International Journal of Economics, Commerce and Management
United Kingdom Vol. III, Issue 5, May 2015
http://ijecm.co.uk/ ISSN 2348 0386

SCENARIO OF MAJOR FRUITS PRODUCTION AND MARKETING SYSTEM IN CHITTAGONG HILL TRACTS

STUDY BASED ON KHAGRACHHARI HILL DISTRICT, BANGLADESH

Bisakha Dewan
Lecturer, Dept. of Agribusiness & Marketing,
Sher-e-Bangla Agricultural University, Dhaka, Bangladesh
d.bisakha@gmail.com

Fatema Sarkar
Lecturer, Dept. of Development and Poverty Studies,
Sher-e-Bangla Agricultural University, Dhaka, Bangladesh
fatema.sau@gmail.com

Md. Nazmul Alam
MS student, Dept. of Development and Poverty Studies,
Sher-e-Bangla Agricultural University, Dhaka, Bangladesh
sobuj_04@yahoo.com

Abstract
The study was conducted at Khagrachhari Sadar upozila, Panchari and Dighinala upozila under Khagrachhari Hill District, Bangladesh to determining growth rates of production of major fruits, identifying marketing channel of major fruits and critical problems affecting fruits marketing. For determining compound growth rate regression analysis and for identifying marketing channel of major fruits descriptive analysis was done. The highest growth rate of production was recorded in mango which was 9.11 percent and negative growth rate was recorded in banana (-11.23%). There are four type of market intermediaries involve in fruits marketing; Bepari, Faria, wholesaler and retailer. Problems affecting fruits production and marketing were divided into two main types; production related problem and marketing related problem. In production related problem the sever problem was disease problem and in marketing related problem the main problem was storage problem and lack of processing center in Khagrachhari Hill District.

Keywords: Chittagong Hill Tracts-Bangladesh, fruits, production, marketing system, distributors

INTRODUCTION

Since the evolution of *Homo sapiens* about 25,000 years ago, men were mainly hunters and food gatherers. They were dependent on the forest for seeds, grains, roots, rhizomes, leaves and fruits for their very survival for about 15,000 years, after which agriculture came into being in its very primitive stage. Therefore, fruits were among the most important foods that helped man to survive from the very beginning. It is the blessings of the Almighty that in Bangladesh we get some kind of the fruits all the year round. Fruit has important roles in human diet, because it contains micronutrients, fiber, potassium, folate, Vitamin C, vegetable proteins, carotenoids and polyphenols, which act as antioxidants within the body as well as bio-functional components and also it is economically important because fruit cultivation can contribute one's earnings significantly.

In our country almost all kinds of fruits are grown but the distinctive climatic conditions in the Chittagong Hill Tracts region, Bangladesh provide a great diversity and variety for fruit production. Chittagong Hill Tracts (CHT) lies in southeastern part of the country (21º 25´ N to 23º45´ N latitude and 91º 54´ E to 92º 50´ E longitude). The CHT region constitutes 76% of the total hilly region of Bangladesh (about 13,184sq km), of which 90% of the area is hilly, 4% covers villages, rivers and marshes and 6% only suitable for intensive agriculture (Khisa 1997). The CHT produced nearly 14 lakh tones of fruit in 2011while a decade ago production in the region was 6 lakh tonnes. Fruit is grown on 77,000 hectares of land, up from 45,000 hectares in 2002 in the CHT (The Daily Star, 2012). Orchard fruit production comprises the largest fruit sector in south-eastern part of Bangladesh. The potential for these orchards to alleviate poverty in marginal farming areas is well appreciated, but low yields and poor fruit quality are major hurdles to overcome for a large number of production areas (Kibria 2011). Among all three Hill Districts (Rangamati, Khagrachhari and Bandarban Hill District) in Khagrachhari hill District recently there happens a silent revolution of fruit production. Jackfruit, mango, lichi, banana, pine-apple are the major fruits grown here with a large quantity and among other fruits guava, papaya, ber, pomelo, melon & watermelon, lime & lemon, orange are also grown here. All the fruits grown here have economic importance for the fruit growers and all types of middlemen involved for their economic empowerment and also rest of the country. This area can supply huge quantity of fruits to the market for meeting up large amount of fruit demand of people can be proved as economically active zone of the country. But fruit marketing system is not so developed is this area. There present a quite problem i.e., transportation problem, road infrastructure problem, absence of cold storage and processing center etc. Khandaker *et al.* (2009) found that appropriate marketing infrastructure is crucial for efficient marketing of fruits. Adequate transportation and product handling are also important for the trade of agricultural

