PROFITABILITY OF ROSE CULTIVATION IN SOME SELECTED AREAS OF JESSORE DISTRICT

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Abstract

Rose cultivation is now a profitable enterprise to the farmers, but the socio-economic data and information of this flower are very scarce in Bangladesh. So, the present study was conducted to identify agronomic practices, analyze relative profitability, and input-output relationship during December 2010. A total of 100 rose growing farmers were randomly selected for this study. The results indicated that 100% farmers cultivated Lincoln variety of rose. The costs of rose cultivation were Tk. 3,87,569 and Tk. 2,75,214 per hectare on full cost and variable cost basis, respectively. The major share of full cost was incurred for human labour (30%), followed by land use (23%), fertilizer (17%), and irrigation (12%). The yield of rose was 5,40,107 flowers per hectare. The net return from rose cultivation was Tk. 23,31,196 per hectare. The benefit cost ratios were 2.29 and 1.63 on variable cost and full cost basis, respectively. The highest profit was obtained from rose cultivation compared to its competitive crops like potato+jute, lentil+til and mustard+mungbean for rose. Human labor, land preparation cost, seedling, urea, TSP, MoP and irrigation had positive effect on the yield of rose. Lack of technical knowledge, non-availability of HYV seedling, and infestation of insects and diseases were major problems found in rose cultivation. Government should take necessary steps to overcome these problems.

Keywords: Rose, profitability, gross margin, net return, BCR.

Introduction

Commercial floriculture in Bangladesh is a new dimension in farming culture. Evidences from all civilizations reveal that mankind has historical interest in gardening and culturing flowers to satisfy aesthetic need. But, in the present world, flower becomes important not only for its aesthetic social values, but also for its economic contribution (Aditya, 1992; Dadlani, 2003). People usually use flowers in all their ceremonies like wedding, birthday and marriage day greetings, religious offerings and sometimes in social, political and historical occasions. The universal usage has created a real trend of producing flower on a commercial basis to meet increasing demand in the market. The area under rose cultivation was 111 ha producing about 2423 tonnes with an average yield of 21.92 t/ha. The annual growth rate of area, production and yield of marigold for

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the period from 2005-2006 to 2009-2010 were 6.30%, 7.89% and 1.59%, respectively (Table 1).

Table 1. Mean, coefficient of variation and growth rates of rose, 2005- 06 /2009-10.

Year	Area (ha)	Prod (mt)	Yield (t/ha)
2005-2006	91	1658	18.25
2006-2007	83	2328	27.96
2007-2008	91	2353	25.95
2008-2009	106	2400	22.71
2009-2010	111	2423	21.92
Mean	96	2232	23.36
CV (%)	11.9	14.5	16.1
Growth rate (%)	6.30	7.89	1.59

Source: BBS, 2010

Considering the market value, some farmers in association with some entrepreneurs have started cultivation of gladiolus, tuberose, marigold, rose, gerbera and orchid flowers. But the socio-economic data and information regarding rose cultivation is very much scarce in Bangladesh. Nevertheless, rose cultivating farmers are depriving from higher production and fair prices due to various farm level constraints that need to be explored.

With this view in mind, the present study was undertaken to (i) identify the existing agronomic practices of rose cultivation; (ii) measure the relative profitability of rose with major competing crops; (iii) determine the input-output relationship of rose cultivation; and (iv) find out the socio-economic constraints to its higher production.

Materials and Method

Sampling technique: A multi-stage sampling technique was followed in this study to select study area and sample farmers. In first stage of sampling, one major rose growing district namely Jessore was selected purposively. In the second stage, Jhikorgacha *Upazila* was selected for sample survey. In the third stage, a complete list of rose growers was collected from the study area, and finally a total of 100 rose farmers were selected by random sampling technique. The rose farmers / gardens were categories into four: Ist year, 2nd year, 3rd year and 4th year on the basis of the duration of cultivation. In order to compare the benefit of rose cultivation with other existing competing crops, potato+ jute, lentil+til and mustard+mungbean for rose were selected. The competitive crops were selected on the basis of same soil and land type of rose cultivation in the study areas. Rice

is not considered a competitive crop of rose because farmers cultivate rice as scattered in the study area.

