

Agro-economic study of Lathyrus cultivation in some selected areas of Bangladesh

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Abstract: The present study is an attempt to assess the existing agronomic practices of lathyrus cultivation, its profitability, and constraints to lathyrus production. The study has been based on both primary as well as secondary data. The primary data were collected from purposively selected seven lathyrus growing districts namely Natore, Pabna, Kushtia, Chuadanga, Jhenaidah, Jessore, and Rajbari during 2011-2012. All kinds of fertilizer used by the farmers were below the optimum level of recommendation. About 26 and 9 percent of the total cost was for human labour and land preparation, respectively. The average yield of lathyrus was found higher than the national average. The average gross margin was observed to be Tk. 17720 on total variable cost basis. Low price of lathyrus, high disease infestation, unfavourable climate, unknown about high yielding lathyrus varieties, and lack of technical know-how were the major problems for lathyrus production. Farmers cultivated lathyrus because of higher yield, higher income and easy growing.

Key words: Lathyrus cultivation, Gross return, gross margin, and profitability.

Introduction

Agriculture is a pillar of Bangladesh economy, using more than 70 percent of land area (FAOSTAT, 2009; Nargis and Lee, 2013). Moreover, this sector feeds up around 160 million people of the country and provides survival and nutrition for the farm households of rural areas (GoB, 2014). Among the crops, average annual production of pulses was about 259 thousand metric tons in the early seventies which increased until mid-nineties but then declined to 217 thousand metric tons in the late 2000s. Since then gradually increased to 309 thousand metric tons in mid-2010s. Pulses production has increased annually at the rate of 10.6 percent in the recent years. Bangladesh is a net importer of pulses. Compared to 1993/94, value of total import of pulse in 2014/15 was 14.3 times than that of 1993/94 (Deb, 2016). Pulses are important legume crops in Bangladesh because of their importance in food, feed and cropping system. Pulses have played an important role in sustaining the productivity of soils. They are generally grown without fertilizer since they can meet their nitrogen requirement by symbiotic fixation of atmospheric nitrogen in the soil (Rahman *et al.*, 2012; Senanayake *et al.*, 1987; Zapata *et al.*, 1987). The per capita consumption of pulse in Bangladesh is only 14.3 g/day, which is much lower than WHO recommendation of 45 g/day and Indian Council of Medical Research recommendation of 60 g/day (HIES, 2010; Afzal *et al.*, 1999). Among the pulses, lathyrus is the first important pulse crop in terms of area and production in Bangladesh (BBS, 2013). Lathyrus is cultivated in different parts of the country. But it is extensively cultivated in mid-western parts of Bangladesh. The average productivity of traditional lathyrus in the country is very low and varies widely across farms and locations (Sikder and Elias, 1985). The Bangladesh Agricultural Research Institute (BARI) has released a number of HYV and disease lathyrus varieties which is cultivating in the farmers field. But the economic performance of this crop is unknown to the researchers and policy makers because of limited study were done in this respect. Sustainability of a crop depends on its economic profitability. Therefore this study is expected to provide valuable information and may be useful to the researchers and policy makers of both Go and NGOs for formulating appropriate policy for widespread cultivation of lathyrus in Bangladesh. With this view in mind, the study was undertaken to assess the production

and area covered by the lathyrus varieties, to estimate the profitability of lathyrus growers at farm level, and to examine the constraints of lathyrus cultivation.

Materials and Methods

The study was conducted in purposively selected seven lathyrus growing districts namely Natore, Pabna, Kushtia, Chuadanga, Jhenaidah, Magura and Rajbari. Again, three *Upazilas* from each district were selected based on the higher concentration of lathyrus areas except Chuadanga. Finally, a total of 93 lathyrus growers were randomly selected for interview. Collected data were edited, summarized, tabulated and analyzed to fulfill the objectives of the study. Tabular method of analysis using descriptive statistics was used in presenting the results of the study. Sample size of lathyrus growers in different districts in the study areas were Natore-6, Pabna-25, Kushtia-15, Chuadanga-4, Jhenaidaha-13, Magura-15 and Rajbari -15. Total number samples of all districts was 93.