products and important factors in assuring good prices and poverty alleviation. According to World Bank (2005) investment is required for improved maintenance of road and port infrastructures. In addition to infrastructure development, modification of policies and management are also needed to improve appropriate and timely shipping of perishables. IDAF (2009) reported that, a weak agricultural credit system, unorganized market structure, unfavorable weather, small land holding sizes and inadequate technology development contributes to low productivity in the smallholder sector. Siddiqu (2001) reported that very good quality litchi grows in the Chittagong hill district area but the rate of expansion is extremely slow, which may be due to prevailing social unrest and difficulty in establishing new orchards. Reviewing all these paper, there is a clear thing that there was no such research about major fruits production and marketing in Chittagong Hill Tracts. This type of study yet not been done in CHT. The growth rate of area, production and yield of fruits and other analytical aspect in this report would help to facilitate, interpretation and forecasting on the future development of fruits in the Chittagong Hill Tracts region. It provides a guideline for future action in the prospective of the past. Therefore, the information to be generated from this study bears a great importance.

Objectives of the Study

i. To determine the annual growth rates production of major fruits in the Khagrachhari Hill District over the period of 1995/96 to 2010/11;
ii. To identify the marketing channel of major fruits in the Khagrachhari Hill District;
iii. To identify the critical problems that affecting fruits marketing in Khagrachhari Hill District.

METHODOLOGY

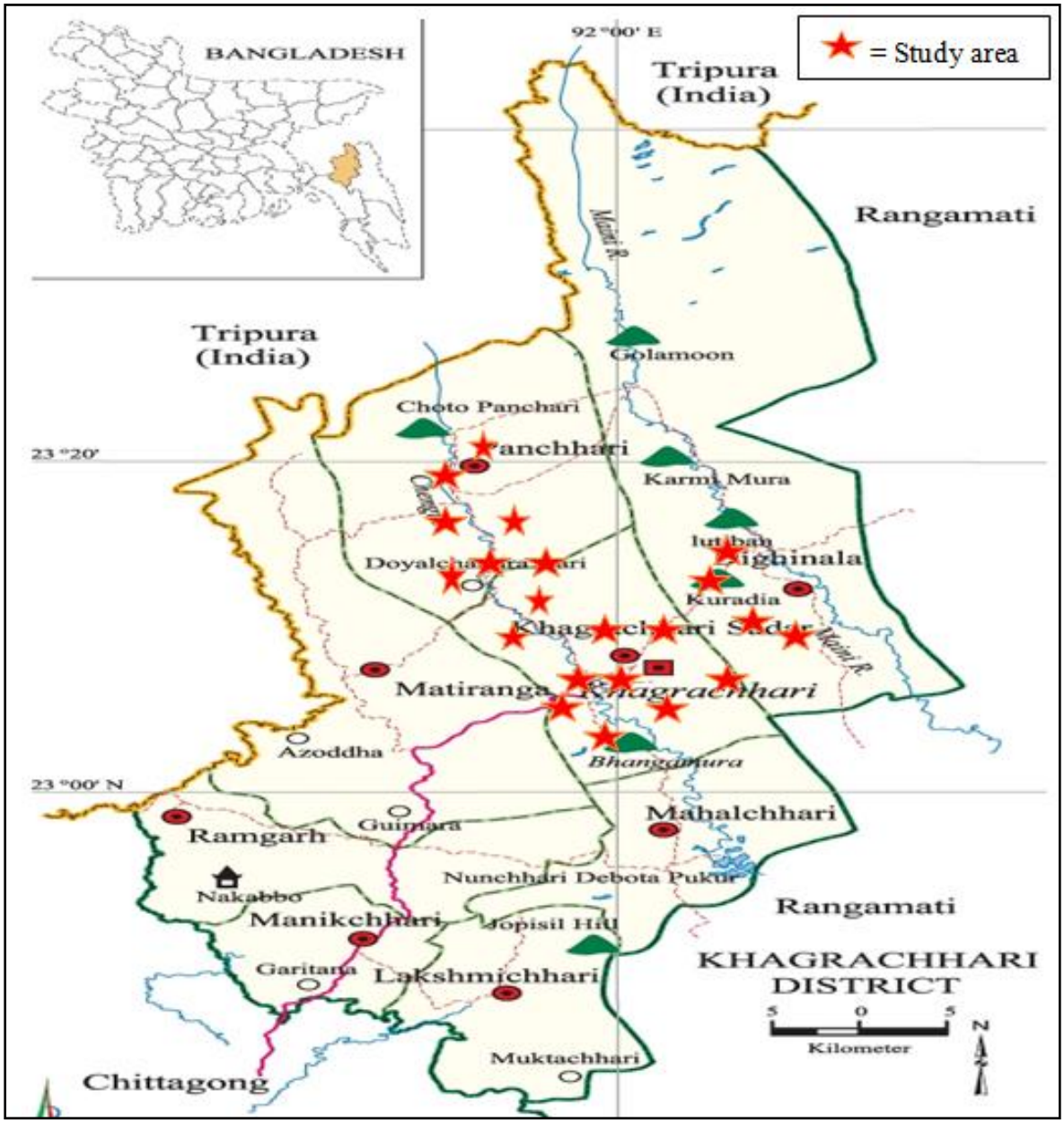
The study was carried out based on both primary and secondary information covering one hill districts namely Khagrachhari Hill District, Bangladesh. Formal survey data was complemented by key informant discussions and fruit growers. Fruit growers selected from different area in Gamaridala, Gargajjechari, Pujgang, Dighinala, Vaibon Chora, Voirofa under Panchari and Dighinala upozila which are located outside the district and also some orchards in Khagrachhari Sadar upozila.

