

**FINANCIAL PROFITABILITY AND RESOURCE USE
EFFICIENCY OF ROSE CULTIVATION IN KALIGANJ
UPAZILA OF JHENAIDAH DISTRICT**

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**FINANCIAL PROFITABILITY AND RESOURCE USE EFFICIENCY
OF ROSE CULTIVATION IN KALIGANJ UPAZILA OF JHENAIDAH
DISTRICT**

BY

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CERTIFICATE

*This is to certify that thesis entitled, “**FINANCIAL PROFITABILITY AND RESOURCE USE EFFICIENCY OF ROSE CULTIVATION IN KALIGANJ UPAZILA OF JHENAIDAH DISTRICT**” submitted to the Faculty of Agribusiness management, Sher- e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE in AGRICULTURAL ECONOMICS**, embodies the result of a piece of bona fide research work carried out by **MD. MASUM HOSSAIN**, Registration No **14-06274** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

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

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***DEDICATED TO MY
LOVING PARENTS***

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FINANCIAL PROFITABILITY AND RESOURCE USE EFFICIENCY OF ROSE CULTIVATION IN KALIGANJ UPAZILA OF JHENAIDAH DISTRICT

ABSTRACT

This study was conveyed to financial profitability and resource use efficiency measurement of rose cultivation in Kaligonj upazila of Jhenaidah district. In this study, a total of 60 farmers were selected as sample and a structured questionnaire was used to collect data in the period of January-February, 2021. In this study, Cobb-Douglas production function was used to analysis factor affecting of rose production. From this study, it was calculated that the average per hectare total cost for rose production was Tk. 628728 as well as variable cost and fixed cost of rose production per hectare was TK.483128 (76.84%) and TK.145600 (23.16%) respectively. Additionally, per hectare total gross return of rose production was estimated Tk.1246712. The net return per hectare from rose production was Tk. 617984. Moreover, gross margin of rose production was TK. 763584. Furthermore, Benefit Cost Ratio of rose production was 1.98 on full cost basis which indicates that the rose production was profitable venture in the study area. The result also revealed that land preparation cost, seedling cost, MoP cost and insecticide cost had positive and significant effect on gross return of rose production whereas manure cost and TSP cost had negative but significant effect on gross return of rose production. Additionally, the expense on human labor, manure, TSP and irrigation were over-utilization and expense on land preparation, seedling, Urea, MoP and insecticide were under-utilization in rose production. The present study identified some problems faced by the farmers. Lack of technical knowledge, non-availability of HYV seedling and infestation of insects and diseases are main issues observed in rose cultivation.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE NO
	ACKNOWLEDGEMENT	i
	ABSTRACT	ii
	TABLE OF CONTENTS	iii-v
	LIST OF TABLES	vi
	LIST OF FIGURES	vi
	LIST OF APPENDIX	vii
	LIST OF ABBREVIATION	vii
CHAPTER I	INTRODUCTION	1-13
1.1	Background of The Study	1-3
1.2	Use of Roses	3-7
1.3	The Scenario of Flower Cultivation In Bangladesh	8-9
1.4	International Scenario of Flower Cultivation	10-11
1.5	Objectives	12
1.6	Justification of The Study	12-13
CHAPTER II	REVIEW OF LITERATURE	14-19
2.1	Review of Literature	14-19
CHAPTER III	METHODOLOGY	20-27
3.1	Study Area	20
3.2	Sample Size and Sampling Procedure	23
3.3	Data Collection Method	23
3.4	Data Processing and Analysis	23
3.5	Analytical Techniques	23
3.6	Profitability Analysis	23
3.6.1	Variable Cost	24
3.6.2	Fixed Cost	24
3.6.3	Gross Margin (GM)	24

3.6.4	Net Income (NI)	24
3.6.5	Profit Calculation	25
3.7	Benefit Cost Ratio (BCR)	25
3.7.1	Benefit Cost Ratio (BCR) calculation	25
3.8	Determination of Factors Affecting of Rose Production	26
3.9	Resource Use Efficiency Measurement	27
CHAPTER IV	SOCIO-ECONOMIC STATUS OF THE ROSE CULTIVATORS	28-33
4.1	Age Distribution	28
4.2	Level of Education	29
4.3	Occupational Distribution of Farmers by Gender	29
4.4	Farm Size	30
4.5	Sanitation Facilities	31
4.6	Economic Status of the Farmer	32
4.7	Sources of Fund	33
4.8	Concluding Remarks	33
CHAPTER V	FINANCIAL PROFITABILITY ANALYSIS OF ROSE CULTIVATION	34-38
5.1	Input Use Pattern of Rose Cultivation	34-35
5.2	Cost and Return Calculation of Rose Cultivation	36-38
5.2.7	Benefit Cost Ratio	38
5.3	Concluding Remarks	38
CHAPTER VI	FACTORS AFFECTING AND RESOURCE USE EFFICIENCY OF ROSE CULTIVATION	39-42
6.2	Effect of Human Labor Cost (X1)	40
6.3	Effect of Land Preparation Cost (X2)	40
6.4	Effect of Seedling Cost (X3)	40
6.5	Effect of Manure Cost (X4)	40
6.6	Effect of Urea Cost (X5)	40
6.7	Effect of TSP Cost (X6)	41
6.8	Effect of MOP Cost (X7)	41

6.9	Effect of Insecticides Cost (X8)	41
6.10	Effect of Irrigation Cost (X9)	41
6.11	Value of R Square	41
6.12	Value of F	42
6.13	Return to scale	42
6.14	Resource Use Efficiency Measurement	42-43
6.15	Concluding Remarks	43
CHAPTER VII	MAJOR PROBLEMS OF ROSE CULTIVATION IN THE STUDY AREA.	44-49
7.1	Problems Faced by the Farmers	44
7.3	Social Problems	46
7.3.1	Loss of Production Due to Visitors and Theft	46
7.3.2	Flower Damage by Animals	47
7.3.3	Spoilage due to Poor Handling	47
7.4	Economic Problems	47
7.4.1	High cost of human labor and insecticides	47
7.4.2	Low Selling Price	47
7.4.3	Insufficient Credit Facilities	47
7.5	Technical Problems	48
7.5.1	Attack by Pests and Diseases	48
7.5.2	Lack of Scientific Knowledge and Training	48
7.5.3	Lack of Extension Services	48
7.6	Marketing Problems	48
7.6.1	Transportation and Communication Problems	48
7.6.2	Inadequate and Underdeveloped Market	49
7.6.3	Lack of Market Information	49
7.7	Concluding Remarks	49
CHAPTER VIII	SUMMARY, CONCLUSION AND RECOMMENDATION	40-54
9.1	Summary	50-52
9.2	Conclusion	52
9.3	Recommendations	53
9.4	Limitation of the Study	54

	REFERENCES	55-57
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LIST OF TABLES

TABLE NO	TITLE	PAGE NO
1.3.1	In 2019-2020, Area and production of Rose in Top Ten Districts in Bangladesh	9
4.1.1	Age Distribution	28
4.3.1	Occupational Distribution of Farmer by Gender	30
4.4.1	Farmers Distribution According to their Farm Size	30
4.5.1	Sanitation Facilities	31
4.6.1	Distribution of Respondent Farmers According to their Yearly Income (In TK.)	32
5.1.1	Input Use Pattern of Rose Cultivation	35
5.2	Cost and Return Calculation of Rose Cultivation	37
6.1	Estimated Coefficients and their Related Statistics of Production Function for Rose	39
6.13.1	Resource Use Efficiency Measurement	43
7.2	Problem Faced by Farmers	44-46

LIST OF FIGURES

FIGURE NO	TITLE NAME	PAGE NO
1.2.1	Rose Oil	4
1.2.2	Rose Water	5
1.2.3	Gulkand	5
1.2.4	Gul Roghan	6
1.2.5	Rose Hip Juice	6
1.2.6	Rose Teas	7
1.2.8	Potpourri	7
3.1.1	Map of Jhenaidah District	21
3.1.2	Map of Kaliganj Upazila	22
4.2.1	Level of Education of The Sample Farmers	29
4.7.1	Sources of Fund	33

LIST OF APPENDIX

APENDIX NO	TITLE	PAGE NO
APENDIX I	QUESTIONNAIRE	

LIST OF ABBREVIATED TABLE

SHORT FORM	ABBREVIATION
BBS	Bangladesh Bureau of Statistics
BCR	Benefit Cost Ratio
BFA	Bangladesh Flower Growers & Exporter Association
BRAC	Bangladesh Rural Advancement Committee
Π	Profit per hectare
EPB	Export Promotion Bureau
<i>et al.</i>	et alia (for others)
etc.	et cetra
EU	European Union
GDP	Gross Domestic Product
MIS	Market Information System
MS	Master of Science
NGO	Non-Government Organization
NO	Number
SAU	Sher-e-Bangla Agricultural University
SCDC	Supply Chain Development Component
SPSS	Statistical Package for the Social Sciences
Tk.	Taka, Bangladeshi currency
USA	United States of America
MFC	Marginal Factor Cost
MVP	Marginal Value Product
GM	Geometric Mean
MPP	Marginal Physical Product

CHAPTER I

INTRODUCTION

1.1 Background of the study

Flower is the symbol of beauty and purity. It is an adorable creation of God. Flowers is considered as an embodiment of human taste and aesthetics. In the past, people used to plant flowers only for the beautification of their homes, office room and other places. Besides gardening was considered as a hobby of the people and they spend their leisure time by gardening and culturing flowers to satisfy their aesthetic need. But, in the present world, with the Commercialization of floriculture in Bangladesh, flower becomes important not only for its aesthetic beauty, but also for its economic contribution on our economy. It creates a huge market demand in domestic market as well as in international market. This huge market demand of flowers turns it into the flower industry in our countries. In Bangladesh, at first commercial flower cultivation has developed in the mid-eighties in Jashore district and now a days it has adopted commercially in 19 district of our country. Among all the flowers Rose is regarded as the flower of friendship and king of flower. It is connected with mankind since ancient period.

