COMPARATIVE PROFITABILITY AND VALUE CHAIN ANALYSIS OF CUT FLOWER CUTIVATION IN JASHORE AND DHAKA DISTRICT OF BANGLADESH

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A THESIS

BY

SHIRAJUM MANJIRA

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This is to certify that the thesis entitled **"COMPARATIVE PROFITABILITY AND VALUE CHAIN ANALYSIS OF CUT FLOWER IN JASHORE AND DHAKA DISTRICT OF BANGLADESH"** submitted to the department of Agricultural Economics, Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, 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 **SHIRAJUM MANJIRA, Registration No. 12-05165** 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, as has been availed of during the course of this investigation has been duly acknowledged by the Author.

Dated: ……………………………………

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DEDICATED

TO

MY BELOVED

PARENTS

ABSTRACT

Floriculture is a fast emerging and highly competitive industry. This study briefs out the existing production and marketing condition and practices of the cut-flower growers and traders. The overall objectives of the present study were to examine socio-economic status of cut-flower (rose and gerbera) producing farmers, to assess profitability and factors affecting the production of cut flower, to identify the main distribution channel and value addition of cut-flower. Jashore and Dhaka district were selected for the study on the basis of intensive growing region of cut-flower cultivation. Multi-stage random sampling technique had been used for collecting data from 100 sample farmers through interview schedule. After analyzing the data, per hectare total cost, gross return, gross margin and net return were Tk. 327019, Tk. 902484, Tk. 648214 and Tk. 575465 respectively rose and Tk. 538479, Tk. 2116800, Tk. 1646766 and Tk. 1578321 respectively. Benefit cost ratio (On full cost basis) of rose and gerbera production were 1:2.76 and 1:3.93 and benefit cost ratio (On cash cost basis) of rose and gerbera were 1:3.55 and 1:4.55 respectively. Though both rose and gerbera production was highly profitable but gerbera was more profitable than rose. The significant coefficient values of seedling was 0.124 and 1.049 for rose and gerbera respectively indicated that yield of gerbera was higher than rose. By analyzing marketing channel and value addition it was found that as the number of intermediaries or value chain actors increased the farmers or producers share to consumers' price decreased. Inadequate cold storage and seasonality in demand were the major constraint for farmers which were reported by 98% and 94% rose growing farmers respectively and 98% and 96% gerbera growing farmers respectively. Results indicated high yielding variety of rose for higher production is needed for rose growing farmers. Adequate cold storage for reducing the post-harvest loss is needed for both farmers and value chain actors. Therefore, it is needed to emphasis dissemination activities of technologies (varietal, production etc.) and government support for getting farmers fair price.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Bangladesh is an agricultural country and most of the inhabitants directly or indirectly are involved in agricultural activities for their livelihood. Agriculture has a great contribution to the Gross Domestic Product (GDP) of the country. At the beginning of industrialization the activities of the population got diversification towards different sectors. As a result, the contribution of the agriculture sector is slowly reducing and now declined to 14.10% of the GDP (BBS, 2018). Still agriculture plays a vital role and is taken as the most important sector of the economy. Despite increase in the shares of fisheries, livestock, and forestry, crop & horticulture sub-sector alone accounts for 43 percent share of agricultural GDP in FY 2015-16 (BER, 2017) (Fig 1.1). Although the contribution of crop & horticulture sub-sector in GDP marginally decreased from 9.49 percent in FY 2016-17 to 9.11 percent in FY 2017-18 (BER, 2018).
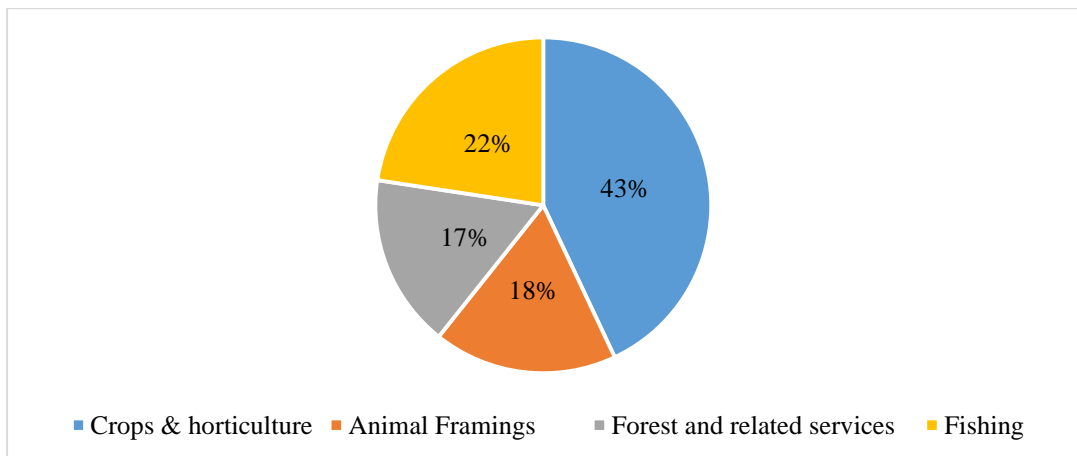
Figure 1.1: Sub-Sectorial Share of Broader Agricultural GDP in 2017-18.
Source: BER, 2018.

Flowers are inseparable from the social fabric of human life. Flowers being adorable Creation of God befits all occasions be it at birth, marriage or death. In the past, flowers were not of much economic importance. One would grow flowers to fulfill his or her aesthetic desire. At times, flowers were offered for sale to meet the special requirements of people. With the passage of time drastic changes have come about in the life style of people leading to commercialized cultivation of flowers. Today, flower plants are no longer meant for only window garden but play an important role in the decoration of the living houses and office establishments. Floriculture is a fast

emerging and highly competitive industry. With the continuous introduction of new cultivators and new crops, cultural techniques are changing and hence new products are developing. Ornamental crop culture technology is improving with the availability of equipment and there is a sea change in the trend of consumers. A new generation of growers is coming forward to employ modern technology for maximizing production and offer quality produce for consumer acceptability, thus fetching a better price.

Bangladesh, with its wide variability of climate and soil, is highly favorable for growing a large range of horticultural crops. Horticulture, which includes the production of fruits, vegetables, flowers, spices, medicinal and aromatic plants and plantation crops has emerged as a major economic activity in Bangladesh. Over the years, horticulture has emerged as one of the potential agricultural enterprise in accelerating the growth of economy. It offers not only a wide range of options to the farmers for crop diversification, but also provides ample scope for sustaining large number of agro industries which generate huge employment opportunities. With the development of societies, flower cultivation has taken a leading role in the commercialization of agriculture. Due to flower cultivation, in past few years the progressive farmers farms have taken a great commercial part in Bangladesh economy. The present cut flower cultivation in major areas greatly satisfies the local demand which has been used for occasions such as marriage, birthday etc. Most of the flowers have been cultivated in open filed and among them and according to area, rose has been the most important one.

The floral industry is one of the major industries in many developing and underdeveloped countries. Bangladesh is not an exception. In Bangladesh, floriculture brought into limelight by some innovative farmers in late seventies with tuberose on a small-scale basis. Large-scale commercial production started from mid-eighties in Jhikargacha upazila of Jessore district (Sultana, 2003). Later it speeded largely in Jessore, Savar, Chuandanga, Mymensingh and Gazipur which turned to be the major flower production belt in Bangladesh.

Considering the market value, some farmers in association with some entrepreneurs have started cultivation of gladiolus, tuberose, marigold, rose, gerbera and orchid flowers. But the socio-economic data and information regarding rose cultivation is very much scarce in Bangladesh. Nevertheless, rose cultivating farmers are depriving from higher production and fair prices due to various farm level constraints that need to be explored.

1.2 Importance of Cut Flower Production

The growing middle class, equipped with disposable income, along with the rise of corporate businesses and widespread use of flowers in various programs have expanded the flowers and cut foliage business in Bangladesh. However, cultural changes among the young generation in celebrating western festivals such Valentine's Day, Friendship Day, Mother's Day and iconic cultural events like Pohela Boishakh, Pohela Falgun have expedited the growth of flower business in the country. In addition, the celebration of National Days such as Ekushey February, Independence Day and Victory Day has reached to rural level more than ever before, which also helped boost the business. According to a recent Dhaka Chamber of Commerce and Industry (DCCI) statistics, the local market of flower and cut foliage has reached at Tk. 1,200 crore per annum and is witnessing a 10% yearly growth (Tribune, 2018). Flowers are widely used in political, social and corporate events. This is because of economic growth, which brought changes in living standards of people as they have disposable income.

1.2.1 Importance of Rose Production

Rose is known as flower of friendship and king of flower. It is associated with mankind since time immemorial The Mughal Samrat Babar introduced the Persian or Damask rose (*Rosa damascena*) in India during 1526. The scented rose (*Rose barbouniana*) was introduced in 1840 during the British rule. These two species of rose are scented and are cultivated in India to a large extent. Rose, botanically identified as *Rosa* spp., is indigenous to Europe and is widely distributed in Europe. It has also been disseminated in the Middle East countries, especially Iran, Afghanistan and Turkey. It is also grown in Bulgaria, Russia, Egypt, France, Morocco and India. There are several varieties of rose classified according to color, size, type, use etc. The following varieties as per color are Light pink- confidence, Navneet, Pink- first prize, Pink peace, Surekha, Red / crimson -gladiator, Red masterpiece, Lavender- blue moon, Lady x. multicolor- candy strips, Sultana. The varieties as per the types are Bush first prize, Superstar, Tree rose hybrid Tea, Floribunda, Rambler and climber-casino, Golden shower, Crimson glory. Hedges- edges- queen, Magic. Cut-flowers-superstar, Gladiator, Arjun, Pot plants - Cinderella. The varieties as per use are Oil-*Rosa damascena*, Gulkand-*Rosa damascena, Rosachinensis.* Rose has become a part and parcel of the life. Rose is connected with all phases of life for planting shrubs, bushes, standard rose, climber's ramblers, edges, rockeries in the garden and pot

plants for decorating the houses. There is a considerable demand for loose flowers for making garlands, bouquets and floral decoration. Rose is a perennial erect shrub with beautiful sweet scented flowers valued for worship, making garlands and preparation of rose oil, rose water, rose *attar* and rose otto. The area under rose cultivation was 516 acres producing about 19501 metric tons during 2016-17 (BBS, 2017).

Rose oil is one of the oldest and most valuable perfumery raw materials. It imparts characteristic fragrant top notes to perfumes. The extracted absolute adds lasting notes. A mixture of distilled oil and extracted absolute combines the advantages of both the products. Also vitamin C, A, B2, K and E are extracted from rose. Bulgarian rose oil is being used for flavoring certain types of tobacco, particularly snuff and chewing tobacco and in number of fruit flavor. Limited quantities of otto are employed in flavoring soft drinks and alcoholic liquors. Rose water has been valued for use in making syrups and medicinal preparation from ancient time. At marriages and other social functions rose water is sprinkled on the guests. Rose jam of unani medicine is used as a mild laxative and tonic. With the availability of cheap or synthetic substitutes like geranial, the use of rose for perfumery purpose has declined.

1.2.2 Importance of gerbera production

Gerbera (Gerbera jamesonii L.) connected to close family *Asteraceae*, a well-known cut flower grown all over the world in a variety of weather circumstances. It is prominently known as 'Barberton daisy' or 'Transvaal daisy'. Genus *Gerbera* L. comprises of 30 varieties, which are of Asiatic and Southern African-American source. Among the different varieties, *Gerbera jamesonii* is the only varieties under farming. The Flower is actually an evergreen herb local to Southern African-American. The Gerbera Flower is also known as the African-American Flower, Transvaal Flower, Gerb, and Barberton Flower. It is one of the most famous cut flowers. The gerbera daisy has large vibrant flowers, which has made it popularity with flower lovers. There is a wide range of variation available in this flower. On an average, the annual flower is 20-35 flower stick per plant and it directly related to the cultivar. Gerbera is very fashionable and widely used as a decorative garden flower or cut flowers. The significance of Gerbera is not limited up to the beautification, design or planning of Gajra, Garland, Veni or Arrangements but also have the commercial significance too. It is also used for removal of essential natural oils which is a platform for the planning of fragrances or attar. Though gerbera is a foreign flower it

has a huge demand in Bangladesh. One tree gives 60 to 70 flowers. In many programs like a wedding, New Year, gerbera flower has huge demand. To meet this rising demand, floriculture becomes popular and in recent days it has emerged as one of the most lucrative professions in all over the world. The future scope of gerbera flowers is increasing demand for cut flowers, live plants, quality seed production, the sale of garden tools, pots and others, perfumery products, Bonsai development etc.

Commercial flower cultivation is one of the most profitable, important and innovative ventures at the national and international scene. Bangladesh has its own tradition of flower cultivation since long past. According to Bangladesh Flower Growers & Exporter Association (BFA), now it has emerged as one of the most important and lucrative professions in Bangladesh. Some of the progressive farmers in the country have been cultivating flower commercially as a viable alternative to traditional cash crops. Many kinds of cut-flowers, orchids and other ornamental plants are grown for the domestic and international trade in various developed and developing countries of the world. Flower cultivation has emerged as a profitable agribusiness option in the world in recent years, particularly in the developing nations like Bangladesh. In the present world, flowers are not only important for their aesthetic and social values but also for their economic contributions. However, commercial flower cultivation in Bangladesh is in its budding stage. The varieties of flowers that Bangladesh can supply include rose, tuberose, gladiolus, carnation, gerbera, gypsophila, limonium, anthurium, philodendron, leather fern, orchid-dendrobium, mokkara, oncidium, lily and foliage etc.

Bangladesh is striving for the future and the Government policy is one of the inducement and facilitation for promotion of investment and export. In response to this policy, entrepreneurs have already started investing in commercial farming of flowers and exporters are getting increasingly involved in channeling the produce to all potential market destinations. Some Non-Government Organization (NGOs) and private entrepreneurs such as Bangladesh Rural Advancement Committee (BRAC), Proshika, Dipta Orchids Limited have already taken initiative for large-scale production and marketing of flowers. Though Bangladesh is a new participant in export market, it has a bright prospect in future to earn foreign currency as like as garment industries by exporting flowers and pot plants.

1.3 History of Flower Cultivation in Bangladesh

The history of floriculture in Bangladesh may be old but flower business is not older than a decade. Flower cultivation was started commercially from the 1980's in Jhikargachha upazilla of Jessore district. Afterward it was extended to Jessore Sadar, Sharsha and Chowgachha upazilla as well as Kushtia, Chuadanga and Satkhira districts. At that time the agricultural crop production was going on in traditional manner. An initiator, Sher Ali, from Jhikargachha upazila under Jessore district brought the tradition of flower cultivation in this region. It can be said, that the beginning of commercial flower cultivation, for the very first time in Bangladesh. Sher Ali had his inspiration seeing of flower cultivation success in different regions of India, whilst the flower market was being captured at that time by India, Thailand and other countries including China. Flower had a poor demand back at that period. During the eighties, flower cultivation started awakening here and there. After Jhikorgacha upazila, flower cultivation spreader gradually in Sharsha, Chougacha, Monirampur, and Keshabpur in a limited extent. Some of them succeeded, but some went back to their traditional cultivation, after being frustrated. Amid the hope and despair, a complete revolution took place in Jhikorgacha upazila. At the very beginning, Marigold, Rose and Tuberose started making place at the farmers' cultivable fields. The general farmers started realizing the benefits and the hurdles of the flower cultivation. Meanwhile, the surrounding districts had started becoming successful in this cultivation. At the beginning, the farmers started importing the necessary ingredients for flower cultivation including flower-plant and insecticide through many different ways from India. The government and non-government organizations had no exact knowledge on flower cultivation during that time. In the interim, a flower bazaar was formed in Goaddkhali village under Jhikargachha upazila (JCF, 2012). From all around Jessore, the flowers were being gathered at Goadkhali market. From this market, through the wholesalers, flowers were being sent to all over the country. Due to relevant necessity, the Goadkhali bazaar had shifted at the place beside the main road. According to Bangladesh Flower Growers & Exporter Association (BFA), the Goadkhali market is now Bangladesh's largest flower bazaar. Recently, flower cultivation has adopted commercially in 19 districts of our country (The Daily Prothom Alo, 2011). The districts are Jhenidah, Chuadanga, Bogra, Rangpur, Dhaka, Manikganj, Narayanganj, Gazipur, Mymensingh, Chittagong and Sylhet. Flower cultivation has emerged as a profitable business which ensures higher

potential to return compared to other agricultural crops (Khan, 2015).The increase in area under floriculture and enthusiasm of the growers revealed the potentiality of the industry. With this background floriculture in Bangladesh is rising. In Bangladesh fresh cut flower business is a very new concept. Rose, Gladiolus, Tuberose, Dahlia, Marigold, Gerbera, Beli, Dolanchampa are the examples of some important cut flowers have high demand in the inland markets. This is also important for international market. There is a high demand of fresh flower and pot plants in Europe, America, Japan and Middle East. The important flowers and ornamental plants which have high demand in the world market can easily be grown in Bangladesh at a low cost. Very recently Bangladesh Govt. has included flowers in the export policy. This will surely open a new avenue for the flower growers of Bangladesh to develop export oriented floral industry.

