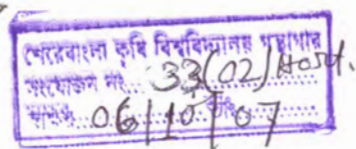


**POSTHARVEST HANDLING AND MARKETING OF BANANA
IN THE SELECTED AREAS OF BANGLADESH**

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**POSTHARVEST HANDLING AND MARKETING OF BANANA IN
THE SELECTED AREAS OF BANGLADESH**

BY

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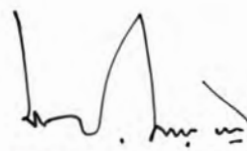
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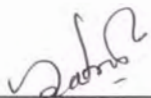
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CERTIFICATE

This is to certify that thesis entitled, "POSTHARVEST HANDLING AND MARKETING OF BANANA IN THE SELECTED AREAS OF BANGLADESH" submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of *MASTER OF SCIENCE IN HORTICULTURE*, embodies the result of a piece of bonafide research work, carried out by *A.K.M. Shahidul Islam, Registration No. 25166/00302*, 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 a source of information, received during the course of this investigation has been duly acknowledged by him.

Dated:
Dhaka, Bangladesh



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*Dedicated to
My
Beloved Parents*

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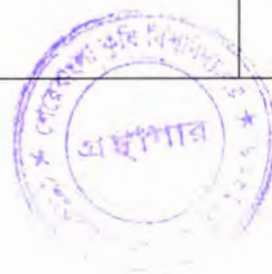
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POSTHARVEST HANDLING AND MARKETING OF BANANA IN THE SELECTED AREAS OF BANGLADESH

ABSTRACT

A study was conducted to determine the present status of postharvest handling including loss assessment and marketing of banana along with constraints and to make probable suggestions to address the identified constraints. The survey was made in selected areas of Bangladesh. Altogether 35 farmers (small, medium and large) and 35 intermediaries (faria, bepari, aratdar and retailers) were interviewed through structured questionnaires during the period from mid September to November 2005. The results of the study indicated that per hectare net returns of large farmers (Tk.88, 259) were comparatively higher than those of the medium (Tk.86, 149) and small (Tk.71, 209) farmers while per hectare gross returns of medium farmers (Tk.197, 207) were comparatively higher than those of large (Tk. 191,232) and small (Tk.190, 037) farmers. Per bunch banana (85 fingers) marketing cost of aratdar (11.00) was comparatively higher than those of faria (6.00), bepari (8.50) and retailers (9.00). Postharvest losses of banana were 25%. Maximum postharvest loss was found at transportation levels. Marketing losses in banana owing to fruit injuries and fruit diseases were estimated at 17% (Tk. 144840) and 8% (Tk. 68160), respectively. Faulty harvesting procedure, loading and unloading, inadequate care during transport and stowage of banana bunches in transit and transport, vibration and compression during transportation caused cracks, cuts, punctures and blemishes. The wholesalers and their agents mainly determined the market price of banana. The total marketing cost was established at 12% (3% by producers, 3% by traders, 4% by wholesalers and 2% by retailers). The negligent attitude towards postharvest handling, lack of quality consciousness and absence of food processing units and unavailability of modern transport and cold storages are responsible for huge postharvest losses. The marketing problems were identified as inadequate transport and marketing facilities, perceived exploitation by middlemen in controlling the market price through their coherent association. Adequate and timely supply of inputs ensure, improvement of transport and communication system, development of storage facilities, market facilities and establishment of processing plants etc. may go a long way in solving the problems.



Chapter I

Introduction

CHAPTER 1

INTRODUCTION

1.1 Introduction

In Bangladesh, Banana (*Musa sapientum* L.) ranks first among all fruits both in acreage and production. It is grown almost everywhere in the country mainly in the backyard in villages with minimum production inputs. In certain areas, it is intercropped with other plants. Now-a-days monocrop ventures also exist in different areas and these are the large commercial plantations employing recommended cultural and management techniques. Fruits are used fresh, cooked, or processed into different forms. Fruits are usually harvested green and sold in bunches, hands or fingers and are of generally low quality due to negligence during production and preparation prior to marketing.

During 1999-2000 to 2003-2004, the land area devoted to banana growing increased from 40,401 to 49,281 hectares and production also increased from 572,160 to 706,585 metric tons in Bangladesh. The per hectare yield also increased from 15.61 to 15.80 metric tons during the same period due to improvement in production methods and conditions in Bangladesh. In 2003-2004, a total of 49,281 hectares planted with bananas produced about 706,585 metric tons of fruits in Bangladesh (BBS, 2005). Although the production areas are scattered throughout the country, there exist some concentrated areas for production because of favorable agro-ecological conditions and better marketing facilities. The important banana growing areas are Chittagong, Jessore, Rangamati, Dhaka, Faridpur, Bogra, Khulna etc.

There are some commercially important cv. namely Amritsagar, Mehersagar, Chinichampa, Sabri, Kabri, Singapuri, Rangeen Mehersagar and green banana. Among the important cv. Amritsagar occupies the top position in respect of area, production and trade. The optimum time of planting of this cv. is September-October (Haque, 1983).

Banana is of considerable significance in the Bangladesh economy as one of the high value crops. A grower can earn a fair return from banana production as it grown in large quantity round the year. There exists scope for increasing the yield of banana by improving the existing production practices. Banana is a perishable fruit and requires careful post-harvest handling and quick marketing. Infrastructure for postharvest management, transportation, storage and marketing has not yet been developed in the country for which sale of fruits at a reasonable price at a desirable time is a major problem under the existing inadequate marketing system.

Poor infrastructure for postharvest handling, storage and marketing contributes to a high proportion of spoilage which averages between 10-40% for horticultural crops (Ahmed, 2004). In the base line survey conducted under Integrated Horticulture & Nutrition Development Project (IHANDP) of Department of Agricultural Extension, Ministry of Agriculture, Government of Bangladesh it was stated that total losses of banana during postharvest operations ranged from 9.12% at landless level to 5.17% at medium and large farmers.

Despite the importance of banana in the economy of Bangladesh, a few research works have been made on the postharvest handling and marketing of banana. So, it is felt that a systematic study on the postharvest handling and marketing of banana could be of much importance which will help improve the production process including postharvest management and marketing of this crop.

1.2 Objectives of the study

- a) To determine the present status of postharvest handling including loss assessment and marketing;
- b) To identify the constraints relating to production, postharvest management and marketing; and
- c) To make probable suggestions for addressing the identified constraints.

1.3 Limitations of the Study

There were some limitations in this study. These were as follows:

- i) The limitation of this study was the shortage of time and fund for which the study could not include a large number of farmers and intermediaries, covering a wider study area
- ii) Because of illiteracy there were no written records maintained by most of the respondents for which the researcher had to depend solely on the memory of the respondents.
- iii) It was very difficult to collect data from the wholesalers for this study because they were afraid of income tax. As a result, they showed somewhat reluctance to divulge the actual information owing to their trading secrecy.
- iv) Another important problem was the initial non-cooperation of the respondents. However, this difficulty was overcome through persuasive explanation with the respondents of the study area.

Ripe banana suffers from various postharvest diseases all over the world including Bangladesh. Due to climacteric type of respiration leading to senescence and improper handling giving rise to physical injuries (eg. technical injuries, breakage, cuts, punctures, impact bruises, compression bruises, vibration bruises), the perishable banana fruits are affected by the postharvest rot diseases. These destructive diseases cause damage to quality, nutrient and the fruits become unfit for consumption, losing their market price. This brings loss to the producers, distributors, retailers and wholesalers.

In Bangladesh a huge amount of banana is spoiled due to prevailing high temp, humidity, inappropriate postharvest handling and sub-optimal knowledge in the field of postharvest technology. Such spoilage can occur during transportation and/or in the wholesale market resulting in considerable economic loss.



Chapter II

Review of literature

CHAPTER 11

REVIEW OF LITERATURE

Anonymous (2002) stated that banana and plantain are highly perishable commodities. A combination of high perishability, high ambient temperatures, slow marketing systems and poor market condition lead to huge losses in quality banana in Nigeria.

In the Philippines, Flordeliza (2002) noted that banana growers incur a huge loss (30-40%) annually because of poor post harvest techniques adopted by them.

Hadi (2001) in Pakistan reported that postharvest losses of fruits and vegetables in Pakistan is about 35%. According to him the factors responsible for post harvest losses are adoption of poor pre harvest measures, insect pest and disease infestation and biotic stresses, low technique harvesting procedures, non application of pre-harvest recommended treatments/ practices, harvesting at improper stage, improper care at harvest, non removal of field heat, dumping procedure, moisture condensation causing pathogen infestation, packing in bulk without sorting and grading of produce improper transportation and storage and distant and time consuming market distribution.

Srinivas *et al.* in India (1997) conducted a survey to assess post harvest losses of mango in karnataka and observed total postharvest losses of 17.9%.

Surveys made by Naqvi and Dass (1994) in several districts of Maharashtra India, indicated that 43-47% of the total losses of mandarins in truck and train transport were due to postharvest diseases.

In a study Daniels (1990) reported 20-40% post harvest losses of fruits and vegetables in the tropical countries.

Gerini (1988) in his study observed 5% Mean weight loss of banana due to mechanical damage and fungal disease.

Subramanyam (1986) in India described that the postharvest losses of fruits and vegetables in developing countries have been reported to vary between 15 and 50% with an estimated minimum loss of 20% at different stages of marketing.

Anonymous(1977) in Kenya made a case study on postharvest losses of bananas and reported that the major factors responsible for the losses were mechanical damage and in transit ripening. Overall the losses from the defingering, bruising, broken fruits and in transit ripening were in the order of 22, 29, 15 and 30% respectively. The position of the fruits in the truck affected the degree of damage with the total losses from the top, middle and bottom being 21, 31 and 44% respectively. Estimates of postharvest loss of Musa crops in the traditional marketing systems ranged from 20-80%.

Chillet *et. al.* (1996) in French in their study on banana found that described anthracnose is the main factor responsible for post harvest decay of West Indian banana.

In Nigeria, Odebode and Sanusi (1996) observed that *Botryodiplodia theobromae* pat is a major organism causing spoilage of banana in southwest part of Nigeria.

Slabaugh and Slabaugh (1994) reported that in Caribbean, India, Taiwan and the Philippines, fully mature fruit is more susceptible to infection

and the affected clusters ripen earlier. The disease develops faster during ripening and can spread to adjacent fingers.