The randomly selected samples included 130 fruit growers and 84 market intermediaries. Market intermediaries were selected from Shonirvor bazaar, madhupur Bazaar, main town market and one temporarily assemble market in Narikel bagan, Khagrachhari Sadar. For trend analysis, 12 major fruits in Khargachhari Hill District were selected based on

availability of time series data in the BBS. The selected fruits were mango, jackfruit. litchi, guava, banana, papaya, ber, pomelo, pineapple, watermelon, lime and lemon and orange.

For the analysis of growth rate of area, production and yield of selected fruits, 16 years (from 1995-96 to 20010-11) respective data were collected from several issues of BBS. Some disaggregated descriptive analyses were also carried out for the trend analysis of area, production and yield.

Figure 1: Khagrachhari hill District map and Study area



In the present study compound growth rates of area, production and yield for the selected fruits were estimated by fitting semi-log or exponential trend equation by using time series data. The compound growth rate (CGR) is usually estimated by fitting a semi-log trend equation of the form. The equation fitted to analyze the trend growth rate is semi log exponential form (Gujarti, 1988).

$Y = a.e^{bti}$……(i)

Or In Y = Ina+bti

Or InY = A+ bti (here A=Ina)

Where, A = Intercept

Y = Quantity of major fruits production, area and yield

b = Growth rate in ratio scale and when multiplied by 100, it express % age growth i.e, annual growth rate

ti = time, i= 1,2, 3,……, 15 years

In = natural log of the variable

The slop coefficient 'b' measures the instantaneous rate of growth. The compound growth rate 'r' may be calculated as follow:

CGR (r) = (antilog of b -1) x 100

The above mentioned equation has been estimated by applying OLS method. The standard error was applied to test the significance of 'b'. This equation is generally used on the consideration that changes in agricultural area or output or yield in a given year would depend upon the area or output or yield in the preceding year (Deosthali and Chandrahekhar, 2004).

EMPIRICAL RESULTS AND DISCUSSIONS

Average Annual Growth Rates of Production of Selected Fruits in CHT

In Khagrachhari Hill District, average annual growth rate of production was positive in almost all fruits except banana and pineapple. The highest growth rate of production was recorded in mango which was significant at 5% level followed by mango and litchi which significant at 1% and 5% level, respectively (Table 1). Recent years mango orchards are increasing in successfully that's why the production growth rates of mango respectively higher than other fruits in this area. Besides mango production growth rates litchi, guava, lime & lemon production growth rate also noticeable. Banana and pineapple both are high perisability in nature and proper storage facilities required for marketing, production rate was negative for these two fruits. Also jackfruit, melon & water melon and orange production growth rate was lower than other fruits (Table 1).