1.4 Floral Industry

Flowers have occupied core position in people's lives since the most primitive ancient Egyptian times (Callahan, 2014). From that time, the uses of flowers have increased day by day to all the people across the globe. Eventually, now it has developed into a very fast growing as well as competitive industry to the business people (Behe, 1993). To survive in this florist business arena and to persuade the floral customers in a more convincing way, every floral business person is now trying to adopt the floral marketing activities. With this strong motive, the concept arose of *Floral Marketing* and *Floral Branding*. In the concept of *Floral Marketing*, a business person tries to bestow the floral products a proper recognition with creative branding elements and by packing and shaping it in an attractive manner. Basically, *Floral Products* refer flowering and foliage plants and fresh-cut flowers and greens. To tailor these floral products, a person must need to determine the kind of service he or she wants to provide to the floral customers. Based on this, there are three major dimensions of a florist business: Wholesale florist service retailers with fresh-cut flowers and potted plants, retail florist service and floral supplier. In the study of (Behe, 1993), he analyzed the demographic factors and classified the floral purchasers into five segments based on their perceptions: Friendly Buyers, Sellers, Married Men, Annuals, and Educated Mothers (Behe, 1993). Thus in this age, floral professionals and researchers recognize that more investigations need to be conducted to accumulate further specific information about these floral consumers.

1.5 International Scenario of Flower Cultivation

Globally, the export of flowers has increased phenomenally from 8 billion US dollar in 2006 to 13 billion US dollar in 2015. The number of countries reported to have exported flowers in 2006 was 50 which has increased to 118 in the year 2015.The Compound Annual Growth Rate (CAGR) of World's flower export during 2006-2015 is 5 percent. India has exported 22,086 MT of flowers to the world for the worth of 549 cores rupees in 2016-17. The Netherland is an important producer for cut flowers (54% in Global Market of Production), as well as a key importer from developing countries. Besides being one of the market leaders for cut flowers, the Netherlands are also a main trade hub, especially in the area of Aalsmeer. Every year roughly 1,200 to 1,500 new flowers and plants are bred and cultivated by growers. New types of cut flowers contributed massively to the flower industry. The leading export markets for Dutch floriculture are European, with Germany, UK and France among the top three countries importing flowers from the Netherlands. USA are emerging as leading flower importers (22%) in World (Vahoniya et al., 2018). According to export data with the Export Promotion Bureau (EPB), the country exported cut flowers and foliage worth USD 3.94 million during July to November 2018–19. The value in the last year during the same period was USD 0.01 million.

Table 1.1 Major flower auction centers and major flower producing countries in the world.

Major flowers auction centers around the world		Top ten countries in flower production	
Rank	Country	Rank	Country
First	Flora Holland, Netherlands	First	Netherland
Second	Ota Floriculture Auction Co. Ltd., Japan	Second	USA
Third	Landgrad, Germany	Third	Brazil
Fourth	VeillingHolambra, Brazil	Fourth	Sweden
Fifth	International Flower Auction Bangalore, (IFAB)Ltd., Bangalore	Fifth	Denmark
Six	MB Flores,Belgium	Six	Malaysia
Seven	Taipei Flowers Auction Co. Ltd. Taiwan	Seven	India
Eight	Ontario Flower Growers Co-operative, Canada	Eight	Switzerland
Nine	FloraMax Flower Auctions, New Zealand	Nine	Cambodia
Ten	FloraBella, Italy	Ten	Australia
Eleven	Dubai Flower Centre, UAE		

Source: Vahoniya*et al.*, 2018.

About 305,105 ha area was under flower production in different countries of the world, of which the total area in Europe was 44,444 ha, North America 22,388 ha, Asia and Pacific 215,386 ha, the Middle East and Africa 2,282 ha and Central and South Africa 17,605 ha. Flowers grown under protected greenhouses in different countries around the world total 46,008 ha. India has the maximum area under ornamental crops (88,600 ha) followed by China (59,527 ha), Indonesia (34,000 ha), Japan (21,218 ha), USA (16400 ha), Brazil (10285 ha), Taiwan (9.661 ha), The Netherlands (8,017 ha), Italy (7.654 ha), the United Kingdom (6,804 ha), Germany (6,621 ha) and Colombia (4,757 ha) (Sudhagar et al., 2013). Globally more than 145 countries are involved in the cultivation of ornamental crops and the area under these crops is increasing steadily. The production of flower crops has increased

significantly and there is a huge demand for floricultural products in the world, resulting in growing international flower trade. The world consumption of cut-flowers and potted plants is increasing at 10 to 15 percent annually due to globalization and its effect on income. In case of developed countries, the consumption of flowers is closely linked with GNP per capita income and urban population (Sudhagar et al., 2013).

1.6 Marketing Status of Cut Flower in Bangladesh

The flower market is expanding day by day. Almost 20 Lac people are occupied themselves in flower business. Late eighties only a few shops were opened in Dhaka city for selling fresh cut flower. Now fresh cut flowers are sold in most of the city and district even upazilla towns of Bangladesh. Flowers are daily auctioned in the morning at Shahbag Avenue in Dhaka. Dhaka is the main center of flower business in Bangladesh. A large number of flower shops have been developed in and around Dhaka city which can give a picture of present flower market situation. There are reportedly around 4000 retail shops of flowers in the country. Forty per cent of the retail shops are located in Dhaka, while Chittagong and Sylhet having 25 percent each and the remaining 10 per cent of the shops are in other district towns. Flowers are daily auctioned in the morning at Shahbag Avenue in Dhaka. Dhaka is the main center of flower business in Bangladesh. A large number of flower shops have been developed in and around Dhaka city which can give a picture of present flower market situation. In Dhaka, flower shops are two types, i) Permanent, and ii) Temporary. It is estimated that there are more than 100 permanent and 450 temporary shops in Dhaka metropolitan city. Individual business of each shop ranges between Tk. 3000–6000 even more. 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. According to world trade organization, cut flowers constitute 45 percent share of total world trade in flower products (Mou, 2012). Majority (almost 80%) of the produced flowers were channeled through BRAC Office under contract farming agreements. Individual business of each shop ranges between Tk. 3000–6000 even more. According to Export Promotion Bureau (EPB) data, in 2016-17 fiscal year, Bangladesh exported cut flowers, leaves, trees, plants, bulbs, roots of $86,000, up 10.26%, which was $78,000 in the previous year (Tribune, 2018). Flower society of Godkhali (Jessore) reported that flower of about USD 54 cores are produced in Godkhali alone every year and the total business amount stands at USD 100 cores.

1.7 Justification of the Study

In recent times, the world is facing the challenges of food crisis, population explosion, lack of shelter, employment, and the management of natural resources. But natural resources are contributing to the lion's share of the world's economy. To meet the demand of the vast and fast population growth agricultural land is gradually converting to homestead and other uses to generating income. Commercial flower cultivation may be an important income generating sector for many developing countries like Bangladesh. Bangladesh has a tremendous potential for flower both for domestic market and export. Different agro climatic conditions are capable of producing different varieties of flowers round the year. If the production and marketing of flowers are well developed, there is a great opportunity for Bangladesh to earn a lot of foreign currency from the international markets. It is a matter of hope that if flower cultivation could have been developed with necessary support from government then the efficiency in marketing might be achieved within a short span of time. Among many cut flowers. This study was based on rose and gerbera as in the study area farmers were preferred to cultivate these flowers as rose had a traditional demand all over the year round and gerbera was a long lasting plant and day by day people interest had been changed and gerbera was a demand of time now. Beside this, rose and gerbera flower cultivation can make a potential contribution to our Gross Domestic Product (GDP) and can create employment opportunity.

Rose and gerbera cultivation plays a vital role on changing our farmer's living standard through increasing income. In order to increase the production of rose and gerbera to the maximum possible extent, it is necessary to identify the factors behind the yield variations and value chain so that it can improve farmers' socioeconomic condition, increase self-employment creation and poverty lessening as well as policy interventions might be made accordingly. It would add new knowledge in the field of rose and gerbera cultivation and build a foundation for further research. Flower producers, traders and exporters at different levels will be benefited from the information generated through the study.

This study generate farm level information on socio-demographic characteristics of rose and gerbera producing farmers, level of input use and its pricing, cost and returns, factors affecting productivity of rose and gerbera cultivation, value chain analysis including value chain mapping, all local marketing channels of cut flower (rose and gerbera), key value chain actors or traders with consequences and problems

associated with rose and gerbera production and value chain. This study add some valuable information to the existing body of knowledge regarding rose and gerbera production particularly with respect to the area under study. This study provides appropriate suggestion and policy recommendations which might help the development agencies and policy makers of the country for improving the livelihood of rural people. This study find out the need of conducting and analyzing the impact of rose and gerbera production in Bangladesh within the current development context, which will help the policy makers to understand the current situation and take programmes to increase cut flower production and improving the livelihood of rural people in Bangladesh. On the other hand, researcher believed that the findings of this study would provide useful updated information, which would help the policy makers and researcher for further investigation.

1.8 Objectives of the Study

The specific objectives of the study are as follows-

    a.   To identify the socio-demographic profile of the growers;

    b.   To estimate the profitability of rose and gerbera cultivation;

    c.   To identify the factors affecting the production of rose and gerbera production;

    d.   To identify the main distribution channel and value addition of rose and gerbera market in Bangladesh and

    e.   To identify the constraints face by the growers and value chain actors.

1.9 Outlines of the Study

This paper contains a total of eight chapters which have been organized in the following sequence. 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 contains the socio-demographic profile of the rose and gerbera producing farmers. Chapter 5 deals with the costs and returns of rose and gerbera production. Chapter 6 describes the factors affecting yield of rose and gerbera production. Chapter 7 describes value chain analysis of cut flower (rose and gerbera) market. Chapter 8 presents problems of cut flower (rose and gerbera) cultivation and marketing. Finally, Chapter 9 represents the summary, conclusion and policy recommendations to increase rose and gerbera production.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction

Review of literature is an attempt for reviewing the findings that give a proper instruction in designing the future research problem and validating the new findings. It also helps to conduct the research work successfully by providing various knowledge and information related to the proposed study. Literature and research of the major past works in connection with the present study were searched because this knowledge and information provide guideline in designing the future research problem and validation of the new findings. But review of literature was not only limited to works done in Bangladesh but also was extended to other countries for having a broader view.

2.2 Rose and Gerbera Production Related Studies

(Raha & Siddika, 2004) completed a study on "Price spreads in cut-flower marketing some: evidence from Bangladesh". She examined the existing marketing system, estimated marketing cost, margins of different flowers of different marketing channels. Flower growers received 30.75% to 60.42% of the consumer's taka while 24.71% to 58.5% was spent as the marketing cost. The net marketing margin varied from 3.0% to 37.83% of consumer's taka. Growers used channel which involved highest cost of all the channels. She also suggested that adoption of proper measures for the solution of the current problems would improve the efficiency of the marketing system which will in turn increase grower's share in consumer's taka.

Star, **(2009)** observed "The role of flower cultivation in poverty reduction and employment generation in Trilochonpur union of Jhenidah". She found that around 2,300 bighas are now under flower cultivation. Farmers have shifted from traditional cultivation to flower cultivation as it proves more profitable for them. It also provides opportunities for women to generate income and contribute to bear their children's educational expenses. This study revealed the urgency of government initiatives to solve the problems such as a lack of preservation facilities, absence of cool transportation systems, scarcity of fertilizer and irrigation for the development of the business.

Sayla, (2010) conducted "An analysis of commercial production of flower in Dhaka and Narayanganj district". The author attempted to examine the profitability of three selected crops. Per hectare net return of producing rose, marigold and gladiolus were Tk. 319372.01, Tk. 146080.91 and Tk. 631428.9, respectively. She also identified problems and constraints associated with production of these flowers and made some recommendations on the basis of constraints, which may help to develop flower industry and strengthen its production.

Mou, (2012) studied "Profitability of flower production and marketing system of Bangladesh". She attempted to examine the production and profitability of some selected flowers in comparison with their competing crops. She also identified the value chains and channels of flower marketing in Bangladesh. Gross margins of flower and vegetables per hectare were Tk. 1359824.20 and Tk. 46 362.14, respectively. She found that flower-farming shows encouraging results to improve farmer's socioeconomic condition, increases self-employment opportunity, promotes entrepreneurship in both urban and rural areas and boosts export-trade to earn foreign currency, it proves to be a potential tool for poverty alleviation and sustainable growth in the economy of Bangladesh. She also identified problems and constraints associated with production and marketing of flower and made some recommendations on the basis of constraints, which may help develop flower industry and strengthen its marketing system.

Haque et al., (2013) examined "The profitability of rose cultivation in some selected areas of Jessore district". They found that rose cultivation is now a profitable enterprise to the farmers, but the socio-economic data and information of this flower are very scarce in Bangladesh. So, this study was conducted to identify agronomic practices, analyze relative profitability, and input-output relationship during December 2010. The costs of rose cultivation were Tk. 387569 and Tk. 275214 per hectare on full cost and variable cost basis, respectively. The major share of full cost was incurred for human labor (30%), followed by land use (23%), fertilizer (17%), and irrigation (12%). The yield of rose was 540107 flowers per hectare. The net return from rose cultivation was Tk. 2331196 per hectare. The benefit cost ratios were 2.29 and 1.63 on variable cost and full cost basis, respectively. The highest profit was obtained from rose cultivation compared to its competitive crops like potato+jute, lentil+til and mustard+mungbean for rose. Human labor, land preparation cost, seedling, urea, TSP, MoP and irrigation had positive effect on the yield of rose. Lack

of technical knowledge, non-availability of HYV seedling, and infestation of insects and diseases were major problems found in rose cultivation. Government should take necessary steps to overcome these problems.

(Sharifuzzaman, 2013) described the potentialities of flower cultivation. It is emerged as attractive business because many farmers shifted to floriculture from vegetables for higher profitability. The flower business has also formed other areas of trade including nurseries, transport service providers etc. As a result, it not only creates jobs for many, especially poor women, but also enlarges the opportunity to export. But due to the problems in production, harvesting, packaging, transportation and lack of government support, traders face losses which can reduce the prospects of flower exports, although Bangladesh has the potential to gain from floriculture due to its favorable agro-climate.

Dinara Zaman, (2013) conducted a study on "Economic analysis of rose cultivation in some selected areas of Jessore district in Bangladesh". This study was identified and analyzed the profitability of rose production, potentialities and constraints during December 2014. The average cost of rose cultivation is Tk.383561 and Tk.252734 per hectare on total cost and variable cost basis, respectively. The major share of total cost is for human labor (22%), land use (21%) fertilizer (22%) irrigation (6%) insecticide (12%).The yield of rose is 558502 flowers per hectare. The net return from rose cultivation is Tk. 454192 per hectare. The benefit cost ratios are 3.31 and 2.18 on variable cost and full cost basis, respectively. The highest profit is obtained from rose cultivation compared to its competitive flowers like gladiolus, marigold and others for rose. Lack of technical knowledge, non-availability of HYV seedling, and infestation of insects and diseases are major problems found in rose cultivation. Government should take necessary steps to overcome these problems.

Usman et al., (2014) stated that the flowers are used for expressing or exhibiting the innermost feelings to the beloved ones or complementing any one or versifying any conceivable emotions. The export of flower from Pakistan is very negligible as compared to other countries like Holland, USA, Columbia, Kenya, Zimbabwe, Japan and Israel. This paper examined the cost and return of rose cut flower along with Cobb Douglass production function to determine factors affecting rose cut flower productivity.

M D Hossain, M M Hossain, (2016) conducted a study on "Price variation and cost benefit ratio of different flowers produced in Bangladesh". The experiment was carried out at the flower market Agargaon, Shahbag and other retail shops at Dhaka, and different flower growing areas of Bangladesh during June 2015 to May 2016 to investigate the present scenario of flower business in Bangladesh. Data were collected from different wholesalers, retailers and farmers. The results indicated that the various kinds of flower are produced in different parts of the country. There are a lot of flower markets and shops available in Dhaka city. The price of different flowers was varied in different days of the week, different month of the year and different special days of the year. The cost of production was varied in different kinds of flower. They also identified that a lot of flowers are produced in Bangladesh, there were some problems prevail in flower production.