Results and Discussion

Trend of area, production and yield of lathyrus: The trends of area, production and yield of lathyrus are shown in Fig. 1. The overall area and production of lathyrus showed a decreasing trend over the period from 2001 to 2010. Again, the area and production showed little bit increasing trend over the period from 2008 to 2010. The yield of lathyrus was fluctuated until 2007. After 2007, increasing trend was observed (Fig.1). This might be due to favorable climatic condition.

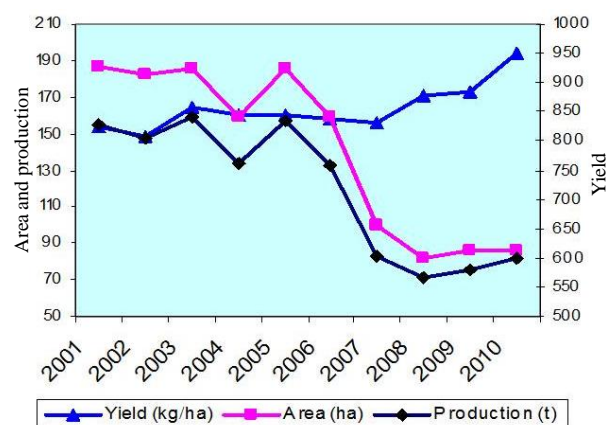


Fig. 1. Trend of area, production and yield of Lathyrus

The overall situation of lathyrus cultivation in the country in 10 years period showed a gloomy picture. The area and

production of lathyrus decreased to a great extent. This was happened due to development of irrigation facilities, competition with high value crops, unfavorable climate, disease and insect infestation etc. Except few exceptions, the overall productivity performance of lathyrus is encouraging which was due to introduction of improved varieties, improved management practices and developed farmers' awareness toward lathyrus cultivation as well as soil health through demonstration and training.

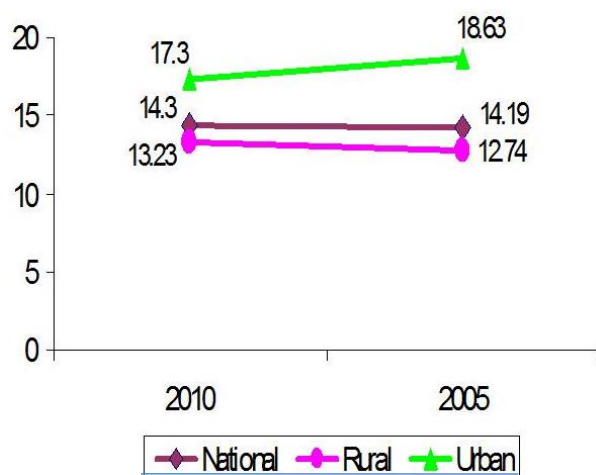


Fig. 2. Per capita intake of pulse 2006 2010

Per capita consumption of pulses is shown in Fig. 2. Per capita per day consumption of pulses increased slightly to 14.3 gram in 2010 from 14.19 gram in 2005. Food consumption pattern in the rural areas is not similar to that in the urban areas. The consumption of pulses is higher in the urban areas than in the rural areas.

Table 1. Agronomic practices of lathyrus cultivation (in percentage)

Activities	Natore	Pabna	Kushtia	Chuadanga	Jhenaidaha	Magura	Rajbari	All
No of responded	n=6	n=25	n=15	n=4	n=13	n=15	n=15	n=90
Ploughing :1-2	67	52	67	100	46	67	47	58
3-4	33	48	33	-	54	33	53	42
Ploughing PT*	100	100	100	100	100	100	100	100
Seed (own)	67	68	80	100	85	80	67	75
As relay cropping	67	72	53	75	69	60	73	67
Sowing method:								
Line	-	-	13	-	23	-	-	5
Broad	100	100	87	100	77	100	100	95
Sowing time:								
October	83	60	53		38	53	33	48
November	17	40	47	100	62	47	67	52
Insecticide application	-	-	20	-	77	7	13	17
Irrigation	17	4	-	-	-	13	20	8
Weeding no.:								
One	-	8	-	25	-	-	-	3
Harvesting :								
Upto 15, March	50	4	27	100	54	40	40	33
After 15, March	50	96	73	-	46	60	60	67
Threshing by PT*	33	100	93	100	62	33	60	72
Animal power	-	-	7	-	23	27	40	15
Beating	67	-	-	-	15	40	-	13

