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Analysis of Growth Rate, Marketing Efficiency and Seasonal Price Variation of Potato in selected Areas of Bangladesh

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ABSTRACT
The present study was undertaken to analysis the marketing efficiency and price structure in terms of marketing cost and margin, growth, and seasonal price variation of potato marketing. The study was conducted in four districts namely Bogra, Jamalpur, Rangpur and Munshigonj of Bangladesh. Both primary and secondary data were used for the study. Six performance indicators were used for measuring marketing efficiency Growth rate of real prices, area, yield and production increased over the period due to increase demand of the people. Seasonal price variation of potato was the highest in Bogra and the lowest in Jamalpur. Average price was the lowest in February and the highest in December.

1. INTRODUCTION

Potato is one of the important vegetables as well as cereal crop in Bangladesh. Almost every family in Bangladesh consumes potatoes as a vegetable throughout the year. Potato is an important food crop in Bangladesh next to rice and wheat. The demand of potato is increasing day by day. Total production has been estimated 83,26,389 metric tons in 2010-2011 compared to 81,68,000 metric tons of the last year which was 1.94% higher and total area under potato crop has been estimated at 4,60,197 hectare in 2010-2011 compared to 4,53,270 hectares of the last year which was 1.53% higher (BBS-2011). So both of the area and production of potato are increasing in trends. The economy of Bangladesh depends on increased production and marketing facilities of agricultural commodities. So marketing plays a great role in value addition and generating employment in the economy. There are some intensive potato growing areas in Bangladesh where potato produced commercially and as well as marketed in other areas of the country. Potato needs to be move along a distance to reach the ultimate consumers under the prevailing marketing system. To keep the interest for growing potatoes, the growers' needs to get full benefit of higher prices prevail in the market. If it is not, their net return per unit area would be decreased with the adoption of improved technology. Both the potato growers and traders could get higher benefit if they know the marketing chains, stages of minimum marketing cost, adequate information in understanding marketing efficiency and price structure. But the seasonal pattern does not remain the same over the years. It changes due to change in production period, cultivating more than one crop in a year, increase in storage facilities, increase in export and import, government intervention etc

Due to lack of adequate cold storage facility, coasting, electricity failure etc. the potato growers are bound to sale the tubers with low price or they store it naturally, where, a huge amount are lost due to different causes. The present study will reflect the real situations of the existing marketing system and suggest some policy guidelines.

Objectives:

- To analyze the level of marketing efficiency of different chains through selected indicators;
- To estimates the growth rate of price, area, production and yield of potato;
- To study the seasonal price variation of potato;
- To identify the problems associated with potato production and marketing and also draw some policy implication from the above study.

2. METHODOLOGY

Sample Size

Four major potato growing districts of Bangladesh, namely Bogra, Jamalpur, Rangpur and Munshigonj were selected for this study. Both primary and secondary data used for this study. One upazila of each district were selected where the cultivation of potato was concentrated. Secondary data were collected from various published sources. Harvest prices of potato have been deflated by agricultural raw material price index to get the prices in real terms. The study considered the time periods of 1990/91 to 2004/05 for time series analysis. Marketing related data were collected from selected 120 (30 for each selected area) potato growers. For intermediaries, 8 Farias, 20 Beparies, 12 Aratdhars, 16 Paikers, 8 cold storage owners and 20 retailers were selected from the above selected areas including major consuming area Dhaka and Gazipur. Three sets of interview schedules were prepared after pretesting. Primary data were collected by face to face interview during 2008/09 and

2009/10.Collected data were edited, compiled, summarized and analyzed to attain desired objectives of the study.

Analytical Technique

Marketing Efficiency Measurement

Six performance indicators were used for measuring efficiency of different marketing chains. These indicators are (i) Producers ' share (I_1), (ii) Marketing cost (I_2), (iii) Intermediaries' margin (I_3), (iv) Price deviation, i.e. differences of maximum and minimum prices of potato in a month (I_4), (v) Peak period seasonal price variability (I_5), (vi) Lean period price variability (I_6) (Chauhan et al., 1994).

