

COMPARATIVE PERCEPTION ANALYSIS OF OFF-SEASON VS. SEASONAL VEGETABLE CULTIVATION: A SOCIO-ECONOMIC PERSPECTIVE

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ABSTRACT

This study examines farmers' perceptions of seasonal and off-season vegetable cultivation in the distinct agro-climatic regions of North and South Gujarat. Vegetables constitute a critical component of agricultural diversification, and understanding farmer perceptions is essential for designing effective extension and policy support systems. With rising vegetable demand and steadily shrinking cultivable land, off-season cultivation has emerged as a viable and increasingly important strategy to enhance farm income and optimize resource utilization throughout the year. The research aims to analyse the socio-economic profiles of farmers, assess their perceptions of both cultivation methods, and explore the relationship between perception and demographic variables. Primary data were collected from 300 farmers, 150 each practicing seasonal cultivation and 150 practicing off-season cultivation using a structured interview schedule. The sample was purposively selected from representative districts across North and South Gujarat to capture the diversity in agro-climatic conditions, farming practices, and socio-economic backgrounds. Descriptive statistics, Likert scale analysis, and Pearson's correlation coefficient were employed for analysis. Results revealed that farmers perceive off-season cultivation as profitable venture capable of ensuring food security and beneficial for year-round employment generation. However, concerns regarding input costs, technical complexity, and risk remain. Seasonal cultivation continues to be favoured for its alignment with natural conditions, stable output, and lower risk. The study found significant positive correlations between education, age, and perception in seasonal cultivation, whereas off-season cultivation was less influenced by socio-economic variables. The findings underscore the need for region-specific interventions, capacity building, and market access to support wider adoption of off-season cultivation. Strengthening institutional support through cooperative networks, subsidized inputs, and access to credit can further incentivize farmers to transition toward or complement seasonal cultivation with off-season practices. A balanced approach integrating both systems can enhance agricultural resilience and rural livelihoods.

Keywords : off-season cultivation, farmers' perception, socio-economic factors.

INTRODUCTION

India's vegetable sector is rapidly transforming in response to growing demand, urbanization, and the need for sustainable livelihoods. In this context, vegetable cultivation has become an essential component of diversified farming systems, offering nutritional, economic, and employment benefits, and playing an important role in reducing migration pressures among rural youth (Gaikwad *et al.*, 2020; Thorat and Patel, 2022). Farmers' perception plays a critical role in adoption decisions because cultivation choices are shaped not only by actual profitability but also by how farmers interpret risks, resource requirements, and expected returns. Therefore, understanding perception is essential for explaining why farmers prefer seasonal or off-season vegetable cultivation.

Gujarat, with its diverse agro-climatic regions ranging from arid zones in the north to humid sub-tropical regions in the south, presents a unique case for analysing

vegetable production systems. Two dominant approaches coexist: seasonal cultivation, which follows the natural crop calendar, and off-season cultivation, where vegetables are grown outside their typical growing periods (Dhital *et al.*, 2015). Seasonal cultivation aligns with natural conditions and is easy to manage, but often leads to price crashes during peak supply. Off-season cultivation offers higher prices and year-round employment but requires greater investment, skills, and risk-taking. Advancements in protected cultivation technologies, drip irrigation, and hybrid seed varieties have progressively enabled farmers to cultivate vegetables beyond their natural growing seasons, making off-season cultivation a commercially attractive alternative in states with well-developed horticultural infrastructure such as Gujarat (Singh & Sharma, 2018). However, adoption remains uneven across regions, influenced by ecological suitability, socio-economic capacity, and farmer knowledge.

