Research Article

Indian Journal of Extension Education
Vol. 62, No. 3 (July–September), 2026, (201-207)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

Competency of Agripreneurs in Organic Farming: An Empirical Analysis on Palakkad District in Kerala

P. J. Sabu[1]*, Minju David Pulikkottil[2] and Deepa Roy[3]

[1]Associate Professor, [2]Research Scholar, Department of Economics, St. Thomas College (Autonomous), Thrissur-680001, Kerala, India
[3]Assistant Professor, Department of English, St. Joseph's College (Autonomous), Irinjalakuda-680121, Affiliated to University of Calicut, Kerala
*Corresponding author email id: sabustc9@gmail.com

HIGHLIGHTS

- Agripreneurial competencies among entrepreneurs in organic farming were found to be multidimensional in nature in Palakkad district.
- Agripreneurs exhibited adequate skill levels which positively reflected in their agripreneurial competencies and enterprise capabilities.
- Professional training, digital exposure and resource support are essential to strengthen competency levels of Agripreneurs in Palakkad.

ARTICLE INFO

Keywords: Competencies, Agripreneurs, Skills, Organic Farming.

https://doi.org/10.48165/IJEE.2026.62330

Citation: Sabu, P. J., Pulikkottil, M. D., & Roy, D. (2026). Competency of agripreneurs in organic farming: An empirical analysis on Palakkad District in Kerala. *Indian Journal of Extension Education*, *62*(3), 201-207. https://doi.org/10.48165/IJEE.2026.62330

Reviewed by: Mr. Pranoy Ray (pranoy-ee@pau.edu); Sonam Prabhakar (sonamprabhakar1@gmail.com); Dr. Jagriti Rohit (jags.rohit@gmail.com)

ABSTRACT

Organic farmers mainly relied on seasonal changes and ecological conditions in Kerala, as a result, entrepreneurs in the organic sector face several uncertainties in Kerala. Earlier research rarely analysed the skills and competencies of organic agripreneurs. The study analyses the dimensions of competency of organic agripreneurs in Palakkad district of Kerala. To accomplish this goal, a mixed-method approach was adopted. Primary data were collected through a structured interview schedule from 250 respondents in February 2026. The primary data were analysed using multinomial logit regression. The organic agripreneurs needed to improve their skill levels, which were reflected in their competency levels. It indicated that policy support mechanisms such as professional training, digital exposure and access to resources were essential for enhancing the competency levels of agripreneurs in organic sector.

INTRODUCTION

Organic farming has been emerged as a sustainable alternative to conventional methods of farming in Kerala. As a reflection of this shift, a notable portion of the total agricultural land has been brought under organic cultivation, reflecting a gradual shift towards eco-friendly farming practices. In Kerala, organic farming remains a fundamental sector, sustaining the livelihoods of a notable segment of the population. Despite its growing prominence, farmers and entrepreneurs in organic sector have been facing several challenges. They often encounter several constraints related to productivity, technical knowledge, and market access, which limit its long-term sustainability as a viable enterprise (Chopra & Rathore, 2024; Bhuriya & Gour, 2025; Kiran et al., 2025; Kerala Economic Review, Various Years). Palakkad was devoted a considerable portion of its total land to organic farming. In this context, agripreneurship in organic sector considers as an effective pathway for transforming agriculture into a market-oriented and income-generating enterprise. Government has introduced several initiatives to support organic farmers. Farmer Producer organisations (FPOs) supported these initiatives. In order to accelerate the impact of initiatives government, agripreneurs were expected to have a strong set of competencies (McElwee & Bosworth, 2010; Garima et al., 2023; Trivedi & Patel, 2024; Kerala Economic Review, Various Years).

Previous studies have examined various dimensions of agriculture enterprises and their agripreneurial attributes. Despite their considerable contributions, agripreneurs encounter multiple constraints, ranging from restricted access to resources and

Received 20-05-2026; Accepted 09-06-2026

technology to skill mismatches and market imperfections. More specifically, previous findings rarely assessed specific competencies of successful organic agripreneurs. The absence of skills to agripreneurs often limits the ability of agriprenuers to identify opportunities and sustain agribusiness ventures (Gills et al., 2021; Gupta et al., 2023; Mukharjee & Ghosh, 2025). An in-depth analysis of the specific challenges faced by agripreneurs in organic sector is imperative for the formulation of evidence-based policies and interventions. It was aimed to empower agripreneurs and advancing sustainable agricultural development. In particular, the present study aimed to enquire the multidimensional competencies of organic agripreneurs in Palakkad district.

METHODOLOGY

The present study was both descriptive and analytical in nature. Palakkad occupied a substantial presence of farmers in organic agriculture in Kerala (Kerala Economic Review, Various Years). Palakkad was fixed as the sample district to analyse the skills of organic agripreneurs. Stratified random sampling was followed to identify the respondents. Palakkad was divided into Block Panchayats. Block panchayat has been divided into grama panchayats. From each panchayath, 5 respondents were planned and altogether 250 samples were selected. Accordingly, respondents were stratified based on their socio-economic characteristics. A structured questionnaire was used to collect the primary data. According to Cochran's formula for sample size determination, the required sample size depends on the confidence level, variability in the population, and the acceptable margin of error. Assuming a 95% confidence level (Z =1.96), maximum variability (p = 0.5), and a permissible error margin of 6 to 7%, the estimated sample size was approximately 200 to 270 respondents. The sample size was determined based on standard statistical equation. Accordingly, a sample size of 250 was considered for the present study. The equation is expressed in the following form:

$$N_0 = Z^2pq/e^2$$

Where, (N_0) =required sample size; (Z)=standard normal variate corresponding to the desired confidence level (1.96 at 95% confidence level); (p)=estimated proportion of the population possessing the attribute of interest; (q)=proportion of the population not possessing the attribute, calculated as (q=1-p); (e) = desired level of precision or margin of error.

