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# What Constrains Agripreneurship? A Factor Analytical Study of Vegetable Growers in South Odisha

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## HIGHLIGHTS

- Identified major institutional, financial, technological, and market constraints limiting vegetable growers' entrepreneurial performance.
- Factor analysis revealed a multidimensional structure of constraints, with four components explaining 71.44% total variance.
- Farmers prioritised market reform, flexible credit, post-harvest infrastructure, and organisational support for enterprise sustainability.

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**Keywords:** Extension strategies, Entrepreneurship, Livelihood enhancement, Market integration, Post-harvest management.

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## ABSTRACT

The study analysed the constraints of entrepreneurial behaviour of vegetable growers in South Odisha and identified priority interventions for agripreneurial development. Using an exploratory design, the data collection was carried out from 240 vegetable growers using the structured interview method in 2025. Constraint severity and suggestion priority were calculated with weighted mean scores and ranking, and seven components to explain 100% variance were extracted by P.C.A., with the first three components explaining 57.2%. Results showed that the biggest constraints were untimely availability of inputs (Mean = 2.154), non-sanction of credit required (2.146), low price in market in the presence of market glut (2.079), and inadequate training (2.033). Major supports as suggested by farmers were insurance coverage in bad situations (2.279), organising vegetable growers (2.233). The findings revealed that the performance of agripreneurs is limited by the interlinked market, financial, technology, and institutional factors. Strengthening the coordination of market regulation, flexible credit systems, post-harvest infrastructure, and organisation of farmers is crucial in improving entrepreneurial capacity and the sustainability of income for vegetable growers.

## INTRODUCTION

Agriculture remains a core economic activity in Odisha and food security system, engaging nearly half of the state's workforce and contributing significantly to rural livelihoods. The sector drives crop diversification and income generation among small and marginal farmers. Vegetables are an important high-value, cash crop segment with Odisha's cropping pattern because they provide year-round income opportunities compared with seasonal crops, increase farmers' marketable surplus, support nutrition security for rural households, encourage agri- industrial linkages (Government of Odisha, 2025a). Vegetable production in the state increased from 97.34 lakh metric tonnes (MT) in 2019-20 to 109.3 lakh MT in 2023-24, reflecting steady growth and adoption of diversified crops, including vegetables. In this period, Odisha ranked 7$^{th}$ among Indian

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states in vegetable production, contributing about 5.5 per cent of the country's total output (Government of Odisha, 2025b).

Vegetable farming in Odisha is currently facing crisis that has emerged due to persistent market failures, inadequate post-harvest infrastructure, production constraints and climatic risk (Amar et al., 2025). Farmers often receive low farm-gate prices due to weak marketing linkages and price volatility, quantities of produce are lost due to the lack of adequate cold storage and processing facilities, and climatic changes like floods, erratic rainfall frequently damage perishable crops. These factors reduce profit, discourage investment in vegetable cultivation, and undermine the economic sustainability of small and marginal farmers (Das et al., 2025). While Odisha is rich in vegetable production potential, but weak in infrastructure, especially in post-harvest infrastructure and market access, have created distress among vegetable growers, turning what should be a high-value enterprise into a high-risk, low-return endeavour (Government of Odisha, 2025b).

Entrepreneurship in agriculture has become an important factor in India's rural development, economic robustness and livelihood diversification. Despite its declining contribution to national GDP in the last few decades, agriculture continues to employ major part of the rural human resources around 52 per cent of the population highlighting the socio-economic significance of agriculture and the potential for agripreneurial growth to uplift the rural incomes (Trivedi & Patel, 2024). Vegetable production, in particular, is a high-value and employment-intensive sector, providing an important source of income generation, risk reduction and market access for smallholder farmers. However, the extent to which vegetable growers behave in an entrepreneurial manner is mediated by a complex interaction of personal, institutional, technological and market constraints (Kumar & Nain, 2012; Chopra & Rathore, 2024; Bhuriya & Gour, 2025). Understanding the binding constraints faced by growers is important in determining extension strategies that can be used to boost agripreneurship (Saha et al., 2024). Research on agripreneurial constraints reveals wide-ranging constraints across the scope of lack of availability of inputs, poor financial services, lack of infrastructure, lack of market linkage and socio-cultural norms inhibiting risk-taking and innovation (Bathini et al., 2021; Raza et al., 2025). The study explores constraints perceived and remedies suggested by farmers among vegetable growers in South Odisha, focusing specifically on the relationships of these barriers to entrepreneurial behaviour.

