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COMPARATIVE ECONOMIC ANALYSIS OF VEGETABLE AND RICE FARMING IN DURG DISTRICT, CHHATISGARH

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ABSTRACT

This study examines the financial aspects of farming rice and vegetables in the Durg region of Chhattisgarh and evaluates the similarities and differences between the two. By assessing the production costs, yields, revenue generation, and profit margins of these two farming systems, the overriding objective of this research is to establish whether or not these two farming methods are economically feasible. In addition to primary sources such as government documents and agricultural studies, data was collected via interviews and questionnaires that were sent to farmers in the local area. During the course of the research, many factors, such as the requirements for irrigation, the various marketing channels, and the costs of inputs (which include labour, seeds, fertiliser, and pesticides), are explored. Vegetable farming yields better returns despite the fact that it requires more labour and inputs than other agricultural practices. This is because crop cycles are shorter, there are more harvests each year, and market prices are higher. Rice production, on the other hand, is more prevalent in the region as a result of the favourable environment and the government's subsidies via Minimum Support Price (MSP) programs. Although the returns are lower, they are consistent. The report also draws attention to the challenges that farmers face, such as the unpredictability of the pricing of vegetables and the challenges that arise when it comes to the management of water in rice cultivation. Based on their findings, the authors of the research come to the conclusion that sustainable agriculture may be accomplished via the use of modern agricultural techniques and the diversity of crop types. The findings of the analysis indicate that farmers in the region might potentially reap the benefits of increased government help in the form of targeted subsidies and the promotion of integrated farming practices. The goal of this aid would be to raise the yields of both rice and vegetables.

Keywords: *- knowledge, Rice Production Technology and Rice-Maize Cropping system, Gross returns, net returns, input-output ratio.*

INTRODUCTION

Agriculture, particularly in rural areas, is a significant contributor to India's economy since it offers a means of subsistence and employment opportunities. The cultivation of crops is one of the most essential parts of agriculture. This is because crops such as rice and vegetables are essential to the continued

existence of humans and the economic well-being of the world. As a result of the favourable meteorological and agricultural circumstances that prevail in the Durg district of Chhattisgarh, rice farming is the primary crop that is farmed there. Agricultural production of vegetables is becoming more popular and profitable as a result of the shorter crop cycles and higher market value of vegetables.

Among the various factors that influence the economic performance of agriculture, especially the production of rice and vegetables, some of the variables that are important include yield, market demand, input costs, and help from the government. Growing vegetables gives greater returns than growing rice, but it is more challenging due to issues such as price volatility, storage challenges, and a lack of access to markets. Conventional techniques and government procurement laws are helpful to rice producers. In the Durg region of Chhattisgarh, the objective of this study is to analyse and contrast the many financial elements associated with the cultivation of rice and vegetables. It examines the two types of crops in terms of their profitability, the efficiency with which they use resources, and the expenses associated with their production. In addition to shedding light on the challenges that farmers face, the study offers ideas for improving the financial outcomes that they achieve. The findings of this research should be of assistance to lawmakers, extension agents, and farmers in the region in terms of increasing agricultural productivity and producing more revenue.

OBJECTIVES

1. To compare the cost of cultivation, yield, and net returns between vegetable farming and rice farming in Durg district, Chhattisgarh.
2. To analyze the profitability and resource-use efficiency of vegetable and rice farming practices.

MATERIAL AND METHODS

In the course of the 2016–2017 academic year, the current research was carried out in the Durg districts of Chhattisgarh, with a particular emphasis on various cropping systems and sample approaches. Patan, Dhamdha, and Durg were the three blocks that were included in the research project in the Durg district. Four villages from each of the three blocks were chosen for the study based on the amount of land that was used for rice and maize growing. Via the use of a standardised and pretested interview schedule, a total of 120 farmers were recruited for the purpose of data collection via personal interviews. Ten farmers were picked from each of the twelve villages that were chosen. Statistics such as frequency distribution, percentages, and correlation coefficients were used in the examination of the data. The Durg region, on the other hand, was chosen for a specific reason because of the enormous cauliflower production area it has. The selection of communities and farmers who were engaged in the production and sale of cauliflower was accomplished via the use of a multistage simple random sample (SRS) approach. The Durg district research concentrated on the rice-maize cropping system using a structured approach to farmer selection, while the Durg study exclusively addressed cauliflower cultivation with a random sample strategy. Both studies used systematic sampling procedures to guarantee that they were representative of the population surveyed. Agricultural patterns, farmer engagement, and economic viability in their particular areas were the subjects of both approaches, which attempted to give understanding of these topics.

