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AN AGRIBUSINESS CHAIN FOR CHILLI OBSERVED IN ISLAMPUR UPAZILA OF JAMALPUR DISTRICE

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ABSTRACT

The specific objectives of the study were to examine the seed supplies, costs and returns, marketing system, seasonal and cyclical price variation, and to estimate the spatial market integration of chilli. Twenty farmers and twenty five intermediaries were selected through convenience sampling procedure. The study was based on both primary and secondary data. Primary data were collected through face to face interview with the respondents from September to October 2010 and secondary data were collected from weekly price bulletin of Department of Agricultural Marketing (DAM), Statistical Yearbook of Bangladesh, and Yearbook of Agricultural Statistics etc. About 90 percent farmers used home supplied seeds in the study area. The intermediaries involved in chilli marketing were: paikars- local and non local, aratdars, retailers. Paikars generally purchased chilli from the farmer and offer same to the aratdars and retailers. In the study area, about 40 percent farmer's sells dry chilli and 60 percent farmers found who sells both green and dry chillies. In case of processing of chilli, farmers, and retailers cum millers were found as processor at local level. The net profit per kg for farmer and retailer cum millers were Tk. 40.95 and Tk. 52.58, respectively and the return over working capital were 63.93 and 39.06 percent respectively. Seasonal price variation of chilli was very high, range of seasonal price variation was 145.35; highest price index (196.88) was found in the month of October, and the lowest was in the month of March (51.53). The cyclical price variation shows 3 to 5 year cycle for the dry chilli. Analysis of market integration shows that the chilli markets in Bangladesh were well integrated that means changing of price information was quickly delivered to other markets in Bangladesh.

Key words: Agribusiness, marketing chain, chilli

Introduction

Chilli is an important spice crop both in tropical and subtropical countries in the world. In the western countries, chilli is utilized as salad while in tropics it is used as spices in cooked recipes. It gives delicious or palatable dishes. Climatic condition of Bangladesh is very congenial for chilli cultivation. Possibilities of cultivating a wide variety of chillies are found in Bangladesh. At present, chilli is widely cultivated throughout the country. About 231 thousand acres of land is under chilli production and the total production is approximately 118 thousand metric tons (BBS, 2008). Chillies are produced seasonally and consumed throughout the year. It is much simpler crop to cultivate with duration of 3-4 months. Now chillies are grown both in Rabi and Kharif-1 season in Bangladesh. It can survive on different soil types and several climatic conditions. It can be grown in fallow land such as road side and homestead area and thus it can ensure the maximum utilization of scarce land of the country. Chilli is labour intensive; it is creating more employment opportunities for the rural poor and generating rural as well as national income. In the country, a good percentage of people suffer from various types of disease due to lack of vitamin B and C. To alleviate the diseases, green chilli has special importance. The top chilli producing districts in Bangladesh are Bogra, Pabna, Barishal, Comilla, Jamalpur and Noakhali. Income generation from chilli is the main source of revenue for many farmers in those areas. In 2007-08, Barishal ranked 1st and Jamalpur ranked 2nd in terms of area under chilli production and Pabna ranked 1st and Jamalpur ranked 5th in terms of total production of chilli. The average yield of chilli is about 0.54 metric tones per acre of land (BBS, 2008), which is very low as compared to that of other countries. As a result the domestic production cannot

meet the domestic demand. Hence, Bangladesh has to import chilli from other countries to meet the domestic demand at the cost of hard earned foreign currency. There is a scope of increasing the production of chilli either by increasing the area under cultivation, which is rather difficult because of limitation of land or by improving the existing production practices, which include among others, improved technologies, better managements, etc. In Jamalpur, chillies were grown in two season- Kharif-1 and Rabi. In the season kharif-1, the chilli production showed decreasing trend over the years because of decreasing cultivated area and lower yield rate. But in case of Rabi season, the area under chilli production and the production of chilli has remained more or less same over the years. Total area under chilli production in Kharif-1 and Rabi season in 2001-02 were 2385 and 21800 acres and the production were 590 and 7520 metric tons, respectively. In 2007-08, area under chilli production in Kharif-1 and Rabi season were 1265 and 22786 acres and the production were 600 and 7835 metric tons, respectively. Kharif-1 chilli occupied highest production in the year 2006-07 while Rabi chilli occupied in 2004-05.