## METHODOLOGY

The current investigation was an ex post facto research design, which is suitable for research into already existing behavioural patterns and constraints under no manipulation of variables. The study was carried out in Ganjam and Koraput of South Odisha which is known for increasing vegetable production and new agripreneurial activities. In the first stage, the major vegetable growing blocks were identified from the two selected districts on the basis of area under vegetable cultivation and participation in the market. From Ganjam District two blocks were taken i.e. Sorada and Khalikote and from Koraput district two blocks were taken i.e. Semiliguda and Koraput. Villages were randomly selected from Sorada and Khalikote blocks of Ganjam district. Twelve villages were selected, six from each block. From Sorada block, six villages were taken: Gopalpur, Nuagada, Borada, Ekalalpur, Gangapur & Sarabadi and from Khalikote block, six villages were taken: Bagalpur, Nuapalli, Chikili, Danapur, Chakasingh & Dimiria. From Semiliguda block six villages were taken: Charangul, Khudi, Dudhari, Sadam, Muthai & Choragan and from Koraput block six villages were taken: Bagara, Chakili, Dakara, Ekataguda, Jerati & Kalchur. Proportionate random sampling was followed for a total sample of 240 vegetable growers. Primary data was gathered in personal interviews with the use of a pre-tested, structured interview schedule developed in consultation with extension experts and subject matter specialists. The dimensions that the instrument addressed were those related to administration, technology, availability of inputs, credit and finance, production, marketing, and socio-cultural constraints and the interventions suggested by farmers, respectively.

Weighted mean scores, gap percentages and ranks were calculated to identify the severity and priority of constraints and suggestions. To examine the underlying structure in a case of multiple constraint variables and simplify the dimensional complexity, the Principal Component Analysis (PCA) using varimax rotation was applied. Factors with eigenvalues greater than one, and variables with high factor loadings were kept, and latent dimensions that have an impact on agripreneurial constraints were interpreted. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarise the data. Inferential and multivariate analyses were conducted using standard statistical software. Content validity of the instrument was established through expert review, and reliability was ensured through pilot testing and necessary refinements prior to final data collection.

## RESULTS

### Distribution of perceived constraints amongst vegetable growers

Among the administrative constraints, lack of control on traders and input suppliers ranked highest (Mean = 2.025) followed by poor liaison in the local vegetable trade system with traders and input suppliers (Mean = 1.967) reflecting poor institutional linkage and governance in the local vegetable trade system. Under the technological constraints, insufficient training for knowledge and skill competency ranked first (Mean = 2.033) and literatures not supplied for reference ranked second (Mean = 1.958), reflecting lack of access of growers to need-based technical knowledge and advisory support. With regard to input availability, inputs not timely available turned out to be the most critical constraint (Mean = 2.154) followed by inadequate distribution of mini-kits (Mean = 2.063), suggesting gaps in the supply chain and institutional input delivery mechanism. In the category of credit and finance, required amount not sanctioned was the biggest constraint (Mean = 2.146), with no relaxation in fixing repayment instalments coming at second position (Mean = 2.104), which reflected the financial rigidity and procedural hindrances faced by vegetable growers. Among the production constraints, there is a lack of knowledge on quality maintenance ranked first (Mean = 2.079), followed by inadequate attempt to develop management competency (Mean = 2.071)

**Table 1.** Distribution of Perceived Constraints Influencing Entrepreneurial Behaviour of Vegetable Growers in South Odisha