Estimation of different cost

In spite of the fact that the returns and expenditures were computed utilising antiquated concepts, a standard method was also used in order to compute the cost of farming the primary vegetable crops. This strategy has been given the go light by the Commission on Agricultural Costs and Prices, often known as CACP. Under this methodology, the cultivation cost was computed by utilising the seven cost ideas, which are as follows: cost A1, cost A2, cost B1, cost B2, and cost C1, cost C2, and cost C3.

It is necessary to have a solid understanding of the cost structure and farm business KPIs in order to conduct an analysis of the profitability of agricultural operations. The expenses associated with irrigation, the depreciation of equipment and tools, the interest on working capital, the income from land, the various costs, the market prices of seeds, fertilisers, insecticides, and herbicides, and the pay for permanent, hired human, and bullock labour are all included in Cost A1. Cost A2 is the result of adding the rent for the leased land to Cost A1, which is the initial cost. However, Cost B2 is the sum of Cost B1 plus the rental value of land that is either owned or leased-in. Cost B1 is the total of Cost A1 and interest paid on owned capital assets (not including land), whereas Cost B2 is the sum of Cost B1 plus the rental value of land. Obtaining Cost C1 requires first adding the value of family work to Cost B1, and then adding the cost of family labour to Cost B2 in order to get Cost C2. Cost C3 is the sum of Cost C2 plus 10% of the management contribution. This is the last but not the least cost. Gross revenue is one of the metrics that is used in the evaluation of agricultural businesses. Gross revenue is the sum total of the value of the production. The income from family labour may be calculated by subtracting Cost B2 from gross income. On the other hand, investment income can be calculated by subtracting imputed family work from the revenue of agricultural businesses. After subtracting all of a firm's expenses from its gross revenue, the net income of the company may be determined. When calculating profitability, the benefit-cost ratio (BCR) is used. This ratio is calculated by dividing the net returns by the total cultivation expenditures. However, production costs are calculated by dividing total expenses by yield. This is the opposite of production costs. Calculating the difference between the gross income and either Cost A1 or Cost A2 is one method for determining the operational efficiency of a farm firm. Productivity may also be evaluated using the input-output ratio, which is the ratio of the total value of output (O) to the total cost of inputs (I). This ratio is another kind of productivity evaluation. The overall financial health of agricultural enterprises may be evaluated with the use of these measures when they are considered in their whole.

RESULT AND DISCUSSION

The cost and returns of cauliflower in the study area Cost of cultivation

The expenditures that are related with the cultivation of the cauliflower crop are shown in Table 1. The costs of producing cauliflower per hectare were much higher for large farms as compared to those involved in the production of maize. After doing research, it was found that the average cost of producing one hectare of cauliflower was 11, 3464 rupees. Small farms spent Rs. 105864 per hectare on production, while medium-sized farms spent Rs. 121640 per hectare. This is in contrast to marginal farms, which spent Rs. 87621.7 or Rs. The production expenses of big farms were much higher, coming in at Rs. 137732 per hectare. When the size of the farm increased, there was a general tendency towards an increase in the price of agriculture per hectare. This occurred as a result of larger farms being able to afford to make more investments in modern agricultural methods, such as improved seeds, fertilisers, and instruments for crop protection.

Table 1: Research on Expenses by Crop Area (Rs./ha)

