

**PROFITABILITY ANALYSIS OF GLADIOLUS CULTIVATION
IN THE SELECTED AREAS OF JASHORE DISTRICT IN
BANGLADESH**

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DEPARTMENT OF AGRIBUSINESS AND MARKETING

SHER-E-BANGLA AGRICULTURAL UNIVERSITY

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CERTIFICATE

This is to certify that the thesis entitled '**PROFITABILITY ANALYSIS OF GLADIOLUS CULTIVATION IN THE SELECTED AREAS OF JASHORE DISTRICT IN BANGLADESH**' submitted to the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **Master of Science in AGRIBUSINESS AND MARKETING**, embodies the result of a piece of bona fide research work carried out by **Nabila Tabassum Tooba**, Registration Number: **13-05707** 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 duly been acknowledged.

Dated:
Dhaka, Bangladesh

.....
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***DEDICATED
TO
MY
BELOVED
PARENTS***

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ABSTRACT

Gladiolus occupies a pristine place in the garden for its magnificent inflorescence, wide array of colours, and fascinating varieties of shapes and sizes. Present study was conducted in order to identify the important socio-economic attributes of gladiolus cultivators; to determine the profitability of gladiolus farming; and to identify problem faced by the gladiolus growers. The study was undertaken purposively in Jhikargacha upazilla under Jashore district. Pre-tested and well-structured questionnaire was used to collect data from 80 farmers from 1st November, 2019 to 1st December, 2019. The average yields of gladiolus was 2,00,000 per hectare for the farmers. The gross returns per hectare was Tk. 6,00,000. It was observed that per hectare net return was Tk. 2,00,150. Cost and returns were worked out to estimate profitability of gladiolus production. Per hectare total cost, gross return, net return and gross margin were Tk. 3,99,850, Tk. 6,00,000, Tk. 2,00,150 and Tk. 2,67,050 respectively. Benefit Cost Ratio was 1.6. Cobb-Douglas production function analysis was carried out for examining the factors affecting the profitability of input use. In most of the cases the coefficients of irrigation, human labor, cost of TSP, cost of manure and cost of pesticide appeared to be significant. The F-value for the gladiolus farmers was 18.76 which were highly significant at 1 percent level. Lack of capital was the 1st problems in the study and improper packaging was the last problem.

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ABBREVIATIONS

BBS	Bangladesh Bureau of Statistics
BARI	Bangladesh Agricultural Research Institute
GDP	Gross Domestic Product
BCR	Benefit Cost Ratio
NGOs	Non-Governmental Organization
BB	Bangladesh Bank
MP	Murate of Potash
HYV	High Yielding Variety
TSP	Triple Super Phosphate
STW	Shallow Tube Well
DTW	Deep Tube-Well
SPSS	Statistical Package for Social Science
LUC	Land Used Cost
TVC	Total Variable Cost
NR	Net Return
TR	Total revenue
TC	Total cost

CHAPTER I

INTRODUCTION

1.1. Background of the study

Flowers and plants play a major role in the life of humans. "Men have been, are and will still buy flowers" In this respect, we can judge sensibly—plants are required for our climate and social environment; realistically, people buy floriculture products because of their heritage and culture, in order to express themselves in line with their behavior or romantically – people use to express their feelings with flowers (Martsynovska 2011). Floriculture can be defined as a specialized branch of horticulture which deals not only with the cultivation of flowers, foliage, climbers, trees, shrubs, cacti, succulents, etc., but also with their marketing and production of value-added products from them. Floriculture can also be defined as “a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and floristry, comprising the floral industry. Floriculture includes bedding plants, flowering plants, foliage plants or houseplants, cut greens and cutflowers” (Van Uffelen 2005). Cut Flowers are the 337th most traded product and the 1122nd most complex product according to the Product Complexity Index (PCI). The top exporters of Cut Flowers are the Netherlands (\$3.68B), Colombia (\$1.4B), Ecuador (\$846M), Kenya (\$687M) and Ethiopia (\$207M). The top importers are the United States (\$1.74B), Germany (\$1.2B), the United Kingdom (\$972M), the Netherlands (\$920M) and Russia (\$445M). The scale of the global market for cut flowers is large, and increasing. According to research from Comtrade, the United Nations’ international trade database, global exports of cut flowers were worth \$8.48bn in 2017, a 46% increase from 1995 (Feenstra 2019). Development of business bloom generation can be followed back to the mid 70s that got force in the mid 80s when

enormous scale business creation began in Jhikargacha upazila of Jessore locale (Sultana, 2003). Later it speeded to a great extent in Jashore, Savar, Chuandanga, Mymensingh and Gazipur which went to be the significant flower cultivation belt in Bangladesh. By and by, Jashore is home to 70% of Bangladesh's floriculture and connects with 4,500 producers in a little, however powerful industry. The recently developing production belts are found in Chittagong, Cox's Bazar, Rangpur, and so on for flowers and Khulna, Bandarban, Khagrachori, Rangamati for ornamental plants (Khan 2013). Gladiolus, also known as sword lily is a popular cut flower in Bangladesh and its demand is increasing day by day. It was first introduced in Bangladesh at 1992 and was imported from India. Now this flower is cultivated throughout the flower growing areas.

Gladiolus is herbaceous perennial bulbous flowering plant commonly known as Glade and botanically known as *Gladiolus grandiflorus*. Gladiolus is also known as Sward lily based on the Greek word Xiphos meaning sword and is usually called as queen of bulbous flowering plants), belong to the family irradiance.

Gladiolus origin is South Africa and it is grown throughout the world. The genus Gladiolus has 270 species having 10,000 cultivars. More than 120 cultivars of gladiolus are cultivated for cut flower purposes. Many others are also used as seasonal flowering plants in gardens and exhibition It is popular commercial bulbous flowering plant, that is widely cultivated in most countries of the world.

Popularity of this plant as cut flowers is increasing day by day in developing countries including Bangladesh, due to the best quality and wide range of colours of its flowers. USA, Holland, Italy are the major countries producing Gladiolus as a cut flower. During winter season gladiolus has a great potential as a cut flowers to be exported to different countries on demand. It is a popular flower use in landscaping and religious ceremonies. For commercial production of cut flowers, aesthetic and decorative purposes mostly gladiolus is grown in pots. Mostly tall

spikes of large blossom produced by gladiolus. In Mexico gladiolus flowers production contribute for more than 80% of total cut flowers. Gladiolus flowers taken a great position in the heart of flower loving people as well as in the cut flower industry. The cut flower industry is a worldwide a fast-growing industry, which is becoming popular day by day. It is an important cut-flower in both domestic and international market, Netherlands, Germany and France are presently focusing the cut flower production of gladiolus traditionally to those countries where the climates are better and production costs are low Commercial cultivation of gladiolus is only possible through corms and cormels. One mother corm generally produces two to three daughter corms of stander size with few cormels. The cormels are auxiliary buds on the corm which is a compressed thickened stem and as resting perpetuating organ.

Gladiolus are half-hardy in temperate climates. They grow from rounded, symmetrical corms that are enveloped in several layers of brownish, fibrous tunics. Their stems are generally unbranched, producing 1 to 9 narrow, sword-shaped, longitudinal grooved leaves, enclosed in a sheath. The lowest leaf is shortened to a cataphyll. The leaf blades can be plane or cruciform in cross section.

The flower spikes are large and one-sided, with secund, bisexual flower. Gladiolus requires well drained soil of pH between 6.0-7.0 for its better growth and development. They also need open position for getting more sunlight, ample water with heavy soaking weekly. Gladiolus corms are harvested six to eight weeks after flowering. When corms harvested after six to eight weeks of flowering then it is dried under shade treated with fungicides and kept in ventilated area Corms of gladiolus are mostly planted on ridges or beds, it is recommended to plant the corms on ridges in case of clay soil while planting on beds is recommended for sandy soil.

Suitable plant spacing is the key factor to provide less competition among plants for moisture, light and nutrients to ensure maximum crop production. Commercial quality of gladiolus can be obtained at a planting density of 25 plants. Wide spacing produces higher number of corms and cormels. Plant spacing affects yield and high-quality spikes and corm. The main purposes of spike removal of gladiolus is to conserve store food of corm and to utilized that food for the production of quality flowers spike in the coming season to catch cut flowers market. Observed that removal of spike had an effect on the production of corms and cormels by diverting more energy for their development. The field will be tilled thoroughly and well decomposed farm yard manure (FYM) at the rate of 4 loaded trolleys was incorporated during plot preparation in order to enhance germination of seedling. Corms of glad were purchased and were planted on 18th February 2013 at the plant spacing of 30 cm and with row to row spacing of 60 cm. All corms will be planted at a depth of 6 cm.

Table 1.1. Name of flower and main production areas in Bangladesh

Cut flowers	Location
Tuberose	Jessore (Sharasha, Chaugacha, Jhikargacha), Savar ,Satkhira, Bogra, Comilla, Chittagong
Rose	Gazipur (Kapasia, Salna, Kaliakair), Savar, Jessore, Dhaka, Satkhira, Dinajpur
Gladiolus	Dhaka, Jessore, Gazipur, (Sreepur, Kaliakair)
Chrysanthemum	Savar (Dhamrai, Nabinagar, Sadullahpur), Gazipur (Kapasia) Bogra, Narayanganj
Dahlia	Dhaka, Savar, Gazipur, Bogra

Source: USAID 2014

Among the cut flower rose contributes the maximum. In the FY 2012-2013, cultivation of Rose occupied an area of 189 acres which expanded to 281 acres within FY 2013-14 according to the report of Bangladesh Bureau of Statistics. Gladiolus coming into play in recent times occupied the top position with a percent market share of 31.11. But an interesting fact is that even though the

production of Gerbera is done in Jessore in huge amount its market share in case of revenue is quite minimal.

Marketing of ornamentals involves many players that deals in different channels. The flower market chain in Bangladesh is really at a very early stage although it is getting structured day by day. The farmers usually get their inputs like seedlings, corms, bulbs from local seedling producers as well as produce themselves. Some special ones like Gerbera they import from India as the quality of the seedlings production in Bangladesh is still lacking. The financial and technical support for flower production comes from different GO's and NGO's as well as from Banks.