The Producer's share was derived by the ratio of net average price received by the producers' to the weighted average price of potato which was calculated with the following formula and the chain which had highest producer's share was ranked (1) as first and vice -versa.

$$\text{Percentage of producer's} \quad \frac{P_{pi}}{P_{ri}} \times 100$$

Where,

$P_{p\,i}$ = Producers' share in the ith chain

P_{ri} = Average price of potato at the retail level in ith chain.

i = Number of chains (i = 1, 2, ------, n)

The cost of marketing was calculated and the lowest cost marketing chain was ranked 1 and that which has highest cost as the last. The same approach was followed in ranking the margin of middlemen in each chain. The deviation ($\bar{d}$) between the highest and lowest prices in each month in the respective channels were computed. The price equalization among all the categories of farmers denote d = 0. That is, there is no price deviation among the farmers' prices .If the differences are high it implies highest price deviation and vice-versa.

The seasonal movement of prices was studied by adopting the simple standard deviation (δ) formula. The formula used in the study was as follows:

$$\delta = \sqrt{\left(\frac{1}{T}\right)\sum W_t \left(P_t - P\right)^2}$$

Where,

δ = Seasonal price variability index

P = Average price of potato of the season in each chain,

P_t = Average farm price for the agricultural year,

T = Total month in the year.

$$W_t = \frac{\text{Sales during the month in each chain (St)}}{\text{Sum of the sales during the month in all chains } (\sum i \sum t\ Sit)}$$

S_t = i^{th} month

S_{it} = i^{th} chain of t^{th} month

The entire season has been divided in two periods. The peak period represents transactions from February to April and lean period from May to January in each agricultural year. The estimation of seasonal price variability (δ) was estimated separately for each period. A lowest value shows that the farmer's price was not affected by the seasonal variation and vice versa. The final ranking of all the six indicators of all chains were computed by using the composite index formula.

$$R = \frac{R_i}{N_i}$$

Where,

Ri = Total value of ranks of all indicators (I_1------ I_6) all chains

Ni = Number of indicators.

The lowest mean represents relatively the most efficient channel and vice versa (Rajagopal, 1986 p.583-589).

Estimation of Return over Investment (ROI):

For estimating return over investment of wholesaler and retailer, the following formula is used:

Return over investment (ROI) = (Net margin ÷ Total investment) x 100

Where, Total investment = Purchase price + marketing cost

Estimation of growth rates

To estimate the growth rate of price, area, production and yield of potato in selected areas of Bangladesh for the period from 1990/91-2004/05, the following model was used (Gujarati 1998, p.169).

$$Y = ae^{bt}$$

$$\text{Or } \ln Y = \ln a + bt$$

Where, LnY = Real price, area, production, yield of potato
t= Time (Years)
a = intercept
b = growth rate to be estimated

Seasonal Price Indices

Ratio to Moving Average method was applied to see the seasonal price of potato in Bogra, Jamalpur Dhaka and Rangpur markets. Secondary data were collected from the Department of Agricultural Marketing (DAM) during 2003 to 2008.

3. RESULTS AND DISCUSSION

Marketing Chains of Potato

Marketing chain refers to the sequential arrangements of various marketing intermediaries involved in the movement of products from producers to consumers (Kohls and Uhl,1980). Sometimes same intermediaries had done some overlapping works. For example, wholesaler (Bepari/Paiker) sometimes performed retail business. When they sold to the retailer was considered as one chain and when sold to the consumer was considered as other chain. In the marketing of potato, fifteen marketing chains were identified on the basis of product run through different chains. Out of these fifteen chains, four chains were important, by which 62% potato flow out from producer to consumer (Table 1).So the efficiency of the following major chains was measured according to the volume of potato handled or participation of the intermediaries in the chain. Fig.1 showed a picture of marketing chain of potato.