S. Khandoker, T. H. Miah, M. Khatun, (2016) examined "Socioeconomic study of commercial floriculture in selected areas of Bangladesh". The study was conducted in Dhaka and Narayanganj districts of Bangladesh to assess the socioeconomic status and profitability of flower production. Based on area, production and market priority, three flowers namely rose, gladiolus and marigold were selected for the study. Per hectare gross cost of producing rose, gladiolus and marigold were Tk. 530238, Tk. 857524 and Tk. 197955, respectively and average gross cost of producing these three flowers was Tk. 528572. Per hectare gross return from rose, gladiolus and marigold amounted at Tk. 849609, Tk. 1488953 and Tk. 344035, respectively and gross return of these flower combinations was estimated at Tk. 894199. Net returns from rose, gladiolus and marigold were Tk. 319372, Tk. 631429 and Tk. 146081, respectively and net return of these flower combinations was estimated at Tk. 365627. Benefit-cost ratio of rose was 1.60, gladiolus was 1.73 and marigold was 1.74 and average BCR of these three flowers was 1.69 which implies that flower production was profitable in the study area.

Ara, Husna; Hosen, (2017) conducted a study on "Exploring the floral marketing practices: An investigation of the retail floral traders of Bangladesh". This study was designed on considering the contemporary trends of floral marketing in Bangladesh with the view different Bangladeshi flower farmers and retail floral traders. The result revealed that the floral traders had not tailored these marketing concerns yet. Beside they suggested that it will give a rational perceptive to Bangladeshi traders of utilizing

this floral marketing theory to bloom this industry by managing different complexities.

AZM Shafiullah Prodhan, Md. Nazirul Islam Sarker, Md. Shahidul Islam, (2017) conducted a study on "Status and prospect of gerbera cultivation in Bangladesh." This study was undertaken to explore importance, present status, research achievements, production techniques, post harvesting handling and the prospect of Gerbera flower in Bangladesh. It also described the constraints of Gerbera cultivation and recommendations for overcoming the constraints.

Md. Rakibuzzaman, Rahul sk, M. R. Jahan, (2018) studied on "Flower industry in Bangladesh: Exploring floriculture potential". This paper showed out the existing marketing conditions and practices of the flower growers and traders and even tries to find out the potentiality of developmental intervention. Demand for flowers especially for cut flowers was increasing in the inland as well as international market. This article stated clear focus on flower business and floriculture, scope and limitations. It was suggested that initiative should be taken for exploring the potential floriculture business to return the income.

Hasan, M.K.Bisakha Dewan, (2019) studied on **"**Profitability analysis of cut flowers- based on rose". The study was conducted to identify and analyze the profitability of rose relative profitability, potentialities and constraints. Three villages (Bonogram Purbopara, Bonogram moddhopara and Sadullapur) of Savar Upazila under Dhaka district were selected as study area. A total of 50 rose farmers were randomly selected for this study. He found the highest profit from rose cultivation compared to its competitive flowers like gladiolus, gerbera and others for rose. Human labor, flowers variety, input seedling, initial investment and market place had positive effect on the monthly income of rose farmers. Lack of technical knowledge, non-availability of HYV seedling, and infestation of insects and diseases were major problems found in rose cultivation. He also suggested that government should take necessary steps to overcome these problems.

Ghanshyam Deshmukh, (2019) studied on "Economic feasibility of gerbera (*Gerbera jamesonii*L.) Under protected cultivation with special reference to Chhindwara district of Madhya Pradesh". They observed that, the majority of cut flower growers have taken up it as a secondary business. The study revealed that there

is an immense scope for expansion of area and production of gerbera in Chhindwara district of Madhya Pradesh. They found the cost of cultivation for gerbera was somewhat initially higher but due to good demand in market, the returns are also very good. They found a good Benefit Cost Ratio (2.94) and concluded that the gerbera cultivation was a profitable business for the investors.

2.3 Concluding Remarks

The above mentioned discussion and review indicate that most of the studies dealt with cost, return, profitability, marketing and productivity of rose. Some studies also determine the factors affecting the profitability. Maximum studies examined parameters, which influence production, more than a decade ago. Within this period changes might have taken place in production process, and owing to these changes, the validity of those factors needs to be looked into again. Side by side the influence of other factors identified by the researchers of other countries is needed to study studied in the context of Bangladesh. Very limited integrated studies were conducted on comparative profitability and value chain analysis of cut flower production in Bangladesh. Therefore, this study is expected to be conducted taking into account those aspects. The review of literature was helpful to re-design methodological aspects with a view to overcome the limitations of previous studies. From the above studies the researcher felt the need of conducting and analyzing the comparative profitability and value chain analysis rose and gerbera cultivation in Bangladesh within the current development context, which will help the policy makers to understand the current situation and take programmes to increase rose and gerbera production and improving the livelihood of rural people in Bangladesh. The above review indicates that a few studies have been conducted on floriculture along with rose and gerbera. The result of these studies varies widely in different reasons. Most of these studies dealt with marketing system of flower, but there is hardly any study related to comparative profitability and value chain analysis rose and gerbera cultivation. So, the present study aims to gather information on profitability and value chain of rose and gerbera cultivation in Jessore district of Bangladesh.

On the other hand, researcher believed that the findings of this study would provide useful updated information, which would help the policy makers and researcher for further investigations.

CHAPTER 3

METHODOLOGY AND ANALYTICAL TECHNIQUES

3.1 Introduction

This Chapter deals with the methodology used for the study. The reliability of a scientific research depends to a great extent on the appropriate methodology used in the research. Farm management research usually involves collection of primary data from the operating farmers. Methodology mainly covers a detailed sequential steps of research work for instance, selection of study areas, selection of study period, sources of data, processing of data and analytical techniques.

Methodology in any systematic study deserves careful consideration. Proper methodology is the prerequisite of a good research. The primary data will be collected depends upon the nature of the study and its objectives. Survey method will choose for the present study because it is less expensive and less time consuming.

3.2 Selection of the Study Area

Selection of the study area is an important step. In Bangladesh flowers are cultivated commercially in few areas only. Some districts due to agro-climatic features are less favorable for cultivation of commercial flower. There are seventy five villages of five upazilas where flower is cultivated in Jessore district. Among them, Jhikargachha upazila is the most important area for flower cultivation. To achieve the objectives of the present study, preliminary surveys was conducted in two villages (Potuapara and Sadirali) of Godkhali Union of Jhikargachha Upazila under Jessore District and for value chain analysis both Jessore and Dhaka district were selected as study area. The reasons for selecting this study area for the present study are given below:

➢ Farmers of these villages are involved in rose and gerbera flower cultivation.

➢ From the view point of time and available resource, this area is suitable for the study.

➢ Easy accessibility and good communication facilities.

➢ Researcher's belief about getting well co-operation from the selected respondent.

3.3 Selection of the Samples and Sampling Technique

It is very difficult to make a farm business survey covering all farms. For this reason sampling is done to select representative rose and gerbera farmers to minimize cost in terms of time and resources for the study.

The total sample sizes from two villages were 100 rose and gerbera flower cultivators. The number of sample from each village was 50 flower cultivators. The number of sample for each flower was 25 flower cultivators/location. The total sample size for value chain analysis was 100 traders. The multistage random sampling technique was used to select the farmers who cultivate rose and gerbera in the study area for collecting the data.

3.4 Preparation of the Survey Schedule

Preparation of survey schedules is of crucial importance in this study. A comprehensive survey schedule was prepared to collect necessary information from the concerned respondent in such a way that all relevant information needed for rose and gerbera cultivation could be easily obtained within the shortest possible time. The interview schedule was pretested for judging their suitability. After pre testing, the schedule was finalized.

3.5 Collection of Data

To satisfy the objectives of the study, necessary data were collected by visiting each farm personally and by interviewing them with the help of a pretested interview schedule. Usually most of the respondent does not keep records of their activities. Hence it is very difficult to collect actual data and the researcher has to rely on the memory of the respondent. Before going to an actual interview, a brief introduction of the aims and objectives of the study was given to each respondent. The question was asked systematically in a very simple manner and the information was recorded on the interview schedule. When each interview was over the interview schedule was checked and verified to be sure that information to each of the items had been properly recorded. In order to minimize errors, data were collected in local units. These were subsequently converted into appropriate standard unit.

Considering the nature of variables and types of respondents, both qualitative and quantitative procedures of data collection was applied. Two sources of data both primary and secondary data was used for the study. Primary data will be collected by

interviewing the selected respondents. Data collection period was 2 months. After collecting, data has properly edited and analyzed. Secondary data was collected from BBS, Bangladesh Flower Growers & Exporter Association (BFA), books, journals, newspapers, articles, internet etc.

3.6 Editing and Tabulation of Data

After collection of primary data, the filled schedules were edited for analysis. 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, 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, a few relevant tables were prepared according to necessity of analysis to meet the objectives of the study.

3.7 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.

3.7.1. Descriptive Analysis:

Tabular and graphical analysis was generally used to find out socio-demographic profile of the respondent. The tabular technique of analysis was used to determine the cost, returns and profitability of rose cultivation. It is simple in calculation, widely used and easy to understand. It was used to get the simple measures like average, percentage and ratio. Tabular technique included production practices and input use, cost and returns of rose and gerbera production.

3.7.2 Production Function Analysis:

The production function represents the relationship between output and factor 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 elasticity's 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. 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 elasticity's 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 calculations by reducing the number of regression to be handled in regression analysis.

The original form used by Cobb and Douglas was

$$Q = aL^{\beta}K^{1-\beta}U$$

This forces sum of elasticity's to one. Their later modification was

$$Q = aL^{\alpha}K^{\beta}U$$

Where, $\alpha + \beta$ need not equal one.

In agriculture, this form of function has not been used in its original form. Neither the sum of elasticity's 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

$$Y_i = \beta_1 X_{2i}^{\beta_2} X_{3i}^{\beta_3} e^{u_i} \qquad \text{…………….. (3.1)}$$

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:

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

$$= \beta_0 + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + u_i \qquad \text{………….. (3.2)}$$

Where, $\beta_0 = \ln \beta_1$.

Thus written, the model is linear in the parameters β_0, β_2, and β_3 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, (3.2) 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. Likewise, β_3 is the (partial) elasticity of output with respect to the capital input, holding the labor input constant.

3. The sum ($\beta_2 + \beta_3$) 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:

$$\ln Y_i = \beta_0 + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \ldots\ldots + \beta_k \ln X_{ki} + u_i \qquad \ldots\ldots\ldots\ldots (3.3)$$

Each of the (partial) regression coefficients, β_2 through β_k, is the (partial) elasticity of Y with respect to variables X_2 through X_k. Assuming that the model (3.2) satisfies the assumptions of the classical linear regression model; we obtained the regression by the OLS. (Acharya, 2010).

3.7.3 Specification of the Cobb-Douglas Production Function

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

$$Y = aX_1^{b_1}X_2^{b_2}X_3^{b_3}X_4^{b_4}X_5^{b_5}X_6^{b_6}e^{u_i} \qquad .... (3.4).$$

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

$$LnY = a + b_1lnX_1 + b_2lnX_2 + b_3 lnX_3 + b_4lnX_4 + b_5lnX_5 + b_6lnX_6 + b_7lnX_7 + b_8 lnX_8 + b_9lnX_9 + Ui \qquad .... (3.5).$$

Where,

Rose	Gerbera
Y = Yield (Stick/ha);	Y = Yield (Stick/ha);
X_1 = Human Labor (Man-days/ha);	X_1 = Human Labor (Man-days/ha);
X_2 = Land preparation cost (Tk. /ha);	X_2 = Land preparation cost (Tk. /ha);
X_3 = Seedling cost (Tk. /ha);	X_3 = Seedling cost (Tk. /ha);
X_4 = Manure (kg/ha);	X_4 = Manure (kg/ha);
X_5 = Urea (kg/ha);	X_5 = Urea (kg/ha);
X_6= TSP (kg/ha);	X_6= TSP (kg/ha);
X_7 = MOP (kg/ha);	X_7 = MOP (kg/ha);
X_8 = Insecticide cost (Tk. /ha);	X_8 = Insecticide cost (Tk. /ha);
X_9 = Irrigation cost (Tk. /ha).	X_9 = Irrigation cost (Tk. /ha).

a = Intercept;
b_1, b_2 -------- b_9 = Coefficients of the respective variables to be estimated.
Ui = Error term.

3.8 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 rose cultivation is calculated by the following way-

3.8.1 Calculation of Gross Return

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

Gross Return/Total Return (GR/TR) = Quantity of the product * Average price of the product

3.8.2 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.

3.8.3 Calculation of Net Return

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

Net Return/Net Income (NR/NI) = Total return − Total production cost.

3.8.4 Undiscounted Benefit Cost Ratio (BCR)

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 hectare.

BCR (Full cost basis) = Total Return/Total Cost (TR/TC)

BCR (Cash cost basis) = Total Return/Total Variable Cost (TR/TVC)

3.9 Methodology for Value Chain Analysis

For cut flower value chain analysis, those steps of value chain analysis were adopted:

3.9.1 Mapping the value chain to understand the characteristics of the chain actors and the relationships among them, including the study of all actors in the chain, of the flow of goods through the chain, of employment features, and of the destination and volumes of domestic and foreign sales. This information was obtained by conducting surveys and interviews.

3.9.2 Identifying the distribution of actors' benefits in the chain. This involves analyzing the margins and profits within the chain and there for determining who benefits from participating in the chain and who would need support to improve performance and gain. In the prevailing context of market liberalization, this steps particularly important, since the poor involved in value chain.

3.9.3 Marketing Cost of the Actors of the Value Chain

Marketing cost refers to those costs, which are incurred to perform various marketing activities in the shipment of flower from producers to consumers. Marketing cost includes: transportation, loading, unloading, storage, market fee/ commission, packaging etc. This information was obtained by conducting surveys and interviews.

3.9.4 Net Value Addition

Value addition calculated by the difference between sell price and purchase price. The argument for using gross margin analysis is that the actors are more interested to know their return over cost. The following equation will be used to assess the value addition of particular actors.

Value addition will also be used to assess the price paid by the consumer and price received by the farmers.

$$VA = SP-PP \ldots\ldots\ldots (1)$$

Where,   VA= Value addition

SP= Sell price

PP= Purchase Price

Net value addition:

Net value addition will be calculated by deducting all marketing costs from value addition

Net value addition = VA-MC ……….. (2)

Where,   VA= Value addition

MC= Marketing cost

3.10 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 answer questions since they thought that the researcher might use the information against their interest. To earn the confidence of the farmers a great deal of time was spent.

II. The farmers did not keep records of their activities and day to day expenses. Therefore the author had to depend upon their memory.

III. The farmers were usually busy with their filed works. So, the researcher sometimes also had to pay extra visits to meet the farmer.

CHAPTER 4

SOCIO-ECONOMIC STATUS OF ROSE AND GERBERA PRODUCING FARMERS

4.1 Introduction

This chapter deals with the socioeconomic characteristics of the sample farmers. Socioeconomic characteristics of the farmers are important in influencing production planning. People differ from one another in many respects. Behavior of an individual is largely determined by his/her characteristics. There are numerous interrelated and constituent attributes that characterize an individual and profoundly influence development of his/her behavior and personality. The socioeconomic aspects of the sample households were examined to the present study. These were family size and composition, age distribution. Occupation, level of education, involvement of women, land ownership pattern etc. A brief discussion of these aspects is given below.

4.2 Age Distribution and Family Size of the Sample Farmers

Age of farmers have an influence on the production and in the better management of the production system. Some researchers think that older farmers are more experienced and more efficient in resource use. Other researchers comment that younger farmers are eager to adopt improved technology than older.

Table 4.1 Age Distribution, Family Size, Earning Member and Farming Experience of the Respondents

	Rose Farming		Gerbera Farming	
Age category	No.	Percentage	No.	Percentage
Young age (< 30 years)	8	16	10	20
Middle age (31-45 years)	22	44	24	48
Old age (>45 years)	20	40	16	32
Total	**50**	**100**	**50**	**100**
Average family size (No.)	4.34		4.80	
Average male member (No.)	2.26		2.55	
Average female member (No.)	2.08		2.25	
Average earning member (No.)	1.44		1.78	
Average farming experience (Years)	19.98		17.39	

Source: Field survey, 2018.