Table 1.2. Flower species and their market share

Flower species	Production of the Farm gate level (MT)	Revenue at the farm gate level (million USD)	Revenue at the retail level (million USD)	Market share (%)
Tuberose (single)	1,298.0	0.405	1.4	1.62
Tuberose (Double)	10,814.0	4.06	15.2	17.38
Rose	11,132.0	4.731	21.3	24.32
Gladiolus	9,914.0	10.04	27.9	31.11
Marigold	12,624.0	3.8	7.1	7.92
Gerbera	72.0	0.261	0.6	0.64
Other ornamentals	10,795.0	5.5	17.3	17
Total	56,649.0	28.8	90.8	100

Source: USAID 2014

Flower cultivation has emerged as a lucrative business which ensures higher potential to return compared to other agricultural crops. It is an emerging sector that has influenced in national GDP growth as well as employment generation in Bangladesh. Flower has an enormous international demand that creates huge opportunities for Bangladesh. Bangladesh is an agro based country, where the

climate is very favorable to flower cultivation (Khan 2012; Islam and Rahman 2013).

1.2. Objectives of the study

The present study was undertaken in order-

- a) To understand the socio-demographic aspects of gladiolus growers in the study area.
- b) To analyze profitability of gladiolus cultivation in the study area.
- c) To assess the association between the variables those affect the grower's income in the study area.
- d) To reveal the factors affecting gladiolus cultivation in the study area.
- e) To depict the women empowerment scenario and potential among the gladiolus farmers

1.3. Significance of the study

Flower industry is a flourishing and emerging industry in Bangladesh that includes the production of bedding and garden plants, foliage plants, potted flowering plants, cut flowers, cut cultivated greens and floriculture materials. Flower farming was found to be a lucrative business that ensures a greater capacity for generating income compared to other crops. But very few and fragmented works have been done previously on the profitability of flower cultivation. The findings of the study will redound to the benefit of the society considering that floriculture industry is and will be playing enormous role in nation's economy. As we aim to understand the realities and challenges of flower cultivation in the study area, it will help us in depicting the future of flower cultivation in Bangladesh. The greater demand of flower growers justifies the need for more effective value chain and income generation potential. Researchers can follow the similar guidelines and recommended approach in order to conduct similar research activities. We

shall assess the scenario of women empowerment, thus how gender equity can be assured through flower farming can be understood. However, this study will be conducted in context of gladiolus flower; it will pave the way for conducting research on other flowers. This study will help us to uncover critical areas of profitability analysis and relationship assessment between variables that affects farmer's income.

1.4. Rationale of the study

The main objectives of the study is to shed light on previous research gap by providing insights of the actual socio-economic condition of gladiolus farmers and the women empowerment scenario. In addition, the goal of the research is to demonstrate the factors that influence grower's profit, income and consumers choice. The discovering of these objectives will enhance the literature on the subject here in Bangladesh and add to existing literature. As a result, the considering of income will be very crucial in analyzing the research question because it is a dependent factor on which conclusions will be drawn. The rationale of this study is to investigate the practice and habits of flower growers in producing gladiolus. While there are a few growers here in Bangladesh, the knowledge of flowers is not very widespread and therefore as a consequence, there are very few people being exposed to the benefits of the floral industry.

1.5. Outline of the study

This thesis contains a total of 11 chapters which have been organized in the following sequences. Chapter 1 includes introduction. The review of literature is presented in chapter 2. Methodology of the relevant study is discussed in chapter 3. Chapter 4 is about socio-demographic profiles of gladiolus farmers. Chapter 5 contains profitability analysis of gladiolus. Chapter 6 deals with factors affecting profitability in selected area. Chapter 7 describes the scenario of women empowerment within the selected area. Chapter 8 presents the identification of

factors in gladiolus production and marketing. Finally chapter 9 represents conclusion and recommendation to increase the income of gladiolus farmers. And chapter 10 and 11 represent references and appendices respectively.

CHAPTER II

REVIEW OF LITERATURE

2.1. Introduction

This chapter will review existing literary works that have been conducted on the topic. As such it will consider both old and relatively new data on the floral industry. Both international and local and will seek to find links or similarities in relation to farmers attitudes and practices of cultivating cut flowers. It will take an in-depth look at various floral markets and exporting countries such as the Netherlands, Germany, The UK, Kenya and some others. Paying detailed attention to profitability analysis in these countries and how they have defined influential factors of growing cut flowers, will serve as benchmark for understanding the dynamics within the Bangladesh context.

Around the world, there has been various research conducted on understanding profitability and value chain potential in the floral industry. In this chapter, a discussion of other literary works done on the topic of profitability and the others will be considered. With the summary and synthesizing of various sources of research on the topic, the study will also find the link it has with these past studies and will endeavor to make its own stance clearly at the conclusion of the review in categorically identifying the growers condition; especially the Bangladeshi context.

2.2. Why cut flower is significant

According to Mishra (2007) among the horticultural crops covering fruits, vegetables spices, medicinal and aromatic plants and the like, floriculture constitutes an important segment. It is the only horticultural commodity which is being grown to improve the aesthetic value rather than culinary purpose.

In recent years floriculture has become a commercial activity due to its capacity to provide high returns per unit area. Today, with the rapid development of the floriculture industry, there has been a sea change in the use of floriculture items in all walks of life. Most of the public institutions have started using flowers in their offices. This is apart from its traditional usages at weddings, religious ceremonies and cultural functions thus making it a blooming sector.

Strictly speaking it is one of the fastest growing industries with huge potential for generating employment opportunities from the Agricultural Economic Review by Baourakis (2001) 'Floriculture is depicted as a serious farming activity, the practices that are devoted to the developing of flowers'. In cutting edge economies, the capital venture required for glass houses and other gear will in general be extremely high. Accordingly, financing for developing cut flower is generally costly. In most prosperous countries, a Behari article demonstrates that there has been massive progress in production practices and substantial research, which has helped shape the floral industry fully. It explained that consumers of cut flowers have become more quality conscious and show an unending demand for innovation' (Behari 1993). This demonstrates that consumers have developed a good eye for the choice of flowers especially in relation to quality. The choice of flowers depicts the need of the consumer to purchase flowers that are of good quality in which they can find value for their money.

2.3. History of Floral Industry: Cut Flower Market

The floral industry has witnessed a significant amount of change over the years. Initially founded as a means of improving the agricultural sector in most developed economies, the evolution of the floral industry dates back to over a long period of time. Tracing back its history, the floral industry dates back to the 19th century in England when flowers were grown on large scales on vast estates. Also, "the establishment of greenhouses in the Netherlands in the 16 and 1700's

introduced the formal cut flower production where spring flowers were brought into bloom early in the winter. In particular, lilac bushes were dug out of the field in the fall, subjected to natural cold temperatures to break dormancy and forced in greenhouses” (Asiedu, 2014). Presently around the world, the floral industry is considered a dynamic, global and fast growing industry making greater margins. With the Dutch horticultural sector considered a global trendsetter in supplying diverse floral markets across the world (Netherlands Enterprise Agency, 2013).

The Dutch Floral Market has become a household name in the international export market for cut flowers and recent fact and figures were released by the Netherlands Enterprise Agency explained that “in 2011, total horticultural production amounted to €8.6 billion. Exports (including re-exports) amounted to €16.2 billion”. Horticulture accounts for 39 percent of Dutch agricultural production. “The share of horticulture in the total Dutch exports in 2010 was 4% (share of agricultural exports 34%). The Netherlands has an exceptionally large share of the world trade in horticultural products, at 24%. In trade in floricultural products worldwide, the Netherlands is dominant with a share of 50%. In flower bulbs, the share is even 80%. The Dutch produce 4.32 billion tulip bulbs each year, some 53% of which (2.3 billion) are grown into cut flowers. Of these, 1.3 billion (or 57%) are sold in the Netherlands as cut flowers and the remainder is exported: 630 million bulbs in Europe and 370 million outside of Europe. For the fourth year in a row, the Netherlands is the world’s biggest exporter (in value) of fresh vegetables. The Netherlands exported 4.6 billion kilos of vegetables in 2010, with a market value of € 4.2 billion” (Netherlands Enterprise Agency, 2013). A little background of the cut flower market emphasized the contribution it makes to the floral market. Cut flowers are usually selected as a way of exchanging gifts or expressed as a certain feeling a consumer has developed about the product.

Industry reports suggested there were at least two different situations for which consumers buy flowers: for their own personal use and enjoyment, and as gifts for

friends or relatives on special occasions. There seems to be some important differences among the occasions for which flowers are chosen as gifts and when they are used for self/ personal satisfaction. This study investigates these different segments of the flower market by examining purchaser characteristics and purchasing behavior patterns for different purchase occasions. There are varied facets of horticulture that make up the floral industry. Floriculture comes under the umbrella of Horticulture. From the survey done on consumers of flowers and ornamental plants was an exploratory survey conducted in the Italian Mezzogiorno regions. “It turned out that 62.6% of interviewees buy cut flowers (despite exclusive buyers of flowers represent just 10.6% of the sample) with an annual frequency (70%), although consumers who purchase from 1 to 3 times a month represent more than 27.3% of total sample” (Asiedu 2014). The floral market is broad and well classed in arrays and assortments of different types of flowers, simply to enhance the natural environment and create jobs for the unemployed.

2.4. Flower production: Global trend

In Europe the most ornamentals are produced. The Netherlands is known for cut flowers and potted plants, as well as bulbs, for annuals and perennials. Germany has a name in nursery stock and garden plants. In Italy lots of flowers and potted plants are produced. While Denmark is famous of their potted plants, France is a broad player when it comes to the different types of products. UK, Belgium and Spain are small players in this field. The total production value is about 10 billion dollars, and has stabilized. Countries with the largest share in cut flower production are Germany (11%), Italy (18%) and the Netherlands (35%) (Van Uffelen *et al.* 2005)

In North and South America ornamental production mainly consist of flowers and cuttings. In North America (USA and Canada), where 80% of the flowers and potted plants are grown, California and Florida are the most important production

regions. In South America, Colombia (6%) and Mexico (3%) together with Costa Rica and Ecuador have developed rapidly over the last decade as producers of flowers and parental material. Also Brazil (6%), for a long time, has been a producer of parental material and cuttings of potted plants (Van Uffelen *et al.* 2005).

Production in Africa has increased over the last decade, with Kenya in the frontline followed by Tanzania, South Africa and Uganda. Flower production, of roses in particular has made enormous progress. Study of Van Uffelen *et al.* (2005) shows that production in countries like Zimbabwe and Ivory Coast has decreased because of the political situation in the country. For Africa we see rapid growth in a high risk environment. Besides an estimate of 0,2 billion dollar production there are hardly figures available about ornamental production in this continent.

About Asian production we hardly have any figures from the developing countries. Japan is traditionally a producer of specialties in ornamentals. South Korea, India and Thailand are coming up strongly as producers of ornamentals, followed by Taiwan. The production of cut flowers in Israel has decreased because of the political situation. Local production for local markets seems to be big. Export is starting from countries like China, Vietnam, India, etc.