S. No.	Particulars	Marginal	Small	Medium	Large	Overall
A. Variable Costs						
1. Material Input Cost						
Seed (Kg/ha)	4580.34 (7.04)	6570.65 (8.11)	7690.41 (8.13)	7800.60 (5.70)	6960.76 (8.00)	
Manure (FYM/Compost, ton/ha)	8900.22 (13.69)	9700.60 (11.97)	10520.50 (11.12)	11600.00 (10.82)	10180.70 (11.71)	
2. Fertilizer (kg/ha)						
Urea	650.17 (1.00)	670.43 (0.82)	700.12 (0.74)	750.92 (0.70)	692.50 (0.76)	
D.A.P.	2520.98 (3.87)	2988.23 (3.68)	2889.06 (3.05)	3325.00 (3.10)	2930.50 (3.37)	
MOP	2201.56 (3.38)	2149.05 (2.65)	2450.90 (2.25)	2449.50 (2.28)	2312.25 (2.80)	
Total Fertilizer Cost	5371.31 (8.26)	5807.23 (8.31)	6039.02 (6.38)	6524.14 (6.08)	5935.25 (6.82)	
3. Plant Protection Chemicals & Herbicides	11550.65 (17.76)	17650.72 (21.78)	-	-	-	
4. Irrigation Charges	2535.69 (2.68)	2700.86 (2.52)	1570.11 (2.41)	2255.61 (2.78)	2265.97 (2.60)	
5. Human Labour (day/Rs./ha)						
Family Labour	25527.07 (39.26)	28750.27 (35.49)	30075.26 (31.81)	33450.90 (31.21)	31450.82 (48.37)	
Hired Labour	22450.03 (34.53)	35680.33 (44.04)	45560.13 (48.19)	54000.30 (50.39)	39422.50 (45.35)	
C. Machine Power Used (Rs./ha)	6509.21 (34.53)	6700.18 (44.04)	6900.78 (48.19)	7000.98 (50.39)	6775.08 (45.35)	
D. Interest on Working Capital	2382.37 (3.66)	24856.7 (23.47)	24000.19 (19.73)	3726.9 (4.28)	2412.45 (2.12)	
Total Operational Costs	65009.23 (74.19)	87621.7 (100)	105864.8 (100)	121640.4 (100)	113464.0 (100)	
B. Fixed Costs						
1. Depreciation	545.43 (0.62)	585.52 (0.55)	632.27 (0.519)	688.98 (0.49)	612.5 (0.53)	
2. Land Revenue	12.00 (0.00)	12.00 (0.00)	12.00 (0.00)	12.00 (0.00)	12.00 (0.00)	
3. Rental Value of Owned Land	20000.50 (22.82)	22000.30 (20.78)	24000.19 (19.73)	28000.3 (20.18)	23500.6 (20.71)	

4. Interest on Fixed Capital (IOFC)	2055.7 (2.34)	2259.7 (2.13)	2464.4 (2.02)	2870.78 (2.06)	2412.45 (2.12)	
Total Fixed Cost	3382.2 (4.17)	22612.7 (25.80)	27108.4 (22.28)	31570.8 (22.75)	26537.6 (23.38)	
Total Cost	81007.2 (76.52)	105864.8 (100)	121640.4 (100)	136732.0 (100)	113464.0 (100)	

Given that the current market price of cauliflower is 900 rupees per quintal, the average gross revenue from cultivating cauliflower per hectare was projected to be 256,500 rupees per hectare. It is estimated that the total amount is Rs. 16, 3836 per hectare, which takes into account revenues from enterprises, family labour, and investments in agriculture. There is a price range of Rs. 13, 7923 to Rs. 14, 5448 per acre. The result is that the size of the farm has a direct bearing on the growth of the net return accumulated by the farm. The average amount of cauliflower that was produced per hectare was 210 quintals. In the following table, we provide the productivity, cultivation costs, and production costs of cauliflower for a variety of different groups of farmers in the study area. Display the first figure here.

Table 2: Analysis of Yield and Income by Group of Farm Size

Parameter	Marginal	Small	Medium	Large	Overall
Cost of Cultivation (Rs./ha)	87,621.7	105,864	121,640	138,732	113,464
Yield (q/ha)	210	260	300	350	285
Price (Rs./q)	900	900	900	900	900
Gross Return (Rs./ha)	189,000	234,000	270,000	333,000	256,500
Net Return (Rs./ha)	101,378	128,136	148,360	194,268	143,036
Farm Business Income (Rs./ha)	134,884	153,251	163,570	203,638	163,836
Family Labour Income (Rs./ha)	112,828	128,991	137,105	172,768	137,923
Farm Investment Income (Rs./ha)	103,434	130,396	150,825	197,138	145,448
Cost of Production (Rs./q)	417.246	407.169	405.467	374.951	398.119
Input-Output Ratio	1:2.16	1:2.21	1:2.22	1:2.40	1:2.26