Table 1: Average annual growth rates of production of major fruits in Khagrachhari Hill District from 1995/96 to 2010/11

Sl. No.	Fruits	Intercept	Compound Growth Rate (%)	t-ratio	P-value	R^2
1	Mango	-14.83	9.11	1.66	0.12	0.16
2	Jackfruit	-14.60	2.26	4.03	0.00	0.54
3	Litchi	-28.51	6.50	8.01	0.00	0.82
4	Guava	-42.82	7.64	5.09	0.00	0.65
5	Banana	113.76	-11.23	-1.89	0.08	0.20
6	Papaya	-16.11	3.62	2.72	0.02	0.35
7	Ber	-33.18	7.92	6.26	0.00	0.74
8	Pomelo	-17.55	4.04	3.10	0.01	0.41
9	Pineapple	39.26	-3.31	-1.28	0.22	0.10
10	Melon & Watermelon	-8.08	2.82	1.95	0.07	0.21
11	Lime & lemon	-1.95	7.47	4.37	0.00	0.58
12	Orange	3.45	2.25	9.28	0.00	0.86

Marketing Channel of major fruits

Almost all the marketing channels ensure the smooth flow of produce from the source of origin to its ultimate destination. In Khagrachha hill District all raw materials required for fruit production collected from town bazaar (Shapla Chattore bazaar). Some private and Government bank i.e., Sonali Bank, Janata Bank, Islami Bank etc give credit facilities to fruit growers. There were no cold storage and processing center in this area. The traditional marketing channels include the Pre harvest Contractor (PHC), the wholesaler/ commission agent, the retailers and other petty shop owners or pushcart vendors. The non-traditional or modern marketing channels include the contracting agencies of the corporate houses and their assembly centers, pack houses with sophisticated infrastructure for cleaning and packing the produce. Besides these, the modern marketing channels have retail marketing outlets of the corporate houses that directly sell the produce to the consumers. In Khagrachhari Hill District yet traditional marketing channel is present for fruit marketing. There are four type of market intermediaries involve in fruits marketing; Bepari, Faria, wholesaler and retailer. There is no aratder market in this area. Only one temporarily assemble market for jackfruit and banana in Narikal bagan, Khagrachhari upozela. For papaya, Melon & watermelon, Lime & lemon and orange the production is comparatively lower than other fruits. For these fruits marketing, fruit growers personally sell to customers in the market. There is no market intermediaries' involvement for these fruits marketing. In order to provide a comparison of alternate marketing networks, this study has identified the following marketing channels for the fruits selected.

Table 2: Marketing channel of major fruits in Khagrachhari Hill District

Mango marketing channel	
Channel I	Grower ⟶ Consumer (local) channel
Channel II	Grower ⟶ Bepari (local) ⟶ Consumer (local)
Channel III	Grower ⟶ Faria(local) ⟶ Retailer ⟶ Consumer (local)
Channel IV	Grower ⟶ Faria (local) ⟶ Consumer (local)
Channel V	Grower → Bepari (local) → Aratder (Chittagong market) → Bepari (Chittagong market) → Retailer (Chittagong market) ⟶ Consumer
Channel VI	Grower → Bepari (local) → Bepari (Chittagong district) ⟶ Consumer
Channel VII	Grower → Aratder (Chittagong market) → Bepari (Chittagong market) → Consumer
Channel VIII	Grower → Retailer (local) ⟶ Consumer (local)
Channel IX	Grower → Wholesaler (local) ⟶ Consumer (local)
Jackfruit supply chain	
Channel I	Grower ⟶ Consumer (local) channel
Channel II	Grower → Bepari (local) → Consumer (local)
Channel III	Grower → Faria(local) → Retailer → Consumer (local)
Channel IV	Grower → Wholesaler (local) → Aratder (Chittagong market) → Bepari (Chittagong market) → Retailer (Chittagong district) → Consumer (Chittagong district)
Chain V	Grower → Bepari(local) → Bepari (Chittagong district) → Retailer (Chittagong district) → Consumer(Chittagong district)
Chain VI	Grower → Bepari → Bepari (Fenny) → Consumer
Litchi Marketing Channel	
Channel I	Grower → Consumer (local) channel
Channel II	Grower → Bepari (local) → Consumer (local)
Channel III	Grower → Faria(local) → Consumer (local)
Channel IV	Grower → Wholesaler (local) → Consumer (local)
Channel V	Grower → Bepari (local) → Aratder (Chittagongdistrict market) → Retailer (Chittagong market) → Consumer(Chittagong district)
Channel VI	Grower → Wholesaler (local) → Retailer (local) → Consumer (local)

