, Joypura,

Source: Field Survey, 2020.

3.4.1 Palash Upazilla

Palash is situated at 23.9500°N 90.6250°E. It has 31350 households and total area 94.43 km2. It is surrounded by Narsingdi Sadar and Shibpur on the east and Rupganj, Kaliganj and Kapasia on the west. The Shitalakshya, Haridoa and Old Brahmaputra rivers all flow through it, total of 60km of river water within Palash's boundaries.



Source: Adapted from Banglapedia.com

Figure 3.1: Geo Code of Palash Upazilla

3.5 Sample Size

It was not possible to include all of the farmers in the study area because of limitation of time, money and personnel. Here a reasonable size of sample was taken into account to fulfill the objectives of the study. In general ,60 farmers were decided on to achieve the ultimate objective of the study. To get the desired sample at first the list of Cauliflower cultivator were collected from the agricultural extension officer of the selected upazilas agricultural office. A total of 200 farmers were observed to cultivate Cauliflower in the areas. The next task become to identify small farmers who cultivated Cauliflower minimum for 3years. Out of 200 farmers 100 farmers have been identified as small farmer who cultivated Cauliflower minimum for 3 years. Then a total of 60 farmers were selected randomly from the chosen villages.

Table 3.2: Respondents

Villages	**No. of Respondents**
Saner bari	10
Raypura	20
Lampur	15
Joypura	15
Total	60

Source: Field Survey, 2020.

3.6 Preparation of Survey Schedule

In Conformity with the objectives of the study, a preliminary survey schedule was prepared in such a way that the necessary information to fulfil the objectives of the study could be collected. The questionnaire was pre-tested and after making necessary adjustments, a final questionnaire was developed maintaining logical sequences.

3.7 Period of the Study

The period covered in this study was the whole production period of the Rabi crops grown in the study area. For the present study the winter season 2020 was considered. Relevant data, however was collected during the months from October 2019 to Mach 2020.

3.8 Problem Faced in Collecting Data

During the period of data collection, the researcher faced the following problems:

i) Most of the farmers felt disturbed to reply questions because they thought that the researcher might use the data in opposition to their interest. To earn the confidence of the farmers a awesome deal of time was spent.

ii) The farmers do now no longer keep records in their activities and day to day expenses. Therefore, the author needed to depend upon their memory.

iii) The farmers were typically busy with their filed works. So, the researcher sometimes additionally needed to pay extra visits to meet the farmer.

3.9 Processing of Data

After collection of data, these data were verified to eliminate possible errors and inconsistencies. All the collected data were summarized and scrutinized carefully. For data entry and data analysis, the Microsoft Excel programs and SPSS and STATA programs was used. It might be observed here that information was collected initially in local units and after checking the collected data, it was converted into standard units. Finally, relevant tables were prepared with a view to achieving the objectives of the study.

3.10 Analytical Techniques

Data were analyzed with the purpose of fulfilling the objectives of the study both descriptive and statistical analysis was used for analyzing the data.

3.10.1 Descriptive Analysis

Tabular technique of analysis was generally used to find out the sociodemographic profile of the respondent, to determine the cost, returns and profitability of cauliflower farm enterprises. It is simple in calculation, widely used and easy to understand. It was used to get the simple measures like average, percentage etc.

3.10.2 Production Function Analysis

The production function represents the technological relationship between output and inputs. To estimate the production function, one requires development of its properties leading to specification of an explicit functional form. One of the most widely used production function for empirical estimation is the Cobb Douglas production. This function was originally used by C.W. Cobb and P.H. Douglas in twenties to estimate the marginal productivities of labor and capital in American manufacturing industries. Their main purpose was to estimate the shares of labor and capital in total product; hence they used this function with the constraint that the sum of elasticities or regression coefficients should total one. Later on, they relaxed this restraint. Cobb and Douglas originally fitted the function to time series 1930s and 1940s; the same form was used for cross section of industries. This form of the function was subsequently used in many

production function studies for technical units (crops, livestock) and farm-firms in agricultures. The popularity of this function is because of the following characteristics of the function:

(i) It directly provides the elasticities of production with respect to inputs;

(ii) It allows more degrees of freedom than other algebraic forms (like quadratic function) which allow increasing or decreasing marginal productivities, and

(iii) It simplifies the calculation by reducing the number of regression to be handled in regression analysis. The original form used by Cobb and Douglas was

$$\text{□} = \text{□}L^{\beta}K^{1-\beta}U$$

This forces sum of elasticities to one. Their later modification was

$$\text{□} = \text{□}L^{\alpha}K^{\beta}\text{□}$$

Where, $\alpha + \beta \neq 1$.

In agriculture, this form of function has not been used in its original form. Neither the sum of elasticities is kept equal to one nor is the number of variables limited to two. Even then as the basic idea of functional form was provided by Cobb and Douglas, various forms of this function have

continued to be called as Cobb-Douglas production function. The Cobb–Douglas production function, in its stochastic form, may be expressed as

$$Y_i = \beta_1 X_{2i}^{\beta 2} X_{3i}^{\beta 3} e^{u_i}$$

ui …… (1.1)

Where,

Y = output

X_2 = labor input

X_3 = Capital input

u = stochastic disturbance term,

e = base of natural logarithm.

From Eq. (3.1) it is clear that the relationship between output and the two

inputs is nonlinear. However, if we log-transform this model, we obtain:

$$\ln Y_i = \ln\beta_1 + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + u_i$$

$$= \beta_0 + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + u_i \ldots\ldots\ldots\ldots (1.2)$$

Where $\beta_0 = \ln\beta_1$.

Thus written, the model is linear in the parameters β_0, β_2, and β_3

The properties of the Cobb–Douglas production function are quite well known and is therefore a linear regression model. Notice, though, it is nonlinear in the variables Y and X but linear in the logs of these variables. In short, (1.2) is a log-log, double-log, or log linear model, the multiple regression counter part of the two-variable log-linear model.

The properties of the Cobb–Douglas production function are quite well known:

1. β_2 is the (partial) elasticity of output with respect to the labor input, that is, it measures the percentage change in output for, say, a 1 percent change in the labor input, holding the capital input constant.

2. β_3 is the (partial) elasticity of output with respect to the capital input, holding the labor input constant.

3. The sum (β_2+ β_3) gives information about the returns to scale, that is, the response of output to a proportionate change in the inputs. If this sum is 1, then there are constant returns to scale, that is, doubling the inputs will double the output, tripling the inputs will triple the output, and so on. If the sum is less than 1, there are decreasing returns to scale—doubling the inputs will less than

double the output. Finally, if the sum is greater than 1, there are increasing returns to scale— doubling the inputs will more than double the output.