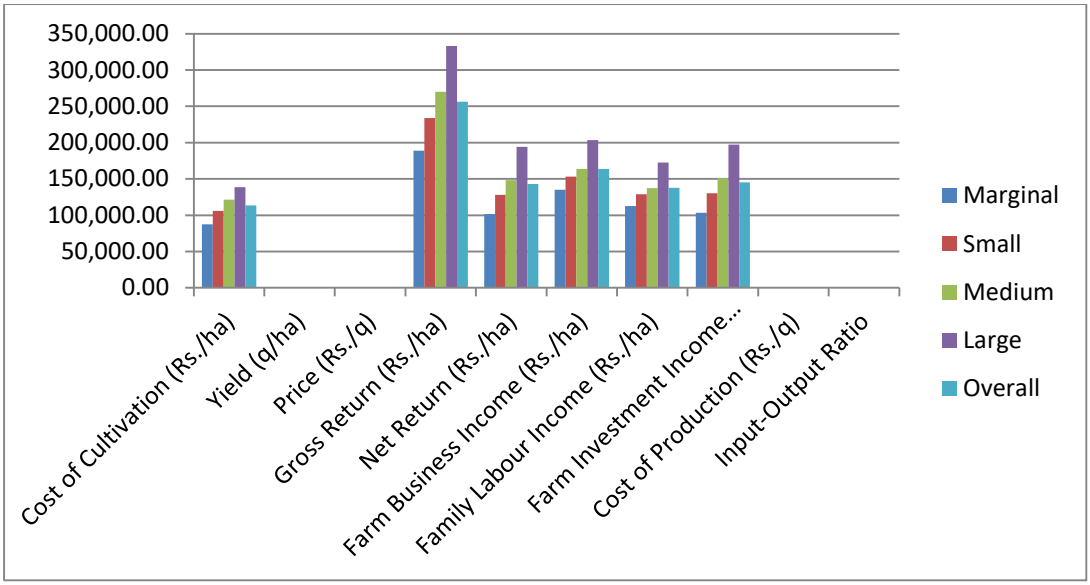

Fig 1: Graph depicting costs and returns of cauliflower in study area of different farmers

Table 3 displays the findings of an examination of the several concepts that were used in the process of making an economic analysis of cauliflower. 69164.4 dollars per hour is the overall cost of A1, and 92664.4 dollars per hectare is the total cost of A2, as shown by the figures in the table. When compared to B2, the cost per hectare for B1 was 95076.9, while it was 118577 for B2. The cost per hectare for C1 is projected to be 11, 3464 rupees per hour, whereas the cost per hectare for C2 is reported to be 13, 6964 rupees per hectare. When comparing the cost of cauliflower per hectare among farms, there were trends that were radically divergent with one another. Showcase this figure number 2.

Table 3: Cauliflower farming expenses in the chosen research region as measured by the cost concept

Items	Marginal (Rs./ha)	Small (Rs./ha)	Medium (Rs./ha)	Large (Rs./ha)	Overall (Rs./ha)
Cost A1	34116	58749.2	82430.4	101362	69164.4
Cost A2	54116	80749.2	106430	129362	92664.4
Cost B1	56717.1	83008.9	108895	132232	95076.9
Cost B2	76171.7	105009	132895	160232	118577
Cost C1	87621.7	105864	121640	138732	113464
Cost C2	107622	127864	145640	166732	136964
Cost C3	118384	140650	160204	183405	150661