Method of data collection: Data for the present study were collected from sample rose farmers through face to face interview method using a pre-tested interview schedule. Field level data were colleted by the researcher with the help of trained enumerators for the period of December, 2010

Analytical techniques: Both fixed cost and variable cost were taken into account in calculating cost of rose cultivation. Land use cost was calculated on the basis of per year existing lease value of land. The profitability of rose cultivation was examined on the basis of gross margin, net return and benefit cost analysis. The collected data were edited, summarized, tabulated and analyzed to fulfill the objectives of the study. Tabular method using descriptive statistics was mostly used in the study. Cobb-Douglas production function model was used to estimate the contribution of factors to rose cultivation. The functional form of the Cobb-Douglas production function model is given below:

$$Y = AX_1^{b1}X_2^{b2} \text{ ------------------------ } X_n^{bn}e^{ui}$$

The production function was converted to logarithmic form so that it could be solved by least square method i.e.

$$lnY = lna + b_1lnX_1 + b_2lnX_2 + \ldots\ldots\ldots\ldots\ldots\ldots b_nlnX_n + U_i$$

The empirical production function model was the following:

$$lnY = a + b_1lnX_1 + b_2lnX_2 + b_3 lnX_3 + b_4lnX_4 + b_5lnX_5 + b_6 \; lnX_6 + b_7lnX_7 + b_8 lnX_8 + U_i$$

Where, Y = Yield of rose (No/ha), X_1 = Human Labour (Man-day /ha), X_2 = Land preparation cost (Tk/ha), X_3 = Seedling (No./ha), $_4$ = Manure (kg/ha), X_5 = Urea (kg/ha), X_6 = TSP (kg/ha), X_7 = MoP (kg/ha), X_8 = Irrigation cost (Tk/ha), A= Intercept, b_1, b_2 ------------------ b_8 = Coefficients of the respective variables to be estimated and U_i = Error term.

Results and Discussion
Agronomic practices of rose

It was found that hundred percent farmers used power tiller for land preparation. The average number of ploughs per farm was 6 (Table 2). All the farmers planted seedling/cutting of rose in line. The planting time of rose seedling/cutting started from mid February and continued up to mid March. The average number of weeding, insecticide spraying and irrigation per farm were 18, 16 and 19 respectively. In the study area, 70% farmers prune their rose garden within mid October to mid November and 30% farmers pruning within mid February to mid March. In the first year garden, 100% farmers started harvesting rose flowers

from the month of April and continued up to next January but in the second, third, and fourth year gardens, 70% farmers' harvested rose flowers from the month of January and continued up to September and only 30% farmers started harvesting rose flowers between April and January. It was happened mainly due to variation of pruning period. Hundred percent farmers in the study area cultivated Lincoln variety of rose.

Table 2. Agronomic practices of rose cultivation in the study area.

Items	Agronomic practices				
	Ist year	2nd year	3rd year	4th year	All
Ploughing (no./farm)	6	-	-	-	6
Planting method (% of farmers):					
Line	100	-	-	-	100
Planting time:					
Mid Feb.-Mid March	100	-	-	-	100
Weeding (no./farm)	15	19	21	18	18
Spraying insecticides (no./farm)	16	17	18	15	16
Irrigation (no./farm)	18	19	22	17	19
Time of pruning (% of farmers):					
Mid Oct.-Mid Nov.	-	70	70	70	70
Mid Feb.- Mid March	-	30	30	30	30
Harvesting time :					
Jan.-Sept.	-	70	70	70	70
April.-next January	100	30	30	30	30
Types of rose (% of farmers):					
Lincoln	100	100	100	100	100

Input use pattern

The number of human labour used for growing rose was 726 man-days per hectare. The cost of land preparation was Tk.1880. The average number of seedlings/cutting was 7304 per hectare. The respondent farmers used 1546 kg of manures per hectare. Rose farmers also used chemical fertilizers like urea, TSP, MoP, Zipsum, Zinc sulphate, and Boron at the rate of 1710 kg, 1194 kg, 592 kg, 453 kg, 33 kg, and 2 kg per hectare, respectively. The use of urea, TSP, and MoP were found higher than the recommended doses (Urea 1302 kg/ha, TSP 1000 kg/ha, and MoP 400kg/ha) (Table-3).

Table 3. Input use pattern of rose cultivation in the study area.

Items	Input use pattern				
	Ist year	2nd year	3rd year	4th year	All
Human labour (man-days/ha)	704	766	688	748	726
Family	306	320	301	319	311
Hired	398	446	387	429	415
Land preparation cost (Tk./ha)	7519	-	-	-	1880
Seedling/Cutting (No./ha)	29218	-	-	-	7304
Manures (kg/ha)	1792	1422	1653	1319	1546
Fertilizers (kg/ha)*					
Urea	1315	2046	1730	1748	1710
TSP	736	1381	1298	1363	1194
MoP	614	441	536	778	592
Zipsum	480	458	296	579	453
Zinc sulphate	11	67	36	19	33
Boron	1	3	-	2	2
Insecticides (Tk./ha)	59498	54192	51510	55601	55200
Irrigation (Tk./ha)	29754	18612	22181	19668	22554

*Recommended doses of fertilizers (Urea 1302kg/ha, TSP 1000kg/ha and MoP 400 kg/ha)