Eckert (1991) noted that fresh fruits are susceptible to attack by many plant pathogens after harvest because they are rich in nutrients and have lost most of the intrinsic resistance that has protected them during their development while attached to the plant.

Sapiah *et al.* (1990) stated that postharvest diseases of banana fruits are considered as a major threat to the banana industry. Fruit rot occupies leading position among the post harvest diseases.

Stover (1972) reported that finger rot was one of the most common rots of bananas that were in transit in boxes for more than 14 days. However, it rarely occurs in fruit transported for 10 days or less.

Salunkhe and Desai (1984) observed that Postharvest losses to fruits in developing countries have been estimated to be in the range of 5-50% or more of the harvest.

Cappellini and Ceponis (1984; Eckert (1985) reported that even in the countries with most advanced technologies available, the postharvest losses are substantial.

Parpia (1976) in India reported that postharvest diseases of fruits are responsible for causing losses up to 30% during harvest to consumption. Post-harvest losses take a heavy toll on the harvested banana; which may vary from 20-80% (National Academy of Science, USA, 1978).

Harvey (1978), Kader *et al.*, (1985) and Sommer, (1982) observed that the extension of marketing periods by storing fruits and vegetables affect

the physiological life of the stored products and may create additional disease problems.

Hossain (2000) in Bangladesh conducted a study to determine the relative profitability of Mehersagar and Amritsagar varieties of banana in Mymensingh and Tangail district. His survey period was April to May, 2000 and sample (20 farmers growing Amrit Sagar and 40 farmers growing Meher Sagar) were selected randomly for this study. He found that Amrit Sagar banana was more profitable than Meher Sagar banana production. Per hectare gross returns, net returns above cash cost and net return above full cost of Amrit Sagar banana production were Tk. 206782, Tk. 127516 and Tk. 91793 respectively, while the corresponding returns for Meher Sagar banana production were Tk. 182505.59 Tk. 106821.73 and 72167.55 respectively.

Nessa (1998) conducted a study to determine the relative profitability of banana and sugarcane in Mymensingh district during the period of July-September, 1997. She found that banana production was more profitable than sugarcane production. Per hectare gross return, net return above cash cost and net return over full cost of banana were Tk. 113295.08 Tk. 70432.19 and Tk. 43899.05 respectively, while the per hectare gross return, net return above cash-cost and net return above full cost of sugarcane were Tk. 67505.81 Tk, 41807.75 and Tk. 14539.30 respectively.

Nargis (1997) conducted a study on "The comparative economic analysis of growing banana and banana with other vegetables in some selected areas of Muktagacha thana". During the period was September to December, 1996. The major findings of the study were that per hectare costs of production of sole banana were Tk. 121438 and Tk.92011, respectively considering full cost and cash cost. Per hectare cost of production of banana with cucumber, banana with Indian spinach and banana with lady's finger based on full cost were Tk.122896, Tk.123328 and Tk.123534 respectively per hectare net return

of growing sole banana was Tk.90032 and Tk. 119459 considering full cost and cash cost, respectively per hectare net return of growing banana with cucumber, banana with Indian spinach and banana with lady's finger were Tk.137974 Tk.142482 Tk.149676 respectively on the basis of full cost. Per hectare net return from banana with cucumber, banana with Indian spinach and banana with lady's finger were Tk.167909 Tk.172499 and Tk.179859 respectively considering cash cost.

Patel (1996) conducted a case study of banana in Gujrat India to indentify the emerging problems of marketing new crops with added focus on impact supply and to offer suggestion for possible improvement in the existing marketing, processing and impact supply system based on the findings of the study. The problems and prospects relating to banana marketing functions such as picking, grading, assembling, packing, transport etc, price received for product, supply of key inputs and price paid for inputs, were reported from a sample survey of banana growers.

Rahman (1995) conducted a study on marketing of banana of Gabtali and Sariakandi thanas under Bogra district. Thirty five farmers and equal number of intermediaries were selected to determine the existing marketing system of banana in the selected areas. He estimated the costs and margins of banana marketing. The study revealed that the marketing cost per 100 bananas was the highest for large farmers (Tk.6.11) and was the lowest for medium farmers (Tk.4.15). Among the intermediaries, the marketing cost was the highest (Tk.18.04) for aratdar and the lowest (Tk.9.22) for faria per 100 bananas. The reported banana marketing channel in the study areas was "Farmer → Faria → Bepari → Aratdar → Retailer → Consumer". The marketing margin for the channel was estimated at Tk.102.90 per 100 bananas.

Bairagi (1995) conducted a study to determine the profitability of banana production in Jhenaidah district of Bangladesh. His survey period was

September, 1989 to October, 1989. The relative economic advantage of banana and sugercane and the factors that affect banana production and marketing of banana were also analyzed in his study. He found that per hectare cost and returns of banana production were Tk.53, 714.50 and Tk.116678.84 respectively.

Shil and Mondal (1990) examined a research on “Inter cropping in Banana with some short duration crops”. They reported that at planting time enough space remain unutilized in between the banana plants, for a period of 4 to 5 months when initial growth was slow. In this stage, profitable utilization of such space could be achieved with some short duration intercrops. If the space remains vacant, there would be serious infestation of weeds. Thus, in the intercropping system, the cost of weeding and other cultural practices was reduced. They also observed that intercropping delayed baunch shooting and consequently it extended the harvesting date of banana. Banana growth with lalshak, spinach and Grasspea did not reduce the yields but when grown with radish, mustard, its yield reduction was significant. By growing banana as single crop, one could earn Tk. 1, 83,000.00 per hectars, but banana with radish world give on extra income of more than Tk. 20,000.00 per hectare. The yield reduction in banana was more than compensated by the additional income derived from radish production as intercrop.

Rahman and Akbar (1989) conducted a study on banana marketing in Narsingdi district. Their survey period was October 1987. They reported that the farmer’s share of the consumer’s taka spent on bananas varied between 44 and 62 percent. The farmer’s share was however, found to be inversely related with the size of the channel; the shorter the channel, the higher was the share. The intermediaries appropriated a marketing margin of 38 to 56 percent in the form of marketing cost and profit. The profit component in the margin for all groups of intermediaries was higher than the cost component. Although the net margin taken by the retailers was reportedly larger, their

overall turn over was considerably less than that of other intermediaries. The intermediaries engaged in marketing of bananas were faria, paiker, aratder and retailer. The problems faced by the farmers in the production and marketing of bananas were lack of capital, diseases, natural calamities, thievery, poor communication, high transportation cost, delay in sale and lack of physical facilities in the market.

Haque (1988) conducted a research at Bangladesh Agricultural University, during October 1987 to November 1988. He examined the economic performance of banana production. He found that per hectare cost and net returns of banana production were Tk. 1, 03,614.88 and Tk. 1, 61,386.12 respectively. According to Haque, net return from banana cultivation was much higher than any other field crops.



Chapter III

Materials and Methods

CHAPTER III

MATERIALS AND METHODS

In order to make an assessment of the postharvest handling and marketing system of banana, this study was conducted in some selected areas of Bogra district. Although banana is grown all over Bangladesh, Bogra district is one of the leading bananas producing area of Bangladesh. In 2003-2004, a total of about 49281.38 hectares of land were cultivated for banana production in Bangladesh and in Bogra district 1566.80 hectares of land were cultivated for banana production which was 3.17 percent of the total cultivated land under banana cultivation (BBS, 2004). In the same year 706585 metric tons of banana were produced in Bangladesh and 27,425 metric tons of banana were produced in Bogra district. The selected unions were Mokamtala, Phasitala, Rohobol, Uthali, Chandihara etc. In addition to these villages, Mokamtala Hat of Bogra, and kawranbazar market in Dhaka city were also considered for this study.

The other reasons for selecting the areas were as follows:

- a) Co-operation from the respondents were expected since the researcher was familiar with local dialect, living experience, beliefs and socio economic characteristics of the area, therefore reliable data were expected to be obtained.
- b) No study of this type was conducted previously in this area.
- c) Easy accessibility and good communication facilities were prevailing in this area.

3.1 Selection of the sample

Sampling is an important part of survey work. In this study, the banana producers of the selected areas and the markets intermediaries of the selected markets were considered as the population for the study. Since it was not possible to interview all the banana farmers and banana intermediaries, so a reasonable size of sample to satisfy the objectives of the study was taken into account. The size of population of the farmers and traders were 90 and 80 respectively. Considering the limitation of time and fund, the sample size for banana producer-farmers was fixed at 35 each of the selected unions. The selected banana farmers were categorized into three groups, viz (i) small (ii) medium and (iii) large. Out of total 35 farmers, 20 were small, 10 were medium and the rest 5 were large farmers. Small farmers were those who were cultivating 0.5-1.00 hectare of land for banana, medium farmers were cultivating 1.01-2.00 hectare and large farmers were cultivating above 2 hectare of land for banana.

The intermediaries involved in the marketing of banana were also categorized into several groups, viz, (i) farias, (ii) beparies (iii) aratdars and (iv) retailers. As regards the selection of intermediaries, a total of 35 intermediaries, 10 farias, 10 beparis, 5 aratdars and 10 retailers operating in the five selected primary and secondary market areas were selected as respondents for the study.

3.2 Preparation of survey schedules

Survey method was followed in order to collect data for this study. After consulting the available literature and taking suggestions of the supervisor, two comprehensive survey schedules were prepared in such a way that all the information relating to the postharvest handling and marketing of banana. The questions included in the schedule were related to primary data regarding socio-economic characteristics of the banana producer-farmers and banana traders and

along with other related aspects. Specifications were included in the schedules to obtain cost of production pattern of buying and selling, transportation system, storage system, ripening system, prices of selling, sources of finance, market information, solution of the production and marketing problems. One of the questionnaires was used for collecting data from the intermediaries i.e. farias, baparis, aratdars and retailers.

3.3 Period of data collection

In general, banana is grown all over the year in Bangladesh. But October-November is the best time for cultivation of banana. For this study, primary data were collected during the months of mid September to November, 2005. Several visits were made during the period to collect necessary data from the selected farmers and intermediaries.

3.4 Collection of data

In this study, necessary information was collected through direct interview. The required data on the (i) Socio-economic condition of the farmers (ii) Cost of production (iii) Present marketing system were collected from the respondents. This data were collected both from primary and secondary sources. The farmers were interviewed by the researcher himself after the harvesting of their crop. During data collection the objectives of the study were clearly explained to the respondents, so that they could respond freely. At the time of interview each question was asked systematically in a very simple manner.