Rose (golap) any of the wild or cultivated, usually prickly-stemmed showy flowered shrubs of genus *Rosa* belonging to the family Rosaceae. The total number of species in the genus exceeds 150. In Bangladesh one native species (*Rosa involucrata* or *Rosa clinophylla*) is found to grow in the marshland of Mymensingh, Sylhet and Chittagong districts. The spiny bushes are not so impressive. The species that have played an important ancestral role in the production of modern cultivated varieties are *Rosa rugosa*, *R. mundi*, *R. centifolia*, *R. canina*, *R. damascena*, *R. gallica* etc.

Many myths and legends show the extent to which the rose had captured the imagination of the ancients. In Greek mythology, rose appeared from the drops of blood of Venus- goddess of Love and Beauty. In Arabian legends it is said that a nightingale adored a white rose, and when it kissed the rose it became wounded by the thorn, and the blood turned the rose - a red rose. According to Hindu Legend, when Brahma

claimed lotus to be the most beautiful flower on earth, Vishnu invited him to his paradise, and pointed to a pale, perfumed rose. There are endless myths relating to rose.

Fossil remains of the rose have been found to be 26 million to 38 million years old. No exact information has yet been obtained about the first cultivation of rose. It seems that Greece, Rome, Middle East, and China have been cultivating rose from the ancient time. Rose spread from Northern to Southern hemisphere; western plants were characteristically light colored and flowered only once a year for a very short period, while flowers of the far east were bright, colorful with continuous flowering habit. Crossing among different species and varieties brought about the revolution in the history of roses. Now it offers an endless variety of shapes, sizes and colors.

Rose is a complete flower bearing all four whorls - calyx, corolla, androecium and gynoecium. Stamens and carpels are usually numerous. All roses can be said to be more or less shrubby although some species can have the climbing habit. Climbers use their thorn as they creep over the supports. Some species are almost thorn less, while others have numerous thorns. As a result of breeding work for several centuries, the rose has attained a wealth of form, with a spectrum of colors in which only true blue and true black are missing.

Mughal Emperor Babar introduced a rose in this subcontinent named Bashra, a highly scented, light pink colored variety having weak stem, long branches, and flowers in clusters at the top. Many of old gardens still have this variety.

In Bangladesh some local varieties have been raised, such as 'Fatema Sattar', 'Shibly', 'Rahela Hamid', 'Piyaree', 'Bhasani', 'Sher-e-Bangla', '1952', and 'Jayanti. In the absence of suitable gardens, it is uncertain whether these varieties can be maintained for long. Roses are naturally cross-pollinated by insects like ants, bees or butterflies, and seeds from naturally formed rose fruits may give a variable progeny possessing a complex pedigree.

Roses can be propagated by seeds, cuttings, and layering, and by budding, or other forms of grafting. Some types can be readily multiplied by means of cutting such as 'Tajmahal' and 'Papa Meilland'.

For the commercial production, budding is by far the most suitable of all forms of grafting for roses. In this technique, the desirable variety is budded on to the stem of the stock which provides the root system. In this way, some of the world-renowned roses like Papa Meilland, Double Delight, Dutch Gold, Queen Elizabeth, and Montezuma are being raised in Bangladesh. Rose plants can also be produced through tissue culture or micro propagation technique but it is not yet commercially viable.

Rose has been used for many purposes from the ancient time. Not surprisingly, it has been figured in the poetry and music, in rituals, in jewelry, in pottery, and in embroidery. Rose water has been valued in Islamic Culture and is used in Milad-Mehfils as a symbol of purity. The credits for the discovery of Otto of roses (rose-oil) are given to Nur Jahan who noticed the oily drops of roses and named Attar-e-Jahangir. This perfume is also used in making incense sticks. Rose petals are also used in making some sweets including jellies. It has some herbal value. The fruit- 'rose hip' is very rich in vitamin C. Petals is often used in 'Pot-Pourri'.

Many countries of the world earn foreign currency by exporting quality roses produced in green houses under controlled conditions. In Bangladesh also the production and marketing of roses have increased recently. The whole subject of rose including its cultivation, pests and diseases, hybridization, mutation, commercial production, marketing, exhibition, and micro propagation is being recognized as specialized branch of arboriculture. (Banglapedia, 2021)

1.2 Use of Roses

Roses are used on different purposes by adding value in it. Value adding is any step taken to increase the value of a raw product anytime between harvesting and sale of the final product. It is increase in value of any product through changes by processing. Any product can be considered value added if it is grown by farmer and increased in value by labor and creativity. The consumers are willing to pay more for the value added products compared to raw ones. Value addition in rose is done by the following ways

- Flower arrangements like bouquets, wreaths, corsages, garlands and buttonholes Dry flowers
- Potpourris
- Rose oil, water, concrete, absolute, gulkand, gulroghan etc.,
- Rose hip juice, jam, tea and candy

1.2.1 Rose oil

Distillation of rose oil started in Persia in 1600 and slowly spread throughout the world. Mughal rulers introduced it in India on a large scale. Cultivation of *R. damascena* and production of rose oil began in Kazanlik region of Bulgaria in the 15th Century. Bulgaria and Turkey are the leading countries in the production of rose oil, other countries producing rose oil are China, Egypt, France, India and Morocco. The major consumers of essential oil are The USA (40%), Western Europe (30%) and Japan (7%). Rose oil is not only used in perfumery industry but also used in food, beverage and pharmaceutical products.



Fig 1.2.1 Rose oil

1.2.2 Rose water

Rose water is used in Persian and Middle East food in sweets. It is also used as a perfume in religious ceremonies. It is also added to tea ice cream, cookies and other sweets in small quantities. It is used to flavor milk and dairy products. Rose water is sometimes used in cosmetics such as cold creams. In India, rose water is used as eye drops to clean them. It is also used as spray applied directly to the face for natural

fragrance and moisturizer. It is also used in Indian sweets and other food preparations (particularly gulab jamun, named from the Persian word for rose water).



Fig 1.2.2 Rose water

1.2.3 Gulkand

Gulkand is an ayurvedic tonic. It reduces the heat in the body, a reduction in eye inflammation and redness, strengthening of the teeth and gums, and the treatment of acidity. Gulkand has cooling properties, thus it is beneficial in alleviating all heat related problems like tiredness, lethargy, itching, aches and pains. It also helps in reducing burning sensations in the soles and palms.



Fig 1.2.3 Gulkand

1.2.4 Gul roghan

It is an effleurage of rose petals in sesamum oil. It is used as a tonic, analgesic and to cure meningitis.

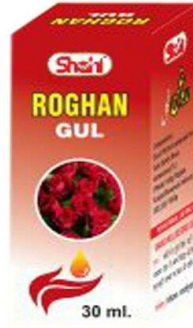


Fig 1.2.4 Gul roghan

1.2.5 Rose hip juice

The juice can be extracted from ripe hips and used as a source of flavors and vitamins in a variety of recipes.



Fig 1.2.5 Rose hip juice

1.2.6 Rose teas

There are many recipes for tea made by combining rose petals with other flavors. Many tea manufacturers produce a variety of rose flavored teas that can be purchased commercially.

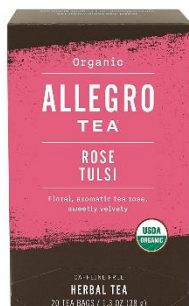


Fig 1.2.6 Rose teas

1.2.7 Candied rose hips

Candied rose hips can be prepared by boiling hips with sugar and water followed by drying.

1.2.8 Potpourri

Potpourri is a mixture of dried, naturally fragrant plant material, used to provide a gentle natural scent inside buildings. It is usually placed in a decorative bowl, or tied in small sachet made from fabric.



Fig 1.2.9 Potpourri

1.3 The Scenario of Flower Cultivation in Bangladesh

Floriculture cultivation of flowers or flowering plants. Trades in floriculture involve mainly cut flowers, foliage plants, propagules of ornamental plants, and production inputs like chemicals, growing media, pots, etc. In Bangladesh, both amateur and commercial floriculture is still in its nascent stage. The demand for foliage plants, cut flowers (mainly rose, tube rose, orchid and gladiolus) and seeds of seasonal flowers is increasing slowly. Limited quantity of ROSE and tube rose is being exported to the Middle East and Europe. Private nurseries are coming up to meet the domestic and potential export demand in the future. Scientific research and training that are prerequisites for developing a modern floriculture industry is almost non-existent in Bangladesh. However Bangladesh Agricultural Research Institute (BARI) has opened a section for floriculture recently.

Cutflower Bunched flowers or cluster of flowers marketed in the form of bouquets, garlands, or in other attractive floral designs. Cupflower business got its origin in this country through the sale of such commodities in the premises of holy shrines or places for devotees who used to visit such places. Cut flowers started becoming popular to the general public since the independence of Bangladesh. Locally collected flowers along with the import of cultivated cut flowers made the beginning of commercial trade of cut flowers in this country. Gradually the farmers of Bangladesh started cultivating flowers in commercial scale to meet the demand of the capital city, and other cities and towns of the country.

Recently Floriculture Research Centre has opened to promote commercial cultivation of flowers. Among the locally produced cut flowers being traded regularly in commercial scale, the following are common Rose (*Rosa multiflora*) include varieties Mirindy, Lincon, Papa Milland, Paseali, and Vargo; Gladiolus (*Gladiolus primulinus*) of several varieties and different colors; Marigold (*Tagates patula, T. erecta*), varieties commonly cultivated are yellow, red, and orange; Chrysanthemum (*Chrysanthemum coronarium*), of varieties Biarritz yellow, Ellen, Euro, and green peas; and tube rose (*Polianthes tuberosa*) of varieties 'single' and 'double'. Lotus (*Nelumbo nucifera*) has recently been included in commercial sales. Flowers locally known as Karobi, Jasmin, Kamini, water lily, Dolonchapa, Golden champa, Dhalia, and Zinnia are also occasionally available. (Banglapedia, 2021)

According to BBS report 2019-2020, the total flower cultivation is about 28 thousands M.tons in Bangladesh while rose cultivation is 19 thousands M.tons. It covers more than 65% of total flower cultivation. The area of rose production under garden from 2016-2020, has increased from 516 acres to 666 acres. It is also revealed from the report that the production of rose has increased to 16015 M.tons.