Before proceeding further, note that whenever you have a log–linear regression model involving any number of variables the coefficient of each of the X variables measures the (partial) elasticity of the dependent variable Y with respect to that variable. Thus, if you have a k-variable log-linear model:

$\ln Y_i = \beta_0 + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \ldots \ldots + \beta_k \ln X_{ki} + u_i$ ……. (1.3)

Each of the (partial) regression coefficients, β2 through βk, is the (partial) elasticity of Y with respect to variables X2 through Xk. Assuming that the model (1.2) satisfies the assumptions of the classical linear regression model (Acharaya, 1988).

3.10.3 Requirement of the Cobb-Douglas Production Function

The input-output relationships in cauliflower farming was analyzed with the help of Cobb-Douglas production function approach. To determine the contribution of the most important variables in the production process of cauliflower farming, the following specification of the model was used.

$\hat{Y} = \hat{\beta}_1 \hat{\beta}_2 \hat{\beta}_3 \hat{\beta}_4 \hat{\beta}_5 \hat{\beta}_6 \hat{\beta}_7 \hat{\beta}_8 \hat{\beta}_9 \hat{\beta}_{10}$ …….. 1.4

The Cobb-Douglas production function was transformed into following logarithmic form so that it could be solved by Ordinary Least Squares (OLS) method.

$\ln Y = \ln a + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + U_i$

…….1.5

Where, Y= Gross income from year round cauliflower (Tk./acre);

Y= Return per Acre(Tk./acre);

Ina= Intercept of the function

X_1= Labor Cost

X_2= Seedling Cost

X_3= Fertilizer Cost

X_4= Insecticide Cost

X_5 = Irrigation Cost

X_6 = Tillage Cost

b1, b2. . ….. b6 = Coefficients of the respective input to be estimated; and U_i = Error term. Coefficient of the respective variable; i= 1, 2…….6.

3.11 Multi-collinearity Test

Economic variables usually exhibit a particular degree of interdependency mostly due to the general interdependence of economic phenomena. However, it becomes difficult to disentangle the effects of each of the explanatory variables on the explained variable where the explanatory variables are highly inter-correlated. The practical question that needs to be asked is how these inter-correlations can be a problem in our inference about the individual parameters and what needs to be done to redress this problem. In case of two explanatory variables one can judge whether there is a co-linearity problem by looking at the correlation coefficient between the two variables. When there are more than two explanatory variables, the simple correlations among them become meaningless. There are several rules of thumb that have been suggested in the literature to detect when multi-collinearity can be treated as a serious problem.

For instance Klein says, ―An inter correlation of variables is not necessarily a issue unless it is high relative to the overall degree of multiple correlation.

3.12 Profitability Analysis

Cost and return analysis is the most common method of determining and comparing the profitability of different farm household. In the present study, the profitability of cauliflower farming is calculated by the following way.

3.12.1 Calculation of Gross Return

Per hectare gross return was calculated by multiplying the total amount of product and by-product by their respective per unit prices.

Gross Return= Quantity of the product * Average price of the product + Value of byproduct.

3.12.2 Calculation of Gross Margin

Gross margin is defined as the difference between gross return and variable costs. Generally, farmers want maximum return over variable cost of production. The argument for using the gross margin analysis is that the farmers are interested to get returns over variable cost. Gross margin was calculated on TVC basis. Per hectare gross margin was obtained by subtracting variable costs from gross return. That is, Gross margin = Gross return –Variable cost.

3.12.3 Calculation of Net Return

Net return or profit was calculated by deducting the total production cost from the total return or gross return. That is,

Net return = Total return – Total production cost.

The following conventional profit equation was applied to examine farmer's profitability level of the cauliflower producing farms in the study areas.

Net profit, $\pi = \Sigma PmQm + \Sigma PfQf - \Sigma (Pxi\ Xi) - TFC$.

Where,

π = Net profit/Net return from cauliflower farming (Tk./ha);

Pm = Per unit price of cauliflower (Tk./kg);

Qm = Total quantity of the cauliflower production (kg/acre);

Qf = Per unit price of other relevant cauliflower (Tk. /kg);

Pf = Total quantity of other relevant cauliflower (kg/acre);

Pxi = Per unit price of i-th inputs (Tk);

TFC = Total fixed cost (Tk); and

Xi = Quantity of the i-th inputs (kg/acre);

i = 1, 2, 3,....., n (number of inputs).

3.12.4 Undiscounted Benefit Cost Ratio (BCR)

Benefit Cost Ratio (BCR) is a relative measure, which is used to compare benefit per unit of cost. Average return to each taka spent on production is an important criterion for measuring profitability. Undiscounted BCR was estimated as the ratio of total return to total cost per acre,

BCR= Total Return /Total Cost.

CHAPTER IV

SOCIOECONOMIC CHARACTERISTICS

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SOCIOECONOMIC CHARACTERISTICS

4.1 Introduction

The socioeconomic characteristics of sample farmers are included in this section. To derive the planning of production, the socioeconomic features of farmers are significant. The sample households completed by studying socioeconomic aspects. These included age distribution and family size. Occupation, women's participation, pattern of land ownership, etc. These aspects are mentioned in brief below.

4.2 Family Size

The Farmers of the research group were divided into two family members group displayed in table. It is apparent from the table 4.1 that the majority of the farmers has 7-10 members. About 28 percent had less than 7 family members. About 72 percent farmers has family members among 7-10.

Table 4.1: Family Size

Category (no. of members)	**Percent %**
Less than 7 members	28
7-10 members	72

Source: Field Survey, 2020.

4.3 Age Distribution

The farmers of the research areas were divided into three age groups as displayed in Table 4.2. It is apparent from the table that the majority of the farmers were moderately aged. About 54 percent were in the age group 25-35 years, 30percent were in the age group of 36-49 years and 16 percent fell into the age group of 25-35 years. This suggests that a larger part of farmers were in the most dynamic age group of above 49 years showing that they gave progressively physical endeavors to cultivating Cauliflower.

Table 4.2: Age Distribution

Age Category	**Percent %**
25-35 years	16
36-49 years	30
Above 49years	54

Source: Authors own estimation.

4.4 Educational Status

Education expands the productivity of human. Education of farmers helps to adopt environmental change and new technology (Alam et al., 2016). Table 4.3 shows that about 62 percent farmers can only write their name, 26 percent farmers had primary education, 12 percent farmers had secondary and above education.

Table 4.3: Educational status

Level of education	**Percent %**
Write Name	62
Primary	26
Secondary and above	12

Source: Authors own estimation.