In the present study, all categories of farmers of the study area were classified into different age groups as presented in Table 4.1. It is evident from the table that most of the farmers were middle aged in the study area. The rose and gerbera producing farmers were classified into three age groups: less than 30 years, 31-45 years and above 45.

In rose farming, out of the total sample farmers 16 percent belonged to the age group of less than 30 years and in gerbera farming 20 percent belonged to the age group of less than 30 years out of total sample farmers. In rose farming, 44 percent belonged to the age group of 31-45 years and in gerbera farming 48 percent belonged to this age group. In rose farming, 40 percent fell into the age group of above 45 and in gerbera farming the percentage was also 32 in this age group. This finding imply that majority of the sample farmers were in the most active age group of 31-45 years indicating that they provided more physical efforts for work in both rose and gerbera farming. This age group is supposed to have enormous vigor and risk bearing ability. The average family sizes of the rose and gerbera producing farmers were found to be 4.34 and 4.80 respectively which were slight less than the average family size of our country. Here, the average male member, average female member, average earning member and average farming experience were- 2.26, 2.08, 1.44 and 19.98 years respectively found in rose farming. On the other hand, average male member, average female member, average earning member and average farming experience were- 2.55, 2.25, 1.78 and 17.39 years respectively found in gerbera farming.

4.3 Educational Status of the Flower Producing Farmers

Education is generally regarded as an index of social improvement of a community. It plays a critically important role in reducing poverty and inequality, improving health and enabling the use of knowledge. Education means efficiency. Education of farmers helps to increase skill and productivity. Education plays an important role in accelerating the pace of agricultural development and it greatly influences the new technology and scientific knowledge regarding farming. It is evident from figure 4.1 that out of 50 rose farmers, 18 percent farmers had primary education, 16 percent farmers had completed P.S.C level education, 20 percent farmers had completed J.S.C level education, 22 percent farmers had completed their secondary level education, 22 percent farmers had completed their higher secondary education and last of all only 2 percent farmers had completed their higher study.

In case of gerbera 50 gerbera farmers 10 percent farmers had primary education, 14 percent farmers had completed P.S.C level education, 20 percent farmers had completed J.S.C level education, 24 percent farmers had completed their secondary level education, 28 percent farmers had completed their higher secondary education and last of all only 4 percent farmers had completed their higher study.
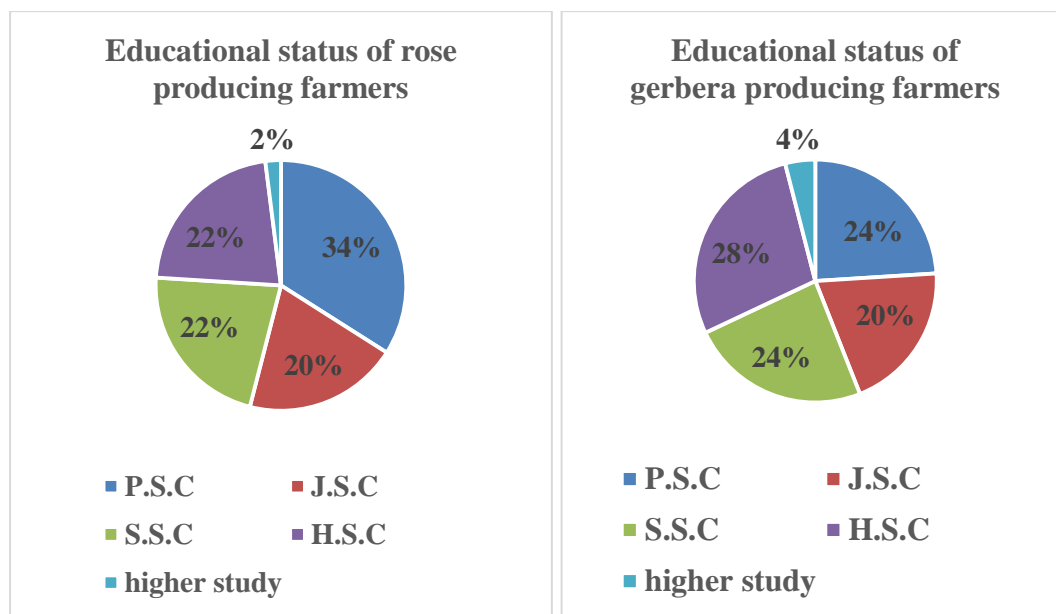
Figure 4.1: Educational Status of the Respondents

Source: Field survey, 2018.

4.4 Age Distribution and Gender of the Sample Farmers

The sex category was divided into two groups here, such as- male and female. The relationship between age and sex of the study area is presenting in figure 4.2.
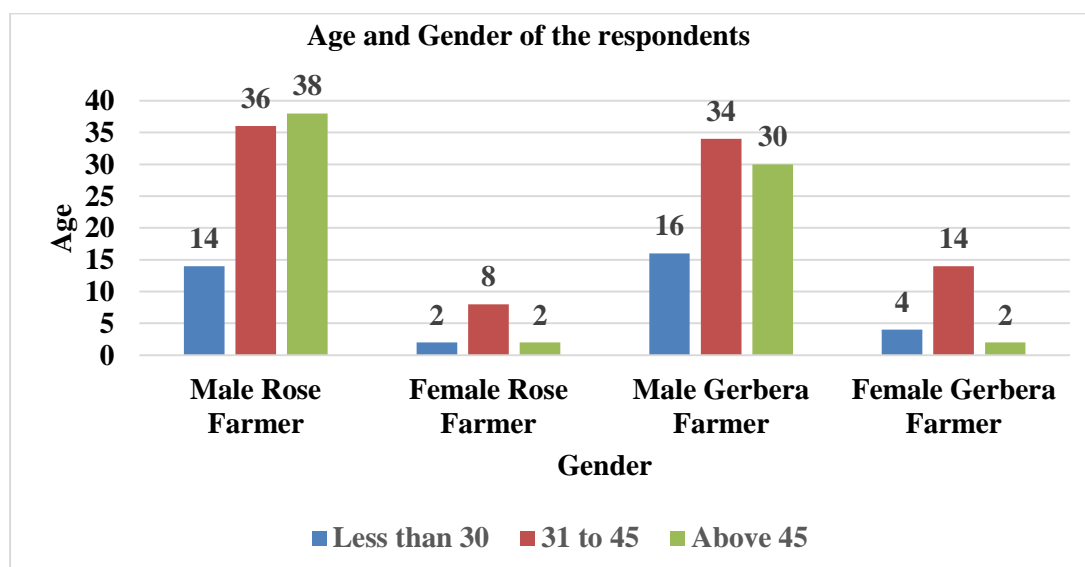
Figure 4.2: Age and Gender of Rose and Gerbera Framers

Source: Field survey, 2018.

In rose farming, out of the total sample farmers 16 percent belonged to the age group of less than 30 years. Here the percentage of male and female were 14 percent and 2 percent respectively. Now, 44 percent belonged to the age group of 31-45 years. The percentage of male and female were 36 percent and 8 percent respectively. Once more 40 percent fell into the age group of above 45 years. Male and female percentages were 38 percent and 2 percent respectively.

Again in gerbera farming, out of the total sample farmers 20 percent belonged to the age group of less than 30 years. Here the percentage of male and female were 16 percent and 4 percent respectively. Now, 48 percent belonged to the age group of 31-45 years. The percentage of male and female were 34 percent and 14 percent respectively. Once more 32 percent fell into the age group of above 45 years. Here male and female percentages were 30 percent and 2 percent respectively.

4.5 Occupational Status of the Rose and Gerbera Producing Farmers

The work in which a man was engaged more or less throughout the year was considered as the occupation of the person. The distribution of occupation is fascinating because it varies greatly depending on how much they are involved and what level of income is earned from the present occupation. In the present study, the selected farmers were engaged with various types of occupation along with rose cultivation. It was observed that, as a main source of income, rose cultivation was the main occupation for rose farmers. Some of them had opportunity to be engaged in other activities. Occupational status of the sample farmers are shown in the following figure 4.3.
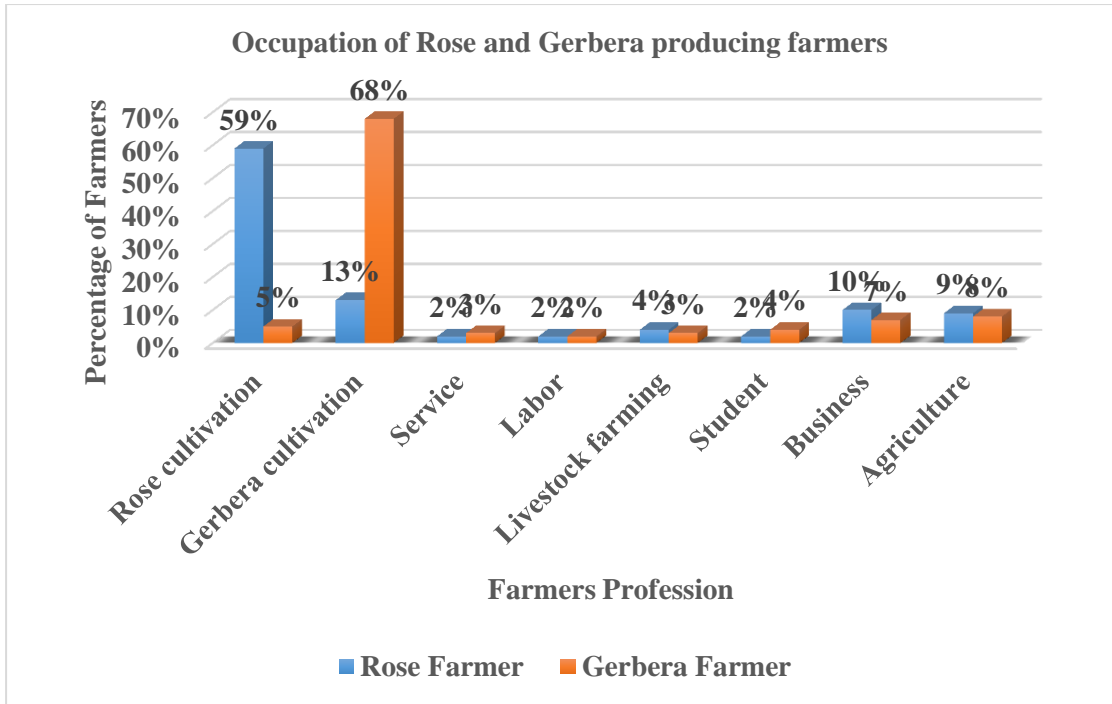
Figure 4.3: Main Occupation of the Rose and Gerbera Producing Farmers
Source: Field survey, 2018.

It is evident from the figure 4.3 that 59 percent and 68 percent farmers were respectively involved in rose and gerbera cultivation as a main occupation. Besides this 9 percent and 8 percent were doing agricultural activities, 2 percent were labor, 10 percent and 7 percent were doing business, 2 percent and 4 percent were student, 1 percent and 3 percent were doing service, 4 percent and 3 percent were rearing livestock, 13 percent and 5 percent were cultivation other flowers.

4.6 Ownership Pattern of Selected Sample Farmers

Most of the agricultural lands in Bangladesh are divided and sub-divided into small plots mainly due to law of inheritance. The ownership patterns of the rose and gerbera producing farmers were classified into three categories: single, joint and leased.

In rose farming about 58 percent rose farmers were single owner, 4 percent were belonged to joint ownership and those of 38 percent had leased ownership.

In gerbera farming about 70 percent gerbera farmers were single owner, 2 percent were belonged to joint ownership and those of 28 percent had leased ownership (Figure- 4.4).
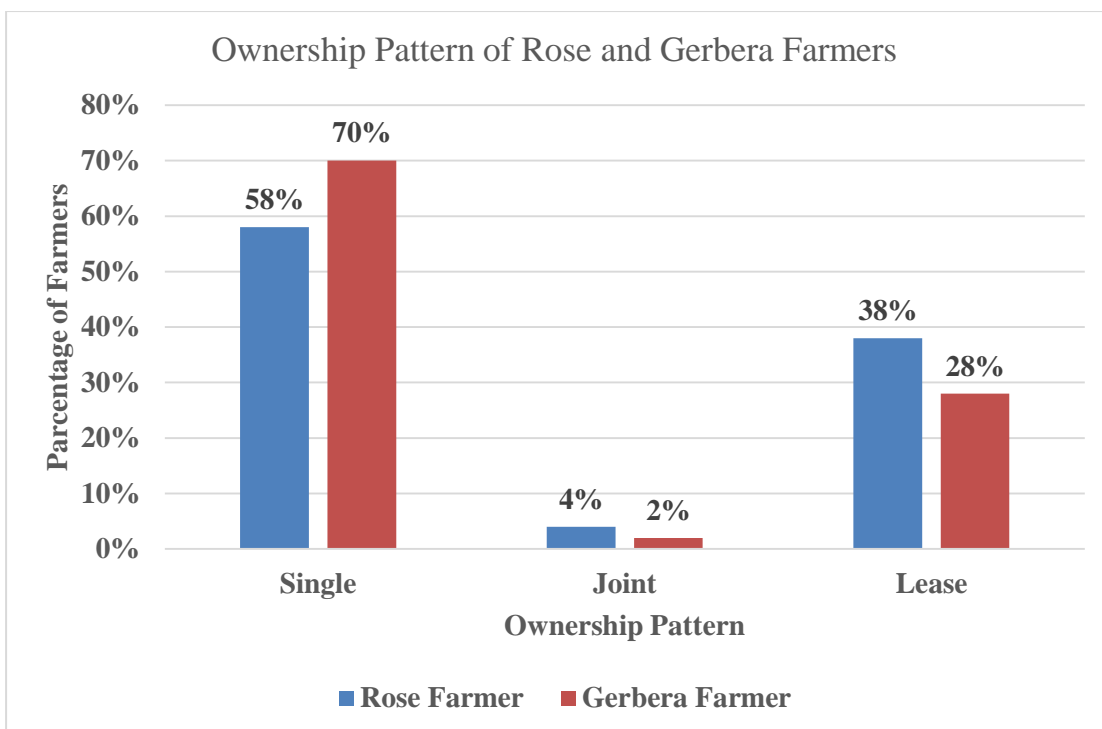
Figure 4.4: Ownership Pattern of the Rose and Gerbera Producing Farmers

Source: Field survey, 2018.

4.7 Credit Facilities of the Respondent

Available amount of funding is an important factor for any kind of farming. The sources of credit facilities for the rose and gerbera producing farmers include Banks, NGOs, Relatives and also their own funding.
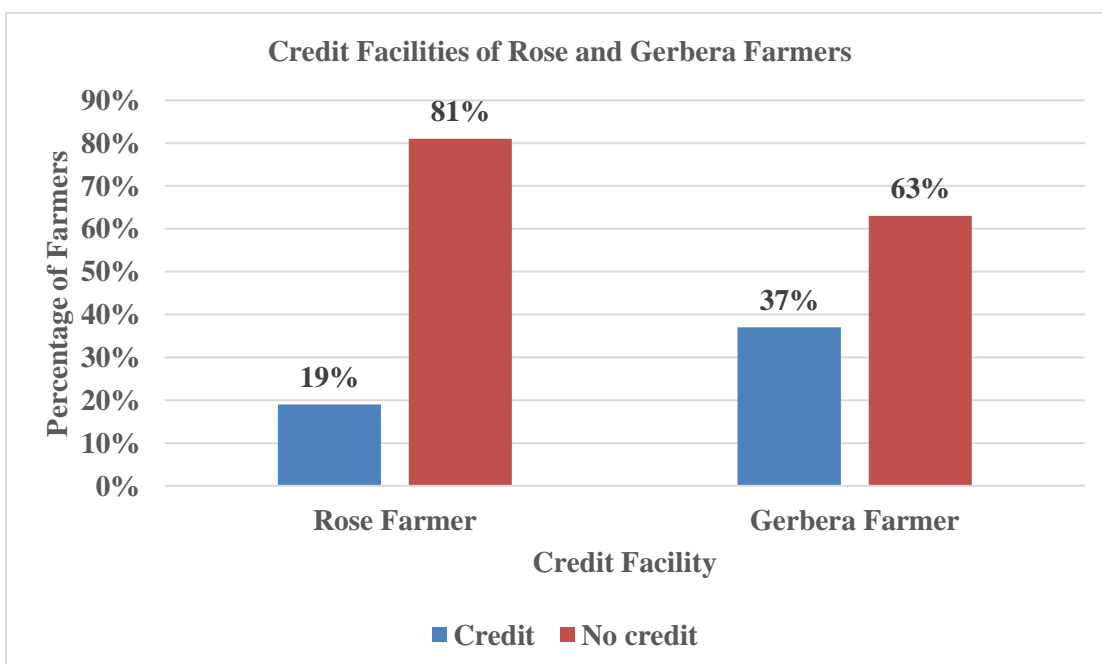
Figure 4.5: Credit Facilities of Rose and Gerbera Farmers

Source: Field survey, 2018.