In 2019-2020, Area and production of rose in top ten districts in Bangladesh are given in table no 1.3.1

Table 1.3.1 In 2019-2020, Area and production of Rose in Top Ten Districts in Bangladesh

Districts	Area Under Garden (Acres)	Total Production of Inside & Outside Garden (M.Tons)
Jashore	222 (33.33%)	18795 (97.93%)
Cox's Bazar	92 (13.81%)	107 (0.56%)
Chattogram	90 (13.51%)	22 (0.11%)
Dhaka	62 (9.31%)	18 (0.09%)
Gazipur	30 (4.50%)	15 (0.07%)
Chuadanga	24 (3.60%)	8 (0.04%)
Rangamati	21 (3.15%)	9 (0.04%)
Rangpur	20 (3%)	3 (0.01%)
Kishoreganj	17.81 (2.67%)	17 (0.08%)
Jhenaidah	16 (2.40%)	34 (0.18%)
Bangladesh	666 (100%)	19193 (100%)

Source BBS, 2020.

1.4 International Scenario of flower cultivation

For more than 200 years, the heart of the global trade in cut flowers has been the Netherlands. The world's largest global auction for flowers began, famously, in a pub. One trader turned to his peers and asked, how much?

The question was the start of the most dynamic and highly organized trading sites for flowers in the world. Now known as the Royal Flora Holland auction house at Aalsmeer, near Amsterdam, the floor of a cavernous warehouse is home to a giant game of Tetris with living flower stems bustled about on trolleys, to be bought, sold and dispatched.

As it has done for years, Royal Flora Holland still plays a critical role importing and then re-exporting 40% of flowers from all over the world. But newer players in the flower trade are making their presence felt, shifting the dynamics of production. As transport technology develops, producers in regions elsewhere, including sub-Saharan Africa, are challenging the Netherlands' traditional hold on the industry.

The scale of the global market for cut flowers is large, and increasing. In the UK alone, the market for cut flowers and ornamental plants was worth £1.3 billion in 2018, according to government statistics. Around 90% of these flowers are imported – the vast majority still coming via the Netherlands. In 2015, the global trade in flowers was worth around €15bn (£10.6bn), with stems shuttled between continents with breathtaking speed.

Keeping up with the world's demand for flowers involves an intricate and delicately balanced supply chain of workers, farmers, wholesalers, airlines, cargo ships, traders, florists and supermarkets. Getting something as delicate as a bunch of flowers from one continent to another without them being crushed or wilting is a daunting technological feat.

Cut flowers have to be transported quickly using a “cold-chain” – a series of refrigerated facilities on farms, lorries, planes, and boats – which put the flowers into a dormant state, so they stay fresh. This allows a rapid transfer from farm to shop within 24-48 hours, if going by plane, says Sylvie Mamias, secretary general of Union Flours, the international flower trade association.

Time is critical for every extra day spent travelling flowers lose 15% of their value. Vase life – the length of time flowers stay fresh after reaching the customer – is then usually 12-15 days, Mamias says.

The biggest buyers of cut flowers are the EU and the US, but the biggest growers and exporters are the Netherlands, Ecuador, Colombia, Kenya and Ethiopia. Roses, carnations and chrysanthemums are the most popular blooms. In the UK, 80% of cut flowers come via the Netherlands, according to the British Florist Association, although a significant proportion originate in Kenya. Some Kenyan flowers also come straight to the UK on direct flights from Nairobi, where entire terminals at certain airports are dedicated to flights exporting blooms.

One of the reasons behind the increase in flower exports in Africa dates from the 1970s, says Mamias, when an oil crisis increased the cost of heating greenhouses in northern countries. As a result, production moved south where flowers could be grown with little energy input all year round. For Europe, this meant seeing more flowers imported from Israel and Morocco, and later east Africa, while US buyers developed trade with Latin America.

These new producers had three things in common areas of high altitude with cool nights, which many flowers benefit from, proximity to the equator for maximum hours of sunlight, and cheaper labor. The change also meant an end to seasonal production and the beginning of a 365-day-a-year international competitive trade.

Kenya is particularly important as a source of roses – the country supplies one third of all roses sold in the EU, according to Union Flours. Cut flowers are now Kenya's second largest export after tea, contributing around 1% of the country's GDP. They are also one of the country's largest source of employment, with over 100,000 people working directly in the flower industry and an estimated two million indirectly. (BBC, 2020)

1.5 Objectives

- i.** To find out the socio-economic status of the rose cultivators in the study area;
- ii.** To estimate the financial profitability of rose cultivation;
- iii.** To measure the resource use efficiency of rose cultivation; and
- iv.** To detect the major problems and suggest some policy recommendation for the improvement of rose cultivation in the study area.

1.6 Justification of the Study

Agricultural land is gradually being converted to homes and other uses to meet the demands of vast and rapid population growth. In these situations, it is necessary to maximize production from limited land. To do so, traditional agricultural practices need to be changed.

As far as productivity is concerned, there is a lot of scope to increase productivity and profits by adopting the latest and improved production techniques. Information on production and marketing aspects, the profile of cut flower grower and rose production and marketing restrictions needs to be generated. Commercial flower growing can be an important income sector for many developing countries like Bangladesh to ensure food security. Bangladesh has enormous potential for flowers for both export and domestic markets. Different agro climatic conditions are capable of producing a variety of flowers throughout the year. If the production and marketing of flowers is well developed, there is a great opportunity for Bangladesh to earn a lot of foreign exchange in the international market.

Commercial flower production in Bangladesh began in 1983 when some of the country's innovative farmers introduced flower cultivation as a viable alternative to traditional cash crops and field crops. According to (BBS, 2020), around 4000 acres of land are currently involved in flower cultivation and 29,000 M.tons of flowers are produced commercially. Bangladesh needs to spend about 2-3 million TK. on imports of flowers and ornamental plants each year to meet market demand (Sayla, 2010). However, Bangladesh has 10, 66,000 acres of fallow land, which could be used for domestic demand and exports (BBS, 2020). I hope that if we can grow flowers with the necessary support from the government, we will be able to improve marketing

efficiency in a short period of time. In addition to this, the cultivation of rose flowers has the potentiality to contribute to gross domestic product (GDP) and can create employment opportunities.

The study is justified on the subsequent grounds

- It would add a modern information in the area of rose cultivation and build a foundation for further research.
- Rose cultivators and buyers at distinctive levels will be profited from the information generated via the study
- The study would provide valuable data for the policy makers of Government and Non-Government Organizations to formulate policy in order to boom production and development of socio-economic status of the rose Producers.
- It will be a great source of knowledge in taking farmers decision when they will go for commercial cultivation of rose flower.

CHAPTER II

REVIEW OF LITERATURE

2.1 Review of Literature

A literature review discusses published information in a particular subject area and sometimes information in a particular subject area within a certain time period. It can be just a simple summary of the sources which helps to acquire knowledge and information relevant to the present research. Literature and research of the important past works which is relevant to this research were searched to get a guideline in designing this research. But there is a little information that I have found which are related to this research. Some important findings are given below

Sultana (1995) completed a study on rose marketing in Dhaka city. She analyzed the marketing frameworks, buyer's adequacy; issues included and offered recommendations for progressing the present marketing framework of flowers in Dhaka City with 30 shops and 30 flower clients. She recognized month to month Net Margin of expansive, medium and little dealers. The author too recognized major problems of flower dealers and specified a few measurers for solution of the problems.

Quinto and Wittstock (2008) examined the status of flower cultivation in Bangladesh. For fast returns and great market prospects, a tremendous region of agricultural land has been turned into flower growing regions. This study too appears the level of women's association totally different stages of flower cultivation.

Seraj (2008) mentioned the records of commercial rose cultivation which passed off in Jhikorgacha upazila of Jessore for the duration of Mid-80s. Continuously it has unfold different upazilas of Jessore and presently Gadkhali bazaar of Jessore district is the biggest flower bazaar of Bangladesh. Roughly thirty thousand flower-farmers of

Jessore area are now engaged with this bazaar. Each day, flowers of Tk.10, 00,000-Tk.15, 00,000 are being bought and sold over here.

Qamruzzaman (2009) made a research that the exports flowers and floral products of Bangladesh to Pakistan, Italy, Portugal, Saudi Arabia, India, the United States, South Korea, Philippines, Singapore, Japan, Germany, Britain, Denmark and France was presently take a amazing position day by day. It extends and includes a new dimension in the export item of Bangladesh. The country earned over 166.1 million taka (Roughly 2.56 million US dollars) in FY 2004-05. But due to lack of appropriate steps Bangladesh cannot utilize the opportunity.

Rahman (2009) watched the role of flower cultivation in poverty lessening and employment generation in Trilochonpur union of Jhenidah range, where around 2,300 bighas are presently under flower cultivation. Farmers have moved from conventional cultivation to modern flower cultivation because it proves more productive for them. It too gives opportunities for women to generate income and contribute to bear their children's institutional costs. This study uncovered the urgency of government activities to solve the issues such as a lack of preservation facilities, absence of cool transportation systems, shortage of fertilizer and irrigation for the improvement of the business.

Sayla (2010) conducted an analysis of commercial production of rose in Dhaka and Narayanganj area. The author endeavored to look at 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, separately. She too distinguished issues and imperatives related with production of these flowers and made a few proposals on the premise of imperatives, which may help to create flower industry and reinforce its production.

Chowdhury and Islam (2010) estimate the impact of post-harvest losses on roses and other flowers on farmers' net profits, marketing margins and marketing efficiency and consumer prices at various marketing levels including producers' shares.

Sohel (2010) described the prospects and potentialities of flower cultivation. He has showed that most of the people have shifted to floriculture due to high profitability than others crops. This study also showed that not only it creates employment for the women but also enlarge the opportunity of export. He has found that traders faces loses due to the problems in production, harvesting, packaging, transportation and lack of government support which can reduce the opportunity of export day by day.

FAO (2011) represented the situation of floriculture in Bangladesh among the countries of Asia. It showed that flower is cultivated commercially under 10,000 hectares of land in which 95% of land are open field condition. It also represented that this sector is developing day by day. But due to the problems in Poor extension and consultancy services, lack of knowledge and infrastructure of post-harvest management, lack of quality certification of flowers and government support traders face loses which can reduce the opportunity of export earnings.