4.5 Occupational Status

In the research area, the study farmers were managed their livelihood with different kinds of occupations alongside agricultural work. It was seen from table 4.4 that, agriculture was the main occupation for Cauliflower farmers. Some of them had the chance to be occupied with different activities. Table showed that 40 percent farmers were engaged with vegetables cultivation and others were associated with agriculture (22%), Fish culture(10%), livestock and poultry (14%), Labor(8%) and Business(6%)

Table 4.4 : Occupation

Types of Occupation	**Percent%**
Vegetables Cultivation	40
Agriculture(Rice/Wheat/Pulse)	22
Fish Culture	10
Livestock Rearing	14
Labor	8
Business	6

Source: Field Survey, 2020.

4.6 Marital Status

Table 4.5 shows the marital status. About 94% of the farmers were Married and 6% were Unmarried.

Table 4.5: Marital Status

Participants	**Percent%**
Married	94
Unmarried	6

Source: Field Survey, 2020.

4.7 Farm Size of Cauliflower Farmer

In the study area most farmers had less amount of land. From table 4.6 we can see that about 10-30 decimal land belongs to 36% farmers, 31-60 decimal land belongs to 34% farmers and 30% farmers had above 60 decimal land.

Table 4.6: Farm size

Farm Size (Decimal)	**Percent%**
10-30 decimal	36
31-60 decimal	34
Above 60 decimal	30

Source: Authors own estimation.

4.8 Land Ownership Pattern

In the study area most of the farmers had Own land. From table 4.7 we can see that about 74 percent of cauliflower farmer had own land and 26 percent farmers cultivate their crop through rented land.

Table 4.7: Land ownership pattern

Types Of Land	**Percent%**
Own	74
Rented in	26

Source: Field Survey, 2020.

4.9 Income Status

Table 4.8 indicates that most of the farmers were belonged to the income category of tk. 9000-18000per month that was 54 percent of the respondents. About 38 percent farmers were in group who earned less than Tk. 9000per year and 8 percent of the farmers were earned Tk. 19000 and above per month.

Table 4.8: Income Status

Monthly Income level	**Percent %**
Less than 9000tk.	38
9000-18000	54
19000 and above	8

Source: Field Survey, 2020.

4.10 Women Involvement

As half of the population of our country is women, they need to join with the main work force. Now, the situation of whole Bangladesh is changing and in our study area 62 percent women of the farmer's family were involved in Cauliflower Cultivation and 38 percent women of the farmer's family were not involved in Cauliflower cultivation.

Table 4.9: Women Involvement

Items No.	**Percent%**
women involvement	62
No women involvement	38

Source: Field Survey, 2020.

4.11 Training Received

Training of farmers basically contributes to human resource development in agriculture. Training is an essential part of any development activity (Pandey et al., 2015). Knowledge and competencies of the farmers in agricultural technology are vital elements for increased agricultural production. In our study 58 percent farmers had taken training and 42 percent farmers had not taken training.

Table 4.10: Training Received

No. of Items	**Percent %**
Received	58
Not received	42

Source: Field Survey, 2020.

4.12 Training Institution

From the selected farmers 56 percent farmers had taken training from Department of Agricultural office at their own upazila and 44 percent farmers were taken training from different NGO`s.

Table 4.11: Training institution

Training Institution	**Percent %**
DAE	56
NGO	44

Source: Field Survey, 2020.

4.13 Credit Received:

In the study area about 66 percent farmers had taken loan for their agricultural and no-agricultural purpose. 34 percent farmer had not taken loan.

Table 4.12: Credit Received

Items no.	**Percent %**
Credit received	66
Not received	34

Source: Field Survey, 2020.

4.14 Sources of Credit Facilities of the Farmer

In the study area 16percent taken loan from bank, 24percent had taken loan from NGO and only 4 percent farmers had taken loan from friends and relatives.

Table 4.13: Sources of Credit Facilities of the farmer

Sources of credit	**Percent %**
Bank	16
NGO	24
Friends and Relatives	4

Source: Field Survey, 2020.

CHAPTER V

PROFITABILITY OF CAULIFLOWER PRODUCTION

CHAPTER V

PROFITABILITY OF CAULIFLOWER PRODUCTION

5.1 Variable cost

5.1.1 Cost of human labour

In case of Cauliflower cultivation human lanour is the vital input that bear a large portion of total cost of Cauliflower cultivation. For various task like land preparation, Sowing, weeding, Irrigation, Pest& Fertilizer Management and harvesting etc. farmers need human labor. There were two sources of human labor in the study area, one was family supplied labor and another one was hired labor. The valuation of hired labor was done as the nominal cash wages paid to the farmers. It can be seen from Table 5.1 that the amount of human labor used for cauliflower cultivation was 72 man and average wage rate was 350man-days/acre. Total cost of human labor amounted to Tk. 25200 per acre. Total family labors were 27 and total hired labor were 45. Highest labor cost incurred in land preparation accounts 6300tk. for per acre .

Table 5.1: Human Labor Cost Tk./Acre

Items of returns/costs	**Hired Labor**	**Family Labor**	**Unit**	**Quantity**	**Average wage rate**	**Total Value(Tk.)**
Land Preparation	13	5	Man-day	18		6300
Sowing	6	4	Man-day	10		3500
Weeding	7	5	Man-day	12		4200
Irrigation	5	3	Man-day	8	350	2800
Pest &Fertilizer Management	6	5	Man-day	11		3850
Harvesting	8	5	Man-day	13		4550
Total	45	27	Man-day	72	350	25200

Source: Field Survey, 2020.

5.1.2 Variable cost of cauliflower cultivation

Table 5.2: Variable Cost of Cauliflower Cultivation

Items of returns/ costs	Unit	Quantity	Price per unit(tk.)	Total Value(tk.)
Human (hired) Labor	Man-day	45	350	15750
Human(family) Labor	Man-day	27	350	9450
Tillage	Tk.	-	-	3028
Seedling	Pcs	10,736	1	10736
Manure	Kg	4767	1	4767
Urea	Kg	300	16	4800
TSP	Kg	146	25	3650
MOP	Kg	134	15	2010
Gypsum	Kg	146	12	1752
Zinc	Kg	7	130	910
Boron	Kg	5	117	585
Insecticides	Tk.	3882	-	3882
Irrigation	Tk.	5213	-	5213
Total	Tk.			66533

Source: Field Survey, 2020.

5.1.2.1 Cost of Seedling

In the study area, most of the farmers used purchased seedlings for Cauliflower production. A few number of farmers used home supplied seeds. The cost of purchased seedling was calculated on the basis of actual price paid by the farmers. The cost of home supplied seedling was also estimated at the prevailing marketing price. For Cauliflower cultivation 10,736 seedlings is needed per acre land. Cost per seedling is

1tk. Table 5.2 stated that total cost of seed for Cauliflower cultivation is Tk. 10,736 which is percent of total cost.