In rose and gerbera farming, about 19 percent and 36 percent farmers were taken credit for their production and 81 percent and 64 percent farmers were not taken any credit facilities (Figure: 4.5).

4.8 Size of Land Holdings of the Sample Farmers

In the present study the size of land holdings of the rose and gerbera producing farmers are classified into different categories. Size of land holdings includes own land, homestead area, pond owned, pond leased, leased in, leased out, mortgage in and mortgage out as reported by the sample farmers.

In rose farming, the evident from the figure 4.6 represent that, 31 percent, 5 percent, 23 percent, 17 percent, 3 percent, 14 percent and 7 percent areas were own land, homestead area, rose land area, share out, leased out, mortgage in and mortgage out respectively hold by the sample farmers on an average.
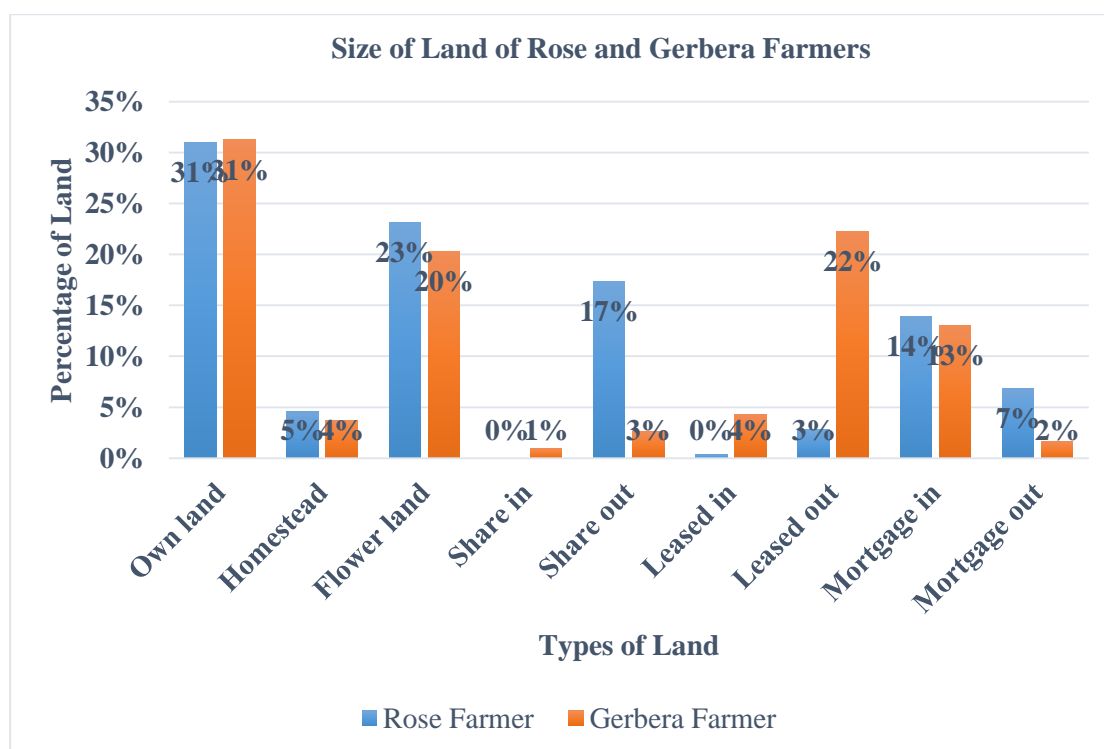
Figure 4.6: Size of Land Holdings of the Sample Farmers
Source: Field survey, 2018.

In gerbera farming, the figure 4.6 shows that, 31 percent, 4 percent, 20 percent, 1 percent, 3 percent, 4 percent, 22 percent,13 percent and 2 percent areas were own land, homestead area, gerbera land area, share in, share out, leased in, leased out, mortgage in and mortgage out respectively hold by the sample farmers on an average.

4.9 Expenditure of the Sample Farmers

The yearly expenditure of rose and gerbera farmers differs from one another. In the present study, the expenditure of rose and prawn farmers were categorized as follows: cloth, house repair, medical purpose, food, festival and others.
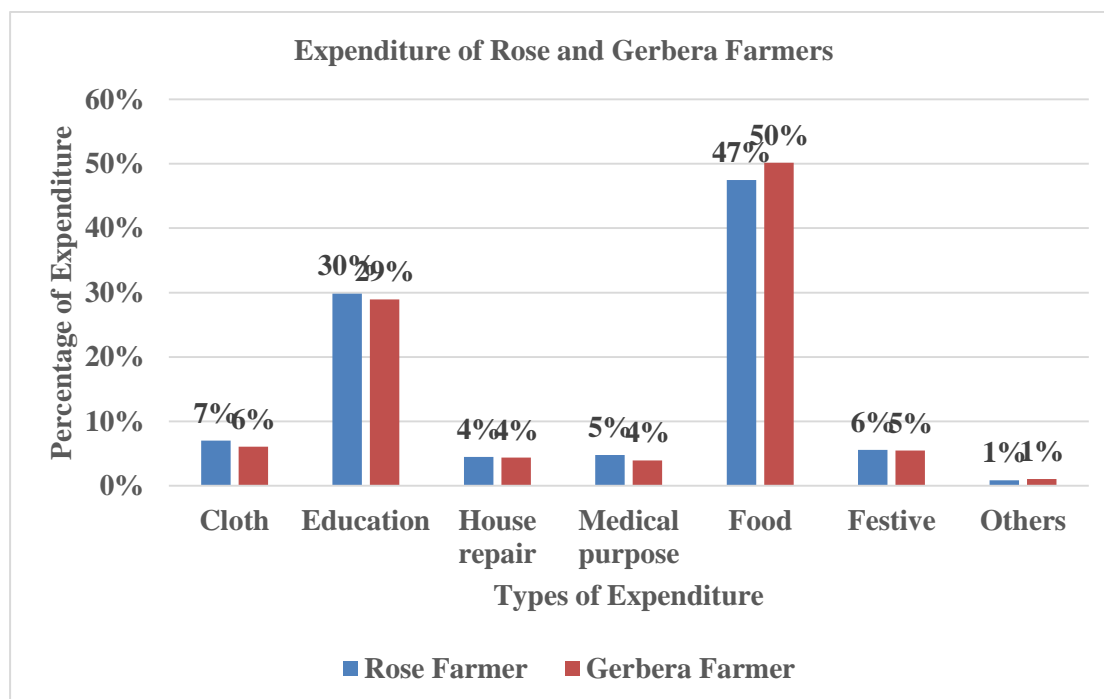
Figure 4.7: Expenditure of Rose and Gerbera Growing Farmers
Source: Field survey, 2018.

In rose farming, figure 4.7 shows that, rose producing farmer's expenditure were 47 percent, 30 percent, 7 percent, 6 percent, 5 percent, 4 percent and 1 percent from food, education, cloth, house repair, medical purpose, festival and others respectively.

In gerbera farming, figure 4.7 represents that, gerbera producing farmer's expenditure were 50 percent, 29 percent, 6 percent, 5 percent, 4 percent, 4 percent and 1 percent from food, education, cloth, house repair, medical purpose, festival and others respectively.

4.10 Concluding Remarks

This chapter analyzed the socioeconomic attributes of the sample farmers. The findings of analysis clearly indicate the socioeconomic characteristics from each other in respect of age distribution, education, occupation, ownership pattern, income etc.

CHAPTER 5

COST AND RETURN FROM ROSE AND GERBERA CULTIVATION

5.1 Introduction

For every production process, cost plays a vital role for making right decision of the farmers. This chapter mainly deals with the estimation and analysis of costs of rose and gerbera production. The costs were classified into variable costs and fixed costs. Most of the inputs were valued at the current market rate and sometimes governments' rates in the study area during the survey period or the prices at which farmers bought the inputs. But, for some unpaid inputs such as family labor, non-cash price was actually paid and pricing was very difficult in such cases. In these cases, the rule of opportunity cost was followed.

In this chapter, in terms of rose cultivation per hectare yield, gross return, gross margin, net return and undiscounted benefit-cost ratio are discussed. Therefore, a financial return of producing rose and gerbera were calculated from the standpoint of farmers. All the returns were accounted for the study period. A brief account showing how the individual costs and returns were estimated in the present study is presented below. For analytical advantages, the cost items were classified under the following heads:

Table: 5.1 Cost item of rose and gerbera cultivation

Cost Item	
Rose	Gerbera
i. Human labor;	x. Human labor;
ii. Land preparation;	xi. Land preparation;
iii. Seedling;	xii. Seedling;
iv. Organic manure;	xiii. Organic manure;
v. Fertilizers;	xiv. Fertilizers;
vi. Insecticides;	xv. Insecticides;
vii. Irrigation;	xvi. Irrigation;
viii. Land use and	xvii. Poly house;
ix. Interest on operating capital (OC).	xviii. Land use and
	xix. Interest on operating capital (OC).

5.2 Variable Costs of Rose and Gerbera

5.2.1 Human Labor Cost

Human labor is one of the most important variable inputs in the production process. Human labor is required for various activities and management of the selected farms such as- land preparation, weeding, sorting, grading, harvesting etc. Human labor was classified into: (a) hired labor and (b) family labor. It is easy to calculate hired labor costs. To determine the cost of family labor, the opportunity cost concept was used.

In this study, the opportunity cost of family labor was assumed to be as wage rate per man i.e., the wage rate, which the farmers actually paid to the hired labor for working a man-day. The labor of women and children was converted into man-equivalent day by presenting a ratio of 2 children day = 1.5 women days = 1 man equivalent day (Miah, 1987). In this study a man-day was considered to be 8 hours of work. For avoiding complexity, average rate has been taken into account. Labor wage rate varies with respect to different seasons. In the study area it varied from 450 to 500 Tk. per man-days. Thus the computed average rate was Tk. 475 per man-days for rose cultivation. Use of human labor and its relevant cost incurred were shown in table 5.2. The per hectare labor cost for rose and gerbera was Tk. 33250 and Tk. 30875 which constituted 13.08 percent and 6.57 percent of total variable cost respectively.

5.2.2 Land preparation

Land preparation cost incurred was shown in table 5.2. The per hectare land preparation cost for rose was Tk. 2120 which constituted 0.83 percent of total variable cost and per hectare land preparation cost for gerbera was Tk. 3550 which constituted 0.76 percent of total variable cost.

Land preparation cost of gerbera was a little higher than rose because gerbera plant required well drained soil and constriction of this kind bed was slightly costly.

5.2.3 Cost of Seedling

Seedling is a major input of rose and gerbera cultivation in the study area. There was a variation in the per unit price of seedling from location to location and time to time. But cost was calculated on the basis of actual price paid by the farmers. The average price of rose and gerbera seedling was Tk. 10 per piece and Tk. 36 per piece respectively. The per hectare average costs of rose and gerbera seedling was estimated at Tk. 63970 and Tk. 216000 respectively which constituted 25.16 percent and 45.95 percent of total variable cost (Table 5.2). Gerbera seedling cost was almost three times higher than rose seedlings because almost all the farmers collected rose

seedlings from local nurseries but most of the gerbera farmers imported gerbera seedlings from India.

5.2.4 Cost of organic manure

Manure (cow dung) was commonly used as organic fertilizer for producing flower. There was no fixed rate for buying manure in the study area. Farmers used purchased manure. Cost of manure was computed at the prevailing market price, which was estimated to be Tk. 1 per kg during the study period.

Per hectare cost of using manure was calculated at Tk. 1728 and TK. 1817 for practicing rose and gerbera cultivation respectively which accounted for 0.68 percent and 0.39 percent of total variable cost (Table 5.2).

5.2.5 Cost of Fertilizer

Fertilizer is an important input for rose and gerbera cultivation. Rose and gerbera farmers applied various kinds of fertilizer such as Urea, TSP, and MOP etc. Uses of these fertilizers influence in increasing the growth of flower. The cost of fertilizer was estimated by using the prevailing market rate which was actually paid by the farmers. The prices of these fertilizers were assumed to be same in all categories of farms. The average prices of Urea, TSP & MPO were Tk. 16 per kg, Tk. 25 per kg & Tk. 16 per kg respectively in the study area.

The estimated costs of fertilizer are shown in table 5.2. It was observed that rose farmers incurred cost of Tk. 24720 for Urea, Tk. 27500 for TSP and Tk. 8880 for MOP on an average which constituted 9.72 percent, 10.82 percent and 3.49 percent of total variable cost respectively and gerbera farmers incurred cost of Tk. 26160 for Urea, Tk.28400 for TSP and Tk. 9840 for MoP on an average which constituted 5.56 percent, 6.04 percent and 2.09 percent of total variable cost respectively

5.2.6 Cost of Insecticides

Costs of Insecticides incurred were shown in table 5.2. The per hectare costs of insecticides for rose and gerbera were Tk. 48000 and Tk. 44500 respectively which constituted 18.88 percent and 9.47 percent of total variable cost.

5.2.7 Cost of Irrigation

Water is needed at the appropriate time for the proper growth of rose and gerbera. Without water rose cannot be cultivated. In the study area farmers used motor for water uplifting and supplying it to the canal. So, cost of irrigation was computed on the basis of prevailing market rate. Average per hectare irrigation cost of rose and

gerbera were calculated at Tk. 33153 and Tk. 43652 respectively which was 13.04 percent and 9.29 percent of total variable cost (Table 5.2).

5.2.8 Cost of Poly House for Gerbera

In August 2017, the construction of the net houses began. And already, each poly net house was filled with gerberas. They had already started marketing. This was not much different from Europe's well-planned and cool weather-adjustable poly net or greenhouse. However, it was more specialized and durable compared to the greenhouse made with local equipment in Bangladesh's flower capital, Godkhali, Jessore. The structure was covered using ultra violet stabilized low density polyethylene. There was the method of reducing temperatures in the net house. Similarly, there was a system to create steam with water. Even though it is a tropical area, modern gerbera field has been established very nicely here. The overall activities of those farms were being monitored by some excellent young people. The average per hectare cost of poly house for gerbera was Tk. 45000 which was 9.57 percent of total variable cost (Table 5.2).

5.2.9 Interest on Operating Capital

Interest on operating capital was determined on the basis of opportunity cost principle. The operating capital actually represented the investment on different farm operation over the period because all the cost was not incurred at the beginning or at any single point of time. The cost was incurred throughout the whole production period; hence, at the rate of 9 percent per annum interest on operating capital for six months was computed for rose and gerbera production (Interest rate was taken according to the bank rate prevailing in the market during the study period). Interest on operating capital was calculated by using the following standard formula (Miah, 1992).

Interest on Operating Capital (IOC) = Alit

Where,

Al= Total investment /2,

t = Total time period of a cycle

i= interest rate which was 9percent per year during the study period.

The interest on operating capital of rose and gerbera was estimated at Tk. 10949 and Tk. 20240 respectively which constituted 4.31 percent and 4.31 percent share of total variable cost (Table 5.2)

Table 5.2: Per Hectare Variable Costs of Rose and Gerbera Cultivation

Variable cost items	Units	Quantity (Unit./ha)		Price (Tk./Unit)		Cost (Tk.)		Percent of total variable cost (%)	
		R	G	R	G	R	G	R	G
Human labor	Man-days	70	65	475	475	33250	30875	13.08	6.57
Land preparation	Tk.					2120	3550	0.83	0.76
Seedling	No.	6397	6000	10	36	63970	216000	25.16	45.95
Organic manure	Kg.	1728	1817	1	1	1728	1817	0.68	0.39
Urea	Kg.	1545	1635	16	16	24720	26160	9.72	5.56
TSP	Kg.	1100	1136	25	25	27500	28400	10.82	6.04
MOP	Kg.	555	615	16	16	8880	9840	3.49	2.09
Insecticides	Brail	384	356	125	125	48000	44500	18.88	9.47
Irrigation	Tk.					33153	43652	13.04	9.29
Poly House							45000		9.57
Interest on operating cost (OC)	-	-		-		10949	20240	4.31	4.31
Total variable cost	-	-		-		**254270**	**470034**	**100**	**100**

Source: Field survey, 2018.