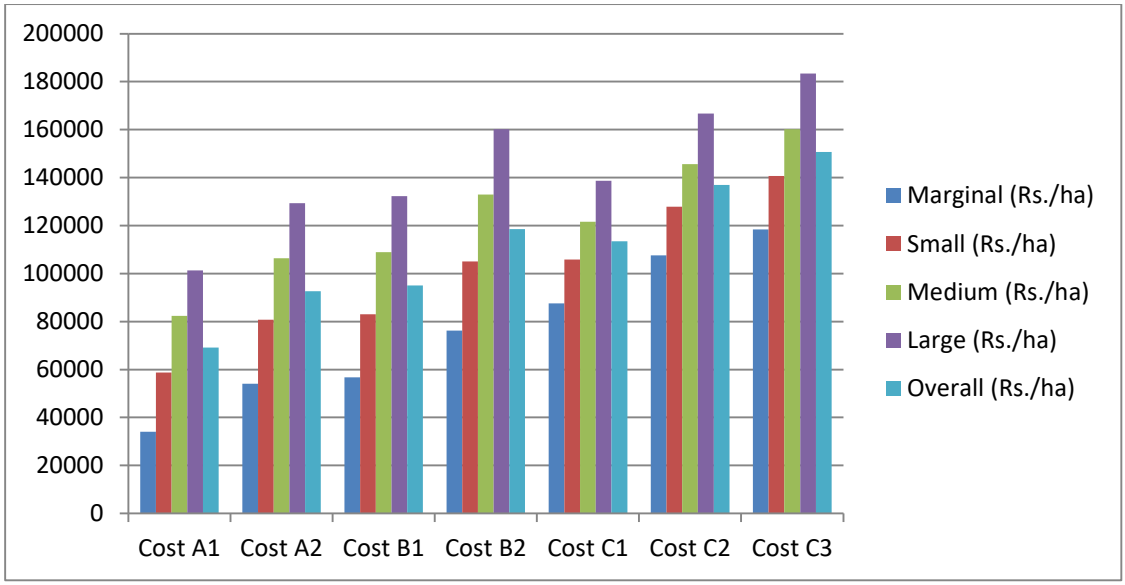

Fig 2: Cost of cultivation of cauliflower of different size of sample household

Various examples of agricultural costs and their respective returns on investment At the overall level, the income over costs A1, A2, B1, B2, C1, C2, and C3 was 187336, 163836, 161423, 137923, 143036, 119536, and 105839 respectively, as shown by the data presented in table 4, which also displays returns on various expenses for certain kinds of farms. Display the third figure here.

Table 4: Returns over different cost in selected study area

Items	Marginal (Rs./ha)	Small (Rs./ha)	Medium (Rs./ha)	Large (Rs./ha)	Overall (Rs./ha)
Cost A1	154884	175251	187570	231638	187336
Cost A2	134884	153251	163570	203638	163836
Cost B1	132828	150991	161105	200768	161423
Cost B2	112828	128991	137105	172768	137923
Cost C1	101378	128136	148360	194268	143036
Cost C2	81378.3	106136	124360	166268	119536
Cost C3	70616.1	93349.7	109796	149595	105839

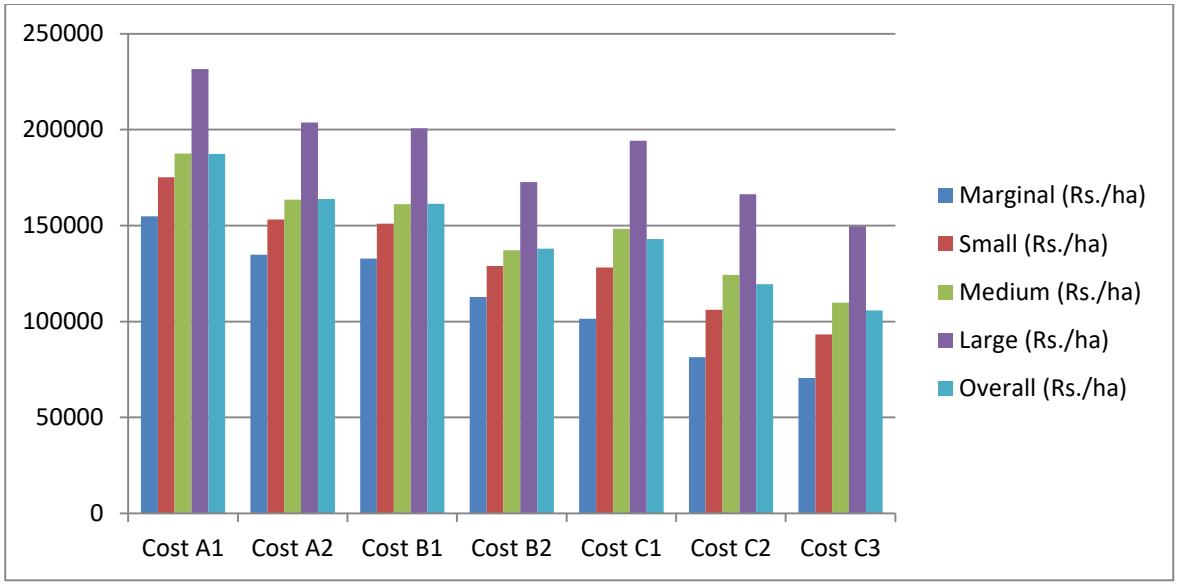

Fig 3: Cost and return over different costs on Sample farmers

Ownership of Land and Distribution of Respondents:

As shown by the distribution of respondents based on land holdings, the majority of respondents were farmers operating on a small scale production. This is most likely due to the fact that land is often distributed among heirs. The percentage of farmers who were engaged in medium-sized land holdings (4.1 to 10 ha) was 32.5%, while 25.83% were involved in semi-medium land holdings (2.1 to 4 ha), 12.5% were interested in great land holdings (above 10 ha), and 2.5% were involved in marginal farming (up to 1 ha).