Table 1.Potato run through the four major chains in selected areas

No.	Chains	Percent of product run	Rank(I)
I.	Farmer-Paiker- Retailer- consumer	14.12	3
II.	Farmer-Retailer – consumer	8.80	4
III.	Farmer-Bapari-Aratder-Paiker- Retailer- consumer	22.50	1
IV.	Farmer- Bapari -Aratder- Retailer- consumer	18.10	2
	Total	61.52	

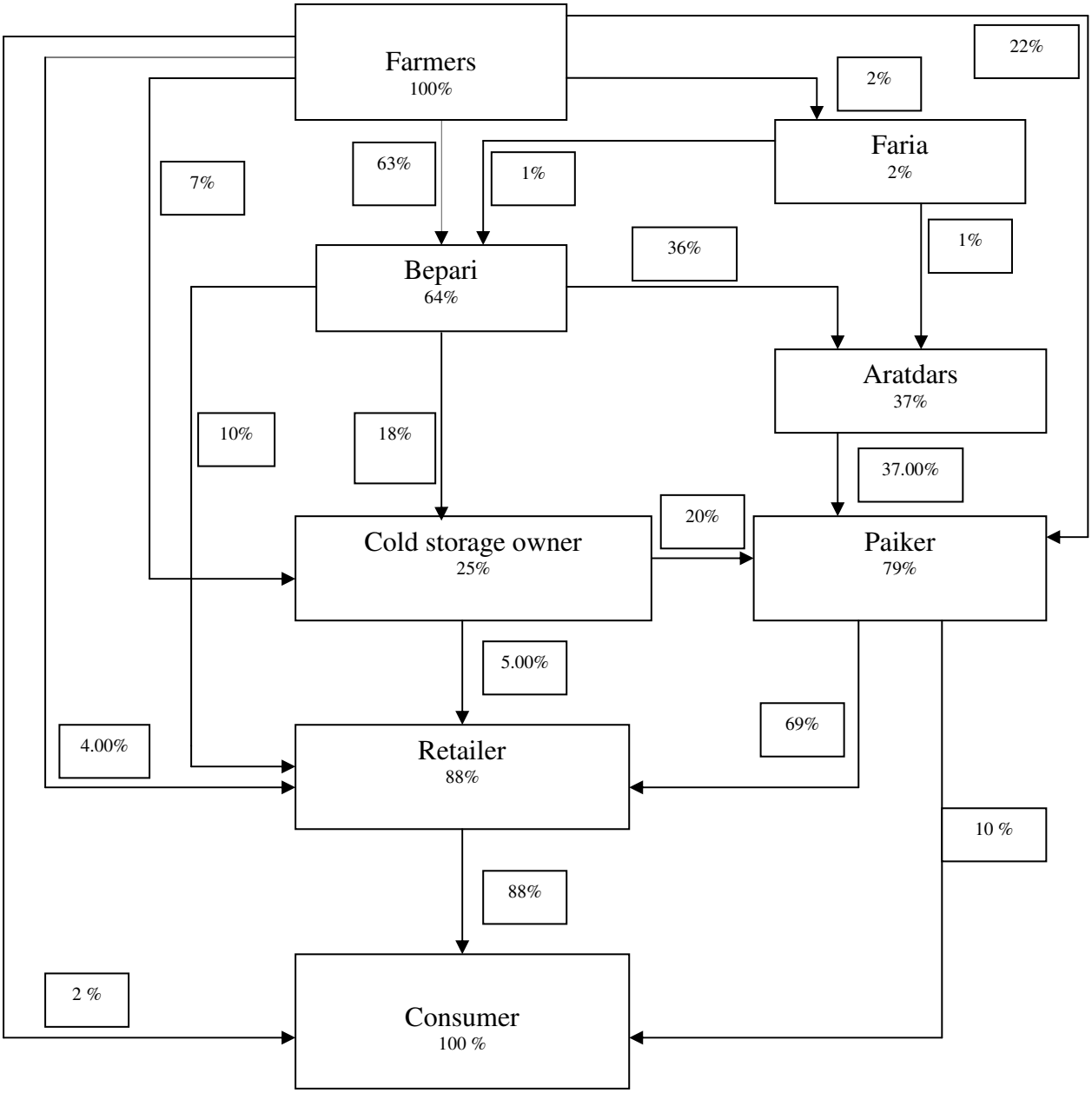

Fig 1. Marketing chain of potato in Bangladesh

Marketing cost potato by farmer

Farmers used different means of transport to carry potato for sell in the market. They generally used van, head load, and rickshaw to carry potato in the market. It was observed that the average marketing cost per quintal of potato was Tk 32.88 (Table 2). Among the marketing cost items, transport incurred the major share (72%). This cost varied from area to area.