| S.No. | Constraint | Strongly agree | Agree | Disagree | Mean | Rank |
|---|---|---|---|---|---|---|
| a. | Administrative constraints | | | | | |
| i | Poor liaison with traders and input suppliers | 55 | 122 | 63 | 1.967 | II |
| ii | No control over traders and input suppliers | 61 | 124 | 55 | 2.025 | I |
| iii | Less credibility of the extension functionaries | 49 | 121 | 70 | 1.913 | III |
| b. | Technological constraints | | | | | |
| i | Inadequate training for knowledge and skill competency | 65 | 118 | 57 | 2.033 | I |
| ii | Inadequate demonstration to enrich knowledge | 54 | 120 | 66 | 1.950 | III |
| iii | Literatures not supplied for reference | 55 | 120 | 65 | 1.958 | II |
| c. | Input availability | | | | | |
| i | Inputs not timely available | 81 | 115 | 44 | 2.154 | I |
| ii | Inadequate distribution of mini- kit | 68 | 119 | 53 | 2.063 | II |
| iii | Input not available on credit system | 65 | 116 | 59 | 2.025 | III |
| d. | Credit and finance | | | | | |
| i | Harassment in processing of documents | 70 | 119 | 51 | 2.079 | III |
| ii | Required amount not sanctioned | 78 | 119 | 43 | 2.146 | I |
| iii | Lack of relaxation in fixing repayment instalments | 72 | 121 | 47 | 2.104 | II |
| e. | Production Constraints | | | | | |
| i | Lack of knowledge about quality maintenance | 68 | 123 | 49 | 2.079 | I |
| ii | Insufficient attempt to develop management competency | 67 | 123 | 50 | 2.071 | II |
| iii | Lack of idea to control stored grain pests | 68 | 120 | 52 | 2.067 | III |
| f. | Marketing constraints | | | | | |
| i | Exploitation by the traders and businessmen | 67 | 119 | 54 | 2.054 | II |
| ii | Low sale price in plea of market glut by the businessmen | 71 | 117 | 52 | 2.079 | I |
| iii | Lack of control of the government on traders and businessmen | 62 | 121 | 57 | 2.021 | III |
| g. | Socio-cultural constraints | | | | | |
| i | Lack of community support to use common resources | 68 | 122 | 50 | 2.075 | III |
| ii | Lack of cooperation of the villages and local people | 73 | 123 | 44 | 2.121 | II |
| iii | Possibility of cattle menace | 77 | 119 | 44 | 2.138 | I |

suggesting that there is a need for capacity building in post-harvest and farm management practices. With respect to marketing constraints, low sale price under the plea of market glut by businessmen emerged as the major constraint (Mean = 2.079) followed by exploitation by traders and businessmen (Mean = 2.054), which shows the vulnerability of the farmers to price fluctuation and the domination of middlemen. Under socio-cultural constraints, possibility of cattle menace scored highest (Mean = 2.138) whereas non-cooperation of villages and local people scored second (Mean = 2.121), showing that social and community related factors also play a very significant role in entrepreneurial decision-making.

**Perceived suggestions from vegetable growers**

Among the organisational support measures, good coordination and cooperation among extension officials (Mean = 2.088) topped the list followed by good linkage with related departments (Mean = 2.071), indicating the need for better institutional convergence for extension delivery. Under technological backstopping, reasonable demonstration to build confidence (Mean = 2.133) emerged as the topmost suggestion followed by adequate training to raise knowledge and competency of skills (Mean = 2.129) reflecting preference of the growers for practical and hand-on learning approaches. In terms of input availability support, authenticity in quality (Mean = 2.083) ranked at the top followed by liaisoning with traders for availability and timely supply of inputs (Mean = 2.075) implying the importance in quality assurance and reliable input supply chains. In the category of credit and finance; flexibility in mortgage (Mean = 2.138) followed by availability of required amount (Mean = 2.133) was the most preferred support which highlights the need for credit policies for the farmers. Under post harvester management support, competency development on grading (Mean = 2.183) was ranked first followed by community drying yard facility (Mean = 2.150) which showed the demand of improved post harvester handling infrastructure and skills from the growers. With respect to marketing support, insurance coverage in adverse situations (Mean = 2.279) was considered most essential followed by minimum support price of the produce (Mean = 2.217) implying the need for risk mitigation and price security mechanisms. Under socio-cultural support, organising vegetable growers (Mean = 2.233) ranked first, followed by establishing coordination and cooperation among vegetable growers (Mean = 2.225) which shows the importance of collective action in strengthening the entrepreneurial behaviour.

**The factor analysis of constraints**

Principal Component Analysis (PCA) was conducted to identify the major dimensions of constraints faced by the respondents (Table 3). Although seven components were extracted, only three components were retained for interpretation following