2.5. Flower industry in Bangladesh: Present scenario

Although the floriculture industry is booming with each passing year, there is still some way to go towards realizing its full potential. Recently the use of flowers has vastly increased among the young especially, as changing cultural practices combining with enhanced consumerism in a growing economy. The calendar these days is packed with days when flower sellers can make a killing, and the export market is gradually picking up. These are the trends that have expedited the growth of the flower business in the country.

Even artificial flowers are gaining in popularity gradually, thanks to their use during different occasions including marriage, political and cultural programs, mainly as decorative items. Artificial flowers also enjoy the advantage of not being perishable. the country's flowers and floral products are being exported to different countries including India, Pakistan, Italy, Portugal, Middle east country specially Saudi Arabia, the United States, South Korea, the Philippines, Singapore, Japan, Germany, Britain, Denmark and France. The country's local market for flowers and cut foliage has reached Tk 1,200 crores per annum and growing at 10 percent per annum.

According to Export Promotion Bureau (EPB) data, the country's export earnings from Cut Flower and Foliage for the July to January period of the current fiscal (2018-19) touched \$3.98 million already, up from just \$0.02 million in the 2017-18 fiscal year. EPB data also read, Bangladesh exported cut flowers, leaves, trees, plants, bulbs, roots of \$86,000 (about Tk 72 lakh) in the 2016-17 fiscal, and \$78,000 (about Tk 65 lakh) in the previous fiscal.

Bangladesh has an economic advantage thanks to its favorable climate and topography as well as low labor costs and relatively low capital investment, which is helping the sector to flourish. More than 20 districts including Jashore, Jhenidah, Magura, Rangpur, Bogra, Dhaka (Savar), Gazipur and Manikganj districts, view the flower and foliage farming are cultivated flowers. Around 200,000 people are directly and indirectly dependent on this sector while more than 25,000 families are engaged in cultivating flowers.

2.6. Review of literature on profitability

According to Kehar Singh (2001) Damask Rose plantations are highly profitable. They need to be developed along scientific lines to stand the test of time. Kaul (1997) in his study on production and marketing of flowers has expressed grave concern over the 20 to 30 percent loss annually registered by the floriculture

sector due to lack of adequate infrastructure needed to preserve flowers once demand picks up and the markets become buoyant.

Agarwal and Duhijod (1997) in their study try to explain how marigold, chrysanthemum and daisy have been produced more than that of gallardia, wheat, soyabean and irrigated cotton. Marigold generates opportunities of gainful employment for the rural womenfolk who are good at flower harvesting. Human labour costs account for 75 per cent of total input cost in marigold as compared to 45 per cent and 41 percent in chrysanthemum and daisy respectively. Irrigation cost as a percentage of total input cost was also higher in daisy (40 percent) as compared to marigold and chrysanthemum.

Aaditya (2007) in his study on “From competition at Home to competition Abroad”, maintains that India’s international transportation costs were 20-23 per cent higher than those in other competing countries. For instance, it costs \$790 to transport one metric ton of grapes from India to Netherlands, about two-three times higher than doing the same from Chile.

According to Anil (2007) during Valentine Day celebrations, along with the bulk order, Tanflora was able to fetch a better price of Rs. 20 a stem compared with the previous year’s Rs.16-Rs.18. Normally red roses grown in the country fetch Rs.15-Rs.18 a stem in the European Markets during the season, but owing to bulk supply, our price realization was higher this year.

Desai (2004) in his study on the production of roses has pointed out in no uncertain terms that the costs of production of cut roses are bound to go up in view of the frightful volatility about the fixed cost which form 36.51 percent of the total cost and the variable cost which forms the remaining 63.49 percent. The cost of production of roses remain volatile in India because the prices of most of its basic inputs have not been under anybody’s control.

Thomas and Gupta (1987) have explained that the main items of expenditure in working out the cost of cultivation of banana per hectare in Kottayam district of Kerala were the expenditure on manures and fertilizers and on labor. An encouraging point noted in their study is the significant contribution of family labor which absorbs about 30 percent of the total labor cost in small size holdings.

According to Selvaraj (2003) in the floriculture smaller farmers have lower overheads. For a smaller farmer production costs per flower are about Rs. 0.80 while it is as high as Rs. 2.10 for larger farmers.

Kalirajan *et al.*(1997) in their study “Sources of Output Growth in Indian Agriculture” found that the cultivations of horticultural crops like fruits, flowers and vegetables is much more profitable and labor intensive than the field crops.

Kazi et al. (1997) in their study “Techno-Organization characteristics of Floriculture in West Bengal” found that the input-output ratios for the crops showed that flowers have an advantage over traditional crops like paddy and potato. High cost of inputs and low prices of output were the major constraints.

Pawan Dahiya () in their study “Comparative Economics of Floriculture in sonapat District of Haryana” revealed that under the present production technology and relative price structure, marigold was found to be considerably more profitable (net return Rs. 20,295 / ha) over its competing crops i.e paddy (Rs. 9,827/ha) and arhar (Rs. 3,380 / ha) similarly gladiolus was also found to be highly profitable (net return Rs 78,808 / ha) over its competing crops (1.c) mustard (Rs. 3,958 / ha) and wheat (Rs. 1372 / ha).

Ajay Kumar (2000) concludes in his analysis “Floriculture Industry an over view” that many of floriculture units suffered due to lack of infrastructure facilities like cold chain, lack of Technical know-how and elite planting material and many of them are closed. And he suggests that an up-to-date information is required as to which are the companies surviving and which are the ones closed.

According to Agro-Economic Research Centre studies floriculture has immense potentials for earning the foreign exchange for the growth of the economy. The report has brought to the light several crucial issues the most important among them is positive of empirical details on demand pattern market arrivals, prevailing prices and price determining factors such as changing consumer tastes and preference for different varieties of flowers. Moreover export of flowers which has emerged as relatively new enterprise requires a lot of efficient marketing intelligence network. The report closed with fervent plan to the government for expediting the process involved in the introduction of full-fledged system of marketing intelligence network as the pre-requisite for user in a viable floriculture industry.

Rao (1997) explained that horticultural crops like fruits vegetables and flower crops have higher employment potential compared to field crops, which is mainly due to spread over of the harvesting period in the case of flowers and vegetables. Land productivity is considerably higher resulting from the high yield performance of horticultural crops.

2.7. Literature review on supply and value chain of flower industry

Theory of the global value chains can be seen as an outcome of scholars' understanding globalization and the changing nature of economic integration, international trade and industrial organization. According to Gereffi *et al.* (2005) value chain is "the process by which technology is combined with material and labor inputs, and then processed inputs are assembled, marketed and distributed". (Gereffi 2005) These value chains are getting more and more fragmented and geographically dispersed meaning the physical separation of different parts of the production process. Such fragmentation allows production in different countries to be organized in efficient production networks.

The value chain theory highlights that for many industries access to international markets is gained merely not through the designing, producing and marketing of the new products, but through the entry into international design, production and marketing networks. This is particularly the case with global floriculture industry where the new emerging hubs (developing countries) acquired new production capabilities and gained access not only to the new markets, but to the new marketing channels. The supply-buyer interactions foster the learning effects in this global value chain as well (Hosseini 2005).

Gereffi *et al.* (1994) introduced the framework of ‘global commodity chains’, where the role of new emerging production hubs and the importance of new global buyers in the global value chains were emphasized. Mainly retailers and brand makers were named as key drivers in the formation of globally dispersed and organizationally fragmented production and distribution networks. The author introduced the term ‘buyer-driven global commodity chain’ to stress how global buyers use full coordination to facilitate the creation of highly competent supply-base upon which global production and distribution systems could be built without direct ownership.

Coe *et al.* (2004) names the ‘strategic coupling’ of the global production networks of firms and regional economies the driver of regional development through the process of value creation, enhancement and capture. Regional development here is “a dynamic outcome of the complex interaction between territorialized relational networks and global production networks within the context of changing regional governance.” (Coe *et al.* 2004) This is reasonable to assume that ‘strategic coupling’ facilitates not only regional, but industrial development as well. Number of value-added activities may be developed in the industries as the learning and cooperation processes within the value chain facilitate a wide range of production and entrepreneurial activities. The study argues that economies of scale and scope embedded within specific regions are advantageous to the regions that can

complement the strategic needs of trans-local actors within the global production networks. Here global production networks are defined as “the globally organized nexus of interconnected functions and operations by firms and non-firms institutions through which goods and services are produced and distributed”. Respectively, new actors in the industry can benefit from the ‘strategic coupling’ in the production networks if they possess required endogenous capabilities to serve the needs of the global value chain actors. Such global production networks integrate firms, regions, countries through the development of different forms of equity and non-equity relationships that erase the traditional organizational boundaries. Being influenced in part by regulatory and non-regulatory barriers and local socio-cultural conditions they create complex geographically dispersed global value-added and product supply chains.

There is a related field of the research that causes great interest among value chain actors and scholars as well – the global value chain governance and the supply chain management. The importance of the efficient supply chain management can’t be overestimated if the peculiarities of the floriculture products are emphasized again. Efficient supply chain management is extremely complex and challenging task today due to the expanding products variety, short product life cycle, globalization of the business processes, and continuous advancement in ICT. The last one – the development of Internet and computer technologies, has contributed a lot to the improvement supply chain management. It enabled actors in the supply chain to enjoy continues flow of information and knowledge sharing, reduced the cost of the transactions, serving the customer needs in a more direct manner. (Lee, 2002) Anyway that is not the key to a success as today many industries even having the access to the global technology demonstrate poor performance. The success of the particular industry depends on the right supply chain strategy. First of all, it is useful to introduce the definition of the supply chain management (SCM) by the Global Supply Chain Forum: “Supply Chain

Management is the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customers and other stakeholders” (Lambert & Cooper, 2000). SCM is a complex process that requires managing not only B2B relationships, but a complex network of numerous businesses and relationships from the point of product origin to the point of its consumption. Managing the supply chain to the point of consumption is the main interest for the actors in the supply chain because who has the relationship with the end user gains the power in the supply chain.

CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the methods used for the fulfillment of the study. The methodological details regarding the selection of the study area, sampling framework, collection of data, analytical techniques and conceptual framework to understand the functioning of the phenomenon (flower production and marketing) employed in the study are presented in this chapter.

3.1. Sampling design

Multistage sampling design was used to collect primary data for the study. The Jashore district was purposively selected on account of higher proportion of area under flower cultivation.