Table 2. Marketing cost paid by farmer **(Tk/quintal)**

Item	Bogra	Jamalpur	Rangpur	Munishigong	Average
Transportation	23.13	32.08	27.22	12.50	23.73
Market tolls	2.54	3.82	3.75	6.25	4.09
Personal cost	5.85	4.33	6.24	3.79	5.05
Total	31.52	40.23	37.21	22.54	32.88

Marketing cost of potato by different intermediaries

Marketing cost represents the cost of performing various marketing functions, which are required to transfer a commodity from the place of production to the ultimate consumers .The marketing cost included the cost of transportation, loading and unloading, market tolls, Aratdari commission and entertainment etc., for the traders. Average marketing cost were calculated as Tk. 69.52 for Faria, Tk. 146.17 for Bepari, Tk.87.42 for Paiker (urban), Tk.43.81 for Retailer(urban) and Tk.25.08 Aratdar(Dhaka & Gazipur) per quintal of potato.

Table 3. Total marketing cost of Potato for farmers and various intermediaries.

(Tk/quintal)

Cost items	Farmers	Farias	Beparis	Arathdar	Paiker(U)	Retailer(U)
Transportation	23.73	27.08	60.71	0	20.30	2.96
Loading & unloading	0	12.50	18.37	0	18.06	2.06
Packaging	0	0	4.99	0	0	0
Wastage /Damage	0	5.03	9.08	0	21.25	27.19
Marketing tolls	4.09	5.40	0	0	16.68	0.17
Personal expenses	5.05	3.79	4.77	0	3.85	0
Salary & wages	0	0	0	7.10	0	0
Tip & donation	0	0	0	0	0	0
Arathdari commission	0	15.72	47.92	0	0	0
Rent	0	0	0	4.04	3.68	5.11
Tax	0	0	0	0	0	0
Electricity	0	0	0	3.64	1.65	3.05
Telephone	0	0	0.88	5.14	1.95	0.70
Weighing	0	0	0	0	0	0
Entertainment	0	0	0	5.16	0	2.57
Total	32.87	69.52	146.17	25.08	87.42	43.81

Marketing cost for different Chains

Chain-wise marketing cost is shown in Table 4. It was observed that the chain III had the highest marketing cost (Tk. 335.90/ quintal), followed by chain IV and chain I. Lowest cost (Tk.76.68/quintal) was found in chain II. High cost of transportation, loading and unloading, market tolls, Aratdari commission were the main reasons for higher marketing cost. Highest numbers of intermediaries were involved in chain III, which were the main reasons for higher marketing cost.

Table 4. Marketing cost of potato for different chains **(Tk/quintal)**

Items	Chains			
	I	II	III	IV
Transportation	46.99	26.69	107.70	87.40
Loading & unloading	20.12	2.06	38.49	20.43
Packaging	0	0	4.99	4.99
Wastage /Damage	48.44	27.19	57.52	36.27
Marketing tolls	20.94	4.26	20.94	4.26
Personal expenses	8.90	5.05	13.67	9.82
Salary & wages	0	0	7.10	7.10
Tip & donation	0	0	0	0
Aratdari commission	0	0	47.92	47.92
Rent	8.79	5.11	12.83	9.15
Tax	0	0	0	0
Electricity	4.70	3.05	8.34	6.69
Telephone	2.65	0.70	8.67	6.72
Weighing	0	0	0	0
Entertainment	2.57	2.57	7.73	7.73
Total	164.10	76.68	335.90	248.48

Marketing margin and price spread

Price spread refers to the difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of farm product. The cost and margin for each intermediary were presented in table 5, 6, 7, and 8 and price spread for different chain were presented in 11. The net marketing was the highest in chain IV and lowest in the chain
I. The price spread was the highest in the chain III and lowest in the chain I.