5.1.2.2 Cost of Tillage

In the study area land preparation is mainly done by power tiller in producing the selected winter vegetable. Power tiller was used by almost all farmers. There was a competitive rate for using power tiller in the study areas. The farmers paid the charge for power tiller used at a fixed rate prevailing in the study area. In the study area per bigah (30 decimal) power tiller cost was Tk.1200. From Table 5.2 the cost for tillage was 3028tk. for per acre land.

5.1.2.3 Cost of Manure

Along with chemical fertilizer, farmers were also used manure for their Cauliflower production. For producing cauliflower farmers used cow dung as manure application. In this study area farmers mainly used home supplied cow dung. The cost of 1 kg cow dung was 1 taka and in this study area 4767 kg cow dung were used. So, total cost of manure is 4767tk.

5.1.2.4 Fertilizer Cost

In cauliflower farming farmers need different types of fertilizer application. So the fertilizer cost is the sum of all the needy fertilizers like the cost of urea fertilizer, the cost of TSP fertilizer, the cost of MOP fertilizer, the cost of Gypsum fertilizer, the cost of Zinc fertilizer and the cost of Boron fertilizer.

Cost of Urea

The cost of urea was Tk.4800 tk. Per acre It is very essential fertilizer to get the bumper production.

Cost of TSP

TSP also important for cauliflower cultivation. In our study cost of TSP was 3650.

Cost of MoP

The cost of MOP was 2010 tk./ acre.

Cost of Gypsum

The Cost of gypsum was 1752 tk./ acre.

Cost of Zinc

The cost of Zinc. Was 910 tk./ acre.

Cost of Boron

The cost of Boron was 585 tk. /acre.

5.1.2.5 Cost of Insecticide

In the production ofCauliflower, insecticide is a very important input. All the farmers intensively used insecticides Diazinon 50 EC, Furadon 5G, Dursban 20 EC, Malathion 57 EC, Theovit, Bordeaux mixture etc. The cost of insecticides was estimated according to the actual price paid by the farmers. The cost of insecticide was 3882 tk./acre.

5.1.2.6 Cost of Irrigation

Irrigation is an essential input for cultivating cauliflower. In the study area farmers used open water sources to irrigate their plot. River water, pond water, and ditch water were widely applied in the study area. In the study area farmers mainly irrigated their vegetable plot by using low lift pump. The cost of irrigation was 5213 tk./ acre.

5.1.2.7 Total variable cost

The total variable cost for per acre cauliflower cultivation was Tk. 66533.

5.2 Fixed Cost

5.2.1 Interest on operating capital

Interest on operating capital (IOC) was determined by taking all the variable costs incurred on various operations in the process of cultivation of cauliflower. Interest on operating capital was determined on the basis of opportunity cost principle. The operating capital actually represented the average operating cost over the period because all costs were not incurred at the beginning or at any single point of time. It was assumed that if the farmers borrowed the money from a bank, they had to pay interest at the same rate. Since all expenses were not incurred at the beginning of the

crop season; rather they spreaded over the whole production period; hence at the rate of 10 percent per annum interest on operating capital for four months was computed for cauliflower. The interest on operating capital was computed using the following formula (Miah and Hardekar, 1988):

Interest on operating capital
(IOC) =AI × i × t
Where, AI = Total investment/3; i = Interest rate (which was 10.00 percent per annum)
t = Total time Period of a cycle (in month)
Per acre interest on operating capital was Tk. 2163.63 for Cauliflower production.

5.2.2 Land use value

In the study area the cost of land was different to plots depending on location, topography and fertility of the plots. It also varies from one season to another, i.e., from kharif to rabi season and from crop to crop. Land use cost was calculated on the basis of opportunity cost of the use of land per acre for the cropping period of four months. Land use cost may be calculated by using one of the following concepts:

i. Interest on the value of land
ii. Rental value of land
iii. Forgoing income from the alternative use

In this study, the cost of land use was considered by taking into account the rental value of land. According to the assessment of the farmers, in the study area per hectare average rental value of the Cauliflower cultivable land for six months was estimated to tk. 15000. The value for using land for Cauliflower cultivation was Tk. 15000 per acre of land.

5.2.3 Total Fixed cost

Table 5.3: Fixed Cost:

Items of returns/costs	**Unit**	**Quantity**	**Total value (Tk.)**
Interest on OC for 4 months @ 10%	Tk.	66533	2217.77
Rental value	Tk.	15000	15000
Total			17217.77

5.3 Total Cost

As the total cost is the sum of variable cost and fixed cost of Cauliflower cultivation. In order to estimate total cost per acre all the resources used in Cauliflower production has been recapture together. Table 5.4 showed that, per acre total cost of Cauliflower production was Tk. 83750.77

Table 5.4: Total Cost

Items of returns/costs	**Unit**	**Variable cost**	**Fixed cost**	**Total (Tk.)**
Total cost	Tk.	66533	17217.77	83750.77

5.4 Gross Returns

Gross returns of the Cauliflower production are the sum of main product and by-product. The main return of Cauliflower production is its main product. The valuation of by-product of Cauliflower is zero. The quantity of main product is 10736.

Table 5.5: Gross Return

Items of returns/cost	**Unit**	**Quantity**	**Price per unit (TK)**	**Total value(Tk)**
Main product	Kg	10736	17	182512
By-product	Tk.	0	0	0
Total returns	Tk.			182512

5.5 Net Return

To determine the net return of cauliflower production, the total cost was deducted from the gross return. The formula is

Net Return= Gross Return- Total Cost

The net return of cauliflower cultivation was 98761.23 tk./acre .

Table 5.6: Net return of Cauliflower cultivation

Items of returns/costs	**Unit**	**Gross Return**	**Total cost**	**Total value**
Net return	Tk.	182512	83750.77	98761.23

5.6 Benefit Cost Ratio (Undiscounted)

Benefit Cost Ratio (BCR) is a relative measure, which is used to compare benefit per unit of cost. Benefit Cost Ratio (BCR) was found to be 2.17 which implies that one taka investment in cauliflower production generated Tk. 2.17 (Table 5.7). From the above calculation it was found that cauliflower cultivation is profitable in Bangladesh.

Table 5.7 : Undiscounted BCR

Items of returns/cost	**Gross Return**	**Total cost**	**Ratio**
Undiscounted BCR on full cost	182512	83750.77	2.17

From the above discussion it is easy to understand about the different cost items and their application doses of farmers, yields and returns per hectare of cauliflower cultivation. Cauliflower production is a labor intensive enterprise. It is most essential to use modern inputs such as seeds, fertilizers, human labor, power tiller, insecticides and irrigation efficiently. Timely and effective use of these inputs are the most important to increase production and profitability. On the basis of above discussions it could vigilantly be concluded here that cultivation of cauliflower is a profitable. Cultivation of cauliflower would help farmers to increase their income earnings.