**Table 2.** Farmer-Perceived Priority Support Measures for Strengthening Entrepreneurial Behaviour of Vegetable Growers in South Odisha

| S.No. | Support | More Essential (3) | Essential (2) | Less Essential (1) | Mean | Rank |
|---|---|---|---|---|---|---|
| a. | Organisational support | | | | | |
| i | Good linkage with related departments | 69 | 119 | 52 | 2.071 | II |
| ii | Immediate solving of field problems | 63 | 119 | 58 | 2.021 | III |
| iii | Good coordination and cooperation among extension officials | 71 | 119 | 50 | 2.088 | I |
| b. | Technological backstopping | | | | | |
| i | Adequate training to enhance knowledge and skill competency | 72 | 127 | 41 | 2.129 | II |
| ii | Reasonable demonstration to develop confidence | 76 | 120 | 44 | 2.133 | I |
| iii | Adequate facilities for soil testing | 71 | 122 | 47 | 2.100 | III |
| c. | Input availability support | | | | | |
| i | Available with fair price | 69 | 118 | 53 | 2.067 | III |
| ii | Liasoning with traders for timely supply | 69 | 120 | 51 | 2.075 | II |
| iii | Authenticity on quality | 71 | 118 | 51 | 2.083 | I |
| d. | Credit and finance | | | | | |
| i | Timely availability of credit | 71 | 118 | 51 | 2.083 | III |
| ii | Flexibility in mortgage | 77 | 119 | 44 | 2.138 | I |
| iii | Availability of the required amount | 77 | 118 | 45 | 2.133 | II |
| e. | Post-harvest management support | | | | | |
| i | Skill competency for quality maintenance | 73 | 118 | 49 | 2.100 | III |
| ii | Competency development on grading | 84 | 116 | 40 | 2.183 | I |
| iii | Community drying yard facility | 78 | 120 | 42 | 2.150 | II |
| f. | Marketing of the produce | | | | | |
| i | Cold store facility to store during market glut | 85 | 119 | 36 | 2.204 | III |
| ii | Minimum support price of the produce | 86 | 120 | 34 | 2.217 | II |
| iii | Insurance coverage in an adverse situation | 95 | 117 | 28 | 2.279 | I |
| g. | Socio-cultural support | | | | | |
| i | Organising vegetable growers | 90 | 116 | 34 | 2.233 | I |
| ii | Establishing coordination and cooperation among vegetable growers | 88 | 118 | 34 | 2.225 | II |
| iii | Cooperative system in the disposal of produce | 79 | 117 | 44 | 2.146 | III |

**Table 3.** Factor Loading / Principal Component analysis of constraints

| Variables | PC 1 | PC 2 | PC 3 | PC 4 | PC 5 | PC 6 | PC 7 |
|---|---|---|---|---|---|---|---|
| Administrative | -0.195 | 0.509 | -0.442 | -0.327 | -0.382 | 0.001 | 0.505 |
| Technical | 0.108 | 0.133 | 0.680 | -0.564 | 0.230 | -0.199 | 0.312 |
| Input Availability | -0.211 | 0.611 | -0.153 | -0.005 | 0.519 | -0.306 | -0.442 |
| Credit & Finance | 0.496 | 0.405 | 0.070 | -0.067 | 0.035 | 0.741 | -0.173 |
| Production | -0.536 | 0.130 | 0.267 | 0.463 | 0.294 | 0.388 | 0.417 |
| Marketing | 0.593 | 0.042 | -0.244 | 0.353 | 0.384 | -0.268 | 0.493 |
| Socio-cultural | 0.142 | 0.409 | 0.428 | 0.481 | -0.544 | -0.308 | -0.082 |
| Eigenvalue | 1.455 | 1.424 | 1.124 | 0.997 | 0.764 | 0.694 | 0.541 |
| Variability (%) | 20.788 | 20.346 | 16.064 | 14.241 | 10.915 | 9.917 | 7.729 |
| Cumulative % | 20.788 | 41.134 | 57.199 | 71.439 | 82.354 | 92.271 | 100.00 |

the Kaiser criterion (Eigenvalue >1). These three components together explained 57.20% of the total variance, indicating a satisfactory representation of the data. The first principal component (PC1) recorded the highest eigenvalue (1.455) and accounted for 20.79% of the total variance, with strong loadings on Marketing (0.593), Credit & Finance (0.496), and Production (–0.536); hence, it was interpreted as Market–Production Constraints, representing economic and output-related barriers. The second component (PC2), with an eigenvalue of 1.424, explained 20.35% of the variance and exhibited high loadings on Input Availability (0.611), Administrative (0.509), and Socio-cultural (0.409) constraints, and was therefore designated as Administrative–Input Constraints, reflecting institutional and access-related limitations. The third component (PC3) possessed an eigenvalue of 1.124 and contributed 16.06% of the total variance, with dominant loadings on Technical (0.680) and Socio-cultural (0.428) constraints, and was labeled as Technical–Socio-cultural Constraints, indicating knowledge-based and social impediments. The remaining components had eigenvalues below unity and were not considered for further interpretation.