Table 5.Marketing margin and cost of potato in chain I **(Tk/quintal)**

Intermediaries	Purchase price	Sales price	Gross marketing margin	Marketing cost	Net marketing margin	Invested business capital	Return on business capita
Paiker	1291.00	1472.00	181.00	87.42	93.58	1378.42	6.79
Retailer	1472.00	1833.00	361.00	43.81	317.19	1515.81	20.93
Total	-	-	542.00	131.23	410.77	-	-

Table 6. Marketing margin and cost of potato in chain II **(Tk/quintal)**

Intermediaries	Purchase price	Sales price	Gross marketing margin	Marketing cost	Net marketing margin	Invested business capital	Return on business capita
Retailer	1256.00	1896.00	640.00	43.81	596.19	1299.81	45.87
Total	-	-	640.00	43.81	596.19	-	-

Table 7. Marketing margin and cost of potato in chain III **(Tk/quintal)**

Intermediaries	Purchase price	Sales price	Gross marketing margin	Marketing cost	Net marketing margin	Invested business capital	Return on business capita
Bepari	1388.00	1676.00	288.00	146.17	141.83	1534.17	9.24
Paiker	1676.00	1928.00	252.00	87.42	164.58	1763.42	9.33
Retailer	1928.00	2265.00	337.00	43.81	293.19	1971.81	14.86
Total	-		877.00	277.40	599.60		

Table 8. Marketing margins and cost of potato in chain IV **(Tk/quintal)**

Intermediaries	Purchase price	Sales price	Gross marketing margin	Marketing cost	Net marketing margin	Invested business capital	Return on business capita
Bepari	1388.00	1794.00	406.00	146.17	259.83	1534.17	16.93
Retailer	1794.00	2230.00	436.00	43.81	392.19	1837.81	21.34
Total			842.00	189.98	652.02		

Table 9. Price spreads in different chains

Particulars	Chain I		Chain II		Chain III		Chain IV	
	TK/ Quintal	Per cent	TK/ Quintal	Per cent	TK/ Quintal	Per cent	TK/ Quintal	Per cent
A. Gross Priced Received by the Producer	1291.00	70.43	1256.00	66.24	1388.00	61.28	1388.00	62.24
i Marketing cost incurred by the producer	32.87	1.79	32.87	1.73	32.87	1.45	32.87	1.47
ii.Net price received by the producer	1258.13	68.64	1223.13	64.51	1355.13	59.83	1355.13	60.77
B.Gross Margin of Bepari	0	0.00	0	0.00	288.00	12.72	406.00	18.21
i Marketing cost incurred by Bepari	0	0.00	0	0.00	146.17	6.45	146.17	6.55
ii.Net amount received by Bepari	0	0.00	0	0.00	141.83	6.26	259.83	11.65
C. Gross Margin of Paiker	181.00	9.87	0	0.00	252.00	11.13	0	0.00
i Marketing cost incurred by Paiker	87.42	4.77	0	0.00	87.42	3.86	0	0.00
ii.Net amount received by Paiker	93.58	5.11	0	0.00	164.73	7.27	0	0.00
D. Gross Margin of Retailer	361.00	19.69	640.00	33.76	337.00	14.88	436.00	19.55
i Marketing cost incurred by **Retailer**	43.81	2.39	43.81	2.31	43.81	1.93	43.81	1.96
ii.Net amount received by **Retailer**	317.19	17.30	596.19	31.44	293.19	12.94	392.19	17.59
Price paid by the consumer (A+B+C+D)	1833.00	100.00	1896.00	100.00	2265.00	100.0	2230.00	100.0

(Tk/quintal)

Chain I: Farmer- Paiker –Retailer- Consumer
Chain:II: Farmer- Retailer- Consumer
ChainIII: Farmer- Bepari-Aratdar-Paiker-Retailer-Consumer
Chain IV: Farmer- Bepari-Aratdar-Retailer-Consumer

Marketing Efficiency

Marketing efficiency is a complicated topic to be defined. Kohls (1992, p.37) defined marketing efficiency as the maximization of input output ratio. Six performance indicators were used for measuring the marketing efficiency in the present study.