CHAPTER VI

FACTORS AFFECTING AND RESOURCE USE EFFICIENCY OF CAULIFLOWER PRODUCTION

CHAPTER VI

FACTORS AFFECTING AND RESOURCE USE EFFICIENCY OF CAULIFLOWER PRODUCTION

6.1 Introduction

The main focus of this section is to estimate and compare the relative economic potential of cauliflower production in tabular form. In this chapter an effort has been made to identify and measure the effects of some important variables of production on gross return of cauliflower in the framework of production function analysis. For the purpose Cobb- Douglas production function model was chosen to determine the effects of selected variables on production.

6.2 Factors Contributing to Yield and Economic Return of Cauliflower:

Cauliflower production depends on different kinds of inputs, such as human labor, power tiller, seedling, fertilizer and manure, irrigation, pesticides etc. Considering the effects of explanatory variables on yield of cauliflower five explanatory variables namely human labor cost (X_1), seedling cost(X_2), fertilizer cost(X_3), insecticide cost(X_4), irrigation cost (X_5), Tillage cost(X_6), were chosen as key independent factors to estimate the quantitative effect of inputs on yield of cauliflower. All these variables have been estimated as per acre monetary values. However, other important variables such as management, farm size, land quality, soil type, sowing time and weather etc. also might affect production of cauliflower. But uses of these inputs were excluded in the analysis due to lack of reliable data.

6.3 Functional Analysis

Functional analysis was designed to look at the contribution of resources employed in the production of the enterprises. Production function is a relation (or mathematical relationship) specifying the most output that can be produced with given inputs for a given level of technology. It applies to a firm or as an combination production function to the economy as a whole (Samuelson and Nordhans 1995). To explore the input output

relationships Cobb-Douglas production function was selected on the basis of best fit and

significance result on output. Moreover, use of Cobb-Douglas production function allows one to obtain the returns to scale directly.

6.4 Estimated Values of the Cobb-Douglas Production Function

Estimated values of the coefficients and related statistics of the Cobb -Douglas production function of cauliflower are presented in Table 4.1.

Estimated Cobb-Douglas production function for cauliflower was:

Ln Y=10.002 + 0.612*** X_1 + 0.366*** X_2 + 0.031**X_3 + 0.045** X_4 + 0.152 X_5 + 0.272** X_6

The following features were noted:

1. Cobb-Douglas production function fitted well for cauliflower growing farms as indicated by F-values and R.

2. The values of coefficients of multiple determinations R2 was .870, which indicates that 87 percent of the total variations in return were explained by the independent variables included in the model.

3. The F-values was highly significant implying that all the included explanatory variables are important for explaining the variation of income of farmers in cauliflower production.

4. For testing the significance level of individual coefficient which has enough degrees of freedom, 1 percent, 5 percent and 10 percent probabilities have been used.

5. The relative contribution of individual key variables affecting productivity of cauliflower farms can be seen from the estimates of regression equation. The results showed that most of the co-efficient had expected sign. However, the explanatory variables like human labor (X_1), seedling (X_2), fertilizer cost(X_3), insecticide (X_4), was found to have insignificant effect on production of cauliflower.

6.5 Estimated Values of Coefficient and Related Statistics of Cobb-Douglas Production Function

Table 6.1: Estimated Values of Coefficient and Related Statistics of Cobb-Douglas Production Function

Explanatory Variables	**Values of Coefficients**	**Standard Error**	**P-Value**
Intercept/Constant	10.002	1.201	0004
Human labor cost(X_1)	0.612***	0.319	0.001
Seedling Cost X_2	0.366***	0.079	0.000
Fertilizer Cost X_3	0.031**	0.014	0.032
Insecticide Cost X_4	0.045**	0.021	0.047
Irrigation Cost X_5	0.152	0.086	0.101
Tillage Cost X_6	0.272**	0.081	0.029
F- Value	28.12		
R^2	.870		

*p< 0.10 denotes 10% level of significance

**p< 0.05 denotes 5% level of significance

***p< 0.01 denotes 1% level of significance

Source: Authors Estimation

6.6 Factors Affecting of Cauliflower Production

6.6.1 Effect of Human labor

From the Table it can be seen that the value of the coefficient was positive and significant at 1 percent level of significance. One percent level of significant indicates that the 1 percent increase in the cost of human labor keeping others factor remaining constant would increase the return of Cauliflower by 0.612 percent (Table 6.1).

6.6.2 Effect of Seedlings

The value of the coefficient of seedling was positive and significant at 1 percent level of significance. One percent level of significant indicates that the one percent increase in the cost of seedling keeping others factor remaining constant would increase the return of cauliflower by 0.366 percent (Table 6.1)

6.6.3 Effect of Fertilizer

It was observed from the regression that the coefficient of the use of fertilizer was positive and significant at 5 percent level of significance. This means that one percent increase in the fertilizer keeping others factor remaining constant would increase the return of cauliflower by 0.031 percent (Table 6.1).

6.6.4 Effect of Insecticide

It was observed from the regression that the coefficient of the use of insecticide was positive and significant at 5 percent level of significance. This means that one percent increase in the insecticide keeping others factor remaining constant would increase the return of cauliflower by 0.045 percent (Table 6.1).

6.6.5 Effect of Tillage Cost

It was observed from the regression that the coefficient of the use of power tiller was positive and significant at 5 percent level of significance. This means that one percent increase in the use of power tiller keeping others factor remaining constant would increase the return of cauliflower by 0.272 percent (Table 6.1).

6.6.6 Value of R square

The multiple co-efficient of determination (R^2) is a summary measure which tells how the sample regression line fits with the data. In this table the value of R^2 was 0.870 that means the variables considered in the models can explain 87 percent of the variation in yield explained by independent variables include in the model.

6.6.7 Value of F

In the table the F value was found 28.12 which is significant at one percent level implying that the explanatory variables included in the model were important for

explaining the variation in gross return of cauliflower production the variation of yield mainly depends on the explanatory variables include in the model.

6.6.8 Return to Scale in Cauliflower Cultivation:

The summation of all the production coefficients of cauliflower cultivation was equal to 1.47. This means that production function for cauliflower cultivation exhibits increasing returns to scale. This means that, if all the variables specified in the model were increased by 1 percent, yield of cauliflower would also be increased by 1.47 percent.

6.7 Resource Use Efficiency

Measurement of Resource Use Efficiency from the analysis of the regression equations we can study the ability of farmers to allocate resources in cauliflower production. It is important to make certain efficient use of resources, because resources are always limited (Majumder et al., 2009). In order to assessment this efficiency the ratio of Marginal Value Product (MVP) to the Marginal Factor Cost (MFC) for each input in computed and tested for its equality to 1, i.e.