Justification of the study: Agriculture sector continues to play a very important role in the economy of Bangladesh. But this sector is totally dominated by rice cultivation. To reduce the dependency on rice cultivation, the government of Bangladesh has been pursuing a crop diversification strategy. Cultivation of horticultural crops, pulses, oil seeds and vegetables, etc., is stressed in the plan document. But unfortunately chilli has not been included in this programme. Due to lack of proper attention, the production of chilli more or less remains constant over the years. Chilli is the most important minor crop, which has role in human diet, generating rural as well as national income and creating employment opportunities. The present study will help in providing a picture of the seed supplies, benefits and cost of chilli enterprises, which will be generating useful information for the producer to take a plan of production.

Objectives of the study: Although it is an agribusiness study, the general objective of the study is to examine the input, output and processing sector of chilli and different price variation of chilli in Jamalpur district. The specific objectives of the study are as follows: i) to examine the seed supplies of chilli production; ii) to estimate the costs and returns; iii) to examine the marketing system; iv) to examine the seasonal and cyclical price variation and v) to estimate the spatial market integration of green chilli in Jamalpur district of Bangladesh.

Materials and Methods

For the present study, Islampur Upazila of Jamalpur district was selected as the study area. The main considerations behind the selection of the above Upazila as study area were as follows: i) the upazila was found to be good chilli growing area; ii) there was high expectation to get cooperation from the farmers and intermediaries; iii) easy accessibility and good communication in the Upazila and iv) no study of this type was done previously in this area. Both primary and secondary data were used. Primary data were collected from 20 farmers and 25 intermediaries and secondary data were collected from books, reports of Bangladesh Bureau of Statistics, documents, journals, reports, publications and raw price data from Department of Agricultural Marketing (DAM) etc. The convenience sampling technique was followed. An interview schedule was prepared to record the relevant information in accordance with the objectives set for the study. Data for the present study were collected during the period from September to mid October and continued till March of the next year. During the study period the farmers were found busy in sowing of chilli. The sowing period of chilli is from October to November and the harvesting period is from February to March. Different descriptive method and statistical methods were used for the analysis of data. After data collection, the data were checked and then entered into computer for analysis. The MS Excel software and SPSS were used mainly in processing data. Classified tables were prepared depending on the study of the objectives. The area data were converted into hectares from different local area measurements. In case of monthly wholesale price of chilli collected from Department of Agricultural Marketing (DAM), it has been found that some data were missing. These missing values were estimated by the simple mean of the before one and after one observation. The collection of data were summarized and analyzed to fulfill the objectives of the study. In the present study various analytical techniques were used for the analysis of data.

Results and Discussion

Seed supplies of chilli production

Sources of seeds: Farmers might collect seeds from different sources such as homestead (home produced seeds), primary market, thana market and district market. In the study area, majority of the farmers (90%) used home produced seeds and only 10% farmers purchased seeds from other farmers in the same area. Most of the farmers used own produced seeds because they had more trust on home produced than others.

Production of chilli seeds and seedlings: In this study, farmers produced chilli in Rabi season and used own produced seeds. At first, farmer collected fully ripe red colored chillies and dried them. During the dry season, sun drying is usually adequate to dry the produce. Before preparing the seedlings, the seeds were poured into water in one night and these wet seeds were spread in the prepared seed bed for seedlings.

Storage system of chilli seeds: The seed growers used conventional method to store chilli seeds. They kept well dried seeds having low moisture in air tied polythene pack or an airtight glass jar. So that the quality of seeds remain unchanged even for one to two years. They had no modern storage facilities.

Reasons for not involving in seed production: In the study area farmers were not involved in seed production for various reasons. The majority (90%) farmers identified that there were no seed buyers found because almost every farmer used their own produced seeds. Farmer's opinions for not involving in seed production are shown in the Table 1.

Farmer's opinion on home produced seeds and purchased seeds: In the study area, majority (85%) of the farmers opined that their seeds were more qualitative than purchased seeds from other sources. About 80 percent of the farmers reported that they need to go distant market for purchasing HYV or other varieties of seeds because of non availability in the local market (Table 2).