Guava Marketing Channel	
Channel I	Grower (Local variety) ⟶ Local customer
Channel II	Grower ⟶ Retailer ⟶ Local Customer
Channel III	Grower (Hybrid variety) ⟶Trader (Fenny/Chittagong Market)⟶Bepari Customer
Banana Marketing Channel	
Channel I	Grower (Local variety) ⟶ Local customer
Channel II	Grower ⟶ Retailer ⟶ Local Customer
Channel III	Grower ⟶ Bepari ⟶ Customer
Ber Marketing Channel	
Channel I	Grower ⟶ Customer (Local)
Channel II	Grower ⟶ Retailer ⟶ Customer (local)
Pine apple Marketing Channel	
Channel I	Grower (Local) ⟶ Customer
Channel II	Grower ⟶ Bepari ⟶ Customer
Channel III	Grower ⟶ Wholesaler ⟶ Bepari ⟶ Customer
Papaya marketing channel	
Channel I	Grower (Local) ⟶ Customer
Channel II	Grower ⟶ Retailer ⟶ Customer (local)

Problem Faced by Fruit growers and Market Intermediaries during Fruits Marketing

According to Hassan (2010) at the growers' levels, the problems are mainly related to unavailability, high price and poor quality of fertilizers, lack of irrigation water, insect infestation and disease attack. At the intermediary levels, the problems are mainly related to transport, lack of proper storage facility and capital. The most common problem is due to the lack of storage facilities. In Khagrachhari Hill District, there were some problems faced by fruit growers. These problems were divided into two main types; production related problem and marketing related problem. Production related problem means problem occurred due to fruits production which causes lower production rate as well as lower profit. These problems were lack of knowledge, lack of sapling, insect/pest problem, disease problem, lack of fertilizer, irrigation problem and capital problem. According to research result all these problems were ranked into their severity basis. The sever problem was disease problem, and second severe problem was insect/pest problem, capital problem was then. Lack of technical knowledge and lack of irrigation facilities

was fourth and fifth problem respectively. Sixth problem was lack of quality sapling. Lack of fertilizer was last problem because respondents said that there was availability of fertilizer but small fruit growers could not afforded that. Marketing related problems include post harvest loss, lack of communication, storage problem, lack of processing center, high market price, less number of intermediaries, transportation problem, lack of rules and regulations, high license cost, high labor cost. In the study area, from all of these problems the main problem was storage problem and lack of processing center, the second main problem was post harvest loss (Table 3). High packaging cost was third most important problem in this area. Only big fruit growers had afforded modern packaging facilities like plastic crates for transporting mango. Small and poor fruit growers still used plastic bags, bamboo basket (traditionally called lai/ turong/hallong etc). Lack of rules and regulation was fifth most important problem faced by fruit growers. Rules and regulation regarding price setting, toll, Government facilities etc was faced by fruit growers. Sixth and seventh problem was high labour cost and lack of communication facilities. Less number of fruit intermediaries and high market price of equipment facilities was 8th and 9th problem. The last problem was high licensed cost. Respondents reported that, they would face high license cost if they stared processed fruit business. Most of respondents were interested in starting processed fruit business but lack of marketing policy and high license cost discouraged them.

Table 3: Problems faced by the fruit growers and market intermediaries of major fruits

Sl No.	Problems	Rank
	Production related problem	
1	Lack of knowledge	1
2	Capital problem	2
3	Lack of fertilizer	3
4	Disease problem	4
5	Lack of sapling	5
6	Insect/pest problem	6
7	Irrigation problem	7
	Marketing related problem	
8	Storage problem	1
9	Lack of processing center	1
10	Post harvest loss	2
11	Packaging cost	3
12	Lack of rules and regulations	4
13	Transport problem	5
14	High labor cost	6
15	Lack of communication	7
16	Less number of intermediaries	8
17	High market price	9
18	High license cost	10

CONCLUSIONS AND RECOMMENDATIONS

The commercialization of fruits in the study area and development of agro processing industry in its infancy. Hence, there is a risk that production increases faster than the corresponding markets. Therefore, a number of actions need to be undertaken in order to promote the development of fruits production and marketing. This particularly includes, capacity building, technological applications, improved extension and plant breeding activities. Infrastructural development is also a key to support the sub-sector. In this arena, emphasis should be given to improved storage and transportation system and offering credit and other services to improve effective production and marketing of the crops.

Practice Integrated Pest management system (IPM): Practice of IPM could be a better solution for pest and disease problem in this area.