The farmers were interviewed at their village homes and also at local markets, the intermediaries were interviewed on the scheduled market days. Respondents had no written documents regarding production, consumption, sales, receipts and marketing of banana. So they had to reply from their memory only. Data were collected in local units such as pon, bigha etc. However these local units were later

converted into international standard units as hectare, tonnes etc. Some secondary data were also needed for the study. The sources of secondary data were relevant books, journals, and various documents of BBS.

3.5 Processing and tabulation of data

After data collection, the data were scrutinized and carefully edited in order to eliminate internal inconsistencies. Then the collected data were transferred into master sheets from the interview schedules. Data were systematically examined and analysis by using average and percentages. A list of tables was prepared on the basis of findings of the analysis to achieve the objectives of the study.

3.6 Problems faced during data collection

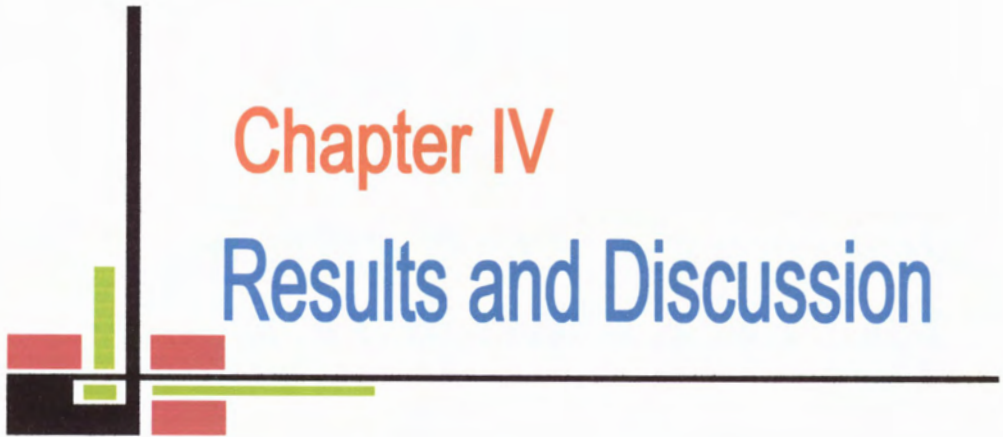
At the time of data collection the following problems were faced the researchers.

These are:

1. Most of the growers at first hesitated to answer questions. To overcome this problem to establish a good rapport.
2. It was very difficult to convince the growers on the utility of this study because of their ignorance and illiteracy.
3. The growers were afraid of imposition of new taxes and they always tried to avoid providing information relating to the actual size of handling, income accrued from banana etc.
4. The growers did not keep the financial record. It was very difficult for them to give this answer from their memory.
5. The growers were not available at home which needed even more than two or three visits to collect the information from them.

Chapter IV

Results and Discussion



CHAPTER IV

RUSULTS AND DISCUSSION

4.1 ECONOMIC SITUATIONS OF GROWERS AND INTERMEDIARIES

4.1.1 Socio-economic characteristics of the banana farmer

4.1.1.1 Farm size of the banana farmers

Farm size has a direct impact on production and marketed surplus of banana. In the present study all the house holds were divided into three categories on the basis of their farm sizes. Households having farm sizes of 0.51 - 1.00, 1.01-2.00 and above 2.00 hectares of land were classified into small, medium and large farmers respectively. Accordingly, out of 35 farmers 20 were small, 10 were medium and 5 were large farmers (Table 4.1)

4.1.1.2 Family size of the banana farmers

A family has been defined as total number of persons of either sex living together and taking meal from the same kitchen. The average sizes of farm family including permanently hired labor were 5.5, 8.0 and 8.0 incase of small, medium and large farmers respectively, where as the average family size for all farms was found to be 6.57 persons of which about 54 percent were male and 45 percent were female (Table 4.1). The average family size of the sampled farmers is higher than the national average (5.44 persons). The size of family was the largest for large farmers followed by medium and small farmers indicating positive association between family size and land holdings.

Table 4.1 Family composition of the farmers according to farm size

Farm size	Male	Female	Average family size
Small	60 (54.55)	50 (45.45)	5.5
Medium	45 (56.25)	35 (43.75)	8.0
Large	24 (60.0)	16 (40.0)	8.0
All farms	129 (56.09)	101 (43.91)	6.57

Figures within parentheses indicate percentages of total

4.1.1.3 Age distribution of the selected banana producer farmer

The selected banana farmers in the study area were categorized arbitrarily into three age groups the first group included the farmers of 25 to 35 years since none of the sampled farmers were below 25 year. The second group included the farmers of 36 to 46 years and the third group included the farmers of 47 years and above. The age distribution of the farmers is shown in table 4.2. Table 4.2 shows that 25.00 percent, 30.00 percent and 20.00 percent of the farmers under small, medium and large farm size groups were within the age group of 25 to 35 years respectively. Among the total farmers under small, medium and large farms size groups 55 percent, 40 percent, and 40 percent respectively were within the age group of 36 to 46 years respectively and on the other hand 20.00 percent, 30.00 percent and 40.00 percent of small, medium and large farmers belonged to the age group of 47 years and above. Most of the farmers were within the age group of 36 to 46 years. It was observed that the small and medium farmers were respectively younger to large farmers. This shows the effect of chronic division of land to the new generation of high population growth in Bangladesh and thus the younger people operating small farm. On an average, 25.71 percent, 48.57 percent and 25.71 percent of farmers belonged to the age groups of 25 to 35 years, 36 to 46 years and 47 to above years respectively.



Table 4.2 Age distribution of the banana farmers according to their farm size

Farm size	Age group			
	25 to 35 years	36 to 46 years	47 to above years	All group (small size)
Small (0.51 to 1.00 ha)	5 (25.00)	11 (55.00)	4 (20.00)	20 (100)
Medium (1.01 to 2.00 ha)	3 (30.00)	4 (40.00)	3 (30.00)	10 (100)
Large (above 2.00 ha)	1 (20.00)	2 (40.00)	2 (40.00)	5 (100)
All farms	10 (25.71)	17 (48.57)	9 (25.71)	35 (100)

Figures within parentheses indicate percentages of total

4.1.1.4 Literacy level

The literacy level of the banana producer farmers is depicted in table 4.3. It may be observed from the table 4.3 that 60.00 percent of small farmers, 30.00 percent of medium farmers and 20.00 percent of large farmers had no education. Among the educated farmers primary education was found to be highest for all categories of farmers (37.14 percent) while the corresponding figures for the three categories of farmers having secondary and above were 10.00 percent, 20.00 percent and 40.00 percent respectively. On the whole 45.72 percent (16 out of 35) farmers were illiterate. The evidence of having higher level of education was found more among the large and medium farmers which was followed by the small farmers. A positive relationship is observed between literacy and farm size that means as farm size increases at the same time the level of literacy also increases.

Table 4.3 Level of education of the banana farmers according to farm size

Farm size	Level of education			
	Illiterate	Primary	Secondary and above	All farmers
Small	12 (60.00)	6 (30.00)	2 (10.00)	20 (100)
Medium	3 (30.00)	5 (50.00)	2 (20.00)	10 (100)
Large	1 (20.00)	2 (40.00)	2 (40.00)	5 (100)
All level	16 (45.72)	13 (37.14)	6 (17.14)	35 (100)

Figures within parentheses indicate percentages of total

4.1.1.5 Annual income of the banana producer farmers

Annual income of the family includes the earnings of all the active member of the family in a year from all income generating activities performed by them. The average income per family per annum of small medium and large farmers were estimated to be Tk. 20500, Tk. 35000 and Tk. 52500 respectively (Table 4.4). Annual average in come was the highest for the large farmers followed by medium and small formers due to the fact that they had more own land. Main source of income of all the farm size groups was agriculture. The small farmers earned 72 percent, medium farmers earned 82 percent and large farmers earned 92 percent of their total income from this source. These three categories of farmers earned 28 percent, 18 percent and 8 percent of their total income from other sources such as business, service etc. The findings reveal that the small farmers as compared to medium and large farmers were less dependent on agriculture.

Table 4.4 Average annual income of the banana producers according to farm size.

Farm size	Annual income (Tk.)	Sources	
		Main sources (%)	Other sources (%)
Small	20500	72	28
Medium	35500	82	18
Large	52500	92	8
All farms	36166	82	18

4.1.2 Socio-economic characteristics of the banana intermediaries

4.1.2.1 Age and level of education of the banana intermediaries

The average age of the farias, beparis, aratdars and retailers were 30,35,43 and 38 years of age respectively with the average age of all intermediaries being 37 years . Among the intermediaries aratdars were the older people having longer business experiences. As regards level of literacy 45 percent, 55 percent, 90 percent and 42 percent of the farias, baparis, aratdars and retailers were literate respectively. Rate of literacy among all categories of banana intermediaries was quite high (58%) (Table 4.5).

Table 4.5 Age and level of education of the banana intermediaries

Intermediaries	Number of intermediaries	Average age (years)	Literate (%)	Illiterate (%)
Faria	10	30	45	55
Bepari	10	35	55	45
Aratdar	5	43	90	10
Retailer	10	38	42	58
All	35	36	58	42

4.1.2.2 Occupation of the banana intermediaries

Among all the intermediaries about 51 percent had business as the only occupation, while about 26 percent had major business with minor agriculture and 23 percent had major agriculture with minor business. Majority of the beparis (50%) had business as the only occupation while 30% of them had major business with minor agriculture. All of the aratdars were full time business men. Among the retailers, 60 percent had business as the only occupation while another 20 percent had major business with minor agriculture and another 20 percent had major business with minor agriculture and another 20 percent had major agriculture with minor business. Among the farias, majority (40%) had major business with minor agriculture and major agriculture with minor business (Table 4.6)

Table 4.6 Occupation of the banana intermediaries

Intermediaries	Business only	Major business with minor Agriculture	Major Agriculture with minor business	Total
Faria	2 (20)	4 (40)	4 (40)	10 (100)
Bepari	5 (50)	3 (30)	2 (20)	10 (100)
Aratdar	5 (100)	-	-	5 (100)
Retailer	6 (60)	2 (20)	2 (20)	10 (100)
All	18 (51.43)	9 (25.71)	8 (22.86)	35 (100)

4.1.3 Estimation of cost of production

Estimation of cost was exclusively necessary for on enterprise costing and subsequently determining the viability of the enterprise from the point of value of farm families. The farmers producing banana had to incur cost for different inputs. For the convenience of analysis, the usual cost items for producing and marketing of banana are discussed under the following heads:

4.1.3.1 Cost of human labour

Human labour was one of the most important and largely used inputs in producing banana. It appears from table 4.8 that the total cost of human labour per hectare varied among the three categories of farmers. In this aspect total human labour cost was the highest (Tk. 21840) of which Tk. 7412 were family supplied and Tk. 14428.4 were hired by small farmers, followed by medium farmers (Tk. 19253) of which Tk. 4304.96 were family supplied and Tk. 14948 were hired and large farmers (Tk. 13731) of which Tk. 1995 were family supplied and Tk. 11735 were hired. Considering all farmers it was observed that total labour cost per hectare was Tk. 54825 of which Tk. 13713 was family supplied and Tk. 41112 were hired (Table 4.7).