Bhairat and Jadav (2012) observed the study was attempted to look at the financial matters of rose cultivation, in reverse and forward linkages in rose production and distinguish the imperatives to rose production and marketing utilizing essential information collected from the Krishnagiri area of Tamil Nadu. The results appeared that there was an amazing growth of rose.

Khan (2012) observed that Bangladesh is well suited for commercial flower cultivation due to its favorable climate, low labor cost and generally low capital speculation. Presently approximately 1, 50,000 people are directly or indirectly involved in floriculture business in Bangladesh. Amid FY 2010-2011, flowers worth US dollar 127,488 was exported. In spite of the fact that there exist a few issues, it can be a productive agro-economic sector which has a great prospect for exports.

Sudhagar (2013) believes that the commercial development of the Indian rose industry is still at a very early stage. The main problems in development are unorganized marketing, weak research, lack of support infrastructure and lack of educational foundation. In addition to observing these issues, the author also gives some positive news about the development of flowers.

Alam and Monayem (2013) analyzed the profitability of growing roses in certain areas of Jessore as a profitable business. Compared to competing crops such as potato + jute, lentil + lentil, and mustard + mung bean, rose cultivation is the most profitable. Labor, land preparation cost, seedling raising, urea, TSP, MoP and irrigation had positive effects on rose yield.

M. Haque and M.A Hossain (2013) showed that the cultivation of rose was highly profitable at farm level because of its higher demand compared to its production. Human labor, land preparation, seedling, urea, TSP, MoP and irrigation had positive and significant effect on the yield of rose in the study areas. Among the competing crops like potato+jute, lentil+til and mustard+mungbean, respectively, the highest profit was obtained from rose. Lack of technical knowledge, high yielding varieties, infestation of disease and insects were major constraints for rose cultivation.

Sharifuzzaman (2013) described the potential for flower cultivation. Many farmers have moved from vegetables to flower cultivation to increase their profitability, which has made them an attractive business. The flower business also forms other trade areas such as nurseries and transportation service providers. As a result, not only are they creating jobs for many, especially poor women, but they are also expanding export opportunities. However, due to production, harvesting, packaging, transportation issues and lack of government support, traders faces losses as the prospect of flower export is reduced. On the other hand, Bangladesh could benefit from flower cultivation due to its favorable agricultural climate.

Islam, S.Sabil (2013) represented that Bangladesh has a very favorable climate to turn the flower business into booming industry. Jashore is regarded as commercial zone of flower cultivation. It can not only play a vital role in employment generation and poverty reduction but also can contribute in the national economy through earning valuable foreign currency. But the commercial development of the business is still at very early stage. This study also reveals that the position of facility provided for flower business is near to medium level. Weak research activities, unorganized market, lack of post-harvest management and air condition vehicles are the major problems. Government initiative is also very limited. Government should be active and these problems should be solved through taking appropriate actions for the proper growth of this industry.

Abid and Usman (2014) said that the flowers are used for expressing or displaying the innermost emotions to the loved ones or complementing any person or versifying any viable emotions. The export of flower from Pakistan could be very negligible in comparison to different international locations like Holland, USA, Columbia, Kenya, Zimbabwe, Japan and Israel. This paper examined the cost and return of rose cultivation along with Cobb Douglass production function to decide elements affecting rose flower production.

Kavirashna and Singh (2014) conducted this study to examine the economics of rose cultivation, backward and forward linkages in rose production, and to determine rose production and Marketing constraints. The results show impressive growth alongside high investment.

Chowdhury and Khan (2014) showed in his study that the landscape and climatic conditions of Bangladesh provide great advantage to flower growers of Bangladesh, which many of the major flower growers of Europe lack. Utilization of these natural advantages to a large extent can ensure the growth of this sector. However additional educational, technical, preservation, distribution, and financial support is needed from both government and private sector institutions. Implementation of governments'

policies in this industry can enhance the development to a great extent. Proper care and support can take this industry to a stage where it would be considered as one of the major export industry of the country in near future.

The above review represent that most of the study were conducted on floriculture along with rose. I had found verities of result in their study due to different reasons like location, specific area of the study, climate condition, market condition etc. Among the study discussed above, most of the study was marketing system of flower, profitability analysis and potential factors of flower cultivation in Jashore and other districts of Bangladesh but there is hardly any study related to financial profitability analysis and resource efficiency of rose cultivation in Jhenaidah district. So, the main aim of this present study is to gather information on financial profitability analysis and resource efficiency of rose cultivation in Jhenaidah District.

CHAPTER III

METHODOLOGY

Methodology is the philosophical framework within which the research is conducted or the foundation upon which the research is based. Research Methodology describes research methods, approaches and designs in detail highlighting those used throughout the study. When we conduct a research methodology, we should meet the following criteria

(i) The methodology should be the most appropriate to achieve objectives of the research. Because inappropriate selection of methodology very often leads to misleading result.

(ii) It should be made possible to replicate the methodology used in other researches of the same nature.

So the author should be very careful in selecting a scientific and logical methodology in order to getting a fruitful result.

3.1 Study Area

Jhenaidah district was selected as study area. There are six upazilas in this district. Among these six upazilas, kaligonj is very popular for the flower cultivation. The study has been carried out in this upazila according to the availability of flower cultivators. In Kaliganj upazila, most of the flowers are cultivated in various villages known as Fulpalli of Kaliganj upazila that includes Balianga, Elochanpur, Kola and Naldanga villages. Around 11 types of flowers, including rose, gerbera, gladiolus, tuberose and marigold are cultivated. The study areas are shown through the map

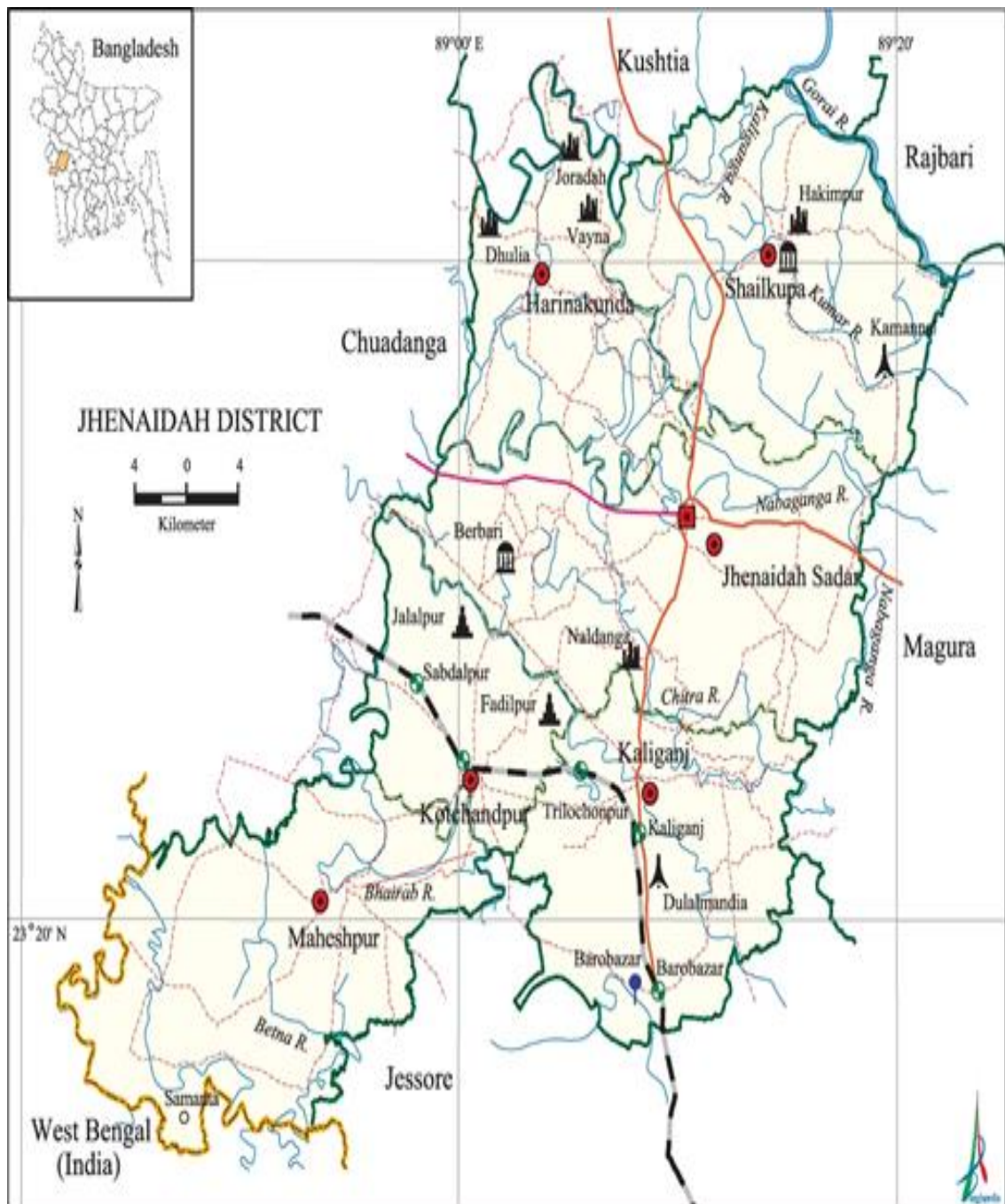


Fig 3.1.1 Map of Jhenaidah District



Fig 3.1.2 Map of Kaliganj Upazila.

3.2 Sample Size and Sampling Procedure

In first stage a purposive sampling procedure is followed in selection of Jhenaidah district and Kaliganj Upazila. In second stage, a simple random sampling procedure was used in selecting sample in the study area. All sample were collected form kaliganj upazila including Balianga, Elochanpur, Kola and Naldanga villages during the period of January-February, 2021. Total sample size was 60 rose cultivators. The data of rose growers were collected on the basis of one year average.

3.3 Data Collection Method

Primary data for the present study were collected from flower growers through face to face interview method using a pre-tested interview schedule. Field level data were collected by the researcher for the period of June, 2020-Jun, 2021. Besides, secondary data were also collected from various sources like Bangladesh Flower Growers & Exporter Association (BFA), Bangladesh Bureau of Statistics (BBS), Ministry of Agriculture, Hortex Foundation, Bangladesh Flower Society (BFC) etc.