In Gujarat, the regions of North and South Gujarat differ significantly in terms of climate, irrigation infrastructure, landholding patterns, and market accessibility. These differences potentially shape farmers' perceptions, preferences, and willingness to adopt either seasonal or off-season cultivation practices (Patel *et al.*, 2023a), and are further influenced by access to agricultural information (Shukla *et al.*, 2024, Anusha *et al.*, 2023). Despite the growing importance of vegetable production, very limited research has compared farmers' perception of seasonal and off-season cultivation across Gujarat's contrasting agro-climatic regions. Moreover, studies seldom analyse how socio-economic factors influence these perceptions, creating a gap in evidence needed for region-specific policy and extension planning. The present study therefore holds significance in providing comparative, region-specific evidence, contributing to the understanding of socio-economic dimensions of agricultural decision-making, and informing extension services, capacity building interventions, and state-level policy for promoting sustainable vegetable production and rural livelihoods.

This study compares farmers' perceptions of seasonal and off-season cultivation in both regions and examines how these perceptions relate to socio-economic factors such as age, education, landholding, and income, providing insights for targeted policy and extension strategies.

OBJECTIVES

- (1) To analyse the farmers' perception regarding seasonal and off-season cultivation of vegetables

- (2) To examine the relationship between farmers' socio-economic profile and their perception of cultivation practices

METHODOLOGY

The study adopted a positivist research philosophy as farmers' perceptions were quantified using standardised instruments (Vinaya *et al.*, 2025), enabling objective measurement and statistical analysis. A deductive approach was followed, wherein objectives and variables were identified from existing literature prior to data collection. A quantitative method was employed as data were collected in numerical form through a five-point Likert scale and analysed using statistical tools. A survey strategy was adopted to collect standardised data from a large number of respondents across two distinct agro-climatic regions, facilitating structured comparison. The study followed a cross-sectional time horizon, with data collected at a single point in time to capture farmers' perceptions during the reference period. Primary data were collected through a structured interview schedule from 300 purposively selected farmers across North and South Gujarat, with 150 each practicing seasonal and off-season cultivation. Socio-economic variables were recorded through a pre-tested questionnaire. Data were analysed using descriptive statistics and Pearson's correlation coefficient in SPSS (version 26) to examine relationships between socio-economic characteristics and perception levels. This methodological framework enabled a structured comparison of perception and decision-making patterns in seasonal versus off-season cultivation.

RESULTS AND DISCUSSION

To analyze the farmers' perception regarding season and off-season cultivation of vegetables

Table 1: Statement wise perception regarding off-season cultivation

(n=150)

Sr. No.	Statement	SA	A	UD	DA	SD
A	Economic Dimension					
1	Off- season cultivation is profitable	122 (81.33)	28 (18.67)	0 (0.00)	0 (0.00)	0 (0.00)
2	Off- season cultivation helps to raise the standard of living	116 (77.33)	34 (22.67)	0 (0.00)	0 (0.00)	0 (0.00)
3	Practicing off-season cultivation facilitates food security	123 (82.00)	27 (18.00)	0 (0.00)	0 (0.00)	0 (0.00)
4	Off-season cultivation is less prone to diseases and pests	119 (79.33)	22 (14.67)	1 (0.67)	8 (5.33)	0 (0.00)
5	Off-season cultivation is expensive (-)	5 (3.33)	6 (4.00)	35 (23.33)	104 (69.33)	0 (0.00)
6	Practicing off-season cultivation is waste of resources (-)	0 (0.00)	0 (0.00)	0 (0.00)	49 (32.67)	101 (67.33)