5.2.10 Total Variable Cost

In the study area, the total variable costs varied from year to year. It was observed that the total per hectare variable cost for rose and gerbera cultivation was Tk. 254270 and Tk. 470034 respectively which comprised of 77.75 percent of total cost (Table 5.3).

5.3 Fixed Costs

5.3.1 Land Use Cost

The farmers used the land as per conditions of leasing arrangement. The term leasing cost means the cost which was required for rose and gerbera farmers to take land lease which would be used for rose and gerbera production to a particular period of time.

Leasing cost varies from one place to another depending on the location, soil fertility, topography of the soil and distance from the sources of water etc. Leasing cost was the single highest cost item in the study areas. The value of own land was calculated as opportunity cost concept. Land use cost for rose and gerbera cultivation was estimated at the prevailing rental value per hectare in the study area. The rental value of per hectare land of rose and gerbera was estimated at Tk. 72749 and Tk. 68445 respectively which occupied 100 percent of total fixed cost (Table 5.3).

Table 5.3: Per Hectare Fixed Costs of Rose and Gerbera Cultivation

Fixed cost items	Cost (Tk./ha)		Percent of total fixed cost (%)	
	Rose	Gerbera	Rose	Gerbera
Land use cost	72749	68445	100	100
Total fixed costs	72749	68445	100	100

Source: Field survey, 2018.

5.3.2 Total Fixed Cost

In the study area, it was estimated that per hectare total fixed cost for year round rose cultivation was Tk. 72749 which comprised of 22.25 percent of total cost (Table 5.3).

5.4 Total Cost

The total costs were calculated by adding up total variable cost and total fixed cost. In the study per hectare total cost of rose and gerbera cultivation was calculated at Tk. 327019 and Tk. 538479 (Table 5.4).

Table 5.4: Per Hectare Total Cost of Rose and Gerbera Cultivation

Cost items	Rose		Gerbera	
	Cost (Tk./ha)	Percent of total cost (%)	Cost (Tk./ha)	Percent of total cost (%)
a. Total variable cost	254270	77.75%	470034	87.29
b. Total fixed cost	72749	22.25%	68445	12.71
Total cost (a+b)	327019	100%	538479	100

Source: Field survey, 2018.
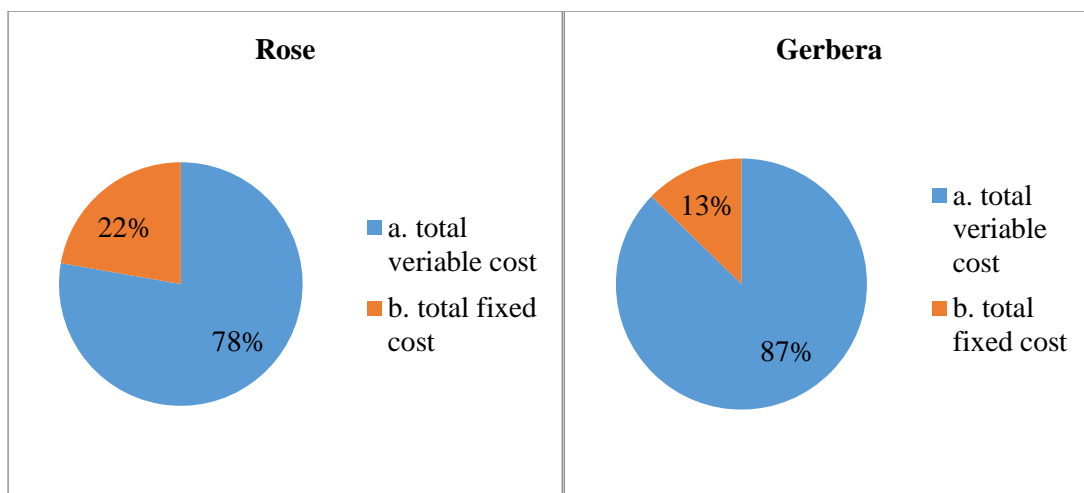
Figure 5.1: Percentages of per hectare total variable cost and total fixed cost of rose and gerbera cultivation.

Source: Field survey, 2018.

5.5 Returns of Rose and Gerbera Cultivation

5.5.1 Gross Return

Gross return is the pecuniary value of total product. Per hectare gross returns were calculated by multiplying the total amount of production by their respective market prices. In the study area, per hectare average yield of rose and gerbera was 530873 (stick/ha) and 216000 (stick/ha) respectively and its money value was Tk. 902484 and Tk. 2116800.

5.5.2 Net Return

In general net return is termed as entrepreneur's income. To evaluate the profitability of rose production, net return is an important aspect. Net return is the difference between gross return and total costs. Per hectare net return of rose and gerbera was estimated at Tk. 575465 and Tk. 1578321 which indicates that rose and gerbera production is profitable business for the farmers (Table 5.5). Net return of gerbera was 3 times more than rose because the per stick gerbera price was more than per stick rose. So we could say gerbera is more profitable than rose.

5.5.3 Gross Margin

Farmers usually want to gain maximum return over variable cost of production. The probable reason is that estimation of fixed cost of production is difficult to determine. Thus the gross margin analysis has been taken into account to calculate the relative

profitability of rose and gerbera cultivation. The gross margin of rose and gerbera cultivation was estimated at Tk. 648214 and Tk. 1646766 (Table 5.5).

Table 5.5 Gross Margin and Benefit Cost Ratio (Undiscounted) of Rose and Gerbera Cultivation

Sl. No.	Items			Amount (Tk./hectare)	
				Rose	Gerbera
A.	Gross returns (GR) (yield* price)			902484	2116800
	Yield(stick/ha)		Price(tk./stick)		
	Rose	530873	**1.7**		
	Gerbera	216000	**9.8**		
B.	Total variable costs (TVC)			254270	470034
C.	Total costs (TVC+TFC)			327019	538479
D.	Net return (GR-TC)			575465	1578321
E.	Gross margin (GR-TVC)			648214	1646766
F.	Benefit-cost ratio (BCR) = GR/TC (Full cost basis)			2.76	3.93
G.	Benefit-cost ratio (BCR) = GR/TVC (Cash cost basis)			3.55	4.50

Source: Field survey, 2018.

5.5.4 Benefit Cost Ratio (Undiscounted)

Benefit cost ratio was calculated by dividing gross return by gross cost or total cost. It implies return per taka invested. It helps to analyze financial efficiency of the farm. It was evident from the study that the benefit cost ratio on full cost basis of rose and gerbera cultivation was accounted for 2.76 and 3.93 implying that Tk. 2.76 would be earned by investing Tk. 1.00 for rose production and Tk. 3.93 would be earned by investing Tk. 1.00 for gerbera cultivation. Again the benefit cost ratio on cash cost basis was 3.55 and 4.50 for rose and gerbera respectively. So, rose and gerbera cultivation was found highly profitable for farmers but gerbera was more profitable than rose (Table 5.5).

5.6 Concluding Remarks

It was evident from the results that per hectare total variable cost for rose and gerbera cultivation were more than per hectare total fixed costs for rose cultivation. Rose and gerbera cultivation provides higher returns to the farmers. Rose and gerbera cultivation is gaining popularity in the country gradually due to its high yield potentiality and high demand in the international market. Sample farmers showed their opinion that higher yield and income encouraged them to continue rose and gerbera cultivation but farmers would earn more by cultivating gerbera rather than rose.

CHAPTER 6

FACTORS AFFECTING YIELDS OF ROSE AND GERBERA CULTIVATION

6.1 Introduction

An attempt has been made this chapter to identify and measure the effects of the major variables on rose and gerbera production. Cobb-Douglas production function was chosen to estimate the contribution of key variables on the production process of rose and gerbera cultivation. The estimated values of the model are presented in Table 6.1.

6.2 Functional Analysis for identifying the factors affecting in production

Production function is a relation or a mathematical function specifying the maximum output that can be produced with given inputs. Keeping in mind the objectives of the study and considering the effect of explanatory variables on output of rose and gerbera cultivation, eight explanatory variables for rose and nine explanatory variables for gerbera were chosen to estimate the quantitative effect of inputs on output.

Management factor was not included in the model because specification and measurement of management factor is almost impossible particularly in the present study, where a farm operator is both a labor and manager. Other independent variables like water quality, soil condition, time etc., which might have affected production of farm enterprises, were excluded from the model on the basis of some preliminary estimation. A brief description is presented here about the explanatory variables included in the model.

6.3 Estimated Values of the Production Function Analysis

i. F-value was used to measure the goodness of fit for different types of inputs.

ii. The coefficient of multiple determinations (R^2) indicates the total variations of output explained by the independent variables included in the model.

iii. Coefficients having sufficient degrees of freedom were tested for significance level at 1 percent, 5 percent and 10 percent levels of significant.

iv. Stage of production was estimated by returns to scale which was the summation of all the production elasticity of various inputs.

The estimated coefficients and related statistics of the Cobb-Douglas production function for rose and gerbera cultivation are shown in Table 6.1.

Table 6.1 Estimated Values of Coefficients and Related Statistics of Cobb-Douglas Production Function.

Explanatory variables	Rose			Gerbera		
	Coefficient	Standard error	t-value	Coefficient	Standard error	t-value
Intercept	13.071***	3.449	3.79	4.546***	1.561	2.91
Human labor (X_1)	0.226***	0.088	2.58	-0.063NS	0.047	-1.35
Seedling (X_2)	0.124***	0.035	3.54	1.049***	0.106	9.93
Organic manure (X_3)	0.203NS	0.327	0.62	0.438*	0.247	1.77
Urea (X_4)	0.186***	0.049	3.79	-0.100NS	0.203	-0.49
TSP (X_5)	0.115*	0.072	1.60	0.628***	0.231	2.72
MOP (X_6)	0.102**	0.048	2.14	0.051NS	0.121	0.42
Insecticides(X_7)	0.050**	0.025	1.98	-0.272NS	0.137	-1.50
Irrigation(X_8)	0.035***	0.010	3.39	0.201NS	0.197	1.02
R^2	0.81			0.97		
Adjusted R^2	0.80			0.96		
Return to scale	1.04			1.93		
F-value	76.96***			475.7***		

Source: Field survey, 2018.

Note: *** Significant at 1 percent level;

** Significant at 5 percent level;

* Significant at 10 percent level; and

NS: Not Significant

6.4 Interpretations of Results

Effect of human labor (X_1): From the table (6.1) it can be seen that the value of the coefficient was positive and significant at 1 percent level of significance for rose which indicates that a 1 percent increase in the use of human labor keeping other factors constant would increase the yield of rose by 0.226 percent.

In case of gerbera the value of the coefficient was negative and insignificant which indicates that at 1 percent increase in the use of human labor keeping other factors constant has no effect on the yield of gerbera. In the study area most of the gerbera farmers was unskilled and had very little knowledge about gerbera cultivation procedure. So, result showed that unskilled labor negatively affect the growth of gerbera flower.

Effect of seedling (X_2): From the table (6.1), it was found that the value of coefficient of seedling was positive and significant at 1 percent level of significance for rose which indicates that at 1 percent increase in the number of seedling keeping other factors constant would increase the yield of rose by 0.124 percent.

On the other hand that the value of coefficient of seedling was positive and significant at 1 percent level of significance for gerbera which indicates that at 1 percent increase in the number of seedling keeping other factors constant would increase the yield of gerbera by 1.049 percent.

Effect of organic manure (X_3)

From the table (6.1), it was found that the value of coefficient of the use of organic manure was positive and insignificant for rose. The value of the coefficient was 0.203 indicating that it has no severe effect on the production of rose.

In case of gerbera the value of coefficient of the use of organic manure was positive and 10 percent level of significance which indicates that at 1 percent increase in the use of organic manure would increase the yield of gerbera by .438 percent.

Effect of urea (X_4)

It was observed from the regression that the coefficient of the use of urea was positive and significant at 5 percent level of significance which indicates that at 1 percent increase in the use of urea keeping other factors constant would increase the yield of rose by 0.186 percent (table 6.1).

In case of gerbera the coefficient of the use of urea revealed that 1 percent increase in the use of urea keeping other factors constant has no significant effect on the yield of gerbera (table 6.1).

Effect of TSP (X$_5$)

It was found from the table (6.1), that the value of the coefficient of the use of TSP was positive and significant at 10 percent level of significance which indicates that at 1 percent increase in the use of TSP remaining other factors constant would increase the yield of rose by 0.115 percent.

On other hand for gerbera the value of the coefficient of the use of TSP was positive and significant at 1 percent level of significance which indicates that at 1 percent increase in the use of TSP remaining other factors constant would increase the yield of gerbera by 0.628 percent.

Effect of MOP (X$_6$)

It was observed from the regression, that the coefficient of the use of MOP was positive and significant at 5 percent level of significance which indicates that at 1 percent increase in the use of MOP remaining other factors constant would increase the yield of rose by 0.102 percent (table 6.1).

In case of gerbera the coefficient of the use of MOP indicates that at 1 percent increase in the use of MOP remaining other factors constant has no significant effect on the yield of gerbera (table 6.1).

Effect of insecticides (X$_7$)

From the table (6.1) it can be seen that the value of the coefficient was positive and significant at 5 percent level of significance which indicates that at 1 percent increase in the use of insecticides keeping other factors constant would increase the yield of rose by 0.050 percent.

In case of gerbera the value of the coefficient indicates that at 1 percent increase in the use of insecticides keeping other factors constant has no significant effect on the yield of gerbera (Table 6.1).

Effect of irrigation (X$_8$)

It was observed from the regression analysis that the coefficient of the irrigation was positive and significant at 1 percent level of significance which indicates that at 1 percent increase in the application of irrigation remaining other factors constant would increase the yield of rose by 0.035 percent (table 6.1).

On the other hand the value of coefficient of the irrigation indicates that at 1 percent increase the application of irrigation remaining other factors constant has no significant effect on the yield of gerbera (table 6.1).

6.5 Coefficient of multiple determinations (R^2)

The values of the coefficient of multiple determination of rose cultivation was found to be 0.81 which implied that about 81 percent of the total variation in the yield (stick/ha) could be explained by the included explanatory variables of the model. So, we can say the goodness of fit of this regression model is better since R^2 indicates the goodness of fit of the regression model (Table 6.1).

In case of gerbera the values of the coefficient of multiple determination was found to be 0.97 which implied that about 97 percent of the total variation in the yield (stick/ha) could be explained by the included explanatory variables of the model. So, we can also say the goodness of fit of this regression model is better since R^2 indicates the goodness of fit of the regression model (Table 6.1).

6.6 Adjusted R^2

Here the term adjusted means adjusted for the degrees of freedom. The adjusted R^2 for rose cultivation was found to be 0.80 which indicated that about 80 percent of the variations of the output were explained by the explanatory variables included in the model (Table 6.1).

On the other hand the adjusted R^2 for gerbera cultivation was found to be 0.96 which indicated that about 96 percent of the variations of the output were explained by the explanatory variables included in the model (Table 6.1).

6.7 Returns to Scale in Rose and Gerbera Cultivation

The summation of all the production coefficients of rose and gerbera cultivation was equal to 1.04 and 1.93 respectively. This means that production function for rose and gerbera cultivation exhibits increasing returns to scale. This means that, if all the variables specified in the model were increased by 1 percent, yield would also be increased by 1.04 percent for rose and 1.93 percent for gerbera (Table 6.1).

6.8 F-value

The F-statistic was computed to denote the overall goodness of fit of any fitted model. The F-value for the rose cultivation was estimated at 76.96 which were highly significant at 1 percent level. It means that the explanatory variables included in the model were important for explaining the variation in yield of rose cultivation (Table 6.1).

In case of gerbera the F-value was estimated at 475.7 which were highly significant at 1 percent level. It means that the explanatory variables included in the model were important for explaining the variation in yield of gerbera cultivation (Table 6.1).

6.9 Concluding Remarks

It was evident from the Cobb-Douglas production function model, that the included key variables had significant and positive effect on rose cultivation except the insignificant effect of organic manure. On the other hand the included key variables had significant and positive effect on gerbera cultivation except the insignificant effect of human labor, urea, MoP, insecticides and irrigation. So there was a positive effect of key factors in the production process of year round rose and gerbera cultivation. It is possible to increase yield of both rose and gerbera by importing improved verity seedlings.

CHAPTER 7

VALUE CHAIN ANALYSIS OF ROSE AND GERBERA

7.1 Value Chain

Marketing value chain denotes the steps involved in the marketing process that ensures the quality of the produce reaching the consumer. A value chain approach in agricultural development helps identify weak points in the chain and actions to add more value. Value chains may include a wide range of activities, and an agricultural value chain might include: development and dissemination of plant and animal genetic material, input supply, farmer organization, farm production, post-harvest handling, processing, provision of technologies of production and handling, grading criteria and facilities, cooling and packing technologies, post-harvest local processing, industrial processing, storage, transport, finance, and feedback from markets. This chapter is mainly deals with the value chain analysis of rose and gerbera. The following steps for value chain analysis were adopted.