Figure 3.1. Map of Jashore District.

The flower producing area of Jashore district is Jhikargacha upazilla. The present study was mainly conducted at this upazilla. And sampling was done by randomly selecting 2 unions of this upazilla. The selected unions are Godkhali and Panisara. Two villages from each union were randomly selected. Gadkhali and Patuapara from Gadkhali union, Krishnachandrapur and Taora from Panisara union were selected to conduct the present study.



Figure 3.2. Map of Jhikargacha Upazilla showing its unions

20 respondents from each villages were randomly selected for face to face interview. Thus total 80 respondents were asked to survey certain pre tested questionnaire.

3.2. Population size

A list was created considering the farmers who cultivate various types of flowers in Jashore district with the help of Upazilla Agriculture Officer (UAO), Agriculture Extension Officer (AEO) and Sub Assistant Agriculture Officers (SAAO). This prepared list is the population of the present study.

3.3. Collection of data

The study is primarily based on primary data, which was collected through personal interview of the respondents with the help of specially structured and pre-tested schedule. The primary data were collected on socio-economic aspects along with the different input cost, yield, return and employment in gladiolus cultivation. The farmers' perception was also recorded about the constraints to gladiolus cultivation. The data was pertaining to the agriculture year 2019-20.



Figure 3.3. Data Collection

However, secondary data were also collected from various sources such as Bangladesh Flower Growers & Exporters Association (BFA), Bangladesh Bureau of Statistics (BBS), Department of Agricultural Extension (DAE), journals, library, current flower market search, ebooks and consultation of resource persons etc.



Figure 3.4. Data collection

3.4. Data analysis process and procedures

Keeping in the view of specific objectives, this section deals with approaches and methods of analysis to test different hypothesis of the study. For the analysis, different statistical procedures was followed specially through the Statistical Program for Social Science (SPSS) software. Tabular and descriptive statistical analysis was employed to study the socio-economic status of selected farmers. The

establishment expenditure on gladiolus cultivation, costs and returns of gladiolus cultivation, marketing cost of flower and employment potential in gladiolus production was also studied using tabular descriptive analysis.

3.5. Analytical technique

To determine the contribution of the most important variables in the production process, the following specification of the model was applied:

$$Y = AX_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} X_6^{b_6} X_7^{b_7} X_8^{b_8} X_9^{b_9} e^{u_i}$$

The empirical production function was the following:

$$\ln Y = a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + b_8 \ln X_8 + b_9 \ln X_9 + U_i$$

Where,

Y = Yield (Stick/ha); X₁ = Human Labor (Man-day/ha); X₂ = Land preparation cost (Tk/ha); X₃ = Seedling (Tk/ha); X₄ = Manure (kg/ha); X₅ = Urea (kg/ha); X₆ = TSP (kg/ha); X₇ = MOP (kg/ha); X₈ = Insecticide cost (Tk/ha); X₉ = Irrigation cost (Tk/ha); a = Intercept; b₁, b₂----- b₉ coefficients of the respective variables to be estimated. U_i = Error term.

Net value of the produce and cost involved were estimated. Cost of variables inputs such as land preparation, labor, seed, fertilizer, manure, irrigation, and insecticides were calculated. The tabular method of analysis involved different descriptive statistics like mean, percentage, ratio, etc. Land use cost was calculated on the basis of per year lease value of land.

Variable costs

- i. Cost of corm
- ii. Cost of hired labour
- iii. Cost of organic manure
- iv. Cost of land preparation
- v. Cost of chemical fertilizer
- vi. Cost of irrigation

vii. Cost of insecticide

Fixed costs

i. Interest on operating capital

ii. Land use cost

Gross Margin

$$GM = TR - VC$$

Whereas,

GM = Gross Margin

TR = Total Revenue

VC = Variable Cost

Net Income

$$NI = TR - TC$$

Whereas,

NI = Net Income

TR = Total Revenue

TC = Total Cost

$$\text{Benefit cost ratio (BCR)} = TR/TC$$

For estimating net income total cost was subtracted from total revenue. Total cost includes variable cost plus fixed cost. Per hectare profitability of gladiolus cultivation from the view point of individual farmers were measured in terms of gross return, gross margin and net return.

Ranking of problems

For ranking the problems reported by respondents, descriptive function was used and the mean value was calculated. After finding the mean values, the ranking was made by traditional scoring function.

CHAPTER IV

SOCIO-ECONOMIC FEATURES OF GLADIOLUS FARMERS

4.1. Agro-climatic features of the study area

4.1.1. Description of the study area

Jashore is popularly known for the market and production niche of Gladiolus in Bangladesh, situated in the heart of Khulna Division. Jessore District encompasses 2606.98 km². It is bounded by Jhenaidaha and Magura districts at the north, Satkhira and Khulna districts at the south, Narail and Khulna districts at the east, and West Bengal of India at the west. Major rivers that flow through this region are the Bhairab, Teka, Hari, Sree, Aparbhadra, Harihar, Buribhadra, Chitra, Betna, Kopotakkho, and the Mukteshwari. (Mahibullah 2012). The district lies between 22°48' and 23°22' north latitudes and between 88°51' and 89°34' east longitudes.

4.1.2. Geography and soil types

The Jessore region includes the western part of the Ganges river floodplain which is predominantly highland and medium highland. General soil types predominantly include calcareous dark grey floodplain soils and calcareous brown floodplain soils. Organic matter content in the brown ridge soils is low but higher in the dark grey soils. Soils are slightly alkaline in reaction. General fertility level is low. This region is suitable for agricultural crop production especially in cereals and vegetables. The cropping intensity is much higher than the other region of the country. The whole area holds comparatively dry weather than the other parts of the country. Annual average temperature range from 15.4 to 34.6 °C (59.7 to 94.3 °F). The annual rainfall is 1,537 millimetres (60.5 in).

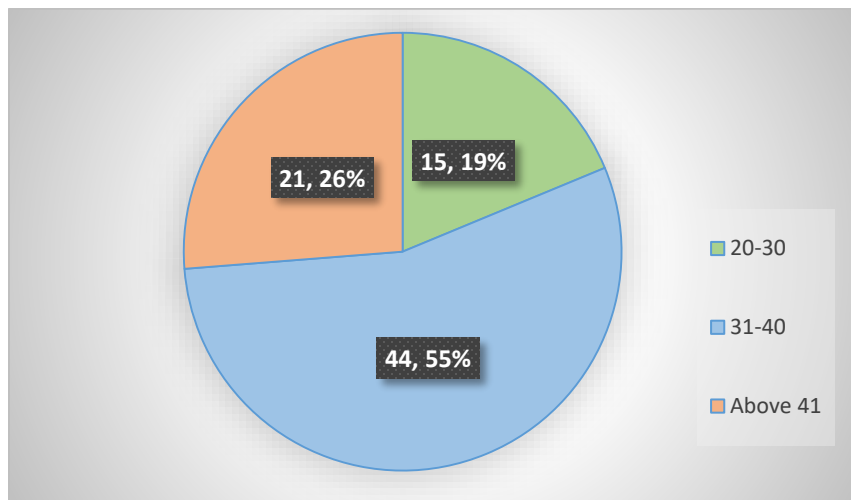
4.1.3. Economic situation of Jashore district

The economy of Jessore is predominantly agricultural. Out of the total 591 thousand holdings of the district, 63.38% holding are farms that produce varieties of crops, namely local and HYV paddy, wheat, jute, vegetables, spices, pulses, oilseeds, sugarcane and others. Various fruits like mango, banana, Jackfruit guava, coconut and betel nut etc. are grown. Fish of different varieties abound in the district. Varieties of fishes caught from rivers, tributary, channels and creeks and even from paddy field during rainy seasons. Besides crops, livestock and fishery are other sources of household income (BBS 2011).

4.2. Socio-economic study of respondents

4.2.1. Age

The socioeconomic profile of the sample respondents is presented in figure 1. On the basis of age, the farmers were classified into three categories: up to 20-30 years, 31-40 years and above 40 years.



Source: Field survey 2019

Figure 4.1. Pie Chart Showing the Age of the respondents.

The analysis of age of the respondents revealed that, in case of gladiolus farmers, 15 respondents were under age group of the 21 to 30 years, 44 respondents between

31 to 40 years and 21 respondents were above 40 years of age, constituting of 19, 55 and 26 percent of the total number of respondents.

4.2.2. Education

The education scores of the respondents ranged from 0 to 17. The average was 8.39 and the standard deviation was 2.87. According to their educational scores, the respondents were categorized into four groups such as illiterate/ can sign only, primary (from class 01 to 05), secondary (from class 06 to 10) and above secondary (above class 10).

Table 4.1. Distribution of respondents according to their education

Level of Education	No. of respondents	Percent (%)
Illiterate/ Can sign only	10	12.5
Primary (1 to 5)	24	30
Secondary (6 to 10)	38	47.5
Above secondary (>10)	8	10
Total	80	100

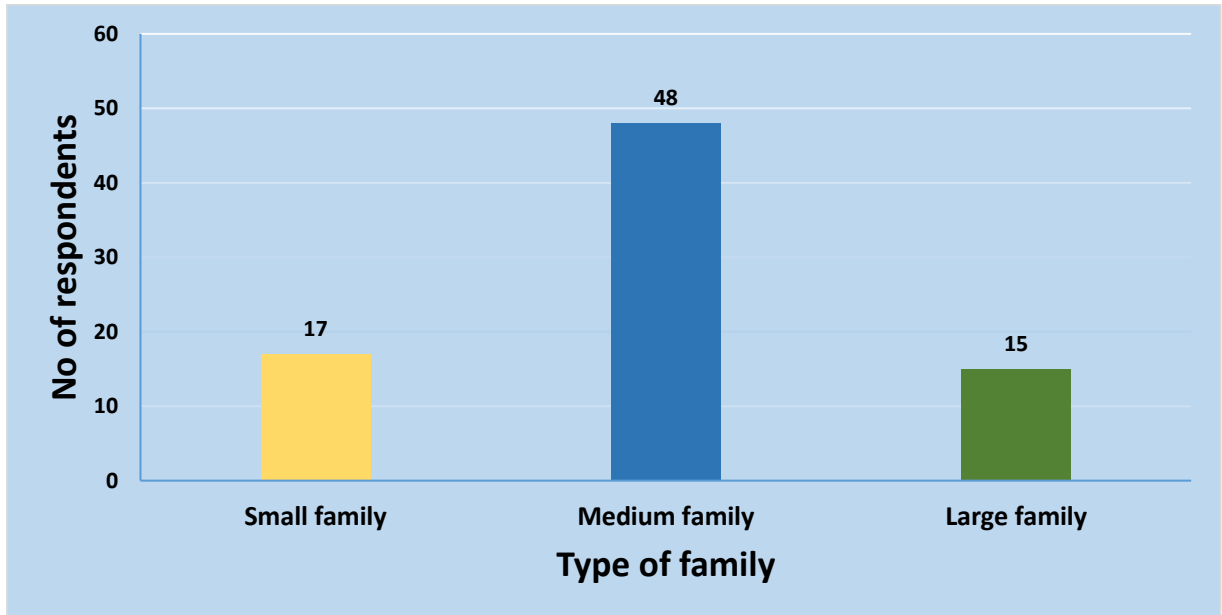
Source: Field survey 2019

From the table 1, it is revealed that highest number of respondents have education of secondary level. Among 80 farmers, 38 farmers were from this group (47.5 %). Only 8 farmers (10%) have above secondary level education whereas, 10 farmers (12.5 %) found illiterate or merely can sign. It is also found that 24 farmers (30%) went to primary school (class 1 to 5).