Sr. No.	Statement	SA	A	UD	DA	SD
7	There is a specific market for off-season products	99 (66.00)	45 (30.00)	0 (0.00)	6 (4.00)	0 (0.00)
8	Special attention is needed for off- season cultivation (-)	0 (0.00)	35 (23.33)	2 (1.33)	36 (24.00)	77 (51.33)
9	Off – Season cultivation is more labour intensive (-)	4 (2.67)	34 (22.67)	13 (8.67)	80 (53.33)	19 (12.67)
10	Use of specialised and high cost inputs is more in off-season (-)	6 (4.00)	9 (6.00)	8 (5.33)	103 (68.67)	24 (16.00)
11	Less Labour cost is incurred as family members can be better utilized	89 (59.33)	6 (4.00)	40 (26.67)	13 (8.67)	2 (1.33)
12	Farmers get the opportunity to sell at higher rates to processors as the market is in glut	126 (84.00)	18 (12.00)	6 (4.00)	0 (0.00)	0 (0.00)
13	Transportation cost is higher in off-season cultivation (-)	2 (1.33)	6 (4.00)	97 (64.67)	44 (29.33)	1 (0.67)
14	Inputs are not easily available in off-season cultivation (-)	0 (0.00)	0 (0.00)	5 (3.33)	87 (58.00)	58 (38.67)
B Technological Dimension						
15	Specialised package of practices needs to be understood (-)	2 (1.33)	1 (0.67)	1 (0.67)	94 (62.67)	52 (34.67)
16	Seeds have to be selected such that they can survive even in adverse climatic condition (-)	0 (0.00)	1 (0.67)	3 (2.00)	82 (54.67)	64 (42.67)
17	Trainings are not available for off-season cultivation (-)	0 (0.00)	1 (0.67)	5 (3.33)	131 (87.33)	13 (8.67)
18	Timely operations lead to optimum output	75 (50.00)	71 (47.33)	0 (0.00)	2 (1.33)	2 (1.33)
19	Inter-cropping is possible in off-season cultivation	112 (74.67)	36 (24.00)	2 (1.33)	0 (0.00)	0 (0.00)
20	Less application of insecticide and pesticide in off-season cultivation	67 (44.67)	32 (21.33)	4 (2.67)	47 (31.33)	0 (0.00)
21	There is a scope of seed production in off-season	57 (38.00)	39 (26.00)	51 (34.00)	1 (0.67)	2 (1.33)
22	Off-season cultivation can be managed better as it can be carried out in smaller area	65 (43.33)	35 (23.33)	3 (2.00)	47 (31.33)	0 (0.00)
23	High dependence on weather in off-season cultivation (-)	13 (8.67)	0 (0.00)	35 (23.33)	85 (56.67)	17 (11.33)
C Other Dimension						
24	Off-season cultivation enhances farm productivity	127 (84.67)	21 (14.00)	0 (0.00)	0 (0.00)	2 (1.33)
25	Off-season cultivation gives an opportunity to do something different	63 (42.00)	80 (53.33)	0 (0.00)	7 (4.67)	0 (0.00)
26	Persons with passion of farming can only do off-season cultivation (-)	20 (13.33)	0 (0.00)	3 (2.00)	112 (74.67)	15 (10.00)
27	Off-season cultivation guarantees year-round income	111 (74.00)	37 (24.67)	0 (0.00)	0 (0.00)	2 (1.33)
28	Off-season cultivation guarantees year -round employment for labours	126 (84.00)	22 (14.67)	0 (0.00)	1 (0.67)	1 (0.67)
29	Off-season cultivation reduces farmer migration to city in search of work	119 (79.33)	28 (18.67)	2 (1.33)	1 (0.67)	0 (0.00)
30	Off-season cultivation brings a feeling of satisfaction and achievement	135 (90.00)	15 (10.00)	0 (0.00)	0 (0.00)	0 (0.00)

Sr. No.	Statement	SA	A	UD	DA	SD
31	Off-season cultivation might lead to crop failure (-)	0 (0.00)	0 (0.00)	3 (2.00)	133 (88.67)	14 (9.33)
32	Off-season cultivation improves my image among other farmers	62 (41.33)	82 (54.67)	3 (2.00)	1 (0.67)	2 (1.33)
33	Off-season cultivation is not feasible if carried out by an individual farmer (-)	7 (4.67)	1 4 (9.33)	11 (7.33)	111 (74.00)	7 (4.67)
34	Customers do not prefer the taste of vegetables cultivated in off-season (-)	3 (2.00)	52 (34.67)	44 (29.33)	42 (28.00)	9 (6.00)

Note: Figures in the parenthesis indicate the percentage

Table 1 analyzes farmers' perceptions of off-season cultivation across economic, technological, and social dimensions using a 5-point Likert scale. Overall, responses indicate a predominantly positive outlook.

Economically, 81.33% find it profitable, 77.33% say it improves living standards, 82% link it to food security, and 84% note premium pricing. Most reject concerns of high cost (69.33%) or resource wastage (67.33%). A dedicated market is recognized by 66%.