Table 5: Knowledge Level of Respondents in Rice Production Practices

Sl. No.	Practices	Low F (%)	Medium F (%)	High F (%)
1	Land preparation	2 (1.67)	23 (19.17)	95 (79.16)
2	Seed bed preparation	16 (5.01)	49 (40.83)	65 (54.16)
3	Selection of seed	8 (6.67)	32 (26.67)	80 (66.66)
4	Seed treatment	15 (12.50)	13 (10.83)	92 (76.67)
5	Sowing methods	5 (4.17)	78 (65.00)	37 (30.83)
6	Seed rate	13 (10.84)	52 (43.33)	55 (45.83)
7	Selection of variety	3 (2.50)	64 (53.33)	53 (44.17)
8	Application of manure fertilizers	9 (7.50)	85 (70.80)	26 (21.70)
9	Water management	0 (0.00)	77 (64.17)	43 (35.83)
10	Weed management	11 (9.17)	76 (63.33)	33 (27.50)
11	Insect management	4 (3.33)	63 (52.50)	53 (44.17)
12	Disease management	8 (6.67)	73 (52.53)	57 (40.80)
13	Time of harvesting	3 (2.50)	36 (30.00)	81 (67.50)

Information about the Methods for Growing Rice:

When it came to harvesting their crops, the majority of those who participated in the poll had a good understanding of the following topics: how to correctly prepare the soil (76.67 percent), how to choose the best seeds (66.66 percent), and how to manage the seeds. Nearly sixty percent of respondents exhibited a reasonable level of comprehension regarding the process of preparing the seedbed, sixty-five percent regarding the processes for sowing, and seventy-eight percent regarding the application of fertiliser. The management of diseases (60.83 percent), water (64.17 percent), weeds (63.33 percent), and insects (52.5% of the population) likewise showed medium levels of comprehension. In terms of the general comprehension of rice production technology, 53.33 percent of respondents fell into the medium group, 32.5% fell into the high category, and 14.17 percent fell into the poor category.

Table 6: Overall Knowledge Level of Respondents on Rice Production Technology

No.	Level of Knowledge	Frequency	Percentage
1.	Low (up to 16 score)	17	14.17%
2.	Medium (17 to 22 score)	64	53.33%
3.	High (more than 22 score)	39	32.50%

CONCLUSION

According to the study, the majority of respondents had a solid understanding of themes such as the preparation of the land, the preparation of the seedbed, the handling of the seeds, the procedures for sowing, the seed rate, and the selection of seeds. The vast majority of respondents demonstrated a level of comprehension that was somewhere in the middle when it came to procedures such as choosing rice kinds, adding manure fertiliser, controlling water, weeds, insects, and illnesses. A significant majority of them demonstrated an amazing level of competence in respect to the most appropriate time to harvest products. Due to the fact that the majority of the respondents were small-scale farmers, it is likely that a significant amount of land was handed down from parents to children. Some of the respondents had a high level of comprehension of the technology used in rice cultivation, while the bulk of them had a medium level of awareness. Some of the responders had a low degree of expertise, although it was quite minor. For the purpose of enhancing farmers' comprehension, it is essential to provide them with training programs, to organise field trips, and to arrange demonstration programs at the village level via the assistance of local extension authorities. The planting of pest- and disease-resistant varieties, the acquisition of scientific advice on packaging and farming practices, the dissemination of information on the ideal doses of fertiliser and possible markets, and other similar activities are all important tasks. Establishing marketing infrastructure, encouraging farmers to participate in training, displays, and demonstrations, and ensuring that market authorities treat commercial concerns seriously are all critical steps that must be taken in order to increase access to markets. If we want to get greater outcomes, we need to make certain that the distribution of manpower, intercultural practices, and fertilisers is carried out in the appropriate manner. The government needs to foster collaboration between research centres, agricultural schools, non-governmental groups, and commercial firms in order to find solutions to issues and establish a connection between vegetable growers and customers. Farmers will get assistance, and the agricultural value chain will be improved, via the establishment of cooperative organisations for the producers of horticulture

products, as well as through the enhancement of transportation management in order to provide simple access to processing facilities.

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