4.1.3.2 Cost of animal labour

For banana production animal power was used only for land preparation. Some times tiller was also used for land preparation here animal power and power tiller cost was calculated combined. per hectare animal power costs for small medium and large categories of farmers were Tk. 350,630 and Tk. 821 respectively. Considering all farmers, the total animal power cost was Tk. 520 per hectare (Table 4.9).

Table 4.7 Per hectare human labour cost in banana production

Operations	Small farmer			Medium farmer			Large farmer			All farmer		
	Cost of family labour (Tk.)	Cost of hired labour (Tk.)	Total cost (Tk.)	Cost of family labour (Tk.)	Cost of hired labour (Tk.)	Total cost (Tk.)	Cost of family labour (Tk.)	Cost of hired labour (Tk.)	Total cost (Tk.)	Cost of family labour (Tk.)	Cost of hired labour (Tk.)	Total cost (Tk.)
1.Land preparation	1850	-	1850 (8.47)	560	1120	1680 (8.73)	-	945	945 (6.89)	2410	2065	4476 (8.17)
2.Hole preparation	640	3319	3960 (18.13)	850	3310	4160 (21.61)	415	3419	3835 (27.93)	1906	10049	11955 (21.81)
3.Application of fertilizer	960	166	1126 (5.16)	390	155	546 (2.84)	162	252	414 (3.02)	1513.05	574.30	2087 (3.81)
4.Carrying of sucker	-	1870.08	1870 (8.56)	-	1710	1710 (8.88)	-	1123	1123 (8.18)	-	4703	4703 (8.58)
5.Planting	41	3610	4021 (18.41)	1621	3220	4842 (25.15)	550	2435	2986 (21.75)	2583	9266	11850 (21.61)
6.Application of insecticides	1290	-	1290 (5.91)	612	-	612 (3.18)	170	-	170 (1.24)	2072	-	2072 (3.78)
7.Weeding	56	2150	2711 (12.42)	-	2010	2010 (10.44)	73	139	213 (1.55)	633	4301	4934 (9.00)
8.Supporting	1390	3311	4701 (21.52)	-	3420	3420 (17.78)	381	3419	3799 (27.67)	17771	10150	11921 (21.74)
9.Harvesting	310	-	310 (1.42)	270	-	270 (1.40)	242	-	242 (1.76)	822	-	822 (1.5)
Total	7412 (33.93)	14428 (66.07)	21840 (100)	4305 (22.36)	14948 (77.64)	19253 (100)	1995 (14.53)	11735 (85.47)	13731 (100)	13713	41112	54825

4.1.3.3 Material input cost

For producing banana, material input cost was also an important cost item, which included the cost of sucker, fertilizer, insecticides, irrigation, bamboo etc. In the study area per hectare material cost was estimated to be Tk. 86499.05, Tk. 78480.5 and Tk. 73915.5 respectively (Table 4.9) for the small, medium and large farmers. For all farmers, it was estimated at Tk. 79631.65 per hectare.

4.1.3.4 Cost of sucker

Cost of sucker was calculated to find out the per hectare cost of sucker of banana cultivation. Table 4.8 shows that the rate of using sucker was maximum in small farmer (2651 number) which costed at Tk. 6627.5 per hectare and minimum in large farmer (2260 number) which costed Tk. 5650 per hectare. For medium farmer it was 2371 number per hectare which costed Tk. 5927.5 per hectare, total 2427 number of sucker was used for all farmers, which costed Tk. 6068.33 per hectare.

4.1.3.5 Cost of fertilizer

Commonly used fertilizers such as, Urea TSP and MP were used by the selected farmers for producing banana. Besides these, farmers also applied Gypsum in the banana field. For small farmers, the amount of Urea, TSP, MP and Gypsum were 510 kg, 900, 520kg, and 157kg per hectare respectively. Cost incurred for these fertilizers per hectare were Tk.3187.5, 12375, 5850 and 706 Tk. respectively. The amount of Urea, TSP, MP and Gypsum used per hectare of the medium farmers were 508 kg, 850 kg, 544 kg, and 160 kg, respectively. Per hectare costs of those fertilizers were Tk. 3175, Tk. 11687.5, Tk. 6120 and Tk. 720 respectively. The per hectare amount of urea, TSP,MP and Gypsum were 490 kg, 830 kg, 470 kg, and 140kg, respectively for large farmers. Per hectare costs of those fertilizers were Tk. 3062.5, Tk. 11412.5, Tk. 5400 and Tk. 630 respectively. It is observed from Table 4.8 that small farmers used

highest amount of urea and TSP and large farmers used lowest amount of those fertilizers. Again, medium farmers used highest amount of MP and Gypsum and large farmers also used lowest amount of these fertilizers.

4.1.3.6 Cost of manure

In this study, it was found that most of the farmers used cow-dung and oil cake as manure in producing banana. In Table 4.8 that the amount of cow-dung and oil cake were 23010 kg, and 1050 kg, per hectare respectively for small farmers. Cost incurred of these manures was Tk. 5752 and Tk. 8400 per hectare respectively. The rate of using cow dung and oil cake by medium farmers were 22400 kg/ha and 950 kg/ha respectively. Per hectare cost of cow dung and oil cake were Tk. 5600 and Tk. 7600 respectively. The doses of using these manure were 2100 kg/ha and 900 kg/ha in large farmers and cost of those manure were Tk. 5250 and Tk. 7200 respectively. Table 4.9 shows that the small farmer incurred highest per hectare cost for manure but the cost incurred for manure was lowest for large farmers. It is evident on Table 4.8 that compare to large and medium farmers, small farmers use large amount at a higher price. So their cost of manure became high. On the contrary, large farmers purchased large amount of that manure at a cheaper price. So their cost of manure was low.

4.1.3.7 Cost of insecticides

Banana growers applied insecticides to protect their crops from attack of pests and diseases. They used Heptachlor, Dimecron, Nogos, Diazinon and liquid insecticides. Per hectare cost of insecticides were Tk. 2400, Tk. 1550 and Tk. 1300 respectively for small, medium and large farmers. It is observed from Table 4.8 that the maximum cost of insecticides per hectare was for small farmers and the large farmers incurred minimum cost. For all farmers total insecticides cost was Tk. 1750 per hectare.

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Table 4.8 Material inputs and cost per hectare in producing banana

Inputs	Unit	Small farmer		Medium farmer		Large farmer		All farmer	
		Quantity	Cost Tk.	Quantity	Cost Tk.	Quantity	Cost Tk.	Quantity	Cost Tk.
1.Sucker	No	2651	6627 (7.66)	2371	5927 (7.55)	2260	5650 (7.64)	2427	6068 (7.62)
2.Urea	Kg	510	3187 (3.60)	508	3175 (4.04)	490	3062 (4.14)	503	3142 (3.94)
3.TSP	Kg	900	12375 (14.31)	850	11687 (14.89)	830	11412 (15.44)	860	11825 (14.85)
4.MP	Kg	520	5850 (6.76)	544	6120 (7.8)	470	5400 (7.31)	511	5790 (7.27)
5.Gypsum	Kg	157	706 (0.82)	160	720 (0.92)	140	630 (0.85)	152	685 (0.86)
6.Cowdung	Kg	23010	5752 (6.65)	22400	5600 (7.14)	21000	5250 (7.10)	22137	5534 (6.95)
7.Oilcake	Kg	1050	8400 (9.71)	950	7600 (9.68)	900	7200 (9.74)	967	7733 (9.71)
8.Insecticides	-	-	2400 (2.77)	-	1550 (1.98)	-	1300 (1.76)	-	1750 (2.2)
9.Irrigation	-	-	5500 (6.36)	-	2500 (3.19)	-	1250 (1.69)	-	3084 (3.87)
10.Bamboo		850	35700 (41.27)	800	33600 (42.81)	780	32760 (44.32)	810	34020 (42.72)
Total			86499 (100)		78480 (100)		73915 (100)		79631 (100)

4.1.3.8 Cost of irrigation

Irrigation is a leading input in producing banana. Table 4.8 shows that per hectare cost of irrigation were Tk. 5500.55, Tk. 2500.50 and Tk. 1250 respectively for small, medium and large farmers. It also shows that the irrigation cost was maximum (Tk. 5500.55) for small farmer followed by medium (Tk. 2500.50) and large farmer (Tk. 1250) .Total irrigation cost for all farmers was estimated at Tk. 3083.68 per hectare.

4.1.3.9 Cost of bamboo

Bamboo also used for production of banana. It was mainly used as support from the premature stage of banana bunches to its harvesting time. The per hectare cost of bamboo for small, medium and large farmers were Tk. 35700, Tk. 33600 and Tk. 32760 respectively. In table 4.8 shows that per hectare cost of bamboo was maximum for small farmers followed by medium and large farmers. For all farmers cost of bamboo was Tk. 34020 per hectare.

4.1.3.10 Interest on operating capital

The amount of money needed to meet the expenses on hired or purchased inputs was treated as operating capital. As regards the production of banana, the interest on operating capital was calculated at Tk. 5050.07, Tk. 4500 and Tk. 4000.86 per hectare respectively for small, medium and large farmers (Table 4.10).

4.1.3.11 Land use cost

Land use cost was a fixed cost for the producers of banana. The rental value of land was estimated for the cropping period at the rate prevailing in the study area. Banana is a year round crop and rental value for its cultivation amounted toTk. 12500 per hectare, which was included in full cost basis (Table 4.10).