Provide credit facilities: Government may provide credit facilities to market actors and processors to encourage in developing fruit production and marketing.

Training facilities: Different Government and NGOs can provide training facilities to both market actors and processors including harvesting, grading, sorting, packaging, transportation, storage (conventional and modern), processing (small and large-scale) and nutrition is required. All the market actors in the value chain should be given adequate training. Different Government NGOs, Agricultural Extension Department and Agricultural Universities provide advice and help to assess the demand for human resources, and assist in improving the knowledge, capacity building and training facilities.

Provide Irrigation facilities: Due to lack of natural source of water this area faces severe water scarcity. This causes a huge problem in irrigation. Those who have capital facilities can arrange deep or sallow tube well for irrigation. So, there is a problem for those fruit growers who cannot arrange deep or sallow tube well. Government and NGOs can help to fruit growers by providing pump machine, water reservation tank etc.

Storage facility: As post harvest losses of fruits was a major problem in the study area, storage facilities could be a solution of this problems. Storage facilities should be established by Government or private organization.

Establish agro processing industry: Establishment of agro processing industry can help to prevent post harvest losses and also encourage fruit growers to more fruit production. This can be helpful for employment generation as well as development of agribusiness sector in this area.

Technology dissemination: Both Government and NGOs can help to fruits production and marketing by disseminate technical information in this area.

Transfer of technology: Development of appropriate technology by experts and conduction of training by appropriate trainers on different aspects of postharvest management. Agricultural Universities i.e., Bangaladesh Agricultural University (BAU), Sher-e-Bangla Agricultural University (SAU), Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) etc. may play a leading role in collaboration with Bangladesh Agricultural Research Council (BARC), Department of Agricultural Extension (DAE), Bangladesh Agricultural Research Institute (BARI), Bangladesh Standers and testing Institutes (BSTI) etc can help to transfer technology regarding fruits production and marketing in this area.

DECLARATION

Data were collected by the First author, Bisakha dewan for MS Thesis - funded by Krishi Gobeshona Foundation (KGF) Dhaka, Bangladesh.

REFERENCES

BBS. (2012). Year Book of Agricultural Statistics, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Dhaka, Bangladesh.

BBS. (2011). Year Book of Agricultural Statistics, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Dhaka, Bangladesh.

BBS. (2010). Year Book of Agricultural Statistics, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Dhaka, Bangladesh.

BBS. (2005). Year Book of Agricultural Statistics, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Dhaka, Bangladesh.

BBS. (2001). Year Book of Agricultural Statistics, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Dhaka, Bangladesh.

Deosthali. V., and Chandrashekhar. M.N., (2004). Rice: Regionwise Growth Trends in Maharashtra. Economic & Political Weekly. Vol XXXIX No. 03, January.

The Daily Star. (2012). Staff reporter, Hill is now hub of seasonal fruits. Wednesday, June12.

Gujarati, Damodar N.,(1988). *Basic Econometrics.* 2nd edition. McGraw Hill. New York.

Hassan, k,. Chowdhury, B., Akhter, N. (2010). Post harvest Loss Assessment: A Study to formulate Policy for loss Reduction of Fruits & Vegetables & Socioeconomic uplift of the Stakeholder'. Final Report PR #8/08, NFPCSP.

IDAF, (2009), Value Chain Analysis of Selected Commodities Institutional Development Across the Agri-food Sector. Final Report -9 ACP MAI 19.

Khandaker, S.R., Bakht, Z. and Koolwal. G. B. (2009). Commercial application of CIPC sprout inhibitor to storage potatoes. Cooperative Extension System, Agricultural Experiment Station, The University of Idaho, USA.

KHISA, S. K. (1997). Indigenous Technology/Knowledge of Watershed Management in the Culture of Ethnic Communities of Chittagong Hill Tracts. Paper Presented at the National Workshop on Indigenous Technology/ Knowledge in Watershed Management held at Bangladesh Forest Academy, Chittagong from 30th November-3rd December 1997. P. 12.

Kibria, M.G., Ahammad, M.J, and Osman, K.T. (2011). Soil Fertility Status of Some Mango Orchards in Chittagong Hill Tracts. The Chittagong Univ. J. B. Sci.,Vol. 6(1 &2):187-197.

Siddiqu, (2001). Litchi Production in Bangladesh.

World Bank. (2005). Bangladesh growth and export competitiveness. Report 31394-BD., WashingtonD.C.