* PT means power tiller

Disposal patterns of lathyrus: On an average, 81% of the total lathyrus were sold by the farmers. About 9% products were consumed, 8% kept for future use as seed, and only 2% gave as gifts. The per capita annual consumption of lathyrus was estimated at 0.69 kg. Consumption was observed comparatively higher by the farmers of Rajbari and Magura (Table 3).

Agronomic practices followed in lathyrus cultivation:

Lathyrus is widely cultivated as a pulse crop in the study areas. About 75% farmers used their own seed and it was found highest (100%) in Chuadanga district (Table 1). Lathyrus is generally cultivated as a relay cropping throughout the country. A good number of farmers also cultivated it as a sole crop. Survey results show that about 67% lathyrus farmers cultivated it as a relay crop and the rest 33% farmers cultivated it as a sole crop in the study areas. Mostly farmers (95%) followed broadcast method of seed sowing. Line sowing was reported only by the farmers of Jhenaidaha and Kustia districts. On an average, 17% farmers applied insecticides and 8% farmers irrigated their land. Within October 48% farmers completed their sowing. Single weeding was done by 3% farmers. Harvesting was completed 33% farmers within 15 March. Threshing was done by power tiller (72%) followed by animal power (15%) and beating (13%).

Input use pattern: Lathyrus cultivation required 33 man-days of human labours per hectare (Table 2). More or less same number of labour was used in all the study locations. The quantity of seed used was 63 kg/ha that was found highest in Natore district (72 kg/ha) and the lowest in Magura district (58kg/ha). The average use of cowdung was 267 kg/ha. Cowdung was used only three study locations namely Jhenaidaha, Magura and Rajbari. They used urea and TSP at the rate of 19 kg/ha and 10 kg/ha for lathyrus cultivation respectively which was found very low than the recommended amount of urea, TSP and MP amounted at 40-45, 80-85 and 30-40 kg per hectare respectively (Hussain *et al.*, 2006).

Cost of lathyrus production: Cost is the expenses for organizing and carrying out the production process. The cost of production included all variable cost items like human labour, land preparation, seed, cow-dung, fertilizers, insecticides, and irrigation. Besides, interest on operating capital was also considered as variable cost and rental value of land was considered as fixed cost for the

estimation of cost of production. The average cost of lathyrus cultivation was found to be Tk 32614/ha (Table 4). The cost of cultivation of lathyrus was found more or

less same in all the study areas. The highest cost was incurred for land use followed by human labour, and land preparation (Table 4).

Table 2. Per hectare input use for lathyrus cultivation in the study areas

Type of input	Natore	Pabna	Kushtia	Chuadanga	Jhenaidaha	Magura	Rajbari	All
<i>No of responded</i>	n=6	n=25	n=15	n=4	n=13	n=15	n=15	n=90
Human labour (man-days)	29	32	32	31	34	39	31	33
Seed (kg)	72	66	62	61	64	58	62	63
Cowdungs (kg)	-	-	-	-	874	192	638	267
Fertilizers (kg):								
Urea	19	26	2	-	39	10	15	19
TSP	-	19	-	-	-	11	17	10
MP	-	-	-	-	-	-	-	-

Table 3. Disposal pattern of lathyrus in the study areas (Percentage)

Districts	Own consumption	Sale	Seed	Gifts
Natore	5	90	4	1
Pabna	6	85	8	1
Kushtia	8	82	8	2
Chuadanga	6	85	6	3
Jhenaidaha	8	79	11	2
Magura	12	78	9	1
Rajbari	18	71	8	3
All	9	81	8	2