3.4 Data Processing and Analysis

Collected data were analyzed statistically using computer software like STATA, SPSS. Besides, both statistical and tabular method were also used for the analysis of profitability of rose cultivation with other major flower.

3.5 Analytical Techniques

The collected data were edited, summarized, tabulated and examined to fulfill the objectives of the study. The methods of calculating profitability and input-output relationship are given below

3.6 Profitability Analysis

The profitability of rose is estimated by calculating gross margin, net return and benefit cost analysis. To calculate the total cost, both fixed cost and variable cost were considered. Land use cost which was taken into account as a fixed cost and was calculated on the basis of per year existing lease value of land.

3.6.1 Variable Cost

- 1) Cost of land preparation
- 2) Cost of seedling/cutting
- 3) Cost of hired labor
- 4) Cost of Urea, TSP, MOP, Zipsun and Zinc sulphate
- 5) Cost of manure
- 6) Cost of insecticide
- 7) Cost of irrigation
- 8) Cost of interest on operating capital

3.6.2 Fixed Cost

- 1) Cost of land use
- 2) Cost of family labor

3.6.3 Gross Margin (GM)

Formula,

$$\mathbf{GM = TR - VC}$$

Where,

GM = Gross Margin, **TR** = Total Revenue, **VC** = Variable Cost

3.6.4 Net Income (NI)

Formula,

$$\mathbf{NI = TR - TC}$$

Where,

NI = Net Income, **TR** = Total Revenue, **TC** = Total Cost

Total cost, TC = Variable cost + Fixed cost

3.6.5 Profit Calculation

Gross return = Total production × per unit price

Profit per hectare (Π) = Gross return – (Variable cost + Fixed cost)

3.7 Benefit Cost Ratio (BCR)

The formula of calculating Benefit Cost Ratio (BCR) is,

$$BCR = \frac{\sum_{t=1}^r \frac{B_t}{(1+r)^t}}{\sum_{t=1}^r \frac{C_t}{(1+r)^t}}$$

Where,

B_t =The benefit in time t

C_t =The cost in time t.

If the BCR exceeds one, then the project might be a good candidate for acceptance.

3.7.1 Benefit Cost Ratio (BCR) Calculation

$$BCR = TR/TC$$

Where,

TR = Total Revenue, **TC** = Total Cost

Comment If a project has a BCR greater than 1.0, the project is expected to deliver a positive net present value to a firm and its investors.

3.8 Determination of Factor affecting of Rose Production

Cobb-Douglas production function model was used to determine factors affecting rose Production. The functional form of the Cobb-Douglas production function model is given below

$$Y = aX_1^{b_1}X_2^{b_2}X_3^{b_3} \dots \dots \dots X_n^{b_n}e^{u_i}$$

In logarithmic form,

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + \dots \dots \dots + b_n \ln X_n + U_i$$

The empirical production function model,

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + b_8 \ln X_8 + b_9 \ln X_9 + U_9$$

Where,

Y = Gross return (Tk./ha); X₁ = Human labor cost (Tk./ha); X₂ = Land preparation cost (Tk./ha); X₃ = Seedlings cost (Tk./ha); X₄ = manure cost (Tk./ha); X₅ = Urea cost (Tk./ha); X₆ = TSP cost (Tk./ha); X₇ = MOP cost (Tk./ha); X₈ = Irrigation cost (Tk./ha); X₉ = Insecticide cost (Tk./ha); a = Intercept; b₁, b₂ ----- b₉ coefficients of the respective variables to be estimated. U_i = Error term, i=1, 2, 3.....9.

3.9 Resource Use Efficiency Measurement

The ratio of Marginal Value Product (MVP) to the Marginal Factor Cost (MFC) for each input were computed to test the efficiency and for its equality to 1.

$$\text{i.e., } r = \text{MVP/MFC}$$

Where,

r = Efficiency ratio

MVP = Marginal Value Product; which is the value of incremental unit of output resulting from the additional unit of inputs.

MFC = Marginal Factor Cost which is equal to one since both dependent and explanatory variables are converted to monetary value; and is defined as the increase in the cost of inputs due to purchase of additional unit of inputs.

Now,

$$\text{MVP} = (b_i * Y_i) / X_i$$

Where,

b_i = Estimated regression coefficient of input X_i

Y_i = Geometric mean value of output.

X_i = Geometric mean value of i^{th} resources used

Decision Criteria The decision criteria of determination level of efficiency

- When, $r = \text{MVP/ MFC} = 1$, the resource is efficiently used.
- When, $r = \text{MVP/ MFC} > 1$, the resource is underutilized.
- When, $r = \text{MVP/ MFC} < 1$, the resource is over-utilized.

CHAPTER IV

SOCIO-ECONOMIC STATUS OF THE ROSE CULTIVATORS

Socio-economic characteristics of the sample farmers is play a crucial role in the development of farmers' behaviors and personality. This characteristics vary from farmers to farmers. It is necessary to know the socio-economic characteristics of the sample farmers because it influences the farmers' production decision. According to the first objective of this research some important interrelated and constituent attributes which affects farmers behavior were taken into consideration for discussion. These characteristics are discussed in below

4.1 Age Distribution

Age of the farmers ranged from 20 to 65. According to their age, the framers were categorized into three category (Source: Zaman, M.S (2013)). These are given in below:

- i) Young age (20-35 years)
- ii) Middle age (>36-50 years)
- iii) Old age (>50-65 years)

The distribution of farmers on the basis of their age is shown in a tabular form in table 4.1.1.

Table no 4.1.1 Age Distribution

Category of age distribution	No of respondnt farmers (%)
Young age (20-35 years)	27(45%)
Middle age (>36-50 years)	18(30%)
Old age (>50-65 years)	15(25%)
Total	60(100%)

Source Field survey, 2021

Out of all rose growers of all age groups, 45% farmer were belong to the young age (20-35) group, 30% farmer were belong to the middle age (>36-50) group and 25% farmer were belong to the old age (>50-65) group.

4.2 Level of Education

On the basis of education level, the sample farmer were categorized into five category. These five category were Illiterate, Primary, Secondary, Higher secondary, Graduate. Out of all rose growers, the majority farmer (40%) has achieved primary education. Others were illiterate (30%), secondary (20%), higher secondary (8.33%) and graduate (1.67%). Only two respondent was graduate. This findings are shown in fig no 4.2.1.

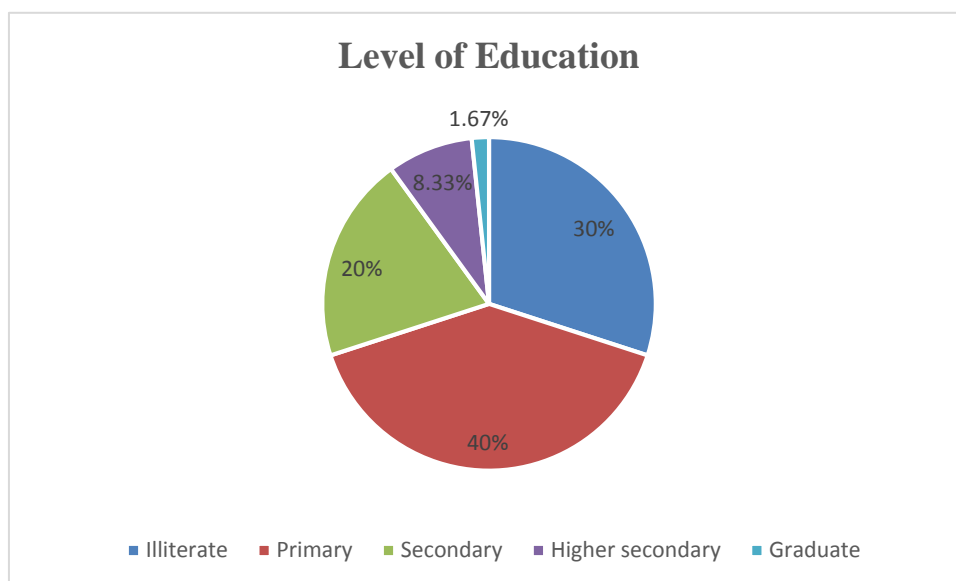


Fig no 4.2.1 Level of Education of the Sample Farmers

Source Field Survey, 2021

4.3 Occupational Distribution of Farmers by Gender

An occupation is a work situation had by a person who has a specific field of interest and distinct skills that benefit that field. Basically occupation refers to the work in which a man involved less or more throughout the year. The respondent in selected area were engaged in various types of work along with flower cultivation. The findings represented that the contribution of female farmers (10%) in rose production was very low due to social and religious obstacle. Among the all rose growers only flower production (33.33%) was high. The main and additional work of selected farmer are shown in table no 4.3.1

Table no 4.3.1 Occupational Distribution of Farmers by Gender

Occupation	Male (%)	Female (%)
Only Flower cultivation	20 (33.33%)	3(5%)
Flower cultivation+ Crop production	14 (23.33%)	0 (0%)
Flower cultivation + Business	10 (16.67%)	1 (1.67%)
Flower cultivation+ Service	5 (8.33%)	0 (0%)
Flower cultivation + Crop production + Business	5 (8.33%)	0 (0%)
Flower cultivation+ Crop production+ Service	0 (0%)	0 (0%)
Flower cultivation+ House keeping	0 (0%)	2 (3.33%)
Total	54 (90%)	6 (10%)

Source Field survey, 2021

4.4 Farm Size

The findings of this study represented that most of the farm size of the sample farmer varied from 0.20-4.00 hectares. On the basis of farm size the sample farmer were categorized into three category followed by the DAE (DAE, 1999) Standard. The distribution of farmers on the basis of farm size is given in table no 4.4.1

Table no 4.4.1 Farmers Distribution According to Their Farm Size

Farm size	No. of Respondent Farmers (%)
Small farm (0.20-1.0 ha)	36(60%)
Medium size farm (1.01-3.0 ha)	17(28.33%)
Large size farm (above 3 ha)	7(11.67%)
Total	60(100%)

Source Field survey, 2021

Out of all rose growers of all age groups, 60% farmers possessed small farm (0.21-1.0 ha), 28.33% farmers possessed medium size farm (1.01-3.0 ha) and 11.67% farmers possessed large size farm (above 3 ha).