MVPxi /MFCxi =1

The MPP and the corresponding values of MVP were obtained as follows:

MPPxi*Pyi = MFC,

Where,

MPPxi *Pyi=MVP

But, MPP = bi*(Y/Xi)

So, MVP = bi* (Y/Xi) Pyi

Here,

Y = Mean output;

bi = regression coefficient per resource;

Xi = Mean value of inputs;

Pyi= output;

MFC = price per unit of input.

In order to check resource use efficiency, it was considered that a ratio equal to unity indicated the optimum use of that factor, a ratio more than unity indicated that the yield could be increased by using more of the resources.

A value of less than unity specified the unprofitable level of resource use, which should be decreased to minimize the losses because farmers overused this variable. The negative value of MVP shows the indiscriminate and inefficient use of resource. The estimated marginal value products (MVPs) of different inputs and the ratio between MVPs and MFCs are presented in table 6.2.

Table 6.2: Marginal Productivity and Resource Use Efficiency

Variables	**GM**	**Y(GM)/ xi(GM)**	**Coefficient**	**MVP(xi)**	**MFC**	**MVP/ MFC**	**Comments**
Yield	125291						
Human labor	42291	2.96	0.612	1.81	1	1.81	Under utilized
Seedling	7611	16.46	0.366	6.02	1	6.02	Under utilized
Fertilizer	15002	8.35	0.031	.025	1	.025	Over Utilized
Insecticide	3094	40.49	0.045	1.82	1	1.82	Under utilized
Irrigation	4306	29.09	0.152	4.42	1	4.42	Under utilized
Tillage	2735	45.81	0.272	12.46	1	12.46	Under utilized

Source: Field Survey, 2020

Note: MVP = Marginal Value Product, MFC = Marginal Factor Cost, GM = Geometric mean. The ratios of MVPxi and MFCxi for human labor, seedling, insecticide, irrigation and tillage were positive and greater than one which implied that these inputs in the study area were underused (Table 6.2). It also indicated that these inputs have high

productivity in cauliflower production and more profit can be obtained by increasing investment in these inputs. So, farmers in the study area should increase the use of these inputs to attain efficiency level. But the ratio of MVPxi and MFCxi for fertilizer was less than 1. It indicates, farmers should decrease the use of this input or adjusted it to bring it closer to unity to attain efficiency level in production of cauliflower.

CHAPTER VII

CONSTRAINTS OF CAULIFLOWER CULTIVATION

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CONSTRAINTS OF CAULIFLOWER CULTIVATION

7.1 Introduction

Bangladesh is an agro-based country in which agriculture is considered as backbone of her economy. Although agriculture plays a vital role through employment sector, poverty alleviation, food security, and income generation but it has a number of problems mainly in cultivation practices. Farmers in Bangladesh do not get the enough amount of seeds, fertilizers, insecticides, technical helps and finally the desirable price of their products (Awal, 2013). Moreover, the farmers are economically unable to make investments the desired quantity inputs for producing crops due to their low capital base. Farmers having inadequate support from governmental agencies, they fail to gain their target. However, this chapter is design to identify the major constraints faced by the Cauliflower growers in the study area. Although cauliflower production was profitable on the farm level, multiple numbers of constraints were suggested by the farmers in the production of cauliflower in the study area.

7.2 Major Constraints Stated by the Farmers

The respondents were asked to give their opinion regarding constraints of cauliflower production. It was observed that all the cauliflower growers faced the identified problems more or less during the cultivation of cauliflower. However, major problems according to the intensity (percentage out of 100) stated by the farmers are given below:

7.2.1 Insect infestation

In the study area most of the farmer reported that they faced insect infestation most. Cauliflower is most prone to insects like aphids, flea beetles, slugs and snails, leap hoppers and several insect larva. The main problem is that most of the farmers have no scientific knowledge of production technology and, management of pests and disease. They have to rely on the dealer of the insecticide about what insecticide is for what kind of insects and diseases. About 97 percent out of 100 percent farmers reported this problem as the main cause of low productivity of cauliflower.

7.2.2 Scarcity of healthy seedling

Seedling is one of the most important input. Production of cauliflower is mainly depends on quality of seedling. But scarcity of improved seedlings was another limiting factor in producing cauliflower. In the study area it was found that about 58percent out of 100 percent cauliflower farmers used purchased seedlings. They reported that in local market HYV seedlings were not available at their desired level. Most of the growers purchased seedlings from local markets as HYV seedling but they opined that in many cases, those seedlings were not good quality which ultimately results in low production of vegetables. About 58 percent farmers reported this problem as the root cause of low productivity.

Table 7.1: Problems faced by cauliflower farmers

Types of Problem	**Percent %**
Insect infestation	97
Scarcity of healthy seedling	58
Irrigation problem	24
Problem in marketing	26
Low Price in season	78

Source: Field Survey, 2020.

7.2.3 Irrigation problem

In case of cauliflower production, irrigation is an essential input. But the cost of irrigation is very costly. About 24 percent of the cauliflower farmers reported that the input cost of irrigation is very high.

7.2.4 Problem in marketing

Low transportation facilities and underdeveloped village roads and inadequate storage facilities made trouble for cauliflower marketing. High transportation cost also

discourage farmers for distance transaction of cauliflower. About 26 percent of the cauliflower farmers reported that the problem of marketing was acute in the study area.

7.2.5 Low price in season

At the beginning of the season farmers get high price of cauliflower. But in late season they get low price of the vegetable. About 78 percent small farmers reported that they have faced with this problem.

7.3 Probable Solutions of the Identified Problems Suggested by Farmers

The farmers in the rural Bangladesh have been facing a lot of problems during the production circle of different crops. Cauliflower farmers are not an exception. They also faced a lot of constraints at the time of producing cauliflower. After identification of different problems and constrains some probable solutions were suggested by the farmer in the study area. They are briefly described below:

i. Government should take necessary steps to decrease the price of fertilizer used in Cauliflower farming.
ii. Government should take necessary steps to inform them about insecticides use and provide different insecticides at reasonable prices
iii. Most of the farmers suggested that supply of quality high yielding variety (HYV) seedlings should be available in sowing period.
iv. Formation of cooperative market for ensuring fair price of cauliflower and increasing bargaining power of farmers is important suggested by the farmers in the study area.

From the above discussion it is clear that farmers of the study area are facing numerous problems regarding cultivation practices of cauliflower. However, in spite of these problems and constraints the farmers in the study area are still producing this vegetable because of its high profitability and easy cultivation process. Moreover, its production is labor intensive. Thus, the idle family labor could be utilized during the production period.