Table 4. Cost of lathyrus cultivation by the sample farmers in the study areas

Cost items	Natore	Pabna	Kushtia	Chuadanga	Jhenaidaha	Magura	Rajbari	All
Land preparation	3243	3090	2969	2245	2994	3194	2395	2935 (9)
Human labour	5894	8513	9231	6130	6777	9811	9294	8450 (26)
Seed	2320	2107	1896	1907	1721	1693	1916	1927 (6)
Cowdungs	-	-	-	-	874	154	357	205 (1)
Fertilizers:								
Urea	225	317	28	-	462	121	193	219
TSP	-	500	-	-	-	288	499	261
Total	225	817	28	-	462	409	692	480 (1)
Insecticides	-	-	230	-	955	66	319	233 (1)
Irrigation	250	120	-	-	-	181	258	119
Threshing	2731	2438	2380	2399	2049	2127	2284	2317 (7)
Interest*	440	513	502	380	475	529	525	499 (2)
Total variable cost	15983	17598	17236	13061	16307	18164	18040	17140 (53)
Land use cost	17672	14387	14948	18678	17590	15564	14262	15491 (47)
Total cost:	32775	31985	32184	31739	33897	33728	32302	32614 (100)

Note: Interest on operating capital (9% for one year), figures in the parentheses indicate percentage of total cost.

Profitability of lathyrus production: Profitability is one of the major criteria for determination of acceptance of a crop. The average yield of lathyrus was 1326 kg/ha which was much higher than the national average of 951 kg/ha (BBS, 2010). The highest yield was found in natore (1378

kg/ha) and lowest in Chuadanga (1235 kg/ha). Average gross return, gross margin and net return were estimated at Tk. 34860/ha, Tk. 17720/ha and Tk. 2246/ha respectively. Average rate of return (BCR) was 2.03 (Table 5).

Table 5. Profitability of lathyrus cultivation in the study areas

Items	Natore	Pabna	Kushtia	Chuadanga	Jhenaidaha	Magura	Rajbari	All
Yield (kg/ha)	1378	1303	1345	1235	1328	1372	1297	1326
Price (Tk/kg)	27	26	25	27	27	27	26	26
A. Total cost (Tk/ha):								
Variable cost (VC)	15103	17598	17236	13061	16307	18164	18040	17140
Fixed cost (FC)	17672	14387	14948	18678	17590	15564	14262	15474
B. Gross return	37814	34415	33298	32924	35725	36711	33900	34860
C. Gross margin (B-VC)	22711	16817	16062	19863	19418	18547	15860	17720
D. Net return (B-A)	5039	2430	1114	1185	1828	2983	1598	2246
E. Rate of return (BCR)	2.50	1.96	1.93	2.52	2.19	2.02	1.88	2.03

Constraints to lathyrus cultivation: The major constraints faced by the farmers were low price of output (50%), infestation by powdery mildew (33%), high rainfall

(24%), low yield (8%), and stolen by people (8%). High weed infestation was also faced by 13% farmers (Table 6).

Table 7. Constraints faced by the lathyrus farmers in the study areas

Problems	Natore	Pabna	Kushtia	Chuadanga	Jhenaidaha	Magura	Rajbari	All
Low price	17	56	33	100	46	54	47	50
Disease and insect infestation	16	28	40	-	31	38	47	33
Damage due to rainfall	17	16	40	-	-	38	33	24
Technical know-how	33	8	-	25	46	8	13	16
Stolen by people	17	16	13	25	8	31	7	16
High weed infestation	18	16	7	-	8	31	7	13
Moisture scarcity during sowing time	17	12	13	25	23	-	7	12
Unknown about HYV lathyrus	15	4	20	-	15	31	-	12

Lathyrus is a profitable crop on the basis of its return to investment. Modern inputs and production technology can help the farmers to increase income through increased yield and improve their socio-economic conditions. Lathyrus can help in improving the nutritional status of the rural people. Low price of output, lack of awareness about high yielding disease resistant BARI varieties and technical know-how were the main constraints to its production. Improved production technologies should be available to the farmers by training through Government and Non-government Organization. In-depth economic study should be taken for development of lathyrus.

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