Table 4.9 Per hectare cost and return of banana

Items	Large farmer	Medium farmer	Small farmer
	Amount (Tk.)	Amount (Tk.)	Amount (Tk.)
A. Gross cost	101277	94059	86471
a. Human labour	14428 (14.25)	14948 (15.89)	11735 (13.57)
b. Animal labour	350.00 (0.34)	630. (0.67)	821 (0.95)
C. Material input	86499 (85.41)	78480 (83.44)	73915 (85.48)
Sucker	6627	5927	5650
Urea	3187	3175	3062
TSP	12375	11687	11412
MP	5850	6120	5400
Gypsum	706	720	630
Cowdung	5752	5600	5250
Oil cake	8400	7600	7200
Insecticides	2400	1550	1300
Irrigation	5500	2500	1250
Bamboo	35700	33600	32760
B. Gross return	190036	197208	191232
C. Net return	88759	103149	104760

Table 4.10 Per hectare cost and return of banana on the basis of full cost

Items	Small farmer	Medium farmer	Large farmer
	Amount (Tk.)	Amount (Tk.)	Amount (Tk.)
A. Gross cost	118827	111059	102972
a. Human labour	14428	14948	11735
b. Animal labour	350	630	821
c. Material input	86499	78480	73915
Sucker	6627	5927	5650
Urea	3187.5	3175	3062
TSP	12375	11687	11412
MP	5850	6120	5400.50
Gypsum	706	720	630
Cowdung	5752	5600	5250
Oil Cake	8400	7600	7200
Insecticides	2400	1550	1300
Irrigation	5500	2500	1250
Bamboo	35700	33600	32760
d. Land use cost	12500 (10.52)	12500 (11.26)	12500 (12.14)
e. Interest on operating capital	5050 (4.25)	4500 (4.05)	4000 (3.88)
B. Gross return	190036	197208	191232
C. Net return	71209	86149	88259.82

4.2 Marketing of banana

Marketing of any product is essential to transfer it to the consumers from widely scattered producing points. Marketing of a product means a process or system which involves with different marketing components such as marketing channels, market intermediaries and marketing functions. Efficient marketing plays an important role in the development of any enterprise. Hence, it was found necessary to investigate the prevalent marketing systems and channels as well as in different markets and other general problems faced by the banana growers in selling their produce.

4.2.1 Marketing system

Marketing system may be thought of as the connecting link between producers and consumers. A marketing system includes all activities involved in the flow of goods from the point of initial production to the consumer. It includes the exchange activities associated with transferring property right to commodities, physically purchasing and allocating resources, handling products, disseminating information to participants and making institutional arrangements for facilitating these activities.

An efficient marketing system is essential for fair profit both for the banana producers and traders. Banana marketing system is composed of marketing channels, marketing intermediaries and associated marketing functions. The components are explained in turn.

4.2.2 Marketing channel

A marketing channel for a product is the route taken by the title to the goods as they move from the producers to ultimate consumers or industrial users (Stanton ,1978) .The chain of intermediaries or middlemen through which the transaction of goods takes place between producer and consumer is known as marketing channel. Marketing channel performs an important roll in achieving the marketing objective of any organization.

In the channel of banana marketing of the study areas the product moves from the producer sellers to the ultimate consumers through some market intermediaries such as faria, bepari, wholesaler, retailer. It was observed that bananas need to be moved a long distance from the production points in order to reach the hands of ultimate consumers. In the study area, banana did not move from producer seller to the consumers through a single channel rather it flowed through different channels. The marketing channel of banana as observed in the study areas are shown in Fig. 4.1



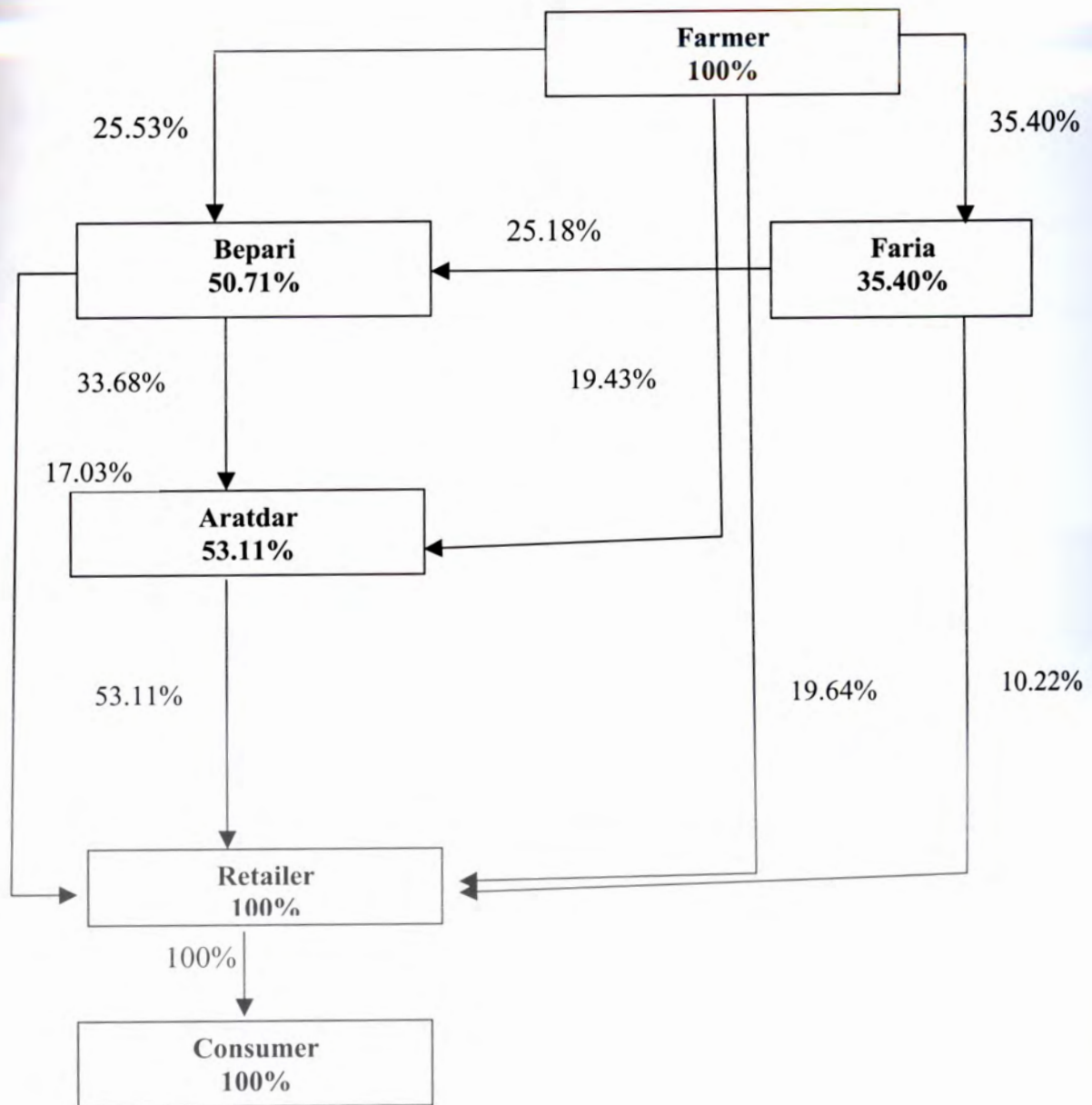


Fig 4.1 Marketing Channels of Banana in the Study Areas

The marketing margin and costs may vary from channel to channel and market to market. Banana is marketed through the following channels:

1. Farmer → Faria → Bepari → Aratdar → Retailer → Consumer
2. Farmer → Faria → Retailer → Consumer
3. Farmer → Retailer → Consumer
4. Farmer → Aratdar → Retailer → Consumer
5. Farmer → Bepari → Aratdar → Retailer → Consumer
6. Farmer → Bepari → Retailer → Consumer
7. Farmer → Faria → Bepai → Retailer → Consumer

The nature of various intermediaries participated in the banana marketing channels are different in function, business size, business premises, mode of operations and places of business. So, a brief description about the intermediaries of the banana marketing is given below:

4.2.3 Market participants

4.2.3.1 Farmer

Banana marketing channels were started from farmers, the producer-sellers and various intermediaries formed linkage in the channels. Banana producing farmers generally sold their produce to all the intermediaries either in the markets or at the farm yards and thus formed a link in the banana marketing channel. The banana grower usually sold his product to the farias, beparis, aratdars and retailers.

4.2.3.2 Faria

Faria was a group of intermediary who purchased banana from producer at the farm gate or in the local primary market. Generally, they sell their purchased banana to the bepari and partly to the retailer. Their volume of business who small in comparison to other intermediaries. They did their business independently and were self financed in banana trading. Apart from banana

trading, most of the farias were engaged in trading of other agricultural commodities. They had no permanent staff and did their petty business in cash.

4.2.3.3 Bepari

The bepari were relatively big and non-licensed traders who purchased banana at the local markets from both the farmers and faria and sold it to the wholesaler and retailers. Their volume of business was larger than that of faria and possessed more capital. They had no fixed business premises.

4.2.3.4 Aratdar

The aratdars were the commission agents who had fixed establishments in the market places with adequate storage facilities and did the functions of negotiating transactions between buyers and sellers of banana and helped them through their own business premises on receipt of aratdari commissions. They had fixed business premises and staffs.

Their business premises generally were situated at the well communicated areas in the secondary market. Generally the aratdars were self - financed as they did not require much capital for operating the business like other intermediaries. Sometimes they purchased banana on their own account mainly from beparis and a small quantity from farmers and sold it to the retailers only. On general the aratdars operated in a larger geographic area between the production points and consumption points.

4.2.3.5 Retailer

The retailers were the last link in the channel of banana marketing. They were the small traders and performed their business independently. They had permanent shops usually situated at crowdy areas adjacent to the food, vegetables and fruit market places. They purchased banana from farmers, faria, bepari and wholesaler and finally sold it to the ultimate consumers. Most of the

retailers were also engaged in other agricultural commodities, like groundnut, pulses, oil etc.