Technologically, 50% agree timely operations improve output, and 74.67% support intercropping. While pesticide views are mixed, most reject heavy chemical dependence. Training is not seen as a barrier (87.33% disagree), and weather dependence is dismissed by 56.67%. Specialized practices are acknowledged by 62.67%, though 34.67% strongly disagree, showing mixed readiness.

Socially, 84.67% report improved productivity, 74.67% year-round income, 90% personal satisfaction, and 79.33% reduced migration. Crop-failure worries are low (88.67% disagree), and 74% reject the idea that off-season farming cannot be done individually.

Overall, farmers view off-season cultivation as profitable, feasible, and socially beneficial, supported by training and institutional guidance.

Table 2 : Overall perception regarding off-season cultivation (n=150)

Sr. No.	Category	Frequency	Percent
1	Very Low (34.0 to 61.2)	14	9.49
2	Low (61.3 to 88.4)	42	27.98
3	Medium (88.5 to 115.6)	11	7.39
4	High(115.7 to 142.8)	25	16.41
5	Very high (142.9 to 170)	58	38.73

The above table 2 indicated the overall perception of 150 farmers with off-season cultivation. The analysis of attitude scores revealed that 37.73 percent of respondents hold a very high perception and 16.41 percent have high perception towards the off-season cultivation. Thus, total 55.1 percent of the respondents, indicating that more than half of the participants exhibit a positive inclination towards off-season cultivation. On the other hand, 27.98 percent of respondents have low perception and 9.49 percent have very low perception about off-season cultivation. Meanwhile, only 7.39 percent of respondents fall in the Medium perception category. Thus, total 37.47 percent respondents have low to very low perception.

Overall, the findings indicate a predominantly positive attitude, with over half (55.14 percent) of the respondents scoring in the high or very high range.

Table 3: Statement wise perception regarding seasonal cultivation

(n=150)

Sr. No	Statement	SA	A	UD	DA	SD
A	Economic Dimension					
1	Seasonal cultivation is profitable for Agri- business	112 (74.67)	34 (22.67)	2 (1.33)	2 (1.33)	0 (0.00)
2	There is an assured market for seasonal products	90 (60.00)	55 (36.67)	4 (2.67)	1 (0.67)	0 (0.00)
3	In season, market is flooded with the vegetables and so desired prices are not obtained (-)	6 (4.00)	2 (1.33)	5 (3.33)	123 (82.00)	14 (9.33)

Sr. No	Statement	SA	A	UD	DA	SD
4	Inputs are easily available in season	123 (82.00)	25 (16.67)	0 (0.00)	0 (0.00)	2 (1.33)
5	Favorable environmental condition	121 (80.67)	28 (18.67)	1 (0.67)	0 (0.00)	0 (0.00)
6	Abundant quantity of vegetable crop is available for value addition	64 (42.67)	80 (53.33)	4 (2.67)	0 (0.00)	2 (1.33)
7	Higher risk of pest and diseases in seasonal cultivation (-)	7 (4.67)	83 (55.33)	19 (12.67)	38 (25.33)	3 (2.00)
B	Technological Dimension					
8	Scientific package of practices are easily available for seasonal cultivation	131 (87.33)	16 (10.67)	0 (0.00)	3 (2.00)	0 (0.00)
9	Availability of seeds and seed treatment chemicals is higher in season	72 (48.00)	76 (50.67)	2 (1.33)	0 (0.00)	0 (0.00)
10	In seasonal cultivations, output is higher	136 (90.67)	14 (9.33)	0 (0.00)	0 (0.00)	0 (0.00)
11	In seasonal cultivation, prediction of occurrences of pest and diseases is more accurate	77 (51.33)	73 (48.67)	0 (0.00)	0 (0.00)	0 (0.00)
12	Routine care is sufficient	119 (79.33)	31 (20.67)	0 (0.00)	0 (0.00)	0 (0.00)
13	Not favorable for seed production (-)	0 (0.00)	1 (0.67)	146 (97.33)	1 (0.67)	2 (1.33)
C	Other Dimension					
14	Risk of crop failure is less in case of seasonal cultivation	141 (94.00)	6 (4.00)	3 (2.00)	0 (0.00)	0 (0.00)
15	Seasonal cultivation guarantees mental peace	66 (44.00)	82 (54.67)	1 (0.67)	0 (0.00)	1 (0.67)
16	Seasonal cultivation has less hurdles for new entrant	119 (79.33)	30 (20.00)	0 (0.00)	1 (0.67)	0 (0.00)
17	Seasonal cultivation guarantees labor availability	61 (40.67)	85 (56.67)	0 (0.00)	3 (2.00)	1 (0.67)
18	In seasonal cultivation, farmers have the opportunity to carry out research on crops	106 (70.67)	39 (26.00)	2 (1.33)	1 (0.67)	2 (1.33)
19	Seasonal vegetables are more preferred due to taste	61 (40.67)	81 (54.00)	6 (4.00)	1 (0.67)	1 (0.67)
20	It is more feasible to grow seasonal vegetables as they are grown in larger quantities	114 (76.00)	32 (21.33)	4 (2.67)	0 (0.00)	0 (0.00)
21	Land remains barren in the other months (-)	7 (4.67)	128 (85.33)	7 (4.67)	4 (2.67)	4 (2.67)