According to Agriculture Year Book (2020), In Bangladesh, 78.32% farmers possessed small farm, 19.54% farmers possessed medium size farm and 2.14% farmers possessed

large size farm. With the comparison of national level data, it is revealed that in the study area the holdings of small and medium size farm are less than national level data.

4.5 Sanitation Facilities

Sanitation is one of the important factor to justify the socio-economic condition of the people. The study showed that most of the farmer of rose growers (56.67%) had good sanitation and 43.33% of rose growers had modern sanitation. The findings of this study also showed that no body (0%) used open space on this purpose. The findings of sanitation facilities are given below in table no 4.5.1.

Table no 4.5.1 Sanitation Facilities

Sanitation facilities	No of Respondents Farmers (%)
Open space	0 (0%)
Modern	26 (43.33%)
Good	34 (56.67%)
Total	60 (100%)

Source Field survey, 2021

4.6 Economic status of the farmer

On the basis of annual income, the farmers were classified into three category. These category were Low income group (1 Lac-2 Lac), medium income group (>2 Lac- 5 Lac) and high income group (> 5 Lac). The findings of the study on annual income of the respondent farmers are given below in table no 4.6.1.

Table no 4.6.1 Distribution of respondent farmers according to their yearly income (In TK.)

Category of income group	No of Respondent farmer (%)
Low income group (1 Lac-2 Lac)	33(55%)
Medium income group (>2 Lac- 5 Lac)	19(31.67%)
High income group (> 5 Lac)	8(13.33%)
Total	60(100%)

Source Field survey, 2021

The findings of the study represented that the number of respondents of low income group of rose growers (55%) were high and the respondent of high income group of rose growers (13.33%) were low. 31.67% of rose growers were belong to medium income group.

4.7 Sources of Fund

According to field survey, among all rose growers 38.33% of the respondent were found who have own fund, 6.67% were found who manage fund by taking loan from local NGOs and other financial institution and 45% were found who collect fund by both. Only 10% cultivators uses others fund like friends, kith and kin.

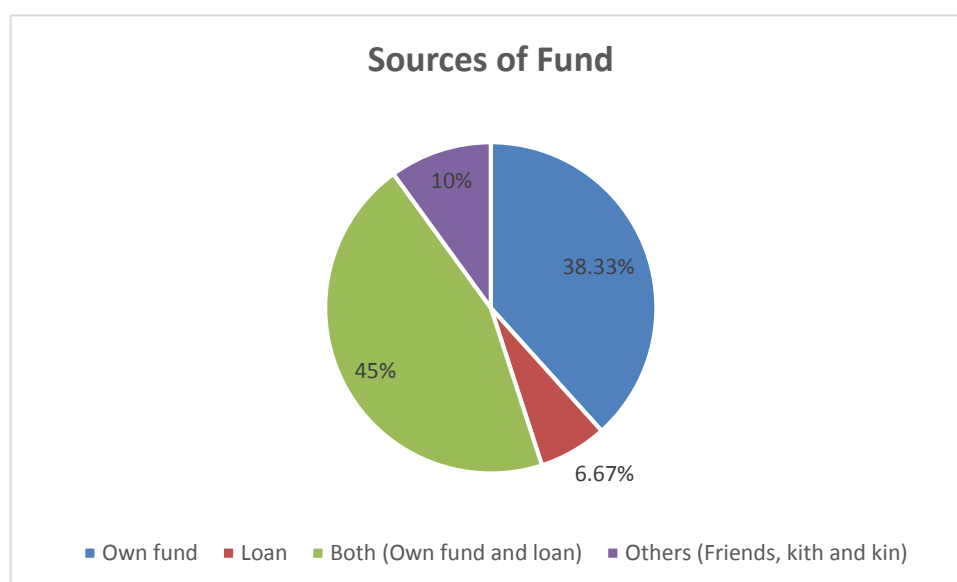


Fig no 4.7.1 Sources of fund

Source Field survey, 2021.

4.8 Concluding Remarks

The majority of the sample farmer were belong to the young age (20-35) group because they can provide more physical efforts for farming. Besides, they are supposed to have enormous vigor and risk bearing ability. The condition of educational level was not so good of rose growers due to lack of awareness. The contribution of women in rose cultivation was very low due to social and religious barriers. The sanitation condition of the farmers was good, it means they are very aware about health issues. Most of the farmers possessed small size farm as well as most of the farmers belong to the low income group. Most of the farmers (45%) manage their fund by both (own and loan).

CHAPTER V

FINANCIAL PROFITABILITY ANALYSIS OF ROSE CULTIVATION

This chapter mainly deals with the estimation of cost and return of rose cultivation with other major flower. During the estimation of cost, the cost were classified into two groups named fixed cost and variable cost. Most of the input price were estimated on the basis of current price, Govt. price and buying price of farmer. The rule of opportunity cost was followed in estimation of family labor cost because it was very difficult to calculate the cost of family labor.

5.1 Input use pattern of rose cultivation

According to the survey, the number of total human labor including hired and family labor used for rose cultivation was 833 man-days per hectare. The average land preparation cost was Tk.2203 per hectare on the basis of local pricing. The average number of rose cutting for planting was 8564 per hectare. The respondent farmers used manures, urea, TSP, MOP, Zipsum and Zinc sulphate at the rate of 1776 kg, 1739 kg, 1278 kg, 592 kg, 442 kg and 40 kg per hectare respectively. During the survey, it was found that farmers used urea, TSP and MOP higher than the recommended doses (Urea 1450 kg/ha, TSP 1000kg/ha, and MOP 400kg/ha). The irrigation cost which was estimated on the basis of local pricing system was 28365 Tk./ha. All inputs used in rose cultivation are summarized in (Table 5.1.1)

Table 5.1.1 Input Use Pattern of Rose Cultivation.

Items	Amount	Unit price (Tk.)	Total (Tk./ha)
Human labor(man days/ha)			
Haired (man days/ha)	549	400	219600
Family(man days/ha)	284	400	113600
Fertilizers(kg/ha)			
Urea (kg/ha)	1739	16	27824
TSP (kg/ha)	1278	22	28116
MOP(kg/ha)	592	15	8880
Zipsum (kg/ha)	442	10	4420
Zinc sulphate (kg/ha)	40	150	6000
Irrigation cost (Tk./ha)	5 times	5673	28365
Insecticide cost (Tk./ha)	60442	-	60442
Land preparation cost(Tk./ha)	2203	-	2203
Seedling(no/ha)	8564	8Tk./seedling	68512
Manures(kg/ha)	1776	320 Tk./400 kg	1420

Source Field survey, 2021.

(Recommended dozes Urea 1450 kg/ha, TSP 1000kg/ha, and MOP 400kg/ha) (Source M.A. Haque¹, M. A. Monayem, Miah², S. Hossain³ and M. Alam⁴ (2013))

5.2 Cost and Return Calculation of Rose Cultivation

Variable cost, fixed cost, total cost and gross return must be considered to calculate profitability of rose cultivation. The profit calculation of rose cultivation is summarized in table no 5.2.

5.2.1 Variable Cost

Variable cost is considered as an important part for any economic analysis to compute the profitability. The items include in variable cost are land preparation is Tk.2203, haired labor cost is Tk.219600, seedling cost is Tk.68512, urea cost is Tk.27824, TSP cost is Tk.28116, MOP cost is Tk.8880, Zipsum cost is Tk.4420 and Zinc sulphate cost is Tk.6000 and manures cost is Tk. 1420 per hectare (Table 5.2). Other variable cost of insecticides is Tk.60442 and cost of irrigation is Tk. 28365 per hectare. Interest on operating capital is Tk. 27346 (Table 5.2) per hectare. Total calculated variable cost is Tk. 483128 per hectare.

5.2.2 Fixed Cost

Fixed cost is also an important part for profitability analysis. It includes land use cost, interest on operating capital, cost and family labor cost. According to the findings land use cost is Tk. 32000 on an average and family labor cost is Tk.113600 per hectare. Total calculated fixed cost is Tk. 145600 per hectare.

5.2.3 Total Cost

Total variable cost and fixed cost are considered in calculating total cost. Total variable cost is Tk. 483128 per hectare and total fixed cost is Tk. 145600 per hectare. So the calculated total cost is Tk. 628728 per hectare (Table 5.2).

5.2.4 Gross Return

Gross return is calculated on the multiplication of yield flower per hectare and price of per flower. The yield of rose per hectare is 623356 and price of per flower in local level is Tk. 2. So the gross return is Tk. 1246712 per hectare (Table 5.2).

Table 5.2 Cost and Return Calculation of Rose Cultivation

Item	Cost and Return (Tk./ha)
A. Variable cost	483128 (76.84%)
Land preparation	2203 (0.35%)
Hired labor	219600 (34.93%)
Seedling/cutting	68512 (10.90%)
Chemical fertilizer	
Urea	27824 (4.43%)
TSP	28116 (4.47%)
MoP	8880 (1.41%)
Zipsum	4420 (0.70%)
Zinc sulphate	6000 (0.95%)
Manure	1420 (0.23%)
Insecticides	60442 (9.61%)
Irrigation	28365 (4.51%)
Interest on operating capital at 6%	27346 (4.35%)
B. Fixed cost	145600 (23.16%)
Family labor	113600 (18.07%)
Land use cost	32000 (5.095%)
C. Total cost(A+B)	628728 (100%)
Yield(Flower/ha)	623356
Price (Tk./flower)	2
D. Gross return (yield* price)	1246712
Gross margin(D-A)	763584
Net return(D-C)	617984
E. Benefit Cost Ratio	
1.Full cost basis	1.98
2.Variable cost basis	2.58

Source Field survey, 2021.

5.2.5 Gross Margin

Gross margin is calculated by the subtraction of variable cost from gross return. Gross return is Tk. 1246712 and the variable cost is Tk. 483128 per hectare. So the gross margin is Tk. 763584 per hectare (Table 5.2).

5.2.6 Net Return

Net return is calculated by the subtraction of total cost from gross return. Gross return is Tk. 1246712 and total cost is Tk. 628728 per hectare. So the net return is Tk. 617984 per hectare.