4.2.4 Marketing functions

Marketing function may be defined as a fundamental or basic physical process or service required to give a product the forms, time, place and possession utility that consumers desire (Branson and Norvel, 1983). According to (Kohls and Uhl, 1980) marketing function may be defined as a major specialized activity performed in accomplishing the marketing process. In this study, marketing of banana has been divided into various functions such as buying and selling, transportation, storage, ripening, grading of bananas and market information.

4.2.4.1 Buying and selling

The buying function is largely one of seeking out the sources of supply, assembling of products and the activities associated with purchase. The function can be either the assembling of the raw products from the production areas or the assembling of finished products into the hands of other middlemen in order to meet the demands of the ultimate consumer (Kohls and Uhl, 1980). Buying generally includes the selection of kinds of goods, the determination of quality and quantities and the selection of source of supply.

Selling is the personal or impersonal process of assisting and persuading service to dispose of a product. The selling function is more than merely passively accepting the price offered. The decision as to the proper unit of sale, the proper packages, the best marketing channel, the proper time and place to approach potential buyers- all are decisions that can be included in the selling function (Kohls and Uhl, 1980). The activities involved in the transfer of goods are completed through buying and selling. From farmer the product was found to change hands several times and in each hand a new price was determined by the interaction of demand and supply.

4.2.4.1.1 Purchase of banana by intermediaries

The intermediaries purchased banana from farmers field as well as from local markets. Table 4.11 shows that the faria purchased 100 percent of banana from farmers field and at local market from farmers. bepari purchased 86 percent and 14 percent of their banana from faria and farmers respectively. The aratdars found to purchase 85 percent of banana from bepari and 15 percent from farmers. The retailers purchased 70 percent from aratdar and 20 percent from faria, bepari and farmers respectively.

Table 4.11 Banana purchased by intermediaries

(In percent)

Intermediaries	Purchased from				Total
	Farmer	Faria	Bepari	Aratdar	
Faria	100	-	-	-	100
Bepari	14	86	-	-	100
Aratdar	15	-	85	-	100
Retailer	10	5	5	70	100

4.2.4.1.2 Sale of banana by intermediaries

It is observed from table 4.12 that faria sold 82 percent and 18 percent of their banana to the bepari and retailer respectively. Bepari sold 100 percent of their banana to the aratdar who sold 95 percent of 5 percent of their product to the retailer and consumers respectively. And the retailers sold their entire volume of banana to the consumers (100 percent) only.

Table 4.12 Sale of banana by intermediaries.

(In percent)

Intermediaries	Purchased from				Total
	Farmer	Faria	Bepari	Aratdar	
Foria	82	-	-	18	100
Bepari	-	100	-	-	100
Aratdar	-	-	95	5	100
Retailer	-	-	-	100	100

4.2.4.2 Transportation

The transportation function is primarily concerned with making goods available at the proper place. Adequate and efficient transportation system is a corner stone of modern marketing system. Products must find their way from the point of production to the final consumers. Transportation is important because it is a bridge that connects the gap between marketing channels. It accounts for a very substantial part of the total marketing cost.

Table 4.13 Mode of transportation used by farmers and intermediaries.

(Percentages of banana transported)

Items	Farmers	Faria	Bepari	Aratdar	Retailer
Headload	23.85	12.67	-	-	22.33
Rickshaw	14.99	33.35	17.67	-	47.45
Van	45.79	54.00	21.67	29.43	30.22
Truck	15.57	-	60.66	70.57	-
Total	100	100	100	100	100

The farmers of the study areas used head loads, rickshaw, van and truck for transporting their banana (Table 4.13). On an average van, head-load, rickshaw, and truck were used by banana farmers for transporting 46 percent, 24 percent, 15 percent, and 15 percent of their banana respectively. Faria transported 54 percent, 33 percent and 13 percent of their total banana by van,

rickshaw, head load respectively. Bepari transported their major portion of banana by truck (61 percent) followed by van (22 percent), rickshaw (18 percent) respectively. Aratdar transported their product by truck 71 percent and van (29 percent). Retailers transported their product by using rickshaw (47 percent), van (30 percent) and Road load (22 percent) as shown in Table 4.13.

4.2.4.3 Market information

Market information is one of the facilitative marketing functions. In the study areas, most of the banana farmer and intermediaries got their market information through market visit, personal observation, relatives and fellow traders. Some of the wholesalers got their market information through telephone among themselves.

Table 4.14 Source of market information for farmers and intermediaries

Farmers and intermediaries	Visit to market and personal observation (%)	Fellow formers and traders (%)	Relatives (%)	Telephone (%)
Farmers	33.01	55.12	11.87	-
Faria	66.01	31.54	2.65	-
Bepari	64.00	36.00	-	-
Aratdar	72.00	16.00	-	12.00
Retailer	67.00	33.00	-	-

Table 4.14 reveals that 33 percent of farmers, 66 percent of faria, 64 percent of bepari, 72 percent of aratdar and 67 percent of retailers got their market information through visit to market and personal observation. Again 55 percent of farmers, 31 percent of faria, 36 percent of bepari, 16 percent of aratdar and 33 percent of retailers respectively received market information through fellow

farmers and traders. Only 12 percent of farmers and 3 percent of faria got their market information through their relatives. But 12 percent of aratdar got their information through telephone communication.

4.3 MARKETING COST AND MARGINS OF BANANA

4.3.1 Marketing cost

The constituent elements of cost in the marketing of banana embraced the costs of a series of services from the point of its production to the point of final consumption. The cost, which incurred to move the product from the producer to the consumer, is known as marketing cost. In other words, the cost of marketing represented the cost for performing the various marketing functions.

The study of marketing cost and margin spread is important for the knowledge of the nature, extent and genuineness of various marketing charges. The study of marketing margin and cost spread can be utilized to develop appropriate price policy that aims to provide incentive prices to producers and assures him of a legitimate share in consumers money. It is helpful in the development and evaluation of the market policies like the regulation of the market charges for different market functionaries and functions.

Marketing cost of banana intermediaries refers to the various expenses incurred by different intermediaries for movement of the product through the marketing channel. The present investigation showed that the marketing of banana by intermediaries included the costs of transportation, loading - unloading, market tolls, damage and wastage, salary and wages, electricity charge, licenses fee, tips and donation, personal expenses and other expenses. Among the intermediaries most of the faria, bepari, aratdar and retailers did not maintain detailed written records of costs. They provided information from their memory. Marketing costs of different intermediaries are presented below.



a. Banana in the market



b. Banana buying and selling

Plate 1. Marketing system of banana

4.3.1.1 Marketing cost for faria

The major cost items of faria were transportation, loading ,unloading, damage, market tolls, personal expenses and miscellaneous. Item wise breakdown of total marketing cost of faria has been shown in Table 4.15 The total marketing cost incurred by faria was calculated at Tk. 6.00 per 85 bananas. Transportation cost (29 percent) was the highest cost item for faria. The other costs in descending order were damage (19 percent), market tolls (18 percent), personal expenses (17 percent), loading and unloading (8 percent) and the miscellaneous which includes tips, donation and other cost were also same to loading unloading (8 percent).

Table 4.15 Marketing cost of faria

(Tk. per 85 fingers)

Cost items	Average cost	Percentage
Transportation	1.75	29.17
Loading and unloading	0.50	8.33
Damage	1.15	19.17
Market tolls	1.10	18.33
Personal expenses	1.00	16.67
Miscellaneous	0.50	8.33
Total	6.00	100.00

4.3.1.2 Marketing cost for bepari

Table 4.16 indicates the major marketing costs items of bepari. The average marketing costs of bepari was calculated at Tk. 8.50 per kadi. From the table 6.2 it was evident that transportation was the highest marketing cost of bepari (29 percent) followed by damage (19 percent), personal expenses (15 percent), loading unloading (9 percent) and miscellaneous and market tolls occupied the same marketing cost which was 14 percent.

Table 4.16 Marketing cost of bepari

(Tk. per 85 fingers)

Cost items	Average cost	Percentage
Transportation	2.50	29.41
Loading and unloading	0.75	8.82
Damage	1.65	19.18
Market tolls	1.15	13.54
Personal expenses	1.30	15.29
Miscellaneous	1.17	13.76
Total	8.50	100.00

4.3.1.3 Marketing cost for aratdar

Marketing cost was highest for aratdar. They had no any transportation cost because bepari brought their product to the aratdar and they sold their product to the retailer. Aratdar purchased their banana from farmers and bepari and sold their product to the retailers. So, aratdar was also involved the various marketing functions. The marketing cost incurred by aratdar was Tk. 11.00 per kadi of banana. The green banana was ripened by the aratdar at their go down in a special system. Many of bananas were damaged here. For this reason, spoilage was the highest cost (29 percent) item for aratdar. The other costs incurred by aratdar were storage and ripening (13 percent), shop rent and electricity (12 percent), market tolls (10 percent), miscellaneous (9 percent), wages (8 percent), personal expenses (7 percent), loading - unloading (6 percent), security (4 percent) and licenses fee (2 percent).

Table 4.17 Marketing cost of aratdar

(Tk. per 85 fingers)

Cost item	Average Cost	Percentage
Loading and unloading	0.75	6.25
Wages	0.80	7.5
Storage and Ripening	1.50	12.5
Wastage	3.00	29.17
Security	0.50	4.17
Licenses fee	0.25	2.08
Shoprent and electricity	1.30	11.66
Market tolls	1.10	10.42
Personal Expenses	0.80	7.08
Miscellaneous	1.00	9.17
Total	11.00	100.00

4.3.1.4 Marketing cost for retailer

Retailers incurred different types of costs for marketing banana. These were transportation, loading, market tolls, cost of damage, personal expenses and miscellaneous. Item wise breakdown of total marketing cost for retailers has been shown in Table 4.18. The total marketing cost incurred by retailer was Tk. 9.00 per kadi of banana. Ripened banana damaged very quickly. For this reason, damage was the highest cost item (42 percent) of total cost of marketing. The other cost items in descending order were transportation (28 percent), market tolls (18 percent), loading (5 percent), miscellaneous (4 percent) and personal expenses (3 percent).

Table 4.18 Marketing cost of retailer

(Tk. per 85 fingers)

Cost item	Average Cost	Percentage
Transportation	2.50	28.42
Loading	0.45	43.74
Market tolls	1.50	18.42
Personal expenses	0.25	2.63
Damage	4.00	42.10
Miscellaneous	0.30	3.69
Total	9.00	100.00

4.3.2 Marketing margin

A marketing margin may be defined as (I) a difference between the price paid by consumers and that obtained by producer on (II) the price of a collection of marketing services which is the out come of the demand for and the supply of such services.