## DISCUSSION

The investigation gave a holistic insight into the constrained environment within which the agripreneurial behaviour of the vegetable growers in South Odisha. Among the administrative constraints, the greatest severity was attached to the lack of control in traders and input suppliers and poor liaisoning brought out the structural weaknesses in the market governance and the extension-market interface. Similar results were obtained by Gupta et al. (2014) and Anamika et al. (2023). The comparatively low ranking of "non-cooperative officials" implied that growers had been freer of interpersonal relationships with officials and more limited by the lack of effective regulatory and coordination mechanisms. Technological limitations, especially the lack of reasonable demonstration to develop confidence, highlighted acute shortcomings in the extension delivery system. These results reinforced the proposition that entrepreneurial behaviour in vegetable cultivation had relied heavily on access to knowledge and learning by experience (Kumar et al., 2013; Das et al., 2014). The intense input availability and credit constraints shown in this study, particularly due to delayed input supply and unsanctioned required credit, meant that financial as well as supply chain constraints have not been key impeding factors for enterprise expansion (Suman et al., 2025; Kiran et al., 2025). Marketing constraints such as low sale price at time of glut in market and exploitation by traders came out as the most acute challenges. Among the production constraints, lack of knowledge about quality maintenance and Insufficient attempt to develop management competency, similar result was obtained by (Ajaykumar et al., 2024). Among socio-cultural constraints possibility of cattle menace, lack of cooperation of the villages and local people and lack of community support to use common resources, a similar result was obtained by (Kobba et al., 2020; Khan et al., 2024).

The suggestions revealed that farmers strongly emphasised the need for good coordination and cooperation among extension officials to ensure timely guidance and effective problem resolution at the field level. Reasonable field demonstrations were identified as the most important technological support, as they enhance farmers' confidence and promote adoption of improved vegetable production practices. Ensuring authenticity and quality of agricultural inputs was considered essential for improving crop performance and minimising production risks. In terms of financial support, flexibility in mortgage requirements for credit access emerged as a crucial factor in enabling small and marginal farmers to invest in cultivation activities without financial constraints. For post- harvest management, competency development on grading was prioritised, as it helps farmers secure better market prices through quality differentiation. Insurance coverage in adverse situations was the top marketing- related suggestion, highlighting farmers need for protection against climate variability and market uncertainties. Organising vegetable growers into groups or collectives was viewed as vital socio-cultural support, as it strengthens collective action, improves market access, and facilitates knowledge sharing, thereby enhancing the overall entrepreneurial capacity of vegetable farmers.

The PCA explained three major components with eigenvalues greater than one. In PC1, the strong positive loadings of marketing and credit indicated that better financial access and market orientation tended to move together, while the negative loading of production suggested that production constraints intensified where these economic linkages were weak. This inverse relationship implied that inadequate commercialisation support may have translated into lower productive efficiency, reinforcing the economic nature of this component. PC2 showed uniformly positive loadings for input availability, administrative, and socio-cultural factors, indicating that these variables operated as a mutually reinforcing system; effective institutional support was closely associated with improved access to inputs and socially accepted practices. In PC3, the high positive loading of technical factors alongside socio-cultural influence suggested that technology adoption depended not only on technical feasibility but also on farmers' awareness and social readiness.

## CONCLUSION

The study concluded that agripreneurial development of vegetable growers in South Odisha had been seriously constricted due to institutional, technological, financial, input and market-related bottlenecks. Market exploitation, insufficient training and demonstration, delayed supply of inputs, poor access to credit and poor post harvesting infrastructural were found to be the most critical impediments. Factor analysis confirmed that these constraints were multidimensional and interlinked, necessitating integrated extension interventions. Based on the findings, it is suggested that the extension agencies should consider prioritising strengthening the market governance, ensuring timely and quality delivery of input as well as expanding need-based training and field demonstration, and improving access to flexible and timely credit. Development of post harvesting infrastructure like grading, storage mechanisms and risk mitigation mechanisms is vital. Promoting farmer organisations and improving coordination between extension institutions will further strengthen agripreneurial capacity and income sustainability of vegetable growers in the region.

## DECLARATIONS

Ethics approval and informed consent: Informed consent was sought from the farmer respondents of the study during the course of the research.

Conflict of interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. The author declares that they have thoroughly reviewed, revised, and edited the content as needed. The authors take full responsibility for the final content of this publication.

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