Cost and return from rose cultivation

All variable costs incurred for human labour, land preparation, seedling, organic manure, fertilizers, insecticides, and irrigation were considered for calculating the cost of rose cultivation. The cost of land use was calculated on the basis of lease value of land. The average costs of rose cultivation were Tk. 3,87, 569, and Tk. 2,75,214 per hectare on full cost and variable cost basis, respectively. The major share of total cost was incurred for human labour (30%) followed by land use (23%), fertilizer (17%), and irrigation (Table 4). In the first year garden, the cost of rose cultivation was found higher than the second, third and fourth year gardens due to the initial cost of establishing the garden. Comparative costs scenarios revealed that the cost of rose cultivation was much higher than that of different comparative cropping patterns. Rose cultivation cost was 36%, 79% and 82% higher compared to potato+jute, lentil+til and mustard+mungbean cropping patterns respectively (Table 6).

Table 4. Cost and return of rose cultivation in the study area.

(*Figure in (Tk./ha*)

Items	Cost of cultivation				
	Ist year	2nd year	3rd year	4th year	All
A. Variable costs	440854 (80)	225252(66)	209762(65)	224987(66)	275214(69)
Land preparation	7519 (1)	-	-	-	1880(1)
Hired labour	48012 (8)	53531(16)	46697(15)	51543(15)	49945(14)
Seedling/cutting	208643 (38)	-	-	-	52160(12)
Organic manure	1289 (0.23)	953(0.28)	1170(0.37)	1010(0.29)	1105(0.28)
Chemical fertilizers	53480 (10)	81277(24)	72664(22)	80497(24)	71979(18)
Urea	15781	24558	20768	20985	20523
TSP	18419	34530	32453	34083	29871
MoP	15071	11062	13909	19786	14957
Zipsum	2743	2538	1684	3270	2558
Zinc Sulphate	1303	8063	3848	2128	3835
Boron	161	523	-	241	231
Insecticides	59498 (11)	54192(16)	51510(16)	55601(16)	55200(14)
Irrigation	29754 (5)	18612(5)	22181(7)	19668(6)	22554(5)
Interest on operating capital	32655 (6)	16685(5)	15537(5)	16665(5)	20385(5)
B. Fixed cost	111830 (20)	113274(34)	111247(35)	113071(34)	112355(31)
Family labour	36982 (6)	38426(12)	36399(11)	38223(11)	37507(10)
Land use	74848 (14)	74848(22)	74848(24)	74848(23)	74848(21)
C. Total cost (A+B)	552684 (100)	338527(100)	314772(100)	338059(100)	387569(100)
Yield (Flowers/ha)	303373	673028	680785	503244	540107
Price (Tk/flower)	1.34	1.17	1.06	1.13	1.17
D. Gross return	406520	787443	721632	568666	621065
Gross margin	-34334	562191	511870	343679	345852
Net return	-146164	448916	406860	230607	233496
E. Benefit cost ratio					
Full cost basis	0.74	2.33	2.29	1.68	1.63
Variable cost basis	0.92	3.50	3.44	2.52	2.29

Figures within the parentheses indicates percentage of total cost

The average yield of rose was 5,40,107 flowers per hectare (Table 4). The gross margin and net return of rose cultivation were Tk. 3,45,852 and Tk. 2,30,607 per hectare. The gross margin and net return were found negative in the first year garden due to higher initial cost of cultivation. The gross margin and net return were found highest in the second and third year garden than the first

year and fourth year garden. The net return of rose cultivation was 38%, 86% and 81% higher than its competing cropping patterns (Table 6).The benefit cost ratio was 1.63 and 2.04 on full cost and variable cost basis, respectively.

Table 5. Costs and returns of different competitive crops and cropping patterns of rose.

Parameters	Potato	Jute	Potato +Jute	Lentil	Til	Lentil +Til	Mustard	Mung- bean	Mustard+ Mungbean
A. Variable cost	164135	20124	184259	18846	23220	42066	14582	20194	37276
Hired labour	21393	12000	33393	6630	7620	14250	4969	4911	9880
Land preparation	5420	1497	6917	3225	3170	6395	2915	2825	5740
Seed	69277	480	69757	1050	620	1670	552	650	1202
Manures	3692	650	4342	830	650	1480	762	820	1582
Fertilizers	43966	2500	46466	4576	7975	12551	3700	8315	14515
Pesticides	10148	-	10148	820	1050	1870	88	350	438
Irrigation	4663	2245	6908	1345	1220	2565	1291	1560	2851
Interest on operating capital	5575	753	6327	370	915	1285	305	763	1068
B. Fixed cost	46494	17132	43626	20316	18430	38746	17030	17132	34162
Family labour	20000	-	20000	3000	2500	5500	2900	3500	6400
Land use	26494	17132	43626	17316	15930	33246	14130	13632	27762
C. Total cost (A+B)	**210629**	**37256**	**247885**	**39162**	**41650**	**80812**	**34112**	**37326**	**71438**
Yield (kg/ha)	26139	1400	-	1200	1494.48	-	979	1050	-
Price (Tk/kg)	12.79	40.55	-	5142	35.00	-	53.44	60.35	-
D. Gross return	335138	56770	391908	61692	52307	113999	52327	63367	115694
Gross margin	171003	36646	187649	42846	29087	71933	35245	43173	78418
Net return	124509	19514	144023	22530	10657	33187	18215	26041	44256
E. Benefit cost ratio									
Full cost basis	1.59	1.52	1.58	1.58	1.25	1.41	1.53	1.70	1.61
Variable cost basis	2.04	2.82	2.13	3.27	2.25	2.71	3.59	3.14	3.10