4.2.3. Family size

According to the number of family members respondents were categorized into three groups such as small family, medium family and large family. Small family constitute upto 3 members, medium family constitute 4-5 members, whereas large family consists of 6 or above 6 family members. Data revealed (figure 6) that among

80 respondent 17 respondent have small family, 48 respondent have medium family and 15 respondent have large family members sharing 22, 60 and 18 percent respectively.

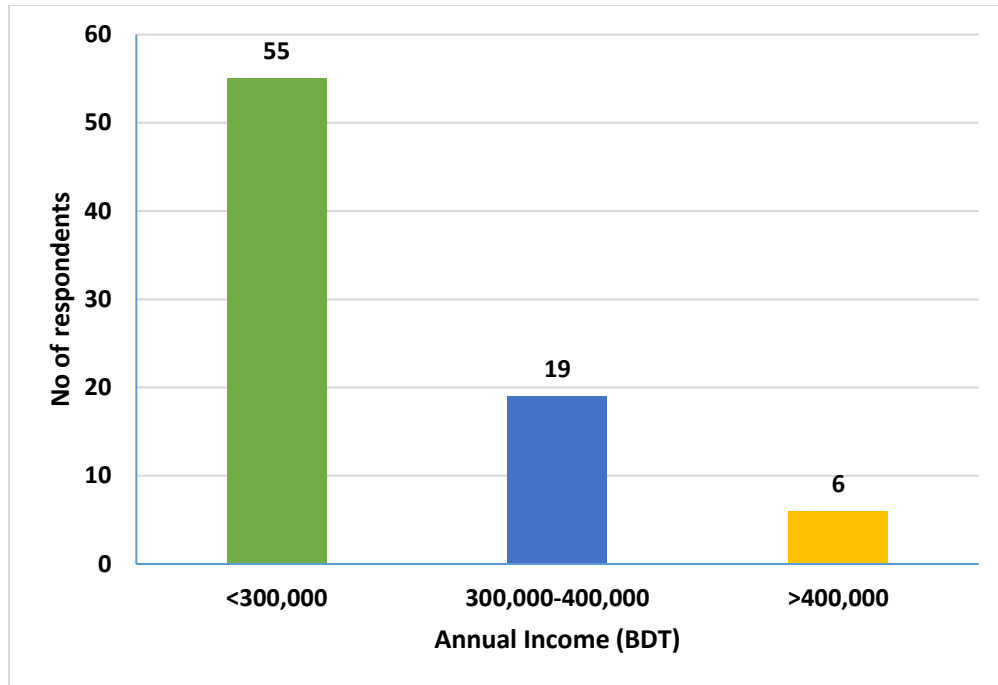


Source: Field survey 2019

Figure 4.2. Distribution of respondents according to family size

4.2.4. Income:

It is evident that annual income of gladiolus growers vary from each other. We categorized the respondents into three income groups such as upto 300,000 BDT, 300,000-400,000 BDT and above 400,000 BDT per annum. We see the figure 7 that show about 55 farmers earned 1-2 lac per year , 19 farmers earned 3-4 lac per year and only 6 farmers earned above than 4 lac respectively. From the figure it is revealed that 69% of total respondents fell in first group, 24% in later and rest 7% respondents fell in the last group.

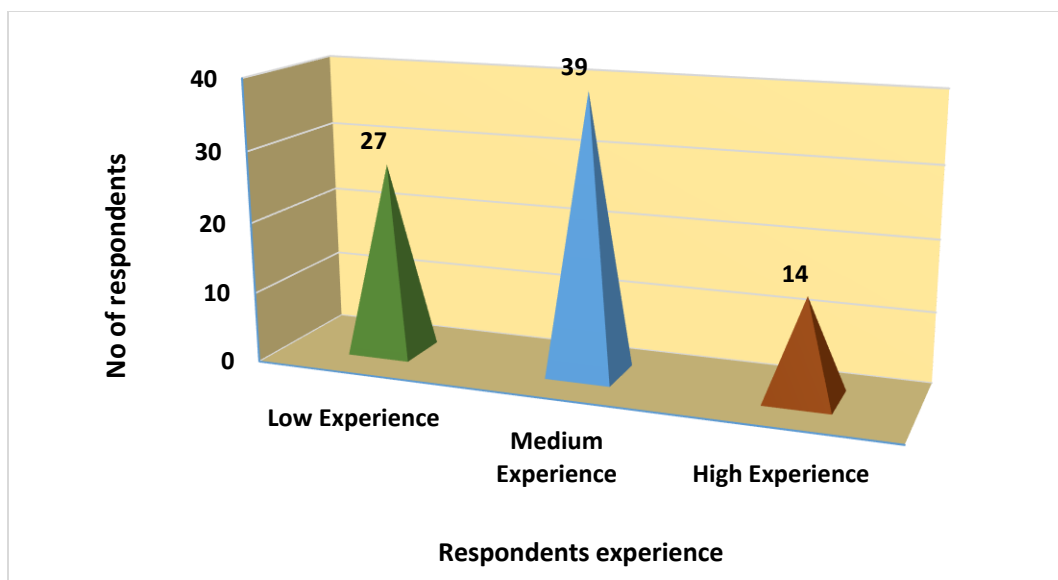


Source : Field survey 2019

Figure 4.3. Distribution of respondents according to annual income

4.2.5. Experience of gladiolus cultivation

Respondents of present study have different experiences of gladiolus cultivation and the years of experience ranges from 2 years to 32 years. According to these experiences, respondents are categorized into three groups. They are low experiences which includes 2 to 7 years of experience, medium experience which engages 8 to 15 years of engagement in gladiolus cultivation and lastly, high experience which denotes above 15 years of experience in gladiolus cultivation. It is evident from the data that majority of respondents (39) have medium experiences followed by low experienced group. 27 farmers have 2 to 7 years of experience in gladiolus cultivation. However, only 14 farmers were involved in gladiolus production for at least 15 years. The low, medium and high experience groups constitute 34%, 49% and 17% of total respondents respectively.

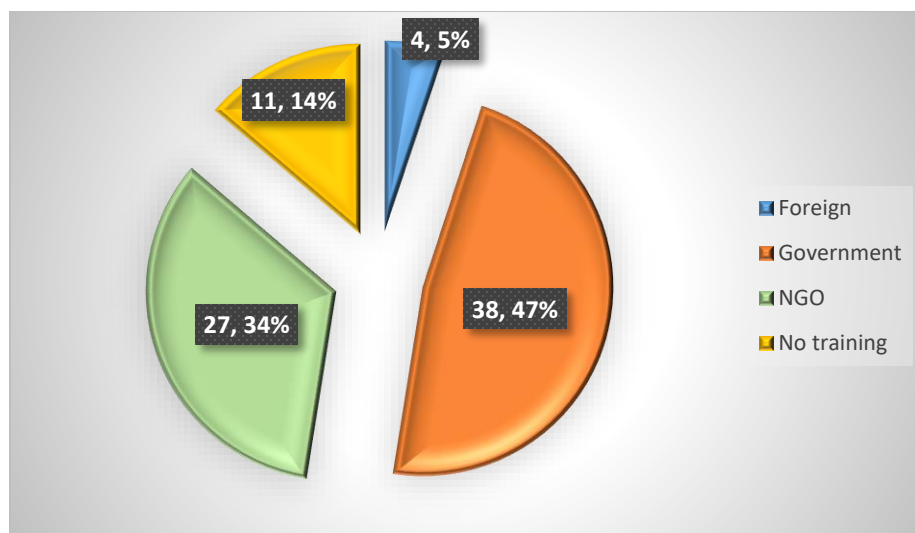


Source: Field survey 2019

Figure 4.4. Experience of respondents

4.2.6. Training on flower cultivation

Respondents of present study experienced training from various sources. Some of them even did not receive any training though. Respondents were categorized into three groups based on their source of training. The sources are Government, NGO, Foreign and no training. From the data it is found that majority (38) farmers got training from government organizations where 27 farmers receive training from different NGO's. However, there are 4 respondents who got the opportunity to go abroad for training purpose. Lastly, 11 gladiolus farmers did not receive any training on flower cultivation. Foreign, Governmental, NGO and no training constitutes 5%, 48%, 34% and 13% of total respondents respectively.



Source: Field survey 2019

Figure 4.5. Training in flower cultivation.

4.2.7. Land under gladiolus cultivation

Farmers utilize various sizes of land for gladiolus cultivation. According to the size of land the respondents were categorized into small, medium and large farmers. Small farmers are those who cultivate at least 1 hectare of land. Medium farmers are those who cultivate from 1 to 2.5 hectares of land whereas, large farmers are those who cultivate gladiolus in more than 2.5 hectares of land.

Table 4.2. Distribution of respondents according to the size of land under cultivation

Types of land	No. of Respondents	Percentage of respondents
Small Farm (<1 ha)	26	33
Medium Farm (1-2.5 ha)	37	46
Large Farm (>2.5 ha)	17	21
Total	80	100

Source: Field survey 2019

From the table it is evident that majority (37) of gladiolus grower is medium farmers and constitute 46% of total respondents. 26 respondents' possessed small sized

farms whereas, 17 respondents cultivate gladiolus in more than 2.5 ha of land constituting 33% and 21% of total respondents respectively.

4.2.8. Source of fund

Respondents of present study cultivate gladiolus either by taking loans or by utilizing their own fund. It is evident that only 15 farmers cultivate gladiolus by their own fund whereas, 65 farmers took loan for gladiolus production. Among 65 farmers, 34 farmers received loan from different banks, 24 farmers received loan from different NGOs and rest of them borrowed money from relatives.