5.2.7 Benefit Cost Ratio (BCR)

Benefit Cost Ratio is the ratio of gross return to cost. Gross return is Tk. 1246712 and total cost is Tk. 628728 per hectare. So the Benefit Cost Ratio (BCR) on full cost basis is 1.98. On the other hand variable cost is Tk. 483128 per hectare. So the Benefit Cost Ratio on variable cost basis is 2.58.

5.3 Concluding Remarks

According to the result, it is appeared that the variable cost of rose cultivation is 72.49% of total cost. On the other hand fixed cost of rose cultivation is 27.51% of total cost. The result also showed that hired labor cost of rose (34.93%) is higher than all variable cost. Besides family labor cost is high among all fixed cost in rose cultivation. Benefit Cost Ratio of rose production is 1.98 on full cost basis. So commercial rose cultivation is profitable at farm level. It is also observed that the net return of rose cultivation is Tk. 617984.

CHAPTER VI

FACTORS AFFECTING AND RESOURCE USE EFFICIENCY OF ROSE CULTIVATION

The effects of different factors has been calculated on yield of rose and marigold in the framework of production function analysis. Nine explanatory variables were taken into consideration to estimate coefficients and their related statistics for production function analysis of rose and marigold. Estimated coefficients and their related statistics are given in table no 6.1.

Table no 6.1 Estimated Coefficients and their Related Statistics of Cost and Return Function for Rose Production.

Explanatory Variables	Co-efficient	t-Value
Intercept	2.338	3.369
Human labor cost (x1)	-0.112 ns	-1.164
Land preparation cost (x2)	0.297***	2.701
Seedling cost (x3)	0.273**	2.546
Manure cost (x4)	-0.446***	-4.226
Urea cost (x5)	0.161 ns	1.299
TSP cost (X6)	-0.235*	-1.696
MOP cost (X7)	0.484***	6.585
Insecticides cost (x8)	0.768***	6.263
Irrigation cost (x9)	-0.080 ns	-0.665
R ²	0.964	
Significance F value	5.31***	
Return to scale	1.10	

Note ‘***’, ‘**’ and ‘*’ indicate 1%, 5% and 10% level of significance respectively and ‘ns’ means non-significant.

6.2. Effect of Human Labor Cost (X1)

From the table of rose production function it can be seen that the value of the coefficient was negative and not significant. It indicates that on an average one percent increase in the cost of human labor keeping other factor remaining constant would decrease the gross return of rose by 0.112 percent.

6.3. Effect of Land Preparation Cost (X2)

It was observed from the production analysis that the estimated coefficient of land preparation cost was positive and significant at one percent level of significance. It indicates that on an average one percent increase in the cost of land preparation keeping others factor remaining constant would increase the gross return of rose by 0.297 percent.

6.4. Effect of Seedling Cost (X3)

From the table of rose production function, it was observed that the estimated coefficient of seedling cost was positive and significant at five percent level of significance. It indicates that on an average one percent increase in the cost of seedling keeping other factor remaining constant would increase the gross return of rose by 0.273 percent.

6.5. Effect of Manure Cost (X4)

From the table of rose production function, it was observed that the estimated coefficient of manures cost was negative and significant at one percent level of significance. It indicates that on an average one percent increase in the cost of manures keeping other factor remaining constant would decrease the gross return of rose by 0.446 percent.

6.6. Effect of Urea Cost (X5)

From the table of rose production function, it was observed that the estimated coefficient of the cost of urea was positive and not significant. It indicates that the one percent increase in the use of Urea cost keeping others factor remaining constant would increase the gross return of rose by 0.161 percent.

6.7. Effect of TSP Cost (X6)

From the table of rose production function, it was observed that the estimated coefficient of TSP cost was negative and significant at ten percent level of significance. It indicates that on an average one percent increase in the cost of TSP other factor remaining constant would increase the gross return of rose by 0.235 percent.

6.8. Effect of MoP Cost (X7)

From the table of rose production function, it was observed that the estimated coefficient of MOP cost was positive and significant at one percent level of significance. It indicates that on an average one percent increase in the cost of MOP keeping other factor remaining constant would increase the gross return of rose by 0.484 percent.

6.9. Effect of Insecticides Cost (X8)

From the table of rose production function, it can be seen that the estimated coefficient of insecticides cost was positive and significant at one percent level of significance. It indicates that the one percent increase in the use of insecticides cost keeping others factor remaining constant would increase the gross return of rose by 0.768 percent

6.10. Effect of Irrigation Cost (X9)

From the rose production equation, it was observed that the estimated coefficient of the irrigation cost was negative and not significant. It indicates that on an average one percent increase in the cost of irrigation keeping other factor remaining constant would decrease the gross return of rose by 0.080 percent.

6.11. Value of R Square

The estimated co-efficient of multiple determination (R^2) is a summary measure which tells how the sample regression line fits with the data (Gujarati, 1995).

From the rose production function, it was observed that the estimated value of R^2 was 0.96 that indicates about 96% of total variation in gross return of rose production is explained by the variables included in the model.

6.12. Value of F

It was observed from the rose production function that the estimated F value of the equation was found 5.31 which is significant at one percent level and it indicates that the variation of gross return of rose production mainly depends on the explanatory variables include in the model.

6.13 Return to Scale

Returns to scale is a term that refers to the proportionality of changes in output after the amounts of all inputs in production have been changed by the same factor. It can give three types of value

1. Constant return to scale ($=1$)
2. Increasing return to scale (>1) and
3. Decreasing return to scale (<1)

Return to scale of rose production was computed by adding all co-efficient of regression which also indicates the elasticity of production. In the study the sum of the co-efficient of different inputs cost stood at 1.10. This indicates that the cost and return function exhibited a increasing return to scale would implying that if all input cost specified in the functions are increased by 1 percent gross return will increased by 1.10 percent.

6.14 Resource Use Efficiency Measurement

The ratio of MVP and MFC of human labor cost(-0.40), manure cost(-39.64) ,TSP cost(-9.13) and irrigation cost (-3.03) for rose production was negative and less than one , which represented that in the study area expense on human labor, manure, TSP and irrigation was over-utilized. So farmers should decrease expense on human labor, manure, TSP and irrigation to attain efficiency in rose production. On the other hand , The ratio of MVP and MFC of land preparation cost(39.64), seedling cost(4.92), Urea cost (6.79),MoP cost (53.99) and insecticide cost(14.60) for rose production was positive and more than one , which represented that in the study area expense on land preparation , seedling, Urea, Mop and insecticide was under-utilized. So farmers should increase the expense on land preparation, seedling, Urea, MoP and insecticide to attain efficiency in rose production. Resource use efficiency measurement are shown in table no 6.14.1

Table no 6.14.1 Resource Use Efficiency Measurement in Rose Cultivation

Variable	GM	Co-efficient	MVP	r = MVP/MFC	Decision rule
Gross return (Y)	53256.13				
Human labor cost(X1)	14571.24	-0.112	-0.40	-0.40	Over-utilized
Land Preparation cost(X2)	398.93	0.297	39.64	39.64	Under-utilized
Seedling cost(X3)	2949.47	0.273	4.92	4.92	Under-utilized
Manure cost(X4)	360.94	-0.446	-65.80	-65.80	Over-utilized
Urea cost(X5)	1262.84	0.161	6.79	6.79	Under-utilized
TSP cost(X6)	1369.94	-0.235	-9.13	-9.13	Over-utilized
MoP cost(X7)	477.41	0.484	53.99	53.99	Under-utilized
Insecticide cost(X8)	2799.95	0.768	14.60	14.60	Under-utilized
Irrigation cost(X9)	1404.49	-0.080	-3.03	-3.03	Over-utilized

Source Field survey, 2021

6.14. Concluding Remarks

From the rose production function, it was observed that seedling cost, land preparation cost, insecticides cost, Urea cost and MOP cost had positive impact on the gross return of rose cultivation. On the other human labor cost, manures cost TSP cost and irrigation cost had negative impact on it. The findings also showed that the expense on human labor, manure, TSP and irrigation was over-utilization and the expense on land preparation, seedling, Urea, MoP and insecticide was under-utilization in rose production.

CHAPTER VII

MAJOR PROBLEMS OF ROSE CULTIVATION IN THE STUDY AREA.

7.1 Problems Faced by the Farmers

For the sake of convenience the problems and constraints faced by the selected rose growers in the study area has been categorized into four general groups such as -

- i) Social
- ii) Economic
- iii) Technical and
- iv) Marketing

Problems faced by the farmers are given in table no 7.2

Table 7.2 Problem faced by farmers

Problems	Percentage of respondent	Ranking of the problems
<p>Social Problems</p> <ul style="list-style-type: none"> • Loss of production due to thief and visitors • Flower damage by animals • Others <ul style="list-style-type: none"> ✓ Spoilage due to poor handling 	<p>75%</p> <p>62%</p> <p>34%</p>	<p>1</p> <p>2</p> <p>3</p>

<p>Economic Problems</p> <ul style="list-style-type: none"> • High labor and insecticide cost • Low selling price • Insufficient credit facilities • Others <ul style="list-style-type: none"> ✓ High price of mother stock. 	<p>83%</p> <p>66%</p> <p>56%</p> <p>42%</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p>
<p>Technical Problems</p> <ul style="list-style-type: none"> • Attack by pest and disease • Lack of scientific knowledge and training • Lack of extension services • Others <ul style="list-style-type: none"> ✓ Little knowledge about flower preservation ✓ Lack of adequate storage facilities both at field and retail levels. ✓ Lack of adequate transport facilities connecting the growing regions to the high value market areas. ✓ Lack of affordable packaging materials. 	<p>90%</p> <p>55%</p> <p>35%</p> <p>20%</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p>

Marketing Problems		
<ul style="list-style-type: none"> • Transportation and communication system. 	82%	1
<ul style="list-style-type: none"> • Inadequate and underdeveloped market. 	68%	2
<ul style="list-style-type: none"> • Lack of market information 	47%	3
<ul style="list-style-type: none"> • Others <ul style="list-style-type: none"> ✓ Inadequate skill of inventory for the post-harvest management of flowers ✓ Lack of grading specifications for flowers ✓ Absence of forward and backward linkage industry. 	36%	4

Source Field survey, 2021

7.3 Social Problems

In the survey area, rose grower had to face some social and other problems like loss of production due to visitors and theft, flower damage by animals and others. These problems are discussed in below

7.3.1 Loss of Production Due to Visitors and Theft

In the study area seventy five percent of farmer had to face loss of production due to visitors and theft especially in the month of February, March and December due to international Valentine's Day, international mother language day, national day and victory day respectively.