7.4 Concluding Remarks

Cauliflower can play an important role in earning cash money. Since it is profitable and has huge domestic demand, its production should be expanded. Therefore, it may be concluded that Cauliflower production per acre as well as its commercial production could possibly be increased to a large extent if the above mentioned problems and constraints could be solved. Then it could help farmers to increase their income as well as their living standard.

CHAPTER VIII

SUMMARY, CONCLUSION AND RECOMMENDATIONS

CHAPTER VII
SUMMARY, CONCLUSION AND RECOMMENDATIONS

8.1 Introduction

This chapter highlights the most important findings and conclusions of the research. This chapter turned into summarized on the basis of previously mentioned chapter. The findings of the study and farmer's observation and perception on various problems associated with production of cauliflower , factors affecting and resource use efficiency of cauliflower production , problems faced by farmers as well as its effect on their socio economic status are summarized on this chapter. Finally, conclusion and some crucial policy recommendations of the study were also presented in this chapter.

8.2 Summary of the Study

Bangladesh is predominantly an agricultural country where, rice is the major food item for the people of the country. But rice alone cannot clear up the demand for balanced diet. Nutritional deficiency is a very common problem for the humans of Bangladesh today. Vegetables are taken into consideration as one of the most important groups of food crops. Nearly 100 different types of vegetable comprising both local and exotic type are grown in Bangladesh. Among winter vegetables cauliflower is important because of their dietary values and sources of income. In Bangladesh, it is called Fulkopi. Cauliflower is one of the least calorie vegetable, providing just 25 calories per 100gm. It is one of the vegetable recommended by the dieticians in weight-control programs. Therefore, the present study was an attempt to analyze the relative profitability and resource use efficiency of cauliflower production in selected area of Bangladesh. The specific objectives of the study were:

a) To identify the socio- demographic characteristics of sample farm households
b) To measure the profitability of cauliflower producing farms
c) To estimate the factors affecting and resource use efficiency of cauliflower production
d) To identify the major constraints associated with production of cauliflower.

The present study was conducted in Palash upazilla of Narsingdi district which was selected purposively. Four villages namely Saner bari, Raypura, Lampur, Joypura under

Palash upazilla were selected for collecting the data. These villages were selected because they possess same socio-economic attributes and homogeneous physiographic conditions. In this study a purposive random sampling method was applied. In total 60 farmers were selected to achieve the ultimate objective of the study. To get the desired sample at first the list of cauliflower producers were collected from agricultural extension officer of the selected upazilas agricultural office. A total of 200 farmers were observed to cultivate Cauliflower in the areas. The next task become to identify small farmers who cultivated Cauliflower minimum for 5 years. Out of 200 farmers 100 farmers have been identified as small farmer who cultivated Cauliflower minimum for 3 years. Then a total of 60 farmers were selected randomly from the chosen villages.

The field survey was conducted over the period from October 2019 to Mach 2020. Tabular technique as well as statistical techniques such as Cobb-Douglas production function were used to process and analyze the gathered data.

In analyzing the socio-demographic characteristics of selected cauliflower farmers multiple numbers of related aspects of the sample households were examined. These were age distribution, composition of family size, level of education, occupation, Monthly income, farm size and land ownership pattern, marital status ,Loan , sources of credit, women involvement, training received etc. It was found that, highest 54 percent of the respondents belonged to the above 49 years. Highest 62 percent of respondents could write name only, the average family members of 72 percent sampled farmers was found7-10 . It was found that 40 percent farmers engaged in vegetable cultivation as main occupation and others were associated with agriculture (22%), Fish culture (10%), livestock and poultry (14%), Labor(8%) and Business(6%). About 94% of the farmers were Married and 6% were Unmarried. In the study area about 10-30 decimal land belongs to 36% farmers, 31-60 decimal land belongs to 34% farmers and 30% farmers had above 60 decimal land. About 74 percent of cauliflower farmer had own land and 26 percent farmers cultivate their crop through rented in Land. The situation of whole Bangladesh is changing and in our study area 62 percent women of the farmer`s family were involved in Cauliflower Cultivation and 38 percent women of the farmers family were not involved in Cauliflower cultivation. About 38 percent farmers were in group who earned less than Tk. 9000per year and 8 percent of the farmers were earned Tk. 19000 and above per month. In our study 58

percent farmers had taken training and 42 percent farmers had not taken training. In the study area about 66 percent farmers had taken loan for their agricultural and no-

agricultural purpose. In the study area 16percent taken loan from bank, 24percent had taken loan from NGO and only 4percent farmers had taken loan from friends and relatives.

In case of Cauliflower cultivation human labor is the vital input that bear a large portion of total cost of Cauliflower cultivation. For various task like land preparation, Sowing, weeding, Irrigation, Pest& Fertilizer Management and harvesting etc. farmers need human labor.

Total cost of human labor amounted to Tk. 25200 per acre. Total family labor were 27 and total hired labor were 45. Highest labor cost incurred in land preparation that is 6300tk. for per acre of land. For Cauliflower cultivation 10,736 seedlings is needed per acre land. The cost for tillage was 3028tk. for per acre land. The cost of urea, TPS, MOP, gypsum, zinc and boron was 3650tk., 2010tk., 1752tk.,910tk. and 585tk. per acre. Cost of insecticide and irrigation was 3882tk. and 5213 tk. per acre. The total variable cost for per acre cauliflower cultivation was Tk. 66533. Per acre interest on operating capital was Tk. 2217.77 for Cauliflower production. The value for using land for Cauliflower cultivation was Tk. 15,000 per acre of land. Total fixed cost of cauliflower cultivation was 17217.77. Total cost, gross return, Net return and undiscounted BCR for cauliflower cultivation was 83750.77tk. ,182512tk., 98761.23tk. and 2.17.

The relative contribution of individual key variables affecting productivity of cauliflower farms can be seen from the estimates of regression equation. The results showed that most of the co-efficient had expected sign. However, the explanatory variables like human labor (X_1), seedling (X_2), fertilizer cost(X_3), insecticide (X_4), was found to have insignificant effect on production of cauliflower. the value of R^2 was 0.870 that means the variables considered in the models can explain 87 percent of the variation in yield explained by independent variables include in the model. The ratios of MVPxi and MFCxi for human labor, seedling, pesticide, irrigation and tillage were positive and greater than one which implied that these inputs in the study area were underused. It also indicated that these inputs have high productivity in cauliflower production and more profit can be obtained by increasing investment in these inputs.

So, farmers in the study area should increase the use

of these inputs to attain efficiency level. But the ratio of MVPxi and MFCxi for fertilizer was less than 1. It indicates, farmers should decrease the use of this input or adjusted it to bring it closer to unity to attain efficiency level in production of cauliflower.

Problem faced by cauliflower farmers were insect infestation (97%), scarcity of healthy seedling (58%), irrigation problem (24%), Problem in marketing (26%) and low price in season (78%).