Farmers' Shares to Consumers' Price

The producers' share of different marketing chains like I, II, III and IV were 70.43, 66.24, 61.28 and 62.24 percent respectively which were paid by the consumers as retail prices(Table 12). Farmers' share in different marketing chains was the highest in chain I followed by chain II and chain IV and was lowest in chain III (the longest route). It indicated that if the farmers' would sell their potato through farmers'- paiker – retailar - consumer, they would be most benefited. It could be concluded that if the farmers' would sell their major portion

of marketable surpluses directly to the paikers they would get more benefit; otherwise, they would lose the benefits.

Table10. Producers' share in the final product price in different marketing chains

(Tk/Quintal)

Particulars	Chain I	Chain II	Chain III	Chain IV
Producers' price	1291.00	1256.00	1388.00	1388.00
Weighted average price at the retail level	1833.00	1896.00	2265.00	2230.00
Percentage of producers' share	70.43	66.24	61.28	62.24
Rank (I_1)	1	2	4	3

Marketing Cost and Margins

Table 11 shows that the cost and margin of different intermediaries of different chains. Chain III incurred the highest marketing cost whereas, the lowest marketing cost is found in chain II (the shortest route). Number of intermediaries and marketing tiers is a major factor for increasing or decreasing marketing cost. For this reasons, price at retail level were differ from chain to chain. On the other hand in case of margin, the lowest margin was found in chain I and highest in chain III. The highest margin was due to highest price received by the intermediaries and the large number of intermediaries involved in the chain as compared to other chains.

Table11. Marketing costs, margins and net margins of the intermediaries under different chains (Tk/quintal)

Particulars	Chain I	Chain II	Chain III	Chain IV
Purchase price	1291.00	1256.00	1388.00	1388.00
Sale price	1833.00	1896.00	2265.00	2230.00
Marketing Margin	542.00	640.00	877.00	842.00
Rank (I_3)	1	2	4	3
Marketing cost	131.23	43.81	277.40	189.98
Rank (I_2)	2	1	4	3
Net marketing margin	**410.77**	**596.19**	**599.19**	**652.02**

Deviation between Maximum and Minimum prices

The price deviation of different chains for each month has shown in table 12. It may be observed from table that chain II incurred lowest price deviation and highest price deviation was in chain IV. It might be the reason of demand and supply condition of the farmer. The traders availed of this opportunity and made price discrimination. Seasonal production and high demand throughout the year is another reason of high deviation of prices.

Table12. Deviation between maximum and minimum price in different chains.

Month	Chain I	Chain II	Chain III	Chain IV
February	36	48	55	61
March	26	22	39	43
April	16	25	31	40
May	32	29	43	47
June	16	21	36	29
July	36	43	26	18
August	27	32	23	19
September	24	28	27	39
October	42	46	38	46
November	32	25	26	21
December	36	34	26	28
January	30	31	21	30
Σd	353	352	391	421
$\bar{D}$	29.42	29.33	32.58	35.08
N	12	11	12	12
Rank (I_4)	2	1	3	4

N = Total number of month (12Month)
D = The average deviation between the highest and lowest prices in each month in the respective channel

Seasonal Price Variability

The seasonal variations in price of potato for the peak and lean seasons in different chains are shown in table 13. In peak season, the price variation was the highest in chain IV and the lowest in chain II. So the farmers' price was less affected under channel II as compared to other chain in the peak period.The seasonal variations in prices of potato for the lean season in different chains revealed that the highest variation in prices was found in chain III and lowest in chain II. It indicated that the farmers would be able to take advantages of price movement in chain II. That is if they sold their potato through Farmer- retailers- Consumer this chain had lowest variation and the farmers would be benefited. Farmer prices were less affected by seasonality in channel II as compared to other chains.