Table 4.3. Source of fund of cultivators

Source of fund		No of respondent	Percentage
Self-fund		15	19
Loan	Bank	34	43
	NGO	24	30
	Relatives	7	8
Total		80	100

Source: Field survey 2019

CHAPTER V

PROFITABILITY ANALYSIS OF GLADIOLUS CULTIVATION

5.1. Introduction

Profit is an excess of revenues over associated expenses for an activity over a period of time. Profitability means to make profit from all the business activities. In this chapter we will discuss about the costs, returns and profitability of gladiolus cultivation. Profitability mainly calculated by net return, gross margin and ratio of return to total cost. This chapter also depicted the undiscounted benefit-cost ratio. There are mainly two type of cost .e.g. variable cost and fixed cost.

5.2. Input use pattern

The number of human labor used for producing gladiolus was 60 man-days per hectare. The cost of land preparation was TK.8,000. The average number of corms was 1,50,000 per hectare. Gladiolus farmers also used chemical fertilizers like Urea, SSP, MOP, FYM at the rate of 150 kg ,100kg, 100 kg,400kg, and 30 ton per hectare respectively. The farmer used plant protection chemicals such as Bavistin 2kg and Chlorpyriphos 2 litre. The cost of irrigation was 2000tk/ha.

Table 5.1. Input use pattern of Gladiolus cultivation in study area

Items	Amount
Human labor (man days/ha)	60
Land preparation cost (tk/ha)	8,000
corms(no/ha)	1,50,000
Fertilizer	
Urea (kg/ha)	150
Single Super Phosphate(kg/ha)	100
MOP(kg/ha)	100
FYM(ton/ha)	30
Plant protection chemicals	
Bavistin (kg/ha)	2
Chlorpyriphos (lit/ha)	2
Irrigation(tk/ha)	2000

Source: Field survey 2019

5.3. Cost and Return from Gladiolus Cultivation

All variable cost incurred for human labor, land preparation, corms, organic manure, fertilizers, plant protection chemicals and irrigation were considered for calculating the cost of gladiolus cultivation. The cost of land use calculated on the basis of prevailing local lease value of land.

5.3.1. Variable cost

Variable costs are corporate expenses that vary in direct proportion to the quantity of output. A variable cost is considered as important component and a management tool in calculating the total expense. Variable cost is hugely important for a business because calculate the profitability. The section include in variable cost are land preparation is 8000tk per hectare. Hired labor cost is

tk.9000. Total cost of fertilizer includes Urea, SSP, MOP, FYM, Plant protection chemicals cost is 750, 1500, 1200, 9000, 1500 taka respectively. (Table 5.2). Irrigation cost is tk.2000. Total variable cost is 3,32,950 TK.

5.3.2. Fixed cost

Fixed cost are predetermined expenses that remain the same throughout a specific period. It is also important part of financial analysis. Here land use cost is tk66,900 .

5.3.3 Total cost

Total cost is calculated on the basis of variable cost and the fixed cost. Total variable cost tk.3,32,950 per hectare and total fixed cost is tk66,900 per hectare. So the total cost tk 3,99,850 per hectare (Table 5.2)

5.3.4 Gross return

Gross return is calculated on the multiplication of yield per hectare and price of per gladiolus. The yield of gladiolus per hectare is 1,50,000 and price of per flower is tk 4. So the gross return is tk 6,00,000 per hectare (Table5.2)

5.3.5 Gross margin

Gross margin is calculated by the subtraction from gross return to variable cost. Gross return is tk 6,00,000 and variable cost is tk3,32,950 in per hectare. So the gross margin is tk2,67,050 (Table5.2)

5.3.6. Net return:

Net return is calculated by the subtraction from gross return to total cost. Gross return is tk 6,00,000 and total cost is tk 3,99,850. So the net return is tk.2,00150.

5.3.7. Benefit cost ratio (undiscounted)

Benefit cost ratio is an important factor which decides the optimum levels of input to be used for maximization of production and returns of crops. Benefit cost ratio is calculated from the table 5.2 by the division of gross return and total cost on the full cost basis. Gross return is tk.6,00,000 and total cost is tk3,99,850per hectare. The benefit cost ratio (BCR) on full cost basis is 1.6. Variable cost is tk3,32,950 per hectare .So the benefit cost ratio on variable cost basis is 1.80 (Table5.2). Benefit Cost Ratio (BCR) is 1.6 which implies that one taka investment in gladiolus production generated TK. 1.6. So we can see that the gladiolus cultivation is profitable in Bangladesh.

5.3.8. Conclusion

The study results were highly encouraging with respect to higher economic return of gladiolus cultivation. To produce desired quantity and quality of flowers to meet the growing domestic as well as international market. From the study it can be concluded that, cultivation of gladiolus is highly economical and more profitable.

Table 5.2. Cost and return of Gladiolus cultivation in study area

Item	Cost of cultivation(tk/ha)
A. Variable Cost	3,32,950
Land preparation	8,000
Hired labor	9,000
Corms	3,00,000
Chemical fertilizer	
Urea	750
SSP	1500
MOP	1200
FYM	9000
Plant protection chemicals	1500
Irrigation	2000
B. Fixed Cost	
Land use	66,900
C. Total Cost(TC): (A+B)	3,99,850
Yield (Flower/ha)	1,50,000
Price(tk/price)	4
D. Gross Return(GR): (yield*price)	6,00,000
Gross Margin (GR-VC)	2,67,050
Net Return(GR-TC)	2,00,150
E. Benefit Cost Ratio(BCR):(GR/TC)	
Full cost basis	1.6
Variable cost basis	1.80

CHAPTER VI
FACTORS AFFECTING PROFITABILITY OF GLADIOLUS
CULTIVATION

6.1. Introduction

In this chapter we will discuss about the each factor. To identify and measure the effect of different factors on yield of gladiolus cultivation. For production function of gladiolus cultivation we were taken into nine explanatory variables. Now we are interpreted below the effect of each of the variables on the yield of gladiolus cultivation.

6.2. Factors Affecting the Yield of Gladiolus

In order to determine the contribution of inputs like humane labor, land preparation, corms, manure, urea, TSP, MOP, insecticides and irrigation for gladiolus production, Cobb-Douglas production function were presented in table

6.2.1. Effect of Human labor (X1)

It is clear from the table that coefficient of human labor are positive and significant at 1% level of significance. One percent level of significant implies that the 1% increase in the use of human labor keeping others factor remaining constant would increase the yield of gladiolus by 0.172%

6.2.2. Effect of Land preparation (X2)

It was evidence from the table that the coefficient of land preparation are positive and significant at 5% level of significance. Five percent level of significant indicates that the 5% increase in the cost of land preparation keeping others factor remaining constant would increase the yield of gladiolus by 0.221%.

6.2.3. Effect of Corms (X3)

From the table the value of coefficient of corms are positive and significant at 1% level of significance. That implies the 1% increase in the cost of corms keeping other factor remaining constant would increase the yield of gladiolus by 0.147 %.

6.2.4. Effect of Manure (X4)

From the table the value of coefficient of manures are positive and significant at 5% level of significance. That implies the 5% increase in the cost of corms keeping other factor remaining constant would increase the yield of gladiolus by 0.378 %.

6.2.5. Effect of Urea (X5)

From the regression that the coefficient of the use of urea are positive and significant at 1% level of significance. That implies the 1% increase in the use of urea keeping others factor remaining constant would increase the yield of gladiolus by 0.257 %. Here statistical t -value is 2.34.

6.2.6. Effect of SSP (X6)

It was observed from the table the value of coefficient of the use of SSP are positive and significant at 5% level of significance. It means the 5% increase in the use of SSP keeping other factor remaining constant would increase the yield of gladiolus by 0.188%

6.2.7. Effect of MOP (X7)

In this table we see that the value of the coefficient are positive and significant at 1% level of significance. One percent level of significant indicates that the one

percent increase in the use of MOP keeping others factor remaining constant would increase the yield of gladiolus by 0.339 %.

6.2.8. Effect of Insecticides (X8)

From the table the effect of the coefficient are positive and significant at 5% level of significance. It show that the 5 percent increase in the use of insecticides keeping others factor remaining constant would increase the yield of gladiolus by 0.234 %.

6.2.9. Effect of Irrigation (X9)

It was observed from the regression that the coefficient of the irrigation are positive and significant at 1% level of significance. One percent level of significant indicates that the one percent increase in the use of irrigation keeping others factor remaining constant would increase the yield of gladiolus by 0.421 %.

6.2.10. Value of R square

The value of co-efficient of determination (R^2) is 0.68, which indicate around 68 % of the variation in yield explained by independent variables include in the model.

6.2.11. Value of F

In the table the F value was found 18.76 which is significant at 1% level implying that the variation of yield mainly depends on the explanatory variables include in the model.

Table 6.1. Estimated coefficients and their Related Statistic of Production Function of Gladiolus

Explanatory variable	Co-efficient	t-value
Intercept	12.8	3.41
Human labor (X1)	0.172**	1.54
Land preparation	0.221*	2.01
Corms	0.147**	1.32
Manure	0.378*	1.08
Urea	0.257**	2.34
SSP	0.188*	1.69
MOP	0.339**	3.18
Insecticides	0.234*	2.12
Irrigation	0.421**	4.099
R ²	0.68	
F value	18.76**	

Note: **and * indicate significant at 1% and 5% level respectively

CHPATER VII

ECONOMIC EMPOWERMENT OF FEMALE FLOWERS GROWERS

Women and men are an essential resource of all nations and societies. Women have been playing a key role, not only in the improvement of family well-being, but also in the development of the economic, political, and ecological environments. However, the role and social status of women in the past were limited by tradition, law, religion, etc. Therefore, women have less opportunity to play their role in the society in comparison to men. The role of women and men in the relationship pattern of decision - making and division of labor in the family, are determined based on the gender status of men and women. The gender role is one of the important factors of interrelationship between husband and wife in the family. Women's fundamental role is a housewife who has to be responsible for house caring and child rearing

Women play a crucial role in the economic welfare of the family. Women perform different tasks depending on their socio-economic structure, number of members in the family, the nature of professions they are involved in and many other factors.

The female cultivators were asked some pre-set questionnaire about their empowerment through gladiolus cultivation. They were asked whether they can take a decision in their family. Forty-five percent respondents said that they can take a decision in their family along with their husband. Others have said that they cannot take decision on family matter. With the changing outlook of the society towards women and her role in various activities both inside and outside the family system, the traditional, male chauvinistic role of the father as one to possess the best decision-making ability in the family has also undergone drastic transformation. Women, in most part of the world today are no longer compelled to be under the garb of veils and are coming out in the open, shouldering

responsibilities in various kinds of decision making and standing at par with men at every tread.