7.2 Value chain Mapping and Distribution of Actors in the Chain of Rose and Gerbera

Mapping a value chain facilitates a clear understanding of the sequence of activities and the key actors and relationships involved in the value chain. Mapping of value chain functions was considered to show the relationships and integration of the processors and activities performed along the value chain. The main actors of the value chain of cut flowers were input suppliers, producers or farmers, local wholesalers, foria, contact farming agents, Dhaka wholesale market, retailer and consumer (Fig. 7.1).
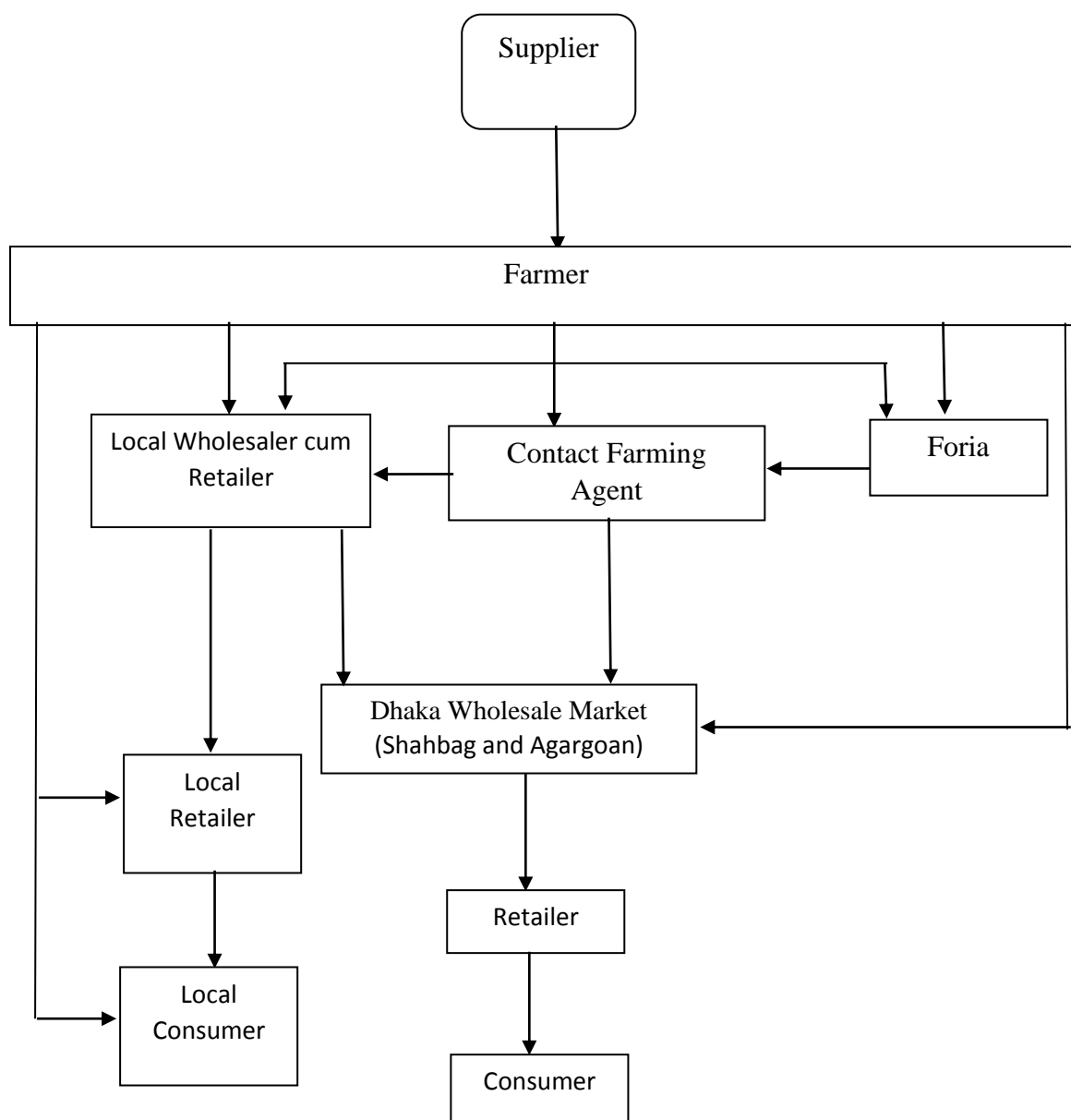
Figure (7.1): Value chain map of cut flower (Rose and Gerbera) and distribution of actors in chain.

Source: Field survey, 2018.

7.3 Marketing channel of Rose and Gerbera

Value chain analysis intended to generate knowledge of flow of flower from origin to final destination through different market intermediaries. Those all market intermediaries form different marketing channel for cut flowers. The existing marketing channels were shown below.

Channel ⅰ : Farmer → local consumer

Channel ⅱ : Farmer → local retailer → local consumer

Channel ⅲ : Farmer → local wholesaler → local retailer → local consumer

Channel ⅳ : Farmer → local wholesaler → Dhaka wholesaler → retailer → consumer

Channel ⅴ : Farmer → contact farming agent → Dhaka wholesaler (Shahbag and Agargoan) → retailer → consumer

Channel ⅵ : Farmer → foria → contact farming agent → Dhaka wholesaler (Shahbag and Agargoan) → retailer → consumer

Channel ⅶ : Farmer → foria → local wholesaler → Dhaka wholesaler (Shahbag and Agargoan) → retailer → consumer

Channel ⅷ : Farmer → foria → Contact farming agent → local wholesaler → Dhaka wholesaler (Shahbag and Agargoan) → retailer → consumer

Channel ⅸ : Farmer → Dhaka wholesaler (Shahbag and Agargoan) → retailer → consumer

7.4 Marketing Cost of Rose and Gerbera

Marketing cost was estimated to compute the share of profit captured by key actors in the value chain. Table 7.1 shows the average marketing cost of rose incurred by every actor during transaction. The highest marketing cost was incurred by the Dhaka wholesalers Tk. 68.2 followed by retailers Tk. 59.7. This was because wholesaler transportation cost and shop rent is higher. The average marketing cost of farmer was Tk.29 when they sold to foria, local wholesaler cum retailer and to Dhaka wholesaler. The average marketing cost of farmer, foria, contact marketing agent, local wholesaler and local retailer was Tk. 29; Tk. 25; Tk. 20.5; Tk. 19 and Tk. 34.9 for 100 rose.

Table 7.1: Rose Average marketing costs for different actors or marketing agents (Tk./100 Stick)

Cost Items of Marketing	Actors						
	Farmer	Foria	Contact Farming Agent	Local Wholesaler	Local Retailer	Dhaka Wholesaler	Retailer
Basket	8	5	7	7	7	5	5
Packing	2				5	4.8	8.5
Transport		5			6	12.5	8
Telephone cost		10	10			2.7	
Storage	4					4.8	
Wastage loss	15			7	2.5	5	3.2
Commission			3.5		4.4	10	4.5
Shop rent				5	10	23.4	30.5
Other cost		5					
	29	**25**	**20.5**	**19**	**34.9**	**68.2**	**59.7**

Source: Field Survey, 2018.

Table 7.2 shows the average marketing cost of gerbera incurred by every actor during transaction. The highest marketing cost was incurred by the Dhaka wholesalers Tk. 73.2 followed by retailers Tk. 70.7. This was because wholesaler transportation cost and shop rent is higher. The average marketing cost of farmer was Tk. 37.2 when they sold to foria, local wholesaler cum retailer and to Dhaka wholesaler. The average marketing cost of farmer, foria, contact farming agent, local wholesaler and local retailer was Tk. 37.2; Tk. 30.5; Tk. 36.5; Tk. 27.1 and Tk. 40.9 for 100 gerbera.

Table 7.2 Gerbera Average marketing costs for different actors or marketing agents (Tk./100 Stick)

Cost Items of Marketing	Actors						
	Farmer	Foria	Contact Farming Agent	Local Wholesaler	Local Retailer	Dhaka Wholesaler	Retailer
Basket	8	6	7	7	7	8	5
Packing	5				8	4.8	8.5
Transport		5	10		6	12.5	8
Telephone cost		10	10			2.9	6
Storage	5.5	6	5	5.6		4.8	5
Wastage loss	16.7			6.5	4.5	6.8	3.2
Commission		3.5	3.5		5.4	10	4.5
Shop rent				8	10	23.4	30.5
Other cost	2		1				
	37.2	30.5	36.5	27.1	40.9	73.2	70.7

Source: Field Survey, 2018.

7.5 Net Value Addition of Rose and Gerbera

Value addition was the difference in the price paid by consumers and that received by the producers. Net value addition is difference between value addition and marketing cost. Table 7.3 indicate that nine different marketing channel having different net value addition.

Net Value Addition of Rose

The result showed that rose farmers had highest net value addition (Tk. 159.4/100 rose) when they sale to local consumers in channel ⅰ and lowest net value addition (Tk. 39.4/100 rose) when they sale to contact farming agents in channel V and to foria's in channel ⅶ. Forias had highest net value addition (Tk. 65/100 rose) in channel ⅵ and ⅷ and lowest net value addition (Tk. 15/100 rose) in channel ⅶ.

Contact farming agents had highest net value addition (Tk. 49.5/100 rose) when they sale to Dhaka wholesalers in channel ⅴ and to local retailers in channel ⅶ and lowest net value addition (Tk. 29.5/100 rose) when they sale to Dhaka wholesalers in channel ⅵ and ⅷ. Local wholesalers had highest net value addition (Tk. 136/100 rose) when they sale to Dhaka wholesalers in channel ⅳ and lowest net value addition (Tk.41/100 rose) when they also sale to local wholesalers in channel ⅶ. Local retailers had highest net value addition (Tk. 40.1/100 rose) when they sale to local consumers in channel ⅱ and lowest net value addition (Tk. 15.1/100 rose) when they also sale to local consumers in channel ⅲ. Dhaka wholesalers had highest net value addition (Tk. 52.8/100 rose) when they sale to retailers in channel ⅸ and lowest net value addition (Tk. 12.8/100 rose) when they also sale to retailers in channel ⅶ. Retailers had highest net value addition (Tk. 120.3/100 rose) when they sale to end consumers in channel ⅸ and lowest net value addition (Tk. 10.3/100 rose) when they also sale to consumers in channel ⅳ.

Table 7.3: Rose Net Value Addition for different channel

Agents		Rose Marketing Channel								
		i	ii	iii	iv	v	vi	vii	viii	ix
Farmer	**Purchase price**	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60	61.60
	Selling price	250	150	145	145	130	160	130	160	200
	Value Addition	188.4	88.4	83.4	83.4	68.4	98.4	68.4	98.4	138.4
	Marketing cost	29	29	29	29	29	29	29	29	29
	Net Value Addition	**159.4**	**59.4**	**54.4**	**54.4**	**39.4**	**69.4**	**39.4**	**69.4**	**109.4**
Foria	**Purchase price**						160	130	160	
	Selling price						250	170	250	
	Value Addition						90	40	90	
	Marketing cost						25	25	25	

Table: 7.3 (Contd.)

Agents		Rose Marketing Channel								
		i	ii	iii	iv	v	vi	vii	viii	ix
	Net Value Addition						**65**	**15**	**65**	
Contact Farming Agent	Purchase price					130	250	170	250	
	Selling price					200	300	240	300	
	Value Addition					70	50	70	50	
	Marketing cost					20.5	20.5	20.5	20.5	
	Net Value Addition					**49.5**	**29.5**	**49.5**	**29.5**	
Local Wholesaler	Purchase price			145	145			240		
	Selling price			250	300			300		
	Value Addition			105	155			60		
	Marketing cost			19	19			19		
	Net Value Addition			**86**	**136**			**41**		
Local Retailer	Purchase price		150	250						
	Selling price		225	300						
	Value Addition		75	50						
	Marketing cost		34.9	34.9						
	Net Value Addition		**40.1**	**15.1**						
Dhaka Wholesaler	Purchase price				300	200	300	300	300	200
	Selling price				400	300	400	380	400	320
	Value Addition				100	100	100	100	100	120

Table: 7.3 (contd.)

Agents		Rose Marketing Channel								
		i	ii	iii	iv	v	vi	vii	viii	ix
	Marketing cost				67.2	67.2	67.2	67.2	67.2	67.2
	Net Value Addition				**32.8**	**32.8**	**32.8**	**12.8**	**32.8**	**52.8**
Retailer	Purchase price				400	300	400	380	400	320
	Selling price				470	450	500	500	500	450
	Value Addition				70	150	100	180	100	130
	Marketing cost				59.7	59.7	59.7	59.7	59.7	59.7
	Net Value Addition				**10.3**	**90.3**	**40.3**	**120.3**	**40.3**	**50.3**
	Total Net Value Addition	**159.4**	**99.5**	**155.6**	**233.5**	**212**	**237**	**263**	**237**	**232.5**

Source: Field Survey, 2018

Gerbera Net Value Addition

Table 7.4 indicate that nine different marketing channel having different net value addition. The result showed that gerbera farmers had highest net value addition (Tk. 470.5/100 gerbera) when they sale directly to local consumers and lowest net value addition (Tk.113.5/100 gerbera) when they sale to contact farming agents in channel v and to forias in channel vii. Forias had highest net value addition (Tk. 99.5/100 gerbera) in channel viii and lowest net value addition (Tk. 79.5/100 gerbera) in channel vii. Contact farming agents had highest net value addition (Tk. 163.5/100 gerbera) when they sale to Dhaka wholesalers in channel v and lowest net value addition (Tk.83.5/100 gerbera) when they also sale to Dhaka wholesalers in channel vi. Local wholesalers had highest net value addition (Tk. 222.9/100 gerbera) when they sale to Dhaka wholesalers in channel iv and lowest net value addition (Tk.132.9/100 gerbera) when they also sale to Dhaka wholesalers in channel vii. Local retailers had highest net value addition (Tk. 159.1/100 gerbera) when they sale to local consumers in channel ii and lowest net value addition (Tk.109.1/100

gerbera) when they also sale to local consumers in channel ⅲ. Dhaka wholesalers had highest net value addition (Tk. 226.8/100 gerbera) when they sale to retailers in channel ⅴ and lowest net value addition (Tk.76.8/100 gerbera) when they also sale to retailers in channel ⅷ. Retailers had highest net value addition (Tk. 949.3/100 gerbera) when they sale to end consumers in channel ⅶ and lowest net value addition (Tk.229.3/100 gerbera) when they also sale to consumers in channel ⅳ.

Table 7.4: Gerbera Net Value Addition for different channel

Agents		Gerbera Marketing Channel								
		i	ii	iii	iv	v	vi	vii	viii	ix
Farmer	**Purchase price**	249.3	249.3	249.3	249.3	249.3	249.3	249.3	249.3	249.3
	Selling price	750	500	450	450	400	460	400	460	700
	Value Addition	450.7	249.7	200.7	200.7	150.7	210.7	150.7	210.7	500.7
	Marketing cost	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2	37.2
	Net Value Addition	**470.5**	**213.5**	**163.5**	**163.5**	**113.5**	**173.5**	**113.5**	**173.5**	**413.5**
Foria	**Purchase price**						460	400	460	
	Selling price						580	510	570	
	Value Addition						120	110	130	
	Marketing cost						30.5	30.5	30.5	
	Net Value Addition						**89.5**	**79.5**	**99.5**	
Contact Farming Agent	**Purchase price**					400	580	510	570	
	Selling price					600	700	640	700	
	Value Addition					200	120	150	130	
	Marketing cost					36.5	36.5	36.5	36.5	
	Net Value Addition					**163.5**	**83.5**	**113.5**	**93.5**	
Local Wholesaler	**Purchase price**			450	450			640		
	Selling price			650	700			800		

Table: 7.4 (Contd.)