Factors affecting rose yield

In order to determine the contribution of inputs like human labour, land preparation, seedling, manure, urea, TSP, MoP, insecticide, and irrigation for rose production, Cobb- Douglas production function was used. The estimated values of co-efficient and related statistics of Cobb- Douglas production function are presented in Table 7. The model reveals that the co-efficients of human labour, land preparation cost, seedling, MoP and irrigation were positively significant at 1% level indicate that 1% increase in the use of these inputs, keeping other factors remaining constant would increase the yield of rose by

0.001%, 0.016%, 0.043%, 0.051 and 0.024% respectively. The co-efficient of urea and TSP were positively significant at 5% level indicated that 5% increase in the use of these inputs, keeping other factors remaining constant would increase the yield of rose by 0.051% and 0.052% respectively.

Table 6.   Relative economic performance of rose cultivation with other competitive crops and cropping patterns.

(Figure in Tk /ha)

Parameters	Rose	Potato +Jute	% higher than Potato+Jute	Lentil + Til	% higher than lentil+Til	Mustard + Mungbean	% higher than mustard+ Mungbean
A. Gross return	621065	391908	37	113999	81	115690	81
B. Variable cost	275214	184259	33	42066	84	37276	86
C. Total cost	387569	247885	36	80812	79	71438	82
D. Gross margin (A-B)	345852	187649	46	71933	79	78418	77
E. Net return (A-C)	230607	144023	38	33187	86	44256	81
F. Benefit cost ratio							
Full cost basis	1.63	1.58	-	1.41	-	1.61	-
Variable cost basis	2.04	2.13	-	2.71	-	3.10	-

Table 7. Estimated coefficients and their related statistics of production function for rose.

Explanatory Variables	Co-efficient	t-value
Intercept	13.523***	3.92
Human labor (X_1)	0.001***	4.08
Land preparation (X_2)	0.016***	3.25
Seedling/cutting (X_3)	0.043***	2.62
Manure (X_4)	0.452ns	1.02
Urea (X_5)	0.051***	2.02
TSP (X_6)	0.052**	2.54
MoP (X_7)	0.051***	2.63
Irrigation (X_8)	0.024***	3.79
R^2	0.56	
F value	5.79***	

Note: *** and ** indicate significant at 1% and 5% level respectively

The value of coefficient of determination (R^2) was 0.56, which indicated that around 56% of the variation in yield was explained by the independent variables

included in the model. The F-value was found 5.79 which were significant at 1% level implying that the variation of yield mainly depends on the explanatory variables included in the model.

Table 8. Constraints to rose cultivation in the study area.

Constraints	% of respondent farmers
1. Lack of technical knowledge	40
2. Non-availability of HYV seedling/cutting	30
3. Lack of transport facility	60
4. Disease and insects infestation	45

Constraints to rose cultivation

Although rose cultivation was observed to be a profitable crop, there are several constraints to its higher production. The constraints are shown in Table 8. It was found that 60% farmers reported that lack of transport facility ranked first constraint of rose cultivation. Others major constraints to rose cultivation were disease and insect's infestation (45%), lack of technical knowledge (40%), and non-availability of HYV seedlings (30%).

Conclusion

The cultivation of rose was highly profitable at farm level because of its higher demand compared to its production. Human labour, land preparation, seedling, urea, TSP, MoP and irrigation had positive and significant effect on the yield of rose in the study areas. Among the competing crops like potato+jute, lentil+til and mustard+mungbean, respectively, the highest profit was obtained from rose. Lack of technical knowledge, high yielding varieties, infestation of disease and insects were major constraints for rose cultivation.

Recommendations

Based on the findings of the study, the following recommendations put forward for the improvement of rose cultivation at farm level.

- Farmers' training should be conducted by the BARI scientists to develop technical knowledge about improved cultivation practices of rose.

- High yielding varieties rose seedling/cutting should be made locally available to the farmers at proper time. For this reason, government should encourage researcher and private seed companies for producing HYV seedling/cutting of rose.

- More intensive research should be undertaken by BARI scientists to develop disease and insect-pest resistant HYV varieties of rose in the near future.

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