Fifty four percent respondents expressed that they can have their own saving from the profit of gladiolus cultivation. However, the rest of them cannot save their profit from farming. However, 76% women can save their profit at home but other of them can save the money in bank or other financial organizations.

Only 38 percent of female respondents said that they can invest the profit in other sectors such as small business, beef fattening and so on without the consent of their husbands. Majority of women farmers have no right to investment in the other enterprise. 65% of women respondents can decision about the education of their children. But only no one can take the decision about their marriage. 48% of female growers are engaged in social development activities but other 52% females are not involved in those activities. For the smooth running of a family, it is very important that equal status and equal power should be given to the basic constituents of family, i.e., man and woman so that they can rear up their children in a better way, and solve their day to day problems for achieving their desired goals.

65% female thought they are comfortable in their working environment and vicinity; they feel free in their working site. However, 56% of the female cultivators shared that they have a good relationship with their coordinators while other female farmers expressed negative vibe. Due to child care responsibilities economically active women often leave the labour market and thus accumulate less work experience. As a result of time constraints women are also more likely to work in part time jobs and in informal arrangements that pay less and/or provide fewer benefits, but provide more flexibility. Women are also more concentrated in certain phases or activities of the supply chain (e.g. packaging, post-processing). Occupational segregation into low-technology occupations limits the opportunities to generate new skills and capabilities, thus hindering future professional development and reinforcing the discrimination towards these sectors as low-pay and low-status occupations.

72% female farmers when asked, expressed that they are encouraged to solve family problems or their own problems by themselves. However, the other females cannot solve problems by their own.

Today, more than ever, women are becoming active participants and full protagonists of the development process. However, many obstacles and barriers continue to complicate women's participation. In many parts of the world, large numbers of women remain isolated, unorganized, poor and constrained by sociocultural and legal structures that restrict their access to, and involvement in, the development process. The obstacles and barriers that limit women's opportunity to participate in different aspects of community life and social development are markedly diverse. Public policy initiatives to overcome barriers to women participating equally in economic, social and political activity vary greatly among countries and over time.

Lastly, it is evident that women cultivators are far away from empowerment in society. Today, the median female share of the global workforce is 45.4 percent. Women's formal and informal labor can transform a community from a relatively autonomous society to a participant in the national economy. Despite significant obstacles, women's small businesses in rural developing communities not only can be an extended family's lifeline, but can form a networked economic foundation for future generations. The role of women in the urban and rural workforce has expanded exponentially in recent decades.

The contribution of women to agricultural and flower production is clearly significant. The available evidence suggests that women are often paid less than men, for the same work. We conclude that accurate, current, regionally specific information and analysis is necessary for good gender-aware agricultural policy making. Data collection has improved substantially over the last decades, as has our understanding of the complexity of women's roles and the need to collect data not only on primary activities but on all women's activities. Data are needed to better understand gender roles in agriculture and how they change over time and in response to new opportunities.

CHAPTER VIII

CONSTRAINTS OF GLADIOLUS CULTIVATION

During the course of the present study, an attempt is made to find out the problems encountered by the farmers in gladiolus cultivation. It is found that invariably all farmers have cultivation problems like seedlings problem, non-availability of labourers, high wages, severity of diseases, lack of finance, lack of technology, water scarcity, poor quality of fertilizer and the cost of other inputs.

To identify the relative importance of the problems in gladiolus cultivation, it is decided to use the scaling of ranks with the help of Scale Conversion Table and Garrett Ranking Technique. Fourteen problems relating to gladiolus cultivation are identified and given in the final interview schedule.

Table 8.1. Ranking of problems of gladiolus production and marketing system

Problem	Score	Rank
Lack of capital	10	1
Poor marketing system	9.375	2
High price of pesticides	8.875	3
High irrigation cost	8.75	4
Shortage of quality planting material	8.375	5
Pest and disease attack	7.875	6
Lack of technical know how	7.625	7
Insufficient training	7.25	8
Poor storage capacity	7.2	9
Poor transportation	6.875	10
Lack of governmental support	6.5	11
Improper grading and packaging	6.275	12

Source: Field survey 2019

All the 80 sample farmers are called to assign rank to all these problems in order of the magnitude. Each farmer is instructed to indicate the importance of the problem by giving rank I to the most important problem, rank II to the second important one and so on.

8.1. Lack of capital

Farmers ranked the lack of capital as the most important and top constraints among all other for gladiolus cultivation. The small flower business that lacks sufficient working capital usually find it difficult to attract buyers and lenders. Working capital shows creditors that a company possesses the ability to pay back its loan or can earn a sufficient profit that allows investors to earn a return on their investments. Some creditors may require a gladiolus grower to use its assets as collateral. Creditors may view farmers without working capital as a risk.

8.2. Poor marketing system

This constraint ranked as the second top most barrier of gladiolus cultivation and marketing. Small scale gladiolus farms in Jashore are always faced with the challenge of market insufficiency. Having to compete with already developed farms which are also seeking new markets to diversify from the traditional flower markets. At present, flower-marketing is not fully organized in Bangladesh. Major traders for flowers can be found in Shahbag, Farmgate and Gulshan in Dhaka. Substantial trade can also be found in Chittagong and other big cities. There are reportedly around 4000 retail shops of flowers in the country. This often results in a wide gap between demand and supply of flowers produced. The traders who enter into contract with the cultivators and agents for the supply of flowers throughout the year always find it very difficult in tide over the situation

8.3. High price of pesticides

Gladiolus is being repeatedly attacked by insects and pests, causes a huge amount of pesticides to get rid of those biotic stresses. Among insects, both sucking type and cutting type insects attack on gladiolus. Some of the sucking insects are Aphids, white flies, mealybugs, scale and thrips which all feed on gladiolus. These tiny bugs pierce the stem or leave and feed on plant cell matter. Damage may appear as yellow or white spots, and leaves may turn yellow or wither and fall. Caterpillars, beetles and grasshoppers all enjoy munching on the juicy leaves and flowers of gladiolus. Farmers usually spray a lot of times throughout a season to repell or kill those pests that costs huge money.

8.4. High irrigation cost

High irrigation cost ranked number four according to the perception of gladiolus growers of Jashore area. Irrigation is a part and parcel of intercultural operation of gladiolus farming. Gladiolus field should be irrigated at 7-10-day intervals in sandy soils and at less frequent intervals in heavy soils. Irrigation should be withheld at least 4-6 weeks before lifting of corms. However, throughout the season, it requires huge amount of moisture and thus cost a plethora of money.

8.5. Shortage of quality corms

Selection of corms is important because there is much difference in their quality, and in the spikes of bloom they will produce. When purchasing corms, illiterate farmers might be deceived by size. Those which are one and one-half to two inches across, with high convex crowns, produce the best blossoms. Very large flat corms, with concave upper surfaces, usually produce weaker growth with smaller spikes, and appear to be prone to disease. Exceptionally large corms frequently send up two spikes of bloom—both inferior. Quality corms are not available in an adequate amount to satisfy the demand of gladiolus farmers.

8.6. Pest and disease attack

Large scale cultivation of gladiolus as in case of other commercial crops has been plagued by many limitations. Attack by insects, mites and other pests is one of the important bottlenecks for successful production of gladiolus. As many as 65 insect pests and diseases have been recorded on gladiolus plants in worldwide. Farmers usually concentrate a lot of time for pest and disease attack. Flower quality reduces to a large extent on account of pest and disease attack. Not only in the field but in postharvest condition, pest and disease cut a lion share that requires to fetch a good price of flower.

8.7. Insufficient technical knowledge

The 7th problem according to the scoring of gladiolus growers is inadequate scientific knowledge on gladiolus farming. Lack of knowledge in planting is another problem as repeated by the gladiolus cultivators. Majority of the small-scale and medium scale growers do not have adequate knowledge with regard to the scientific planting and nurturing of the plants in their nurseries. Scientific selection of plants, scientific preparation of adequate quantities of the Ingredients to be used for the preparation of potting mixtures, spacing to be provided between plants, extent of shade to be provided to each variety of plants and also suited to each locality where the plants are grown, etc., are important factors determining the growth and yield of plants to a great extent. But majority of the small-scale and medium-scale cultivators surveyed do not have proper ideas in these important aspects to be considered at the time of planting.

8.8 Insufficient training

Lack of training is another problem constraining gladiolus cultivator (8th) In Jashore. Lack of training with regard to the low cost cultivation techniques, scientific pest and disease management, low cost in-vitro propagation technique, training for the identification of disease free planting material, training for early detection of diseases and pests, adoption of timely control

measures, production of innovative value-added items, etc., make the cultivation of gladiolus a costly affair.

8.9. Poor storage capacity

In Jashore, there are very limited air-conditioned storage facilities to keep the flowers afresh like the one in foreign countries like Netherlands, Mauritius, Singapore, and Thailand etc. Lack of such a facility either in the private or public sector in Jashore often compel the flower traders to sell their produce at an abysmally low prices compared to their competitors.

8.10. Poor communication and transportation system

Gladiolus flowers should be transported as quickly as possible to the trading auction centres in order to get high unit value realisation. In Jashore there is a lack of refrigerated vehicles specially designed for carrying flower from the procurement centres to the trading centres. Proper marketing network as in the case of other plantation crops have not been developed so far in for the marketing of gladiolus both within and outside the district. Hence the traders themselves have to establish direct contacts with the cultivar, which are scattered. There is no uniformity in the prices offered by each trader to the cultivator. A few traders and their agents both within and outside the jashore often eliminate marginal traders due to the unhealthy trade practices resulted.

8.11. Lack of governmental support

The Government has not yet provided much support to the growers by providing infrastructure facilities such as quick transportation facilities for despatching flowers to the nearest destinations, centralised air-conditioned storage facilities for keeping the flowers in prime locations ideally suited for the marketing of flowers, auction centres with all modern facilities, fixation of support prices for each varieties of flowers, facilities for the export of these flowers through publicity, trade fairs, exhibitions, etc.

8.12. Improper grading and packaging

Due to, the lack of proper training, many of the cultivators are ignorant with regard to the standardized grading and packing procedures to be adopted at the time of despatch of flowers to traders or agents. Unhygienic methods of harvesting, careless handling and improper transportation of flowers cause severe damages and degradation of the quality of flowers. This often makes the flowers unsuitable for marketing by the traders located at distant places. Sometimes it also requires further grading and repacking by the traders resulting in additional expenses, delays and inconveniences to the traders.