Marketing margin at a particular stage of product flow may be defined as the difference between purchase and sale price of a commodity. Total marketing margin is the difference between the price received by the producer and price paid by the final consumer. Marketing margin includes marketing cost and profit or loss of all intermediaries in the marketing channel.

Marketing margin is sometimes taken as a measure of the profit to be gained by farmers and consumers as a result of performing additional marketing functions. However, the marketing margin is composed of both costs and profits.

4.3.2.1 Marketing margin of banana intermediaries

Systematic study and analysis of marketing cost and margin are necessary to understand the nature of market integration, the level of competition at different stages in the marketing channel, technique of price determination, the

nature of marketing services rendered and rewards there for various agencies involved.

In this study, the marketing margin of each intermediary was estimated by deducting the purchase price of banana from the sale price while the profit component was estimated by deducting the marketing cost from his share of marketing margin. Marketing margins of different groups of intermediaries were calculated separately to examine their relative performance of marketing activities.

Table 4.19 Marketing margin of the banana intermediaries

Intermediaries	Purchase price (Tk.)	Sale price (Tk.)	Gross margin (Tk.)	Marketing cost (Tk.)	Net margin (Tk.)
Faria	80.00	95.00	15.00	6.00	9.00
Bepari	95.00	120.00	25.00	8.50	16.50
Aratdar	120.00	150.00	30.00	11.00	19.00
Retailer	150.00	190.00	40.00	9.00	31.00

Table 4.19 shows the marketing margins of different intermediaries of banana marketing. Faria purchased banana from the producers at Tk. 80.00 per kadi and sold it to the bepari at Tk. 95.00 per kadi of banana. So, gross margin of faria was Tk. 15.00 per kadi of banana. As they incurred a marketing cost of 6.00 per kadi and therefore their net margin was Tk. 9.00 per kadi. The bepari purchased banana from faria at Tk. 95.00 per kadi and sold those to the aratdar at 120.00 per kadi. Gross margin of bepari was 25.00 per kadi and their marketing was 8.50 per kadi. So their net margin was 16.50 per kadi. Aratdar purchased banana at 120.00 per kadi from the bepari and they received Tk. 149.00 per kadi. Aratdars gross margin was 30.00 per kadi and net margin was Tk. 19.00 per kadi when their marketing cost was Tk. 11.00 kadi. The retailers purchased banana from the aratdar at a price of Tk. 150.00 per kadi and sold it

to the ultimate consumers at Tk. 190.00 per kadi. The retailers incurred an expense of Tk. 9.00 for marketing one kadi of banana. The gross margin was Tk. 40.00 and net margin was Tk. 31.00 per kadi.

Table 4.19 shows that the gross margin was the highest for the retailers and the lowest for the faria. Among all the intermediaries, the retailers were found to earn the highest amount of net margin from the banana trade, whereas the faria obtained the lowest amount of net margin. In the case of retailers, they purchased small amount of product and sold them at higher price. Thus the net margin of retailers because higher than that of other intermediaries.

4.4 PROBLEMS AND SUGGESTIONS OF BANANA MARKETING

4.4.1 Problems faced by the banana farmers

The present postharvest activities found to be practiced at a very limited level. The growers are practicing postharvest activities with traditional knowledge and have had very little postharvest management knowledge. They have no exposure on modern postharvest techniques. They urged that, they could not find any additional benefit of doing sorting, grading and washing of produce and it is costly and time consuming and does not attract the interest of traders to pay more prices for these operations.

The banana farmers were found to face various problems which may broadly be classified in to production and marketing problems. Production problems were related to the lack of capital, diseases and pest attacks, natural calamities, lack of availability of adequate inputs and high cost of inputs and pilferage of banana from field. On the other hand, marketing problems were related to poor communication and high transportation cost, lower price of banana, higher market tolls, dishonesty of the intermediaries and lack of physical facilities of marketing.

As regards the problem of banana production, the findings reveal that 81 percent of the banana farmers in all the farms faced lack of capital as the major problem in banana cultivation. Another major problem reported by 77 percent of farmers was the lack of availability of adequate inputs and high cost of inputs.

Diseases and pest attacks, natural calamities and pilferage of banana from field were mentioned as problems by 73 percent, 56 percent and 53 percent of the farmers respectively.

As regards the marketing problems of banana, 86 percent of farmers stated that poor communication and higher transportation cost were the major problems of banana marketing. 76 percent of farmers reported that lower price of banana was a major problem in banana marketing. 56 percent of farmers reported that there was no standard rate of market tolls. The market tolls collectors charged irregular and high rate of tolls but which were not uniform for all traders. It was observed that price fluctuation of banana at primary market was due to dishonesty of the intermediaries in 39 percent cases. Lack of physical facilities of banana marketing was also reported as a problem in the study areas by 51 percent of farmer's. There was no shed to protect the farmers and their produce from rain or sunshine and the growers had to sit on the open space for selling their produce (Table 4.20)

Table 4.20 Problems faced by the farmers in banana marketing

Reported problem	Farm size			All farms (%)
	Small (%)	Medium (%)	Large (%)	
production problems:				
Lack of capital	94	87	61	81
Diseases and pest attacks	78	75	66	73
Natural calamities	68	56	44	56
Lack of availability of adequate inputs and high cost of inputs	88	79	63	77
pilferage of banana from field	52	64	43	53
Marketing problems:				
poor communication and high transportation cost	74	83	100	86
Lower price of banana	67	82	79	76
Higher market tools	49	63	56	56
Dishonesty of the intermediaries	34	43	39	39
Lack of physical facilities of marketing	51	44	58	51

4.4.2 Measures suggested by farmers

Measures suggested by the farmers for solving the above mentioned problems are as follows:

Transportation facilities should be improved to facilitate the marketing process. On the basis of priority village roads should be developed at least brick bedded road should be made so that rickshaws or carts can move even in the rainy days easily. It would also help reduce the transportation cost.

Better and incentive prices for the banana should be ensured. In this regard, the government should resort to support price program like jute, rice and other control measures on banana production and marketing in favor of banana farmers.

Institutional credit facilities should be made available to the banana farmers for increasing the volume of production.

Co-operative marketing societies should be established which will improve bargaining power of the farmers and enable them to face the middlemen and ensure better returns for banana farmers.

By dissemination of market information, the farmers should be helped in getting the fair price for their produce.

Physical facilities like drainage, water supply, tin shed, electricity supply, pucca floor etc., should be provided in the market places and market tolls should be fixed at a reasonable level and regulated by some responsible authorities.

4.4.3 Problems faced by intermediaries

The intermediaries in the study areas faced various problems in banana marketing. Lack of capital was reported by 95 percent of the intermediaries followed by lack of good transport (61 percent), lack of storage facilities (59 percent) perishability (35 percent), theft of banana (35 percent) lack of market facilities (34 percent), high marketing cost (33 percent) and others (31 percent)

It was found that the problems stated above affected intermediaries in different ways. Shortage of operating capital as a marketing problem was reported by all the farias and retailers, 88 percent of beparis and 90 percent of aratdars. No institutional fund was available to them for doing banana business. Lack of

good transport was a major marketing problem as reported by 84 percent of beparis and 86 percent of aratdars. Lack of storage facilities affected 38 percent of farias, 73 percent of beparis, 92 percent of aratdars and 35 percent of retailers. Perishability was a problem of banana marketing reported by 55 percent of the beparis, 46 percent of the aratdars and 39 percent of the retailers. Theft of banana was a marketing problem reported by 32 percent, 57 percent and 49 percent of the farias, beparis and retailers respectively. Lack of market facilities was another problem of banana marketing which was stated by 32 percent of beparis, 69 percent of retailers and 35 percent of farias. High marketing cost was the problem of banana marketing reported 30 percent of farias, 44 percent of beparis. 38 percent of aratdars and 23 percent of retailers (Table 4.21)

Table 4.21 Marketing problems faced by intermediaries

Reported Problems	Intermediaries				
	Faria	Bepari	Aratdar	Retailer	All
Lack of capital	100	88	90	100	95
Lack of good transport	47	84	86	28	61
Lack of storage facilities	38	75	92	35	59
Perish ability	-	55	46	39	35
Theft of bananas	32	57	-	49	35
Lack of market facilities	35	32	-	69	34
High marketing cost	30	44	38	23	33
Others	25	32	42	27	31

4.4.4 Measures suggested by intermediaries

The problems stated above always hampered the sound marketing of banana. The intermediaries who identified their problems also provided some suggestions for improving the existing banana marketing system.

The banana intermediaries specially suggested for the improvement of transport as well as storage facilities in primary and secondary markets. They also believed the improvement of feeder roads would increase the efficiency of the transportation system thereby lowering the transportation cost. Availability of adequate number of transports would also increase marketing efficiency. Their suggestions included improvement of local law and order situation for checking harassment and disturbances created mostly by local hooligans. They also suggested that storage facilities should be increased with lower charge of preservation. Other remedial measures included improvement of physical facilities in the market place, dissemination of market information and checking theft of banana that would greatly facilitate the marketing operation.

To ensure the socio-political stability in the country, the government has to strengthen the law enforcing agencies and eradicate the terrorists from the society.

In addition to the above recommendation, all the intermediaries also suggested to establish available institutional credit facilities so that they could receive credit on easy terms and conditions.

4.5 ESTIMATION OF POSTHARVEST LOSSES

4.5.1 Faulty Postharvest handling of banana

4.5.1.1 Harvesting procedure

Excising the bunch following the felling of banana plants was the most common method of harvesting. This is a common and usual procedure of harvesting banana in Bangladesh. However, in some places bunches were separated from the standing plant providing some sort of support to the plant. The practice exposes the banana fingers to injuries due to impact bruises. These injuries create avenues for pathogenic infection during postharvest stages.

4.5.1.2 Latex removal

Latex extruded while excising bunches drips on the surface of the fingers. Latex harbors propagules of plant pathogens, insect's egg and larvae which subsequently initiate infection on wounds of fruits. Banana growers in Bangladesh never go for latex removal while a simple wash in plain water help avoid postharvest rot infections (Alam and Meah, 2000). In Caribbean region, latex removal in washing tank is a common practice (Stillingford, 1977).

4.5.1.3 Grading before transportation

It was observed that only mature hard bananas were transported which is the recommended practice. This is a very good side in postharvest banana handling in Bangladesh. However, there is the concern of transportation of immature green bananas.