Table 1. Farmer's opinion for not involving in seed production (Field survey under the study during 2010)

Statements	Number of reported farmers (N=20)	%
Seed production is not profitable business	14	70
No buyers of seeds were found in the study area, almost every farmer like to use own produced seeds.	18	90
Farmers had no scope to contract with seed procurement companies or other Government Or Non-government Agencies.	11	55
Low requirement of chilli seeds	5	25

Table 2. Farmer's opinion on home produced seeds and purchased seeds (Field survey under the study during 2010)

Statements	Number of reported farmers (N=20)	%
More qualitative than purchased seeds	16	80
Non availability in the local market	17	85
More trust on home produced seeds	13	65
Traditionally used home produced seeds, although having low quality and average production	7	35
Money saved in case of using home produced seeds	5	25
Old seed having low germination are usually sold in the market	3	15
Adulteration in case of market seeds	2	10

Costs and returns of chilli production

The cost and returns were assessed to find out net returns of the chilli farmers. Cost items were identified as human labour, power tiller, seed, fertilizer, irrigation, pesticides and insecticides, interest on operating capital and land use cost (Table 3). All these cost were then accounted for one production period of green chilli. Per hectare gross return Tk. 113027.20, net returns Tk.9155.22 were calculated respectively. The

calculated BCR was 1.08 which shows that green chilli production is not so profitable in the study area. The reasons might be low price of green chilli, and damages of green chilli etc. Normally farmers do not think about the own labour cost, cost of home produced seeds and organic materials, interest on operating capital and land use cost If those cost are avoided then the per hectare net return of green chilli becomes Tk. 30247.62 and the BCR 1.37. These results indicate that if farmers spend Tk.1.00, then the return will be Tk.1.37 that is; it is profitable business.

Table 3. Total Cost of green chilli Production per hectare during study period

Cost items	Unit	Quantity	Cost(tk)	% total cost
Variable cost				
Human labour	Man days	405.08	54596.88	52.56
power tiller	---	--	4643.60	4.47
organic fertilizer	kg	1309.10	1636.38	1.58
Inorganic fertilizer	kg	812.63	16393.39	15.78
Insecticides and pesticides	--	--	3495.05	3.36
Seed	kg	4.17	208.72	0.20
Irrigation	--	--	5051.15	4.86
Others cost	--	--	452.01	0.44
Total variable cost	--	--	86477.18	83.25
Fixed cost				
Interest on operating capital @ 10% for 5 month	--	--	1801.69	1.73
Land use cost (lease value)	--	--	15593.11	15.01
Total fixed cost	--	--	17394.80	16.75
Total production cost (on full cost basis)	--	--	103871.98	100
Total production cost	--	--	82779.58	--

Table 4: Cost and returns from green chilli production

Particulars	Unit/hectare
Yield(kg)	7464.20
Gross return (Tk.)	113027.20
Total variable cost (Tk.)	86477.18
Total cost (on full cost basis)	103871.98
Total cost (on cash cost basis) (Tk.)	82779.58
Gross margin (Tk.)	26550.02
Net return (on full cost basis) (Tk.)	9155.22
Net return (on cash cost basis) (Tk.)	30247.62
BCR (on full cost basis)	1.08
BCR (on cash cost basis)	1.37

Marketing system of chilli

The process of chilli marketing started from the farmer and continued through the channel till the produce reached to the consumers. The intermediaries involved in chilli marketing were: paikars- local and non local, aratdars, retailers, paikars generally purchased from the farmer and offer same to the aratdars and retailers. In the study areas, the various marketing functions of chillies were performed by the different market participants such as buying and selling, pricing, grading, transportation, storage, packaging etc.

Buying and selling: Buying and selling are the function of exchange. The intermediaries purchased dry chilli from the farmyard or primary market and sold these to the consumers or other intermediaries. Table 5-6 show the buying and selling of chillies by different market participants. In the present study, 100 percent local Paikars and 66.67 percent non-local Paikars purchased chilli from farmers. 33.33 percent non-local Paikars and 25 percent Aratdars purchased chilli from local Paikars, respectively. In case of selling, 56.25 percent farmers sold dry chilli to local Paikars and 31.25 percent farmers sold to non-local Paikars, respectively.