Note: Figures in the parenthesis indicate the percentage

The table presents respondents' perceptions of seasonal cultivation, revealing an overall positive outlook. Economically, 74.67% strongly agreed and 22.67% agreed that seasonal cultivation is profitable. An assured market is recognized by 96.67% of respondents. However, 82% disagreed that desired prices are obtained during peak season due to market saturation. Input availability is not an issue (98.67%), and 99.34% agreed that environmental conditions

are favourable. Value addition is supported by 96%, though 60% acknowledged higher pest and disease risks.

Technologically, respondents reported strong support: 98% agreed that scientific practices are readily available, and 98.67% confirmed seed and seed-treatment availability. Higher output was noted by 90.67%, and 100% agreed that pest and disease prediction is more accurate

in seasonal cultivation. Routine care was unanimously considered sufficient. Opinions on suitability for seed production were largely neutral (97.33%).

Socially, seasonal cultivation is viewed as low-risk, with 98% agreeing that crop-failure chances are minimal. Mental peace is reported by 98.67%, and 99.33% felt it has low entry barriers. Labour availability is affirmed by 97.34%, and 96.67% noted opportunities for on-farm research. Taste preference for seasonal vegetables is acknowledged by 94.67%. Additionally, 97.33% agreed that large-scale production enhances feasibility. A key limitation is land underutilization, with 85.33% indicating that land remains barren during off-season months.

Overall, seasonal cultivation is perceived as a profitable and technologically viable practice with assured markets, easy access to inputs, and a favourable environment. While challenges such as market saturation and pest risks exist, these are counterbalanced by increased productivity, predictability, and reduced crop failure risk. The data strongly suggested that seasonal cultivation is a practical and economically sustainable option for agribusiness. The findings agree with earlier studies conducted by Ray, *et al.* (2023); Natwadia *et al.* (2023); Jadav *et al.* (2023).

Table 4: Overall perception regarding seasonal cultivation
(n=150)

Sr. No.	Category	Frequency	Percent
1	Very Low (21.0 to 37.8)	02	01.33
2	Low (37.9 to 54.6)	07	04.67
3	Medium (54.7 to 71.4)	10	06.67
4	High(71.5 to 88.2)	48	32.00
5	Very high (88.3 to 105)	83	55.33

The above table 4 reveals that the majority of respondents (55.33%) have a very high perception about seasonal cultivation. Additionally, 32% of respondents have a high perception about seasonal cultivation. This distribution suggests that most respondents (87%) have high to very high perception for seasonal cultivation in terms of economic, technological, and other dimensions, with only a small fraction expressing lower levels of agreement.