7.3.2 Flower Damage by Animals

According to the survey sixty two percent of rose growers claimed that they faced this problem.

7.3.3 Spoilage due to Poor Handling

Poor handling management is one of the main reason of spoiling flower and according to the field survey, thirty four percent of the farmer had to face this problem.

7.4 Economic Problems

In the field survey, the economic problems faced by the farmers were identified by asking them scheduled question. Some of them are discussed in below

7.4.1 High cost of human labor and insecticides

Input materials like seedlings, insecticides, irrigation etc. play a vital role in the production of rose. Besides, the farmers' production decision largely depends on the price and availability of input materials.

High cost of human labor and insecticides affect rose production negatively. According to the field survey, eighty three percent of the farmer had to face this problem.

7.4.2 Low Selling Price

In the off season, Low selling price is a big problem for farmers as they don't get their anticipated price. . According to the field survey, sixty six percent of the farmer had to face this problem.

7.4.3 Insufficient Credit Facilities

In rose production, insufficient credit facilities one of the major problem in the study area. Farmers don't get sufficient credit from the banks. As a result they take credit support from the NGOs at a high interest rate. According to the field survey, fifty six percent of the farmer had to face this problem.

7.5 Technical Problems

Technical problems are mainly related with the production techniques and technology. In the study area I had found many technical problems such as lack of scientific knowledge and training, lack of quality seeds or plants, attack by pest and diseases, lack of storage facilities and lack of extension service.

7.5.1 Attack by Pests and Diseases

According to the field survey, ninety percent of the farmer had to face this problem and they mentioned that considerable amount of loss in rose production was caused by the attack of pest and diseases.

7.5.2 Lack of Scientific Knowledge and Training

Scientific knowledge and training is very important for commercial rose production because it is a new practice in Bangladesh. Successful rose farming is very much depends on trained manpower, post-harvest management, product development and biotechnology. According to the field survey, fifty five percent of the farmer had to face this problem.

7.5.3 Lack of Extension Services

Successful commercial rose farming depends on new production methods and technology at a large scale. According to the field survey, twenty percent of the farmer had to face lack of extension service.

7.6 Marketing Problems

In the survey area, several marketing problems were found which are discussed below:

7.6.1 Transportation and Communication Problems

Transportation and communication system play a crucial role in modern marketing system. In the study area the transportation and communication was not properly developed for the movement of rose from the producer's field to different markets. According to the field survey, eighty two percent of the rose farmer had to face inadequate transportation and communication system in transporting produced flowers.

7.6.2 Inadequate and Underdeveloped Market

According to the field survey, sixty eight percent of the farmer had to face Inadequate and underdeveloped market problem.

7.6.3 Lack of Market Information

As rose is a highly perishable product, so proper market information is needed for quick disposal. According to the field survey, farmers mentioned that forty seven percent of the farmer had to face improper market information problems.

7.7 Concluding Remarks

On the basis of ranking thief and visitors was the number one problem for production loss. 75% farmers had to face this type of social problems. On the other hand high input price (cost of human labor and insecticides) was the number one economic problem and 83% farmers had to face this problem. Besides pest and disease problem (90%) and good transportation and communication problem (82%) ranked number one problem in technical and marketing problems respectively. These type of social economic, technical and marketing problems are the main reasons behind the lower production as well as lower net return in rose production.

CHAPTER VIII

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter focuses on the outline in the light of the discussion made within the prior chapters. Conclusion has been made on the premise of the observational result. Policy suggestions are drawn for enhancement of the prevailing inefficiency of rose production in some selected area of Jhenaidah district.

8.1 Summary

The financial performance of rose cultivation in some selected regions of Jhenaidah district has been evaluated on this study. The consequences found out that rose cultivation is highly profitable at farm level. Seedling cost, land preparation cost, insecticides cost and MOP cost had positive impact at the yield of rose cultivation. On the other hand manures cost and TSP cost had negative impact on it. The study also discovered that because of numerous socio-economic limitation, the rose growers cannot obtain expected yield and price in their produces.

Particular findings from the study are summarized in below

Out of all rose growers of all age groups, 45% farmer were belong to the young age (20-35) group, 30% farmer were belong to the middle age (>36-50) group and 25% farmer were belong to the old age (>50-65) group.

Out of all rose growers, the majority farmer (40%) has achieved primary education. Others were illiterate (30%), secondary (20%), higher secondary (8.33%) and graduate (1.67%). Only two respondent was graduate.

The respondent in selected area were engaged in various types of work along with flower cultivation. The findings represented that the contribution of female farmers (10%) in rose production and the cause of lower contribution of female was social and religious obstacle. Among the all rose growers only flower production (33.33%) was high.

Out of all rose growers of all age groups, 60% farmers possessed small farm (0.21-1.0 ha), 28.33% farmers possessed medium size farm (1.01-3.0 ha) and 11.67% farmers possessed large size farm (above 3 ha).

Sanitation is one of the important factor to justify the socio-economic condition of the people. The study showed that most of the farmer of rose growers (56.67%) had good sanitation and 43.33% of rose growers had modern sanitation. The findings of this study also showed that no body (0%) used open space on this purpose.

The findings of the study represented that the number of respondents of low income group of rose growers (55%) were high and the respondent of high income group of rose growers (13.33%) growers were low. 31.67% of rose growers were belong to medium income group.

According to field survey, among all rose growers 38.33% of the respondent were found who have own fund, 6.67% were found who manage fund by taking loan from local NGOs and other financial institution and 45% were found who collect fund by both. Only 10% cultivators uses others fund like friends, kith and kin.

Total variable cost is Tk. 483128 per hectare and total fixed cost is Tk. 145600 per hectare of rose cultivation. So the calculated total cost is Tk. 628728 per hectare for the production of rose. The gross return, gross margin and net return of rose cultivation Tk. 1246712, Tk. 763584 and Tk. 617984 per hectare respectively. The Benefit Cost Ratio (BCR) of rose on full cost basis is 1.98 and variable cost basis is 2.58.

The gross margin percentage of rose is TK. 763584 as well as the net return percentage of rose is Tk. 617984.

From the rose production function, it was observed that seedling cost, land preparation cost, insecticides cost, Urea cost and MOP cost had positive impact on the gross return of rose cultivation. On the other hand, human labor cost, manures cost, TSP cost and irrigation cost had negative impact on it.

The findings also showed that the expense on human labor, manure, TSP and irrigation was over-utilization and expense on land preparation, seedling, Urea, MoP and insecticide was under-utilization in rose production.

According to the field survey, eighty three percent, sixty six percent, fifty six percent, ninety percent, fifty five percent, twenty percent of the farmers faces the problems of high input cost (cost of human labor, insecticides, seedlings and irrigation), low selling price, insufficient credit facilities, attack by pests and diseases, lack of Scientific knowledge and training, lack of extension services respectively. Besides eighty two percent, sixty eight percent, forty seven percent, seventy five percent, sixty two, thirty four percent of the respondent farmers faces the problem of transportation and communication problems, inadequate and underdeveloped market, lack of market information, loss of production due to visitors and theft, flower damage by animals, spoilage due to poor handling respectively.

The findings of the existing study suggest that production of rose is profitable business for farmers. The return of rose over cost is nearly double, which shows excessive profitability. Also, buying and selling of rose is profitable venture for distinctive intermediaries. It may be stated that flower cultivation and marketing has wider scope in Bangladesh, so the farmers and intermediaries should certainly be benefited financially if overall performance of marketing system of flower turns into well developed. The growing demand of rose in the domestic as well as in the export marketplace requires a concerted attempt at the part of the authorities as well as the private entrepreneurs to increase industry on scientific lines.

8.2 Conclusion

The findings of the study revealed that rose cultivation is highly profitable at farm level. The input cost like seedling cost, land preparation cost, insecticides cost, Urea cost and MOP cost had positive impact on the gross return of rose cultivation. On the other hand, human labor cost, manures cost, TSP cost and irrigation cost had negative impact on it. The expense on human labor, manure, TSP and irrigation was over-utilization and expense on land preparation, seedling, urea, MoP and insecticide was under-utilization in rose production. There were several major problems were found through the study regarding rose cultivation such as lack of technical knowledge, less availability of HYV seedling and infestation of insects and diseases that affects negatively in the production of rose. Jhenaidah is one of the most popular district for commercial flower cultivation. Balianga, Elochanpur, Kola and Naldanga etc. village under Kaligonj upazila are known as ‘fulpalli’. Around 11 types of flowers, including rose, gerbera, gladiolus,

tuberose and marigold are cultivated in these village. As the demand of flower in our country as well as international market turns it into a flower industry, it can contribute in our national economy by generating employment opportunity and earning foreign currency.

8.3 Recommendations

Based on the results of the study, the following recommendations were made to improve the cultivation of rose at the farm level. Some important recommendations are pointed in below

- As the commercial cultivation of rose is profitable at farm level. So, farmers should be encouraged to cultivate rose.
- As human labor cost of rose cultivation is high, farmers should be more mechanized in rose production and to reduce insecticide cost, Scientists have to develop pest resistant high yielding varieties (HYV) of rose in near future. Besides integrated pest management (IPM) training facilities must be available at farmers' level to reduce insecticide cost.
- Cultivators need to provide suitable cooling services at market place to reduce spoilage and damage of flowers. If they cannot sell their product today, they will be capable to sell it in the subsequent day.
- Strong fencing facilities should be provided to prevent the movement of visitors and to prohibit the stolen of flowers.

8.4 Limitation of the Study

- Sometimes respondent were not well co-operated with the interviewer in the collection period when most of the data were collected.
- The data gathered generally via the memories of farmers which were not always accurate.
- Sometimes respondents were not interested to give data to the interviewer.
- Farmers cultivated flowers without giving much care practice, that's why it was very difficult to collect accurate profit margin data from their production.

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