Agents		Gerbera Marketing Channel								
		i	ii	iii	iv	v	vi	vii	viii	ix
	Value Addition			200	250			160		
	Marketing cost			27.1	27.1			27.1		
	Net Value Addition			**172.9**	**222.9**			**132.9**		
Local Retailer	Purchase price		500	650						
	Selling price		700	800						
	Value Addition		200	150						
	Marketing cost		40.9	40.9						
	Net Value Addition		**159.1**	**109.1**						
Dhaka Wholesaler	Purchase price				700	600	700	800	700	700
	Selling price				900	900	925	980	850	950
	Value Addition				200	300	225	180	150	250
	Marketing cost				73.2	73.2	73.2	73.2	73.2	73.2
	Net Value Addition				**126.8**	**226.8**	**151.8**	**106.8**	**76.8**	**176.8**
Retailer	Purchase price				900	900	925	980	850	950
	Selling price				1200	1500	1300	2000	1700	1550
	Value				300	600	375	1020	850	600
	Marketing cost				70.7	70.7	70.7	70.7	70.7	70.7
	Net Value Addition				**229.3**	**529.3**	**304.3**	**949.3**	**779.3**	**529.3**
	Total Net Value Addition	**470.5**	**372.6**	**445.5**	**742.5**	**1033.1**	**802.2**	**1517**	**1222.6**	**1119.6**

Source: Field survey, 2018.

7.6 Concluding Remarks

It was observed from that in marketing channel ⅶ for both rose and gerbera had the highest numbers of actors and maximum total net value addition but farmers were getting the lowest net value addition. On the other hand in marketing channel ⅰ and ⅱ the farmers were getting highest net value addition as in these channel farmers directly sold their flowers to consumers without any intermediaries. So it is observed that the as the number of intermediaries or value chain actors increase the farmers or producers share to consumers' price decrease.

CHAPTER 8

PROBLEMS OF CUT FLOWER CULTIVATION AND MARKETING

8.1 Introduction

Rose and gerbera cultivation as a source of livelihood has been an age-old practice for thousands of cut flower farmers in Bangladesh. But flower farmers are socially, economically and educationally backward. In the present study, an attempt had been made to identify and analyze the major problems faced by the farmers which act as main barriers in running the cultivation of rose and gerbera. The problems were broadly classified under two categories such as problems relating to production and problems relating to marketing.

8.2 Production Constrain Faced by Cut Flower Farmers

8.2.1 Problems relating to production of rose and gerbera

Table 8.1 indicated that the major problems faced in the production of cut-flowers growers included huge investment in cut-flower production (reported by 88 percent and 98 percent of the rose and gerbera farmers respectively), irregular supply of electricity required for irrigation (reported by 10 percent and 24 percent of the rose and gerbera farmers respectively), scarcity of labor (reported by 18 percent and 20 percent of the rose and gerbera farmers respectively), non-availability of quality indigenous planting material (reported by 80 percent and 84 percent of the rose and gerbera farmers respectively), poor harvest during the rainy season (reported by 90 percent and 92 percent of the rose and gerbera farmers respectively), pest and disease attack on crops (reported by 72 percent and 70 percent of the rose and gerbera farmers respectively), Labor scarcity (reported by 18 percent and 20 percent of the rose and gerbera farmers respectively) and lack of scientific knowledge and training (reported by 72 percent and 80 percent of the rose and gerbera farmers respectively).

8.2.2 Relating to Marketing Problems

Table 8.1 showed that with regard to marketing, the prominent constraints expressed by the sample growers included, seasonality in demand (reported by 98 percent and 94 percent of the rose and gerbera farmers respectively), frequent power cuts affecting irrigation of the standing crop, adequate cold storage facilities (reported by 92 percent and 96 percent of the rose and gerbera farmers respectively), price fluctuations (reported by 93 percent and 92 percent of the rose and gerbera farmers respectively)

and transportation and communication (reported by 24 percent and 30 percent of the rose and gerbera farmers respectively). Almost all the growers opined that there should be an exclusive flower market in Bangladesh on modern lines with all requisite infrastructure facilities. The need for developing general infrastructure and setting up of cold storage facilities was expressed by the majority, i.e., 89.09 percent and 83.63 per cent respectively of the sample respondents.

Table 8.1 Major Problems Faced by the Sample Farmers in Producing Cut flowers

Problems	Rose		Gerbera	
	No of respondents	Percentage (%)	No of respondents	Percentage (%)
Relating to Production				
Huge investment requirement	44	88	49	**98**
Non availability of quality indigenous planting material	40	80	42	84
Scarcity of labor	9	18	10	20
Irregular supply of electricity	5	10	12	24
Pest and diseases attack	36	72	35	70
Poor harvest during rainy season	45	**90**	46	92
Lack of scientific knowledge and training	36	72	40	80
Relating to Marketing				
Price fluctuation	42	93	43	92
Seasonal demand	49	**98**	47	94
Transportation and communication	12	24	15	30
Lack of cold storage	46	92	48	**96**
Other Problems				
Loss of production due to thief	20	40	25	50
Spoilage	25	50	22	44

Source: Field survey, 2018.

8.2.3 Other Problems

About 40 percent and 50 percent of rose and gerbera producing farmers respectively reported that theft of flower from field by thieves was another major problem and 50 percent and 44 percent of rose and gerbera farmers reported that spoilage of flowers was also a major problem. (Table 8.1).

8.3 Problems faced by value chain actors or intermediaries

The main constraints of value chain actors related to lack of infrastructure, non-availability of good flowers and selling of cut flowers.

8.3.1 Lack of infrastructure

Table 8.2 showed that the infrastructural problems comprised inadequate facilities for storage, packing, transportation and grading. Nearly two-thirds of the sample actors pointed out that these problems hampered their value chain activity. It was observed that about 84 percent, 58 percent, 60 percent and 72 percent of the actors was facing problem of lack of storage, high transportation cost, lack of good quality packaging materials and grading problem in their value chain activity.

8.3.2 Non availability of good quality flowers

About 70 percent of the actors reported about the problems pertaining to sourcing of quality flowers related to high price fluctuations, 56 percent reported lack of good varieties, 80 percent reported irregular supply while 82 percent complained of quick deterioration in flower quality and 67 percent expressed about lack of new varieties. The need for a separate market for cut flowers was expressed by all the sample actors. Need for cold storage, grading, packing and regular supply of cut-flowers were expressed by nearly 80 percent respondents. The need for government support in terms of proper policy was felt by about 40 per cent of the sample wholesalers.

Table 8.2: Problems faced by the cut flower value chain actors or intermediaries

Problems	No of respondent	Percentage (%)
Lack of infrastructure		
Storage	84	84
Transportation	58	58
Packaging materials	60	60
Grading	72	72
Non availability of good quality flowers		
High price fluctuation	70	70
Lack of good varieties	56	56
Lack of continuous supply	80	80
Quick deterioration in quality	82	82
Lack of new varieties	67	67
Selling of cut flower		
Wastage of flowers	60	60
Lack of awareness among consumers	50	50
Lack of regular consumer	86	86

Source: Field survey, 2018.

8.3.3 Selling of Cut flower

Majority (86 percent) of actors opined that there were lack of regular customers and that there was a quite bit of wastage of cut flowers (60 percent).

8.4 Concluding Remarks

The above mentioned problems, of course, are interrelated with one another and hence, need to be removed comprehensively through an integrated programme for the overall development of cut flower cultivation. Problems faced by the farmers were ranked on the basis of corresponding percentages. Most of the farmers were reported that seasonal demand, lack of cold storage and price fluctuation were the main constraint for their rose production and huge investment requirement, lack of cold storage and seasonal demand were the main constrain for gerbera production. And most of the value chain actors were reported that lack of storage, quick deterioration of flowers, lack of regular customers and price fluctuation were the main constrain in their value addition process.

CHAPTER 9

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

9.1 Summary

Flower industry has been playing a very vital role in the economy of Bangladesh from the time immemorial. A lot of importance has been given to this sector due to its multiple uses, satisfying the aesthetic needs of the people, creating more employment, ensuring higher rate of returns to rural people and facilitating earning more foreign exchange.

Broad agriculture sector which includes crops, livestock, fisheries and forestry contributes 14.23% percent to the Gross Domestic Product (GDP) as a whole in the FY 2017-18 (BER, 2018). The ecology of the country is appropriate for the growth and production of the flowers. Flower production is increasing day-by-day with the blessings of modern technology. Flower production has increased to 19,501 MT in 2016-17, which was 2,353 MT in 2008-09. In 2016-17 fiscal year, Bangladesh exported cut flowers, leaves, trees, plants, bulbs, roots of $86,000, up 10.26%, which was $78,000 in the previous year.

In this context, the specific objectives of the study were formulated to determine comparative profitability and value chain analysis of cut flower (rose and gerbera) cultivation in selected areas of Bangladesh. The specific objectives were as follows:

a. To identify the socio-demographic profile of the farmers.

b. To estimate the cost, returns and profitability of rose and gerbera cultivation

c. To identify the factors affecting the production of rose and gerbera

d. To identify the main distribution channel and value addition of rose and gerbera flower market in Bangladesh

e. To identify the constraints face by the growers and value chain actors.

The study was mainly based on primary data, which were collected by the researcher herself through interviewing the sample farmers. A total of 100 year round cut flower farmers (50 rose farmers and 50 gerbera farmers) were selected from two villages namely, Potuapara and Sadirali of Jhikargachha Upazila under Jessore District (25 farmers for each flowers from each village). Survey method was followed to collect production related data while, multi stage random sampling was used to select the rose and gerbera farmers. Tabular as well as statistical technique was followed to fulfill the objectives of the study.

With respect to socioeconomic features of the sample farmers, the findings revealed that none of the farmers had the age below 20 years. The rose and gerbera producing farmers were classified into three age groups: up to 20-30 years, 31-45 years and above 45. Out of the total sample farmers 16 percent and 20 percent belonged to the age group of 20-30 years, 44 percent and 48 percent belonged to the age group of 31-45 years and 40 percent and 32 percent fell into the age group of above 45 of rose and gerbera farmers respectively. The average family sizes of the rose and gerbera producing farmers were found to be 4.34 and 4.80. Out of 50 sample rose farmers, 18%, 16%, 20%, 22%, 22% and 2% had primary education, P.S.C. level education, J.S.C level education, secondary level education, higher secondary education and higher study respectively. Out of 50 sample gerbera farmers, 10%, 14%, 20%, 24%, 28% and 4% had primary education, P.S.C. level education, J.S.C level education, secondary level education, higher secondary education and higher study respectively. Out of 100 rose and gerbera farmers 12% and 20% were female farmers respectively. The main occupation of the majority of the sample farmers was rose and gerbera cultivation. About 58% and 70% of rose and gerbera farmers were single owner, 4% and 2% of rose and gerbera farmers were belonged to double ownership and 38% and 28% had multiple ownerships respectively. The rose and gerbera farmer's average yearly income were Tk. 210500 and Tk. 382573.71 respectively. The rose and gerbera farmers had maximum expenditure on food and education.

To determine the profitability of rose and gerbera cultivation both the inputs and outputs were valued at market price during the study period. For analytical advantages, the cost item were identified as human labor, land preparation, seedling, organic manure, fertilizers, insecticides, irrigation, land use cost, interest on operating capital for both rose and gerbera and poly-house cost was identified only for gerbera. Cost and returns were worked out to estimate profitability of rose and gerbera production. Per hectare total cost, gross return, net return and gross margin were Tk. 327019, Tk. 902484, Tk. 575465 and Tk. 648214 respectively rose and Tk. 538479, Tk. 2116800, Tk. 1578321 and Tk. 1646766 respectively. Undiscounted benefit cost ratio of rose and gerbera were 2.76 and 3.93 respectively.

In this study, Cobb-Douglas production function model was used to determine the effects of key variable inputs. The most important explanatory variables were included in the model to explain the gross yield of rose and gerbera cultivation. Most of the variables in the rose production function were significant in explaining the

yield (stick per ha) except the insignificant effect of organic manure. The coefficient with expected sign indicates the selected inputs contributed positively to the yield. Production function for rose cultivation exhibits increasing returns to scale (1.04). This means that, if all the variables specified in the model were increased by 1 percent, yield (stick per ha) would also increase by 1.04 percent.. The F-value for the rose cultivation was 76.96 which were highly significant at 1 percent level. Seedling, TSP and organic manure has significant effect variables in the gerbera production function in explaining the yield (stick per ha). Production function for gerbera cultivation exhibits increasing returns to scale (1.93). This means that, if all the variables specified in the model were increased by 1 percent, yield (stick per ha) would also increase by 1.93 percent. The F-value for the rose cultivation was 475.7 which were highly significant at 1 percent level.

This study also identified a proper value chain mapping, value chain actors or intermediaries, nine marketing channel and net value addition of rose and gerbera. Rose and gerbera farmers were getting maximum net value addition in marketing channel i (Farmer to local consumer) when there had the lowest numbers of actors.

This study also identified some of the problems and constraints associated with rose and gerbera cultivation and value chain or marketing. The cultivation problems were categorized into production and marketing problems and value chain problems were categorized into lack of infrastructure, poor quality of flower and selling of cut flower. The findings revealed that seasonal demand, lack of cold storage and price fluctuation were the main constraint for their rose production and huge investment requirement, lack of cold storage and seasonal demand were the main constrain for gerbera production. And most of the value chain actors were reported that lack of storage, quick deterioration of flowers, lack of regular customers and price fluctuation were the main constrain in their value addition process.

9.2 Conclusion and Policy Recommendations

It may be concluded that rose and gerbera cultivation profitable. If modern inputs and production technology can be made available to farmers in time, yield and production will be increased which can help farmers to increase income and improve livelihood standards. There is an ample opportunity to improve per hectare yield of year round rose and gerbera cultivation. In meeting demands of flowers for big occasions like Ekushey February, Bangladesh has to import, as the demand in the local market is growing very fast. On the other hand, there is huge opportunity in the export market

as the production cost in Bangladesh is lower compared to other flower-exporting countries. Bangladesh has a competitive advantage due to its favorable climate and topography as well as low labor cost and relatively low capital investment which is helping the sector to thrive. Using the favorable environment and comparatively better opportunity, we can grab the markets in home and abroad. To enhance the productivity, efficiency and effectiveness of rose and gerbera cultivation and value chain the following recommendations are made as a part of present study which acts as a formulating strategy for enhancing rose and gerbera production and developing the cut flower industry.

i. Government should export rose and gerbera to different countries that ultimately increase the output price by earning foreign currency and establish proper monitoring of flower market. So that farmer gets fair prices of output.

ii. Well-structured marketing facilities should be developed by the government and ensures good transport facilities reduce the spoilage of rose and gerbera.

iii. Though the government is already given subsidy on fertilizer like urea and other inputs required for rose and gerbera cultivation but fair prices of inputs should be ensured so that the farmers can get the inputs at a reasonable price.

iv. Scientific method of cultivation should be introduced to increase production. The farmers should be provided with training, adequate extension services, information and necessary facilities to cope with new and changed situation.

v. It is important to have separate cold storage to store flower seed, corms and unsold flowers. Specialized cold storage for flowers can ensure better price for the farmers as they will have the option of not selling the cut flowers if the price is too low.

vi. It is important to establish linkage with the local entrepreneurs to motivate them to produce and supply low-cost high quality packaging materials such as cartons, boxes and bamboo cages to ensure the quality of the flowers and to lengthen their shelf life.

vii. Private sector needs to be motivated in order to invest in this sector to establish a wholesale market with modern facilities such as paved floor, water supply, drainage system, shed and cold storage. Future project can also explore establishing direct linkage between local farmers/traders and exporters to ensure higher income for the farmers.

viii.   Farmers marketing group association can be established with proper government support.

9.3 Limitations of the Study

It is very common that there is no study without some limitations. The study I have made is of great importance. During preparing this paper, I have tried my best. But while conducting this study I had to face a number of problems. The problems are-

- Most of the data collected through interview of the farmers so sometimes they were not well-cooperated with the interviewer.

- The information was collected mostly through the memories of the respondents which may not always be correct.

- Secondary data are extremely difficult to collect and may be contradictory. All the information is not based on valid data.

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APPENDIX

SOME COMMONLY USED ABBREVIATIONS AND SYMBOLS

BBS	Bangladesh Bureau of Statistics
BCR	Benefit Cost Ratio
BER	Bureau of Education and Research
BRAC	Bangladesh Rural Advancement Committee
CAGR	Compound Annual Growth Rate
DCCI	Dhaka Chamber of Commerce and Industry
et al.	Et alia (for others)
etc.	Et cetra
FY	Financial Year
GDP	Gross Domestic Product
Ha	Hectare
H.S.C.	Higher Secondary Certificate
J.S.C.	Junior School Certificate
Kg	Kilogram
NGO	Non-Government Organization
P.S.C.	Primary School Certificate
SPSS	Statistical Package for the Social Science
S.S.C.	Secondary School Certificate
Tk.	Taka, Bangladeshi currency
USA	United States of America
%	Percentage
>	Greater Than
<	Less Than