Table13. Chain- wise seasonal price variability for the peak and lean season.

Particulars	Month	Chain I	Chain II	Chain III	Chain IV
Peak season	February	3685	7483	16848	17526
	March	2655	1792	15522	15522
	April	11905	6233	17497	18934
$\sum w_t(pt- \bar{P})^2$		18246	15507	49867	51982
T		3	3	3	3
δ		77.98	71.89	128.92	131.63
Rank (I_5)		2	1	3	4
Lean Season	May	7110	9036	14294	15806
	June	2502	4251	1365	1310
	July	2652	4403	2409	2331
	August	3594	3214	1408	1331
	September	5060	7563	49019	46334
	October	21009	3597	33064	35009
	November	7318	4205	12304	11009
	December	15552	1966	528	428
	January	8023	5860	8449	9217
$\sum w_t(pt- \bar{P})^2$		72820	44094	122840	122776
T		9	9	9	9
δ		89.95	69.99	116.82	116.79
Rank (I_6)		2	1	4	3

Source: Field Survey, 2009.

Overall marketing efficiency measurement

The efficiency of different marketing chains was drawn as the basis of ranks of different performance indicators in different chain using composite index formula. The performance indicators revealed that the marketing chain III and IV were not relatively efficient in the potato producing regions. It was due to low prices received by the farmers in the chain II and I as compared to other chains. The farmers' response to the marketing chain II, selling potato directly to the retailers (U)- Consumer, showed to be the most desirable (Table 14). It may, thus be concluded from the forgoing analysis that farmers' shares seemed to be very low in chains (III and IV) while the cost of marketing and intermediaries' margins were high in these chains. To enhance the share of the farmers, development of chain II situation should be given priority/ incentives by government to help in performing more marketing activities in their jurisdiction on the one hand and to create competitive Conditions for the intermediaries in favour of the farmers on the other.

Table14. Efficiency of Different Marketing Channels

Performance Indicator	Chains			
	I	II	III	IV
I_1	1	2	4	3
I_2	2	1	4	3
I_3	1	2	4	3
I_4	2	1	3	4
I_5	2	1	3	4
I_6	2	1	4	3
Composite Index (R_i/N_i)	1.67	1.33	3.67	3.33
Final Ranking	2	1	4	3

R_i = Total value of the ranks of performance indicators.
N_i = Total number of performance indicators.

Estimation of Growth Rate

Price: The growth rate of real price of potato was estimated as 0.09 % per annum during the study period. The growth co–efficient positive but not significant. Real price of potato was found to increase over the period of 1990/91 to 2004/05 due to increased demand of the people**.** The nominal price increase 3.11% per annum during the study period. The nominal price increase was caused by inflationary effect (Table15).

Area: The potato areas of selected districts of Bangladesh increased significantly during the study period because it is considered as the most demandable vegetable throughout the year and might be high adoption of HYV technologies. Highest growth rate was found in Bogra (9.58 %) and lowest for Jamalpur (2.19 %)(Table15).

Production: The growth rate of production of potato in selected districts and Bangladesh as a whole were increased significantly. Highest growth rate was found in Bogra (13.20%) and lowest for Jamalpur (4.10 %). Increase in production was mainly due to HYV seeds, plant protection measures, favoural climatic condition and adoption of better agronomic practices (Table15).

Yield: The yield of potatoes of selected districts increased significantly during the study period. Highest growth rate was found in Rangpur (4.55 %) and lowest for Jamalpur (2.62%) (Table15).

Table 15. Growth rates of real price, area, production and yield of Potato in selected areas of Bangladesh for the period from 1990 /91 to2011/12.