4.5.1.4 Transportation of bananas

Bananas are transported in rickshaw, van-car, trucks, bullock-cart and push-cart. Vans and push-carts were used for carrying banana bunches after harvest to nearby wholesaler shops or to the roadside for loading onto the trucks. Rickshaws were also used for the same purpose. For long distance transport, trucks were mainly used.

During transport, stowage of bananas was covered by either banana leaves (van-cars, rickshaws) or by tarpaulin (trucks). Stowage of bunches in the transport as practiced in Bangladesh is unscientific. Bunches are heaped leaving no space for air circulation but disposing the fingers to impact bruises, compact and vibration bruises. The system leads to finger injuries, which facilitates for pathogenic infection. This observation has support of (Alam and Meah, 2000) who reported >10% banana fruit rot infection in the transit. Temperature in a covered transport goes above 32⁰c which is intentionally done for enhancing banana ripening. It tremendously favors fruit rot infection. (Quroshi and Meah, 1992). *Botryodiplodia theobromae* has been reported to be the most serious and damaging one under a hot and humid condition of Bangladesh (Meah and Khan, 1987).

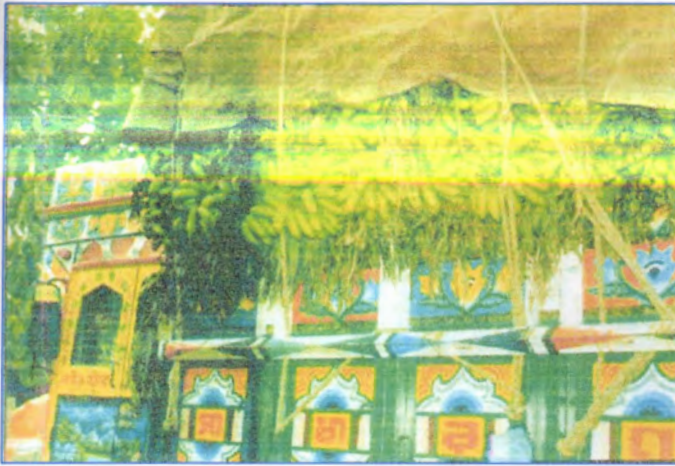


Plate 3 : Transportation of banana by truck



Plate 4 : Transportation of banana by rickshaw-van



Plate 5 : Transportation of banana by bicycle

4.5.1.5 Ripening of banana

Bananas were arranged in a heap surrounding a heat generating system. Candles were put on and the bunches were placed around the candles and subsequently over the candles when the candles automatically went off. Many bunches were arranged in this system and it was covered by a polyethylene sheet. After 20-22 hr the polyethylene sheet was removed and the bunches showing trace of yellowing (color break). Then the bunches were put on hanging for aeration. After 8-10 hrs. the fingers showing colour change.

Both ripening house (Heat chamber) and wrapping with color polyethylene sheet were used for ripening Amritsagar bananas. Rice brans were also used for banana ripening. But procedure of banana ripening followed in Bangladesh is unscientific evolving excessive ethylene and predisposing banana fingers to compact bruises due to heaps. Scientific procedure of banana ripening to be introduced where regulated ethylene evolving and healthy stowage of bunches are followed (John and Marchal, 1995).





a. Banana in heat room



b. Bunches accumulation



c. Covered by polyethylene



d. Polycover removed



e. Bunches removed

Plate 5. Procedure of banana ripening

4.5.1.6 Fruit injuries

Fruit injuries were estimated as 10 percent. Fruit cracks and blemishes were major types of injuries. Insect bites as fruit injuries were accounted for 50 percent. Faulty harvesting procedure, loading and unloading of the bananas on to the transport and storage of banana bunches in the transport led the development of fruit cracks, cuts punctures, blemishes and compression bruises due to vibration.

Mechanical damage is one of the major factors leading to post harvest deterioration of banana. It can occur at any time from the point of harvest to the point of consumption.

Mechanical damage can detract from the products appearance and increase potentiality for infection by diseases. There are three main sources of mechanical damage to banana viz. impact, pressure on compression and vibration (Dadzie and Orchard, 1996).

Fruit cracks, cuts, punctures, blemishes were recorded very high (25-50%) in banana fruits in the markets which were believed to facilitate the invasion by not pathogens. This opinion has been supported by wade *et al* (1993) who reported the effect of practices of packing bananas, handling during transport and storage on banana rots.

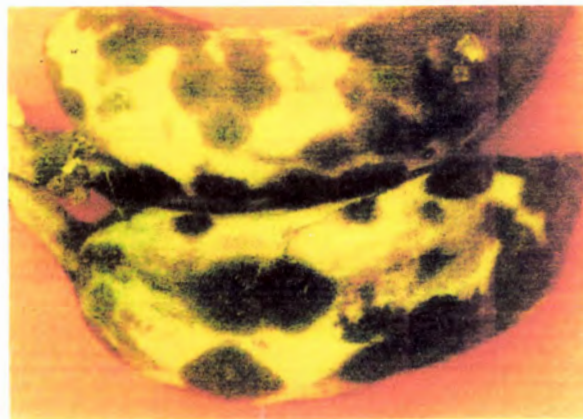


Plate 6. Banana Spoiled due to Cracks, Blemishes and Diseases

Table 4.22 Incidence of postharvest banana fruit injuries and fingers disease in different locations of Bangladesh

Markets	Total bunches inspected	Total fingers inspected	Incidence	
			% fingers injured	% fingers diseased
<u>Dhaka City</u>				
Kawran bazar	700	73500	16.5	7.8
Tejgaon	600	60000	17.5	8.4
<u>Bogra</u>				
Mukamtola	700	105000	17	8.2
Phasitola	600	78000	18	8.0
Rohubal	650	81250	17	7.5
Uthali	550	74250	17.5	8.5
Chandihara	750	96000	16	8.6
Total	4550	568000	17.07	8.14

4.5.2 Loss estimation

Loss in quantity of banana fruits were recorded and presented in Table 4.23. The affluent consumers disliked fruits with cuts, punctures, cracks, blemishes and insect bite. So, they did not like to buy injured bananas and those bananas had to be sold to low income group people at a very negligible price. Secondly, rotten fruits could not be sold at all; those had to be thrown away from the shop every morning. Based on the survey, total monetary loss as banana marketing was Tk. 213000 (25.00%), loss owing to injured and diseased was estimated to be Tk. 144840 (17%) and Tk. 68160 (8%).

Table 4.23 Loss in banana marketing owing to postharvest fruit injuries and diseases

Observation		Value (Tk.)	% Loss
Total bunches inspected	4550		
Total fingers	568000	852000*	
Total injured	96560	144840**	17
Total diseased	45440	68160**	8.1

* @ Tk. 1.50 per finger

** Sold at negligible or no price



Chapter V

Summary and Conclusion

CHAPTER V

SUMMARY AND CONCLUSION

Banana is an important relished fruit crop in Bangladesh. It is the only fruit crop which is available through out the year in Bangladesh and consumption rate is also higher than other fruits. Banana is not only the source of nutrients but also the source of cash income for farmers. But its production highly depends on its postharvest practices and market facilities. If the growers fail to sell banana at incentive prices and in proper time they are likely to discontinue its production.

This study was conducted to determine the present status of postharvest handling including loss assessment and marketing of banana, to identify the constraints relating to production, postharvest management and marketing and to make probable suggestions for addressing the identified constraints during the period from mid September to November 2005. The selected unions were Mokamtala, Phasitala, Rohobol, Uthali, Chandihara etc. In addition to these villages, Mokamtala Hat of Bogra, and kawranbazar market in Dhaka city were also considered for this study.

The sample included 35 farmers (20 small farmers, 10 mediam farmers, and 5large farmers), 35 intermediaries (10 faria, 10 beparies, 5 aratdar 10 Retailers). Data were collected through direct interview method with the help of pretested interview schedules. Per hectare net returns were TK. 71209, TK 86149 and TK 88259, while per hectare gross returns were TK 190036.8, Tk197207 and TK 191232 respectively for large, medium and small farmers.

Per kadi (85 bananas) bananas marketing cost for faria, bapari, aratdar and retailers were TK. 6.00, Tk. 8.50, TK. 11.00 and TK 9.00 respectively. Per kadi net margin for faria, bapari, aratdar and retailers were Tk. 9.00, Tk. 16.50, Tk. 19.00 and TK. 31.00 respectively.

Postharvest handling of banana in Bangladesh was also studied. Harvesting procedure, latex removal, transport system and ripening procedure of banana were observed. A report on banana survey that poor infrastructure for postharvest handling, storage and marketing contributes to a high proportion of spoilage which averages between 10-40% for horticultural crops

Fruit injuries were estimated as 17% and fruit diseases were estimated 8.01%. Fruit cracks and blemishes were major types of injuries. Faulty harvesting procedure, loading and unloading of the bananas on to the transport and storage of banana bunches in the transport caused the development of fruit cracks, cuts, punctures, blemishes and compression bruises due to vibration.

Based on survey total loss of banana marketing in Bangladesh was Tk.213000 (25%), loss owing to fruit injuries (17%) and diseases (8%).

Based on the above discussion it may be concluded that faulty and unscientific procedures of postharvest handling and marketing of banana in Bangladesh causes fruit injuries and rots which brings about a considerable loss in banana marketing. Injuries and rots in fruits exert pressure on the supply and price of banana in the market and more striking is the pollution of the market areas.

Therefore, a standard procedure of postharvest handling and marketing of bananas is required to be developed.

Recommendations:

The constraints faced by the producers in production, postharvest management and marketing of banana has been identified along with estimated loss during postharvest handling and marketing. A lot of valuable information has been generated by the study with some suggestions which could be implemented for improvement in the area of banana production, postharvest handling and marketing.

The recommendations made are as follows:

- Arrangement of timely supply of quality planting materials and other inputs;
- Training on improved production technology with emphasis on post harvest management of banana;
- Commodity collection centres/pack houses may be established in different rural areas for proper handling of banana through grading, washing and packaging ;
- Establishment of procurement centres, improvement of rural roads, communications and transport facilities will reduce costs and wastes and also reduce the total price spreads;
- Encourage private sector in establishing banana processing units;
- Organize market information system to serve the far and near areas and to collect and disseminate market information of the nearest assembling and terminal market, to start with; and
- Exploration of foreign markets be encouraged.



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