Table 5. Purchasing of dry chilli by different market participants during 2010

Participants	Purchased from (%)				
	Farmer	Local paikar	Non-Local paikar	Aratdar	Retailer
Farmer	--	--	--	--	--
Local paikar	100	--	--	--	--
Non-Local paikar	66.67	33.33	--	--	--
Aratdar	-	25	75	--	--
Retailer	--	25	--	75	--

Table 6. Selling of dry chilli by different market participants during 2010

Participants	Sold to (%)				
	Local paikar	Non-Local paikar	Aratdar	Retailer	Consumer
Farmer	56.25	31.25	--	--	12.5
Local paikar	--	60.00	20	20	--
Non-Local paikar	--	--	66.67	33.33	--
Aratdar	--	--	--	100	--
Retailer	--	--	--	--	100

Seasonal and cyclical price variation

The twelve months centered moving average was used to estimate the seasonal price variation. From this study it was found that the seasonal price variation of chilli was higher in Jamalpur district. The price index of chilli was the highest in October (196.88) and the lowest in March (51.53) as shown in Table 7. During the harvest period of chilli, price remained low and after that it gradually rose up to the next harvesting period. So, it is better for farmer to sell their produces during the post harvest periods.

Table 7. Seasonal price variation of green chilli at Jamalpur market during 2010

Month	Seasonal Price indices (BDT per kg)
January	58.00
February	54.34
March	51.33
April	53.00
May	70.51
June	64.80
July	110.09
August	130.23
September	163.54
October	196.88
November	166.58
December	88.91
Highest	196.88
Lowest	51.33

Market integration

The empirical result suggests that the regional chilli markets in Bangladesh are highly integrated and Dhaka market proved to be a very influencing central market (Table 8). With the development of telecommunication facilities especially cell phone technologies, price information in one market follow to another distant market within a short time Moreover, market integration offered a clear picture of the process of intensive transmission across the marketing chain: importantly, distance between markets is not an important to ensure efficient adjustments of prices to new information. In case of chilli market, price changes are fully and immediately passed on the other market. In the present study Co-integration model was used to assess the market integration. In the last few years, a large volume of literature and some

specialized books such as Alexander and Wyeth (1994), Engle and Granger (1987), Hargreaves (1994), etc. have been published where the issue of estimating and testing of long run relation under the notion of co-integration has been addressed. For the same reason, in Bangladesh many authors ie.; Nasrin (2010), Salam (2010) used co-integration methods to assess the market integration by co-integration method instead of Coefficient of variation method

Table 8. Co-integration results for market pairs of green chilli from 1986-2007

Markets	Co-integrating regression	Co-integration Test	Decision
		Engle - Granger	
Dhaka-Jamalpur	p_d=309.62+0.73p_j (20.93) R^2= 0.93,DW= 2.42	$\Delta\varepsilon_t$= -1.23 ε_{t-1}*** (-5.67) R^2= 0.61,DW= 2.03	Hypothesis is rejected and markets are co-integrated
Dhaka-jessore	p_d=267.24+0.87p_{jes} (11.38) R^2= 0.86,DW= 2.09	$\Delta\varepsilon_t$= -1.05ε_{t-1}*** (-4.71) R^2= 0.52,DW= 1.99	Hypothesis is rejected and markets are co-integrated
Dhaka-Bogra	p_d=341.40+0.84p_b (14.66) R^2= 0.91,DW= 2.42	$\Delta\varepsilon_t$= -1.24ε_{t-1}*** (-5.94) R^2= 0.63,DW= 1.97	Hypothesis is rejected and markets are co-integrated
Dhaka-Pabna	p_d=167.71+0.89p_p (18.03) R^2= 0.94,DW= 2.58	$\Delta\varepsilon_t$= -1.30ε_{t-1}*** (-6.17) R^2= 0.65,DW= 2.00	Hypothesis is rejected and markets are co-integrated

Figures in the parentheses indicate t-value of the regression coefficient, *** Significant at 0.1 per cent level
Tau (t) values are -2.66 and -1.95 at 1% and 5% level of significance respectively without constant in the equation.

Conclusion

It can be concluded that production of green chilli is not so much profitable. But the processing of chilli in the study area was profitable. The prices of agricultural crops are not stable. It fluctuates throughout the year. By knowing the best selling period, farmers would be more benefited if they supply the crop in peak price month rather than the harvesting period and reap the price benefit. The cyclical price movement also shows the price cycle which helps farmers to get the price benefit from the market. The result also reveals that, the chilli markets were integrated because the market price information was transmitted from regional markets to other markets. Thus it implies that, price analysis and policy formation at aggregate level is valid and will be pertinent for policy implementation.

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