8.3 Conclusion

From the results of the present study, it can be concluded that considerable scope apparently exists in the study area to increase the productivity of cauliflower and to increase income, employment and nutritional status of the farmers. The management practices of cauliflower production in the study area have not been found good enough. All the cauliflower farmers had not as much of idea about the application of inputs in right time with right doses. Therefore, some of them made over or under use of some inputs. Thus, well planned management training in accordance with their problems, needs, and resource base can lead to viable production practices and sustainable income from cauliflower production.

8.4 Recommendation

On the basis of the findings of the study, it was evident that cauliflower production was highly profitable and it can generate income earning and employment opportunity to the rural people of Bangladesh. But some problems and constraints came out into the production of cauliflower. So, policy recommendations constitute important guidelines for overcoming these constraints and increasing cauliflower production in Bangladesh. Some policy recommendations based on the findings and conclusion of the study are presented below:

i. Since quality seedlings played a significant role on cauliflower yield, both the government and private institutions should take necessary steps to ensure availability of quality seedlings at the doorsteps of farmers at reasonable price
ii. Government should take necessary steps to train the farmer about the proper use of inputs. Department of Agricultural Extension (DAE) can play an important role in this case. They can provide training program to the farmers in rural areas directly through Upazilla Extension officer

iii. Different government agencies like DAE and Non-Government Agencies (NGO`s) should continue strong extension program in order to increase cultivation area in other potential areas where land remaining fallow in cauliflower producing season.

iv. Institutional credit program should be launched aiming at commercial cauliflower production particularly for small farmers. The bank should reduce the difficulty in getting loans and should be encouraged to provide loans at a reasonable rate of interest. Government should take essential steps to control the interest rate of bank and NGOs at a reasonable level

v. Government also should take initiatives to search for new markets of cauliflower besides other agricultural products in abroad to export in large scale. To familiarize Bangladeshi vegetables to the foreigners and foreign super market quality of vegetable has to be improved by different value adding deeds like packaging, processing, handling, grading and transportation. Besides this, different promotional activities like vegetable fair can also be organized.

8.5 Limitations of the Study

This study was based on the profitability and resource use efficiency of cauliflower production. Though awareness had been taken to eliminate the errors and inconsistency of the study but it is not free from its limitations which are as follows:

i. It was very difficult to convince the respondents to give required information relating to such a research work, some of them demanded for money or other financial support for their farming since they thought it was government survey

ii. Most of the respondents initially hesitated to answer questions, as they thought the investigators might use the information against their interest specially they were hesitated to provide their income and land holding data.

iii. Most of the farmers were illiterate or quite unaware and they did not keep any written record of their annual, monthly or daily transaction and activities. It was very difficult to collect actual data. As a result, the author had to depend on the respondent’s bare memory regarding data generation

iv. At times, the interviewees were not available at home, which needed multiple visits to conduct a single interview

v. The present study defined the relationship of some selected variables, but there may be other variables such as farm size, management and weather that have direct or indirect influence on cauliflower production

vi. Resource such as time, money etc. were inadequate.

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APPENDICES

Department of Agricultural Economics

Sher-e-Bangla Agricultural University

An Interview Schedule on

Financial Profitability of Cauliflower Production in Some Selected Area of Narsingdi District

Specimen No.:

1. **Identification of the Farmer:**

Name of the Farmer: ……..

Village: …….

Union: ……..., Upazila: ……..

District: ……

2. **No. of the family member**: …….. , Male: …….

Female: ……...

3. **Socio-economic Information:**

A. Family details:-

Sl. No.	**Relation with the Household**	**Age**	**Education (Year of Schooling)**	**Marital Status**	**Occupation**		**Income (Monthly)**
					Main	**Subsidiary**	
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							

NB: Married=1, Unmarried=2, Widow=3, Divorce=4

Education: Write Name=1, Primary=2, Secondary=3, H.S.C=4, Graduate=5, Post Graduate=6, Uneducated=7.

Occupation: No Work=o, Cauliflower Cultivation=1, Agriculture=2, Fish Culture=3, Livestock Rearing=4, Labor=5, Business=6, Student=7, Housewife=8, Service=9 Others=10

B. Farm size / Size of land holdings:

Types of land	Area(acres)
I. Own Cultivated Land	
II. Rented in	
III. Rented out	
IV. Mortgaged in	
V. Mortgaged out	
VI. Fellow land	
Total Land	

C. i) Have you received any training on Cauliflower cultivation?

Yes: …….. No: ……... (Put tick mark)

If yes then-------

ii) From where you received the training?

……

iii) Involvement of cauliflower cultivation in terms of year? (Age of farm): ……..

iv) Involvement of women in cauliflower cultivation: ……

D. Are you a member of any organization?

i) Yes; …….. No: ……. (Put tick mark) if yes then------

ii) Name of the Organization: ……..

4. Cost and return calculation of Cauliflower cultivation:

A. Human Labor Requirement (man/days)

Please mention of your human labor requirement

Name of items	Cauliflower			
	No. of labor (quantity)		Taka/labor	Total (Tk.)
	Own	Hired		
Land preparation				
Manure & fertilizer application				
Weeding				
Irrigation				
Pest management				
Harvesting				
Total				

B. Cost of animal or mechanical powers used

Please mention your cost of animal or mechanical powers used

Name of practices	Cauliflower			
	Name of Machine/ Animal	No of machine or animal/days	Rent (Taka/days)	Total (Tk.)
Tillage				
Weeding				
Spraying				
Total				

C. Materials inputs used

Inputs	Unit Price	Cauliflower	
		Amount (kg/unit)	Taka/unit
Seed			
Manure			
Fertilizer			
a. Urea			
b. TSP			
c. MOP			
d. Gypsum			
e. Zinc			
Insecticides			
Irrigations			
Others			

D. Total Production

Items	Quantity	Price/Return
Main Product		
By Product(Leaf)		
Total		

5. Month of Cauliflower harvesting? ……

6. Amount (No.) of seedling sowing per decimal land (per Bigha): …….

7. Yearly income from Cauliflower cultivation? ……

10. Sourced of Credit Facilities:

a) Are you taking loan from others?

Yes: ……. No: ……. (Put tick mark) if yes---

b) Amount of Credit:

Sources	**Amount (Tk.)**
Banks	
NGOs	
Friends & Relatives	
Neighbors	
Money Lender	
Other Sources	

Please mention the problems faced by you in Cauliflower cultivation

a)……..

b)……..

c)……..

d)……..

e)……..

12. What are your suggestions to overcome the above problems?

a)……

b)……..

c)……..

d)……..

e)……..

Thank you for kind co-operation

Date:

Signature of the interviewer: