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Economic Efficiency, Profitability and Cost Structure of Dutch Rose Cultivation in the Malnad Region of Karnataka

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Abstract:

The production and consumption of cut flowers and ornamental flowers are increasing in the Malnad region of Karnataka. The growth of flowers produces more revenue per unit of land than the growth of conventional crops. At this location, flower crops have received all of the attention from farmers and business owners in the horticultural sector. Farmers in this area gave structured floriculture a substantial space to grow a variety of flowers. One of the most common flower crops and one that brings in greater profits for farmers is Dutch Rose. The cost of producing this flower is manageable for small and marginal growers. The gross income for all farms on an average in the cultivation of Dutch Rose is Rs 1151678.22.The benefit cost ratio for all farms was 3.85.The benefit-cost ratio was determined to be lower for marginal and small farms. Dutch Rose is highly growing commercial flower under polyhouse in Malnad region.

Key Words: *Malnad, flower, crops, Dutch Rose*

Introduction:

Horticulture has emerged as one of India's key development areas, accounting for 30% of the country's agricultural GDP and 50% of all agri-exports. This sector creates three to four times as many jobs as other agricultural products. Policymakers and experts have shifted their attention to horticulture crops that are more lucrative and have export potential.

Floriculture is a timeless creative skill as well as a cutting-edge science. Historically, India has grown flowers in open fields that are vulnerable to both biotic and abiotic influences. A wide range of floricultural goods are in high demand on the export market in the era of globalization. The demands of today's consumers can be met by modern floriculture.

Floriculture can be defined as "a specialized branch of horticulture which deals not only with the cultivation of flowers, foliage, climbers, trees, shrubs, cacti, succulents, etc., but also with their marketing and production of value-added products from them"(Sarkar, 2019)

Statement of the problem:

Karnataka is one of the top flower-growing states in India, but there is a huge gap between the supply and demand for flowers in the state. This gap can be closed by closely monitoring the floriculture sector. Flowers are necessary for religious, social, and decorative purposes, and must be transported from other parts of India to meet demand.

The Malnad region of Karnataka's floriculture is the subject of the current study. The Cost and Returns, of Dutch Rose Flowers in Different Districts in Malnad Region of Karnataka have been studied.

Profile of Dutch Rose Flower:

The rose is regarded as the "queen of flowers" and is the most well-liked garden flower in the entire world. It ranks first among the cut flower varieties on the global market and is thought to be one of the earliest cultivatable flowers. Cut flowers are blooms that are taken from a plant with a long stem and a few leaves for decorative purposes. For a business to be successful, cut flowers need to be produced in large quantities and of acceptable quality. In the international markets, a variety of rose known as the Dutch rose is in high demand, ideally with high quality. It is fairly simple to comprehend that growing excellent-quality flowers in an open setting year-round is really challenging due to inappropriate weather conditions and other dangers. Therefore, a polyhouse—a naturally ventilated building with a polyethylene covering—can be used as a cost-effective method of protected horticulture. Here, plants can be cultivated year-round for a lot less money than in a greenhouse.

A polyhouse may completely or partially regulate the atmosphere to provide optimal development and top-notch products. Without exploitation from outside forces, the plants can be grown all year long. When growing Dutch roses, it's crucial to keep in mind that the ideal cut flower should be vibrant and high-quality for a set amount of time, and that this depends largely on how well the polyhouse's internal conditions are managed.

Objectives:

1. Analyze the cost-benefit of cultivating of Dutch rose flower in the Malnad region of Karnataka.
2. To study the profit in Dutch rose flower with respect to type of farmers.

Significance of the Study:

The present study is based on a field survey of representative samples of the existing floriculture in the chosen districts of the Malnad region of Karnataka. This is because there are gaps in the economic aspects of floriculture, such as cost, returns, profitability, price spread, and job creation.

Thus, the Dutch rose flower is center of this study. The study only focuses this flower because they are the ones that are currently being commercially grown on a large scale in the Malnad Region of Karnataka. The cultivation of these flowers in poly houses is the main topic of the study.

Review of Literature:

Yogesh Tiwari, P. K. Awasthi1 and Prem Ratan Pandey (2020) in their study Economic Analysis of Cut Flower (Rose and Gerbera) Production under Polyhouse in Jabalpur District of Madhya Pradesh, In the district of Jabalpur, eight polyhouses for cut flowers were built last year. The total costs for producing roses and gerberas on an average of 1200 m2 were Rs. 909206 and Rs. 882517, respectively. A list of polyhouses cut flower farmers was compiled from the selected blocks.

Debajit et. al. (2016) highlights the most recent growth of India's floriculture business, particularly in terms of cut flower production, industry expansion, and international

trade. The export of Indian floricultural products did not significantly increase throughout the first decade. However, exports increased at a 4.33 percent CAGR over the next decade. Only about 0.6 percent of the world's floriculture trade is accounted for by India. The study used time series data spanning the previous two decades.

Steephen et.al (2013) in their study on the average cost of a Dutch Rose in Kerala was Rs. 13830 for large groups and Rs. 19341 for small groups. In the small group, the returns ranged from Rs. 32, 790 to Rs. 41, 152 in the large group. A benefit-cost ratio of 1.30 for small and 2.22 for large was discovered.

Line of Analysis:

Estimates have been made on the costs and profits associated with growing the chosen flowers. The cost concepts (Costs A1, A2, B, and C) used by the Commission on Agricultural Costs and Prices (CACP) are described in this section. It has been approximated using these cost concepts and income metrics.

Cost Concepts: These include cost A1, A2, B and C.

Cost A1: The following items are included

- Wages of hired human labour
- Charges of machinery
- Market rate of fertilizers
- Market rate of seeds
- Market rate of pesticides
- Irrigation charges
- Transport
- Land revenue
- Interest on working capital.

Cost A2: Cost A1 + Rent paid for leased in land.

Cost B: Cost A2 + interest on fixed capital excluding rent + rental value of owned land.

Cost C: Cost B + imputed value of family labour.

Income Measures:

Gross revenue is the overall amount of money earned by the farmer's businesses within a given year, including from the sale of their primary product.

- Farm business income = Gross income- Cost A1
- Family labour income = Gross income – Cost B
- Net income = Gross income – cost C
- Net income over fixed cost = Gross income – total fixed cost

- Net income over variable cost = Gross income – total variable cost
- Farm investment income = Farm business income – imputed value of family labour.
- Benefit – Cost Ratio = Gross Return/ Cost C

For Regression equation is used. This is because the semi log regression is useful when one of the variables being plotted covers a large range of values and the other has only a small range. In the present study, the area under cultivation varied largely while output did not vary as widely.

$Q = Ax1^{b1}x2^{b2}x3^{b3}x4^{b4}x5^{b5}x6^{b6}eu$

Where Q = output, bi s is the elasticity of production with respect to the inputs.

A = constant

X1= area under flower cultivation (arc/farm/ crop duration)

X2 = money spent on Family/Hired labour (farm/ crop duration) X3 = money spent on seeds (farm/crop duration)

X4= money spent on fertilizer (farm/crop duration)

X5 = money spent on insecticides (farm/crop duration) X6= money spent on irrigation (farm/crop duration) U= error term

The table 1 shows the total cost of cultivation of Dutch Rose (Cost C) for all farms on an average was Rs 224753.43. Cost A1, CostA2, and Cost B was found to be Rs 216205.46, Rs 216205.46 and Rs 220591.51 respectively.

For the marginal farms, the total cost of cultivation (Cost C) was Rs. 239379.78. Cost A1, Cost A2 and Cost B was found to be Rs 231114.44, Rs 231114.44 and Rs 233955.97 respectively.

For small farms, the total cost of cultivation (Cost C) was Rs 230639.6. Cost A1, Cost A2 and Cost B was found to be Rs 223015.84, Rs 223015.84 and Rs 226782.93 respectively.

For medium farms, the total cost of cultivation (Cost C) was Rs. 208738.39. Cost A1, Cost A2 and Cost B was found to be Rs 199186.25, Rs 199186.25 and Rs 205261.25 respectively.

The table 2 shows the gross income for all farms on an average in the cultivation of Dutch Rose is Rs 1151678.22. The net income was found to be Rs 926924.79. The net income over fixed cost and variable cost was Rs 1128962.51and Rs 931335.85 respectively. The benefit cost ratio for all farms was 4.04.

For the marginal farms, the gross income was Rs 921733.33 and the net income was Rs 682353.6. The net income from fixed cost and variable cost was Rs 899391.1 and Rs 685220.1 respectively. The benefit cost ratio was found to be Rs 2.76.

For small farms, the gross income was Rs 1137157.5 and the net income was 906517.9. The net income over fixed cost and variable cost was Rs 1115023.75 and Rs 910310 respectively. The benefit cost ratio in case of small farms was 3.85.

For the medium farms, the gross income was Rs 1336583.21 and the net income was Rs 1127844.82. The net income over fixed cost and variable cost was Rs 1313088.57 and Rs 1133944.82 respectively. The benefit cost ratio was 5.31.

The table3 shows that the coefficient of multiple determination of R2 is 0.915. It can be said that 91.5 percent of the variation in net income of Dutch Rose flower accounted for whatever is measured cost of cultivation in Planting Material (X1), Fertilizer (X2), Insectides/Pesticides (X3), Irrigation (X4), Family Labour (X5), Hired Labour (X6), Transport (X7), Machinery Charges (X8) and Interest on Working Capital (X9) taken together. The SEest for the regression equation is 57799.65. This means that each time the regression equation for the sample is used to predict a Net-income; the chances are predicted Net-income will not miss the actual Net-income of Dutch Rose flower growers by more than ±57799.65.

The effect of cost of cultivation in Planting Material (X1), Fertilizer (X2), Insectides/Pesticides (X3), Irrigation (X4), Family Labour (X5), Hired Labour (X6), Transport (X7), Machinery Charges (X8) and Interest on Working Capital (X9) was significant ($F=75.199$, $p<0.05$) on Net-Income of Dutch Rose flower growers at 0.05 level of significance. Hence, Planting Material (X1), Fertilizer (X2), Insectides/Pesticides (X3), Irrigation (X4), Family Labour (X5), Hired Labour (X6), Transport (X7), Machinery Charges (X8) and Interest on Working Capital (X9) are the significant predictors of Net-Income of Dutch Rose flower growers.

From the results of table: 3.1, we observed the effect of Planting Material (X1) was negative and significant on Net-Income of Dutch Rose flower growers (Regression co-efficient =

-0.159, $t= -3.795$, $p<0.05$) at 0.05 level of significance. It means that cost of cultivation in Planting Material (X1) is a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Fertilizer (X2) was negative and significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.218, $t= -3.683$, $p<0.05$) at 0.05 level of significance. It means that cost of cultivation in Fertilizer (X2) is a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Insectides/Pesticides (X3) was negative and not significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.72,$t= -1.788$, $p>0.05$) at 0.05 level of significance. It means that cost of cultivation in Insectides/Pesticides (X3) is not a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Irrigation (X4) was negative and significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.137, $t= -2.853$, $p<0.05$) at 0.05 level of significance. It means that cost of cultivation in Irrigation (X4) is a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Family Labour (X5) was negative and significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.348, $t= -5.074$, $p<0.05$) at 0.05 level

of significance. It means that cost of cultivation in Family Labour (X5) is a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Hired Labour (X6) was negative and not significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.047, t= -1.087, p>0.05) at 0.05 level of significance. It means that cost of cultivation in Hired Labour (X6) is not a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Transport (X7) was negative and significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.097, t= -2.012, p<0.5) at 0.5 level of significance. It means that cost of cultivation in Transport (X7) is a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Machinery Charges (X8) was negative and significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.191, t= -4.091, p<0.05) at 0.05 level of significance. It means that cost of cultivation in Machinery Charges (X8) is a significant predictor of Net-Income of Dutch Rose flower growers.

The effect of Interest on Working Capital (X9) was negative and significant on Net-Income of Dutch Rose flower growers (Regression co-efficient = -0.151,t= -2.784, p<0.05) at 0.05 level of significance. It means that cost of cultivation in Interest on Working Capital (X9) is a significant predictor of Net-Income of Dutch Rose flower growers.

The relative contribution of cost of cultivation in Planting Material (X1), Fertilizer (X2 Insectides/Pesticides (X3) and Irrigation (X4) Family Labour (X5) Hired Labour (X6) Transport (X7) Machinery Charges (X8) Interest on Working Capital (X9) on Net-Income of Dutch Rose flower growers are presented in the following table.

From the results of table: 3.2 the total contribution of all the variables on Net-income of Dutch Rose growers found to be 90.75% in which, the contribution of cost of cultivation in Planting Material (X1)= 6.201%, Fertilizer (X2)= 17.83%, Insectides/Pesticides (X3)= 2.36%, Irrigation (X4)= 5.671%, Family Labour (X5)= 29.61%, Hired Labour (X6)= 1.38%, Transport (X7)= 5.73%, Machinery Charges (X8)= 12.70 % and Interest on Working Capital (X9) =9.25% Therefore, we conclude that Family Labour (X5) is the First Contributor/predictor followed by Fertilizer (X2), and Machinery Charges (X8), in Net-income of Dutch Rose flower growers.

The regression equation developed for the contribution of predictor variables cost of cultivation in Planting Materia, Fertilizer, Insectides/Pesticide, Irrigation, Family Labour, Hired Labour, Transport, Machinery Charges and Interest on Working Capital) in predicating the criterion variable (Net-Income) among Dutch Rose flower growers (N=73) i.e.,

Y= 2429426.307- 0.159 (X1) - 0.218 (X2) - 0.072 (X3) - 0.137 (X4) - 0.348 (X5)- 0.047 (X6) - 0.097 (X7) - 0.191 (X8) - 0.151 (X9)

Y=Net-Income, X1 = Planting Materia, X2= Fertilizer, X3= Insectides/Pesticide, X4= Irrigation, X5= Family Labour, X6= Hired Labour, X7= Transport, X8= Machinery Charges X9 Interest on Working Capital

Major Findings:

1. Grass income is higher in case of medium farmers compared to marginal and small farmers.
2. According to a field assessment, the Malnad region has a favorable agro-climate, plenty of water, a vast amount of biodiversity, and fertile soils. So, various cut flowers, such tube roses, gerbera, orchids, and others, are grown in this area. Because of the favorable climatic conditions in the Malnad region, it is highly suggested to grow Dutch Rose flowers there.

Field Observations

1. It would be smarter to support horticulture in polyhouses, where the climate can be controlled.
2. By combining with rainwater collection and water conservation schemes, rainwater gathering techniques in polyhouse cultivation might be made more sophisticated.

Policy Suggestions:

1. The government should ban the importation of plastic flowers. Plastic flowers distorted the market for floriculture; the government should take the necessary steps to ban plastic flowers otherwise in the coming days flower producers are quickly down.

Conclusion:

Floriculture has significantly contributed to the diversification of agriculture and to the improvement of the financial circumstances of families who depend on the industry. Rural areas' socioeconomic development is another effect of this. In a nutshell, floriculture is linked to the health of the economy and the agricultural sector in particular.Dutch Rose is highly growing commercial flower under polyhouse in Malnad region.

Polyhouse floriculturists have a significantly better economic situation. Pests and illnesses are among the many hazards and uncertainties that are present in the field of floriculture. The fact that more young people are interested in floriculture, which itself represents economic feasibility, is really interesting.

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List of tables:

Table 1 Cost of cultivation of Dutch Rose (Rs per Acre)

Particulars	Marginal	Types of Small	Farmers Medium	Total
Planting Material	132821.43	124585.42	121712.50	125852.74
Fertilizer	8399.62	7169.17	5771.79	6987.15
Insectides/Pesticides	32372.19	32341.67	26832.14	30237.21
Irrigation	20563.81	23787.50	16356.07	20009.73
Hired labour charges	8779.29	8904.17	8370.54	8663.56
Transport	3363.33	3258.33	2310.71	2925.07
Machinery Charges	20154.29	19498.75	14207.50	17657.81
Land revenue	25.00	25.00	25.00	25.00
Interest on Working Capital	4635.48	3445.83	3600.00	3847.19
Cost A1	231114.44	223015.84	199186.25	216205.46

Cost A2	231114.44	223015.84	199186.25	216205.46
Interest on fixed capital	1486.05	1326.67	2570.00	1849.41
Rental value of owned land	1355.48	2440.42	3505.00	2536.64
Cost B	233955.97	226782.93	205261.25	220591.51
Imputed value of family labour	5423.81	3856.67	3477.14	4161.92
Cost C	239379.78	230639.6	208738.39	224753.43

Data from a survey of floriculture farmers.

Note. Data collected by author on the May 2022.

Table2 Return from Cultivation of Dutch Rose

Particulars	Marginal	Small	Medium	All farms
Gross Income	921733.33	1137157.5	1336583.21	1151678.22
Farm Business Income	690618.9	914141.66	1137396.96	935472.76
Family labour Income	687777.4	910374.57	1131321.96	931086.71
Net Income	682353.6	906517.9	1127844.82	926924.79
Net Income over fixed cost	899391.1	1115023.75	1313088.57	1128962.51
Net Income Over variable cost	685220.1	910310	1133944.82	931335.85
Farm Investment Income	685195.1	910285	1133920	931310.8
Benefit Cost Ratio	2.76	3.85	5.31	4.04

Data from a survey of floriculture farmers.

Note. Data collected by author on the May 2022.

Table 3 ANOVA for Regression of Dutch Rose flower

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.958[a]	.918	.905	88144.61731

F Value = 75.199, Sig. at 0.05 level

Data from a survey of floriculture farmers.

Note. Data collected by author on the May 2022.

Table 3.1 Multiple linear regressions of Dutch Rose flower growers

Model	Unstandardize B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	2429426.307	131045.620		18.539	.000
Planting Material	-2.576	.679	-.159	-3.795	.000
Fertilizer	-30.647	8.322	-.218	-3.683	.000
Insectides/Pesticides	-1.852	1.036	-.072	-1.788	.079
Irrigation	-5.428	1.903	-.137	-2.853	.006
Family Labour	-70.786	13.950	-.348	-5.074	.000
Hired Labour	-14.243	13.101	-.047	-1.087	.281
Transport	-23.815	11.835	-.097	-2.012	.048
Machinery Charges	-9.320	2.278	-.191	-4.091	.000
Interest on Working Capital	-43.053	15.463	-.151	-2.784	.007

Data from a survey of floriculture farmers.

Note. Data collected by author on the May 2022.

Table 3.2 Relative contributions of predictor variables on criterion variable (Net-Income)

Variables	β	r	β X r	%
Planting Material	-0.159	-0.390	0.06201	6.201
Fertilizer	-0.218	-0.818	0.178324	17.8324
Insectides/Pesticides	-0.072	-0.328	0.023616	2.3616
Irrigation	-0.137	-0.414	0.056718	5.6718
Family Labour	-0.348	-0.851	0.296148	29.6148
Hired Labour	-0.047	-0.294	0.013818	1.3818
Transport	-0.097	-0.591	0.057327	5.7327
Machinery Charges	-0.191	-0.665	0.127015	12.7015
Interest on Working Capital	-0.151	-0.613	0.092563	9.2563
Total			0.90753	90.75

Data from a survey of floriculture farmers.

Note. Data collected by author on the May 2022.