CHAPTER IX

SUMMARY, CONCLUSION AND RECOMMENDATION

9.1. Summary

Present study was notable based on primary data (survey), which were collected by the researcher herself through interviewing and discussing with the sample gladiolus farmers. A total of 80 gladiolus cultivators were selected from Jhikargacha upazila of Jashore district followed to collect production related data while, simple random sampling technique was used to select the gladiolus farmers. Tabular as well as statistical technique was followed to accomplish the core objectives of the study.

Considering the present study, following specific objectives were formulated-

- a) To understand the socio-demographic aspects of gladiolus growers in the study area.
- b) To analyze profitability of gladiolus cultivation in the study area.
- c) To assess the association between the variables those affect the grower's income in the study area.
- d) To reveal the factors affecting gladiolus cultivation in the study area.
- e) To depict the women empowerment scenario and potential among the gladiolus farmers

With respect to socioeconomic attributes of the sample gladiolus farmers, it is revealed that 15 respondents were under age group of the 21 to 30 years, 44 respondents between 31 to 40 years and 21 respondents were above 40 years of age, constituting of 19, 55 and 26 percent of the total number of respondents. The respondents were categorized into four groups such as illiterate/ can sign only, primary (from class 01 to 05), secondary (from class 06 to 10) and above secondary (above class 10). It is revealed that highest number of respondents have education

of secondary level. Among 80 farmers, 38 farmers were from this group (47.5 %). Only 8 farmers (10%) have above secondary level education whereas, 10 farmers (12.5 %) found illiterate or merely can sign. It is also found that 24 farmers (30%) went to primary school (class 1 to 5). Among 80 respondent 17 respondent have small family, 48 respondent have medium family and 15 respondent have large family members sharing 22, 60 and 18 percent respectively. About 55 farmers earned 1-2 lac per year , 19 farmers earned 3-4 lac per year and only 6 farmers earned above than 4 lac respectively. It is revealed that 69% of total respondents fell in first group, 24% in later and rest 7% respondents fell in the last group. It is evident from the data that majority of respondents (39) have medium experiences followed by low experienced group. 27 farmers have 2 to 7 years of experience in gladiolus cultivation. However, only 14 farmers were involved in gladiolus production for at least 15 years. The low, medium and high experience groups constitute 34%, 49% and 17% of total respondents respectively. It is found that majority (38) farmers got training from government organizations where 27 farmers receive training from different NGO's. However, there are 4 respondents who got the opportunity to go abroad for training purpose. Lastly, 11 gladiolus farmers did not receive any training on flower cultivation. Foreign, Governmental, NGO and no training constitutes 5%, 48%, 34% and 13% of total respondents respectively. Only 15 farmers cultivate gladiolus by their own fund whereas, 65 farmers took loan for gladiolus production. Among 65 farmers, 34 farmers received loan from different banks, 24 farmers received loan from different NGOs and rest of them borrowed money from relatives.

The average yields of gladiolus was 2,00,000 per hectare for the farmers. The gross returns per hectare was Tk. 6,00,000. It was observed that per hectare net return was Tk. 2,00,150. Cost and returns were worked out to estimate profitability of gladiolus production. Per hectare total cost, gross return, net return and gross margin were Tk. 3,99,850, Tk. 6,00,000, Tk. 2,00,150 and Tk. 2,67,050 respectively. Benefit Cost Ratio was 1.6. Cobb-Douglas production function analysis was carried out for

examining the factors affecting the profitability of input use. In most of the cases the coefficients of irrigation, human labor, cost of TSP, cost of manure and cost of pesticide appeared to be significant. The F-value for the gladiolus farmers was 18.76 which were highly significant at 1 percent level.

The female cultivators were asked some pre-set questionnaire about their empowerment through gladiolus cultivation. They were asked whether they can take a decision in their family. Forty-five percent respondents said that they can take a decision in their family along with their husband. Fifty four percent respondents expressed that they can have their own saving from the profit of gladiolus cultivation. 65% of women respondents can decision about the education of their children. But only no one can take the decision about their marriage. 48% of female growers are engaged in social development activities but other 52% females are not involved in those activities.

Lack of capital was ranked as the most important constraints in gladiolus farming and improper packaging was ranked as the less important constraints.

9.2. Conclusion

- i. Literacy rate is not so high among gladiolus farmers. As education is the backbone of nation, farmers' education is very important. Education will help them in decision making.
- ii. More training is needed for gladiolus farmers. Training will help those identifying good cultivars, good corms and proper cultural techniques.
- iii. Credit facilities is not much among gladiolus farmers.
- iv. Majority of farmers are medium farmers which denotes they have more than 2 hectares of land.
- v. Majority of farmers earn 1-2 lacs taka per year from gladiolus cultivation.

- vi. Majority of farmers have medium sized family.
- vii. Majority of farmers have below 7 years of experience in gladiolus cultivation.
- viii. To produce desired quantity and quality of flowers to meet the growing domestic as well as international market. From the study it can be concluded that, cultivation of gladiolus is highly economical and more profitable.
- ix. Financial constraints are the major constraints for gladiolus cultivators.
- x. Women are engaged with different social development activities. Women empowerment can be gained gradually.

9.3. Recommendation

The following recommendations are presented for successful shrimp farming development in the study area.

- I. Government and non-Govt. agencies should take a concentrated effort -
 - a. to enhance gladiolus production by train-up the gladiolus farmers,
 - b. to provide appropriate production assistance and storage facility,
 - c. to provide support farmers in marketing of the produced flowers,
 - d. to train and assist the traders in processing, grading, storing and displaying flowers, and
 - e. to allocate permanent market infrastructure in major cities for the self- governed flower markets in Dhaka and other major cities for facilitating flower trading.
- II. A Market Information System (MIS) should be developed for ease access of the stakeholders to required updates of the industry.

III. Entrepreneur-friendly SME and credit policies and packages should be developed to ensure a balanced growth of the floriculture industry.

CHAPTER X

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CHAPTER XI

APPENDIX

QUESTIONNAIRE

Title: Profitability analysis of gladiolus cultivation in the selected areas of Jashore district in Bangladesh

1. Personal information of respondents :

Respondent's Name :..... Mobile Number :
 Village : Union :
 Upazilla : District :

2. (i) Socio-economic information about female flower farmers in the study area :

Age	Marital Status	Family members	Earning family members	Family size	Educational background	Occupation		How long have you involved in flower production and marketing
						Main	Secondary	

Code : Marital Status : Unmarried = 1 , Married = 2 , Family members : 1-3 member = 1 , 3-5 member =2, 5-8 member = 3 , above 8 member = 4 , Earning family member : 1 member =1 , 2 member =2 , above 2 member =3 , Educational background : class 1-5 =1 , class 6-8= 2 , class 9-10 = 3 , class 11-12=4, Graduate and above =5 , illiterate = 6 , How long have you involved in flower production and marketing : 1 -2 years = 1 , 2-3 years =2 , 3-5 years= 3 and above 5 years =4.

(ii) Other important information:

Does it helping economic development?		Yes = 1 No = 0
Do you have taken any loan? If Yes , from where?		Yes = 1 No = 0 Bank = 1 , Relatives =2,Village leader=3,Neighbour=4,NGO=5,Others=6

Do you have any training regarding of flower marketing? If Yes, from where?		Yes =1 No =0 Government =1, NGO=2
Do you think training is necessary for your business?		Yes=1 No=0
Number of farmers involved in your business?		

(3) Profitability Analysis:

(i) Pricing information:

How much your monthly income?		
How much your monthly expenditure?		
How much Your initial investment?		
What is selling price of per stick of flower?		
Payment of flower farmers		Daily =1, Weekly=2,Monthly=3

(ii) Humane labor requirement (man/ day) :

Operation	Labor (man\day)		Unit cost (TK)	Total cost (TK)
	Family labor	Hired labor		
Land preparation and sowing seed				
Weeding and fertilizer				
Harvesting				
Retting and Packaging				

(iii) Per hectare material inputs used :

Various inputs	Quantity	Unit cost (TK)	Total cost (TK)
Seed			
Fertilizer			
Urea			
TSP			
Irrigation			
Pesticide			
Transportation			

(iii) **Land use information :**

Name of flower	Land area under cultivation	Rental price (TK)

(v) **Flower marketing cost:**

Instrument cost	Number /Amount	Cost (TK)
Labor cost		
Packaging cost		
Polythene cost		
Storage cost		
Transportation cost		
Other cost		
Total cost		

(vi) **Income from flower last year**

Sell of flower	Number / Amount	Cost (TK)

(iv) **Raw material collection:**

Source of raw materials		Collection point of raw materials
Seed		Local nursery=1,Own farm=2,Outside of Jashore=3,India=4,Dhaka=5,Other=6
Fertilizer		Farmers=1,Local market=2,Other market=3
Pesticide		Local market=1,Other=2
Others		

(5)Economic empowerment of female flower farmers

(i)

Do you take any decision in your family?		Yes=1 No=0
Do you start your saving?		Yes=1 No=0
Do you save money at home?		Yes=1 No=0
Do you have a postal or bank account?		Yes=1 No=0
Do you invest your money?		Yes=1 No=0
Which sector are you investing your money?		Other small business=1,Making own home=2,Buying transport=3,Buying land=4,Other(Specify)=5

Do you taking your children study decision?		Yes=1 No=0
Do you taking your children marriage decision?		Yes=1 No=0

- ii. Are you satisfied your own business? Yes=1 No=0
- iii. Are you interested to involved more worker in your business? Yes=1 No=0
- iv. Are you involved any social development activities ? Yes=1 No=0
- v. Do you feel free in your working environment? Yes=1 No=0
- vi. Do you have good relationship with coordinators? Yes=1 No=0
- vii. Are you encouraged to solve your family or own problem? Yes=1 No=0
- viii. Are you planning to start any income generating activity in the next five years?
Yes=1 No=0

(5) Problems of flower production and marketing system:

Problems	Yes=1	No=0	Rating of problems
Lack of quality seed			
High irrigation cost			
Attack by pest and disease			
High pesticide cost			
Lack of scientific knowlewdge			
Lack of training			
Poor storage capacity			
Poor transportation system			
Lack of capital			
Poor marketing system			
Improper packaging			
Other(Specify)			

Suggestions: Do you have any suggestion to develop flower market in your area? Yes=1
No=0

If Yes, please tell some suggestions.....
.....

Date :

Name of Interviewer :

THANKS FOR YOUR PARTICIPATION.