Areas	Annual Growth Rates (%)				
	Nominal Price	Real price	Area	Production	Yield
Bangladesh	3.11	0.09	7.35^{hs}	9.81^{hs}	2.61^{hs}
Bogra			9.58	13.20^{hs}	3.64^{c}
Jamalpur			2.19^{c}	4.10	2.23^{c}
Dhaka			4.38^{hs}	6.80h^{s}	2.62^{s}
Rangpur			7.04^{hs}	11.69^{s}	4.55^{s}

Source: Computed from the Tables 1-5 Appendix B,
'hs' 's' and 'c' indicate highly significant, significant and critically significant at 1%,5% and 10% error level respectively. Figures in parentheses indicate't' values.

Seasonal price variation

Many crops like potato are produced in a particular season in a year but they have demand throughout the year. As a result, prices remain at the lowest level in the harvesting period and then increase in different months based on the storage cost and reached the peak level just before harvest. The seasonal price variation of potato was higher for all markets. The price index of potato was the highest almost in December for all markets and the lowest in February (Table 16). The cause of this fluctuation may be because the supply of potato was the highest during period of February and March. After that period, the supply gradually decreases and the price of potato in these markets started to increase gradually. The coefficient of variation was the highest in Bogra and lowest in Jamalpur. The important thing is that the different seasonal variations in different markets are not significant. All the markets showed more or less the same seasonal pattern.

Table. 16 Seasonal price variation of potato for the period from 2000 to 2011.

(Seasonal Indices)

Months	Bogra	Jamalpur	Dhaka	Rangpur	Average
January	72.776	96.042	71.345	69.969	77.533
February	52.474	64.867	60.890	58.741	59.243
March	63.879	69.709	71.910	69.738	68.809
April	72.964	72.516	78.872	79.780	76.033
May	98.996	88.827	96.792	96.898	95.378
June	108.287	101.037	103.700	105.032	104.514
July	111.292	108.905	111.340	109.792	110.332
August	111.805	110.503	107.806	112.647	110.690
September	111.897	106.367	111.279	110.736	110.070
October	125.044	115.005	115.678	120.937	119.166
November	134.281	130.519	132.471	139.158	134.107
December	136.304	135.702	137.862	126.571	134.110
Highest	136.304	135.702	137.862	139.158	134.109
Lowest	52.474	64.867	60.890	58.741	59.243
Range	83.83	70.835	76.972	80.417	74.866
CV (%)	28.0162	22.783	24.608	25.248	24.811

Source: DAM

4. CONCLUSION AND RECOMMENDATION

The following problem based recommendation was made to the policy maker considering the response of the potato farmers and traders which will helpful to overcome the present situation of the potato marketing.According the farmers' opinion, price of potato is very low at peak harvesting period. Establishment of cold storage in the intensive growing areas may be one of the remedy of this problem and it will ensure fair prices for the farmers. In this respect, new trust on research needs to direction of HYV (both winter and summer) for regular supply of potato in the cold storage for maximum utilization of plant. In this respect, agricultural research efforts should be made towards varietals improvements of potato for increasing their yields. Greater emphasis should be given for evolving drought and disease resistant high yielding verities of potato

- Market information should be spread widely in the national mass media (i.e T.V, Radio, Newspaper) which would have taken initiatives to circulate information about daily market prices of potato both at producers' market and at retail levels.
- Cooperative marketing system can be introduced to ensure assured market and better price for the products. As an organized body they would also acquire a better bargaining power for their products over the powerful middlemen that manipulate and control the price of potato in the marketing system.
- Market infrastructure should be developed in terms of quick transportation, proper storage and other physical facilities to reduce spoilage and damage.
- Before taking any price policy, price response level and price flexibility and cross price flexibility effects must be considered carefully.
- Price and yield risk factors will need to be taken care of by appropriate measures in order to provide the necessary incentives to the producers. Because these variables were statistically significant.
- Usually, potato market is controlled by some fraudulent traders and the consumers have to pay higher price for it. Therefore, steps should be taken against those types of traders and the existing market monitoring mechanism should be strengthened.
- For reducing post harvest loss and diversification of potato consumption,family level demonstration for the preparation of potato chips, potato shemai and potato powder is required and researchers can take different programs in the intensive potato growing areas for of this matter. The preparation method of the items can be communicated to the farmers through leaflets.

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