Relationship between socio-economic profile and perception of farmers

To find the relationship between socio-economic profile (Independent variables) and perception (dependent variable) of the farmers, correlation was calculated for seasonal cultivation and the results are as below:

Table 5: Relationship between socio-economic profile and perception for seasonal cultivation

Sr. No.	Independent Variables	r value (Seasonal cultivation)	r value (Off-season cultivation)
1	Education	0.253**	0.042
2	Age	0.319**	0.035
3	Size of the Family	0.102	0.156
4	Occupation	-0.110	-0.037
5	Area under cultivation(own land) ha	0.016	-0.132
6	Area under cultivation(rented land)	-0.012	0.007
7	Family Income(Annual)	0.129	0.042
8	Farming Experience in years	0.014	-0.020
9	Source of finance	0.053	-0.147
10	Type of Irrigation	0.270**	0.009

*=Significant at 5% level of significance, **= Significant at 1% level of significance

The correlation analysis reveals that education and age have a significant positive association with seasonal cultivation (Patel *et al.*, 2023b), indicating that older and more educated farmers tend to view seasonal farming more favourably. However, these variables show negligible correlation with off-season cultivation, suggesting limited influence on its perception.

Family size shows a weak positive correlation with both types, slightly stronger for off-season farming. Occupation has a weak negative correlation with both,

implying that non-agricultural work slightly reduces farming involvement, though insignificantly.

Land ownership has minimal impact: own land shows negligible correlation with seasonal cultivation and a weak negative link with off-season farming, suggesting larger landholders are less inclined toward off-season practices. Rented land shows no meaningful correlation. Family income has a weak positive correlation with seasonal cultivation but not with off-season. These findings are consistent with evidence that socio-economic variables such as education,

family size, landholding, and income differentially influence farmers' agricultural decision-making and diversification behaviour (Vekariya *et al.*, 2022; Sindhura *et al.*, 2025; Dadheech *et al.*, 2024)

Farming experience and source of finance show near-zero correlations for both types. Finance access has a slight positive effect on seasonal farming and a weak negative effect on off-season, indicating minimal influence.

Irrigation type is positively and significantly correlated with seasonal cultivation, highlighting its importance. In contrast, irrigation shows little relevance to off-season farming decisions.

In summary, seasonal cultivation is significantly influenced by age, education, and irrigation, whereas off-season cultivation appears less dependent on these socio-economic factors.

CONCLUSION

This study analysed farmers' perceptions of seasonal and off-season vegetable cultivation in North and South Gujarat. Farmers practicing off-season farming view it as profitable due to premium prices, year-round employment, and reduced migration, though they highlight challenges such as high input costs, technical skills, and dependence on controlled conditions. Seasonal cultivation is preferred for its low costs, ease of management, and alignment with natural climate, though peak-season market saturation reduces profitability. Correlation results show that age and education significantly shape perceptions toward seasonal farming, while irrigation access strongly influences its adoption. These factors are less relevant for off-season cultivation. Overall, both systems contribute to farmers' livelihood security off-season farming offering higher returns but higher risks, and seasonal farming remaining stable but less lucrative. A balanced, well-supported mix of both practices, backed by policy, finance, and extension support, can enhance agricultural sustainability in Gujarat.

Thus, it can be said that Seasonal cultivation is perceived to provide an assured market but faces the challenge of market saturation, while off-season cultivation is perceived to offer a promising opportunity to enhance income stability. However, success depends on market accessibility and proper planning.

POLICY IMPLICATIONS

(A) Promote better market access:

It was found from the research that off-season crops can fetch premium prices, but market access and

demand are critical. Policy measures should promote better market linkages, cold storage facilities, and transportation infrastructure to ensure farmers can sell their produce at fair prices and reduce post-harvest losses.

(B) Encourage a balanced approach for seasonal and off-season cultivation

Since seasonal cultivation is low-risk but prone to market saturation, policies should encourage a balanced approach, where farmers combine seasonal and off-season crops. This can improve land utilization, stabilize income, and enhance overall agricultural resilience.

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CONFLICT OF INTEREST

This is to declare that there is "No conflict of interest" among researchers.

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