An Agripreneurial Competency Scale (ACS) was used to fetch competency levels. This scale was developed through an extensive theoretical and empirical literature and expert discussions. Afterwards, competency indicators were identified and structured into five domains. They were: (i) personal and behavioural competencies; (ii) agribusiness management competencies; (iii) psychological competencies; (iv) strategic and modern competencies and (v) sustainability and innovation competencies. Each domain comprised multiple indicators representing specific skill dimensions. Based on these domains, 50 statements were developed. In total, the competency scale included 50 skill indicators. Equal weights were assigned to all competency indicators because each competency was considered equally important in evaluating agripreneurial capability. The score for each respondent was obtained by summing the scores across all 50 competency items. Based on these items, a questionnaire was developed. Respondents were classified into low, medium and high competency categories based on percentile distribution. A pilot study was conducted among respondents in the study. The validity of the research findings was ensured through a series of statistical procedures.

Subsequently, the reliability and clarity of the instrument was tested. The Cronbach's Alpha coefficient of the competency scale was 0.861. The adequacy of the data for factor analysis was tested using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity confirmed the adequacy and validity of the scale (Cronbach, 1951; Garcia, 2020). Finally, to identify the determinants of agripreneurial competency levels, a multinomial logit regression model was employed. Therefore, the findings of the study were derived from a statistically reliable and valid analytical procedure. The findings of the analysis are presented in the next section.

RESULTS

The socio-economic profile of the respondents revealed that male argipreneurs are 51.2% while female respondents constituted to 48.8%. Majority (47.2%) of the respondents belong to 26-35 age group which indicated the active youth segment in organic sector.

Results of the analysis on personal and behavioural competencies are presented in Table 1. It is seen that most of the agripreneurs had 'high' personal and behavioural competencies in Palakkad. For instance, 'decision-making competency' was recorded the highest proportion in the high category (54.4%), followed by 'continuous learning orientation' (49.6%) and 'creative problem-solving ability' (46.4%). It implied that the agripreneurs possesses the high ability to evaluate alternatives, learn from experience, and

Table 1. Personal, behavioural and agribusiness competencies of agriprenuers in Palakkad

	Item	Low	Medium	High
I	*Personal and Behavioural Competencies*			
1	Persistence	24.8	38.4	36.8
2	Social leadership ability	21.6	35.2	43.2
3	Communication competency	19.6	41.2	39.2
4	Relationship-building skill	22.4	36.0	41.6
5	Continuous learning orientation	17.6	32.8	49.6
6	Creative problem-solving ability	16.0	37.6	46.4
7	Innovative orientation	20.0	43.6	36.4
8	Analytical reasoning ability	23.6	40.8	35.6
9	Decision-making competency	15.2	30.4	54.4
10	Solution-oriented ability	18.4	37.6	44.8
II	*Agribusiness Management Competencies*			
1	Financial planning ability	22.8	37.6	39.6
2	Budgeting and cost control	20.4	38.8	40.8
3	Pricing strategy skill	18.4	35.2	46.4
4	Marketing and promotion ability	21.6	37.2	41.2
5	Supply chain coordination	24.0	36.0	40.4
6	Bargaining and negotiation skill	19.2	34.4	45.6
7	Inventory management ability	24.8	38.4	36.8
8	Market penetration ability	18.8	39.2	42.0
9	Resource allocation skill	22.0	38.0	40.0
10	Business risk management	20.8	36.0	43.2

respond effectively to emerging challenges, which in turn determined the strong behavioural readiness among agripreneurs. Similarly, skills such as social leadership ability (43.2%), relationship-building skill (41.6%), and solution-oriented ability (44.0%) also was high among respondents. These dimensions of competencies have played a crucial role in enterprise sustainability.

Entrepreneurs in organic agriculture remained in the 'medium' category was mainly in communication competency (41.2%) and innovative orientation (43.6%)**.** These findings suggest that 'low' category entrepreneurs will improve their traits by training and mentorship programmes. Results on agribusiness management are presented in Table 1. It is evident that pricing strategy skill shows the 'highest' **(**46.4%), category followed by bargaining and negotiation competency (45.6%)**,** business risk management (43.2), market penetration ability (42.0%). These relative strengths of these components show relatively strong market-oriented decision-making abilities. It was exhibited that 'moderate' competency levels are present in some skills such as budgeting and cost control (38.8%) and market penetration ability (39.2%). It indicates that the entrepreneurs are at an evolving and early stage of developing stronger managerial capabilities. In addition, inventory management ability (24.8%) and supply chain coordination (24.0%) showed relatively higher proportions in the low category.

Results on psychological competencies are presented in Table 2. A notable majority of entrepreneurs belong to 'high' competency category in most of the dimensions. For instance, 'achievement motivation' recorded the highest proportion (52.8%), followed by self-confidence (50.4%). It indicates that respondents possess confidence in their own abilities and clarity in pursuing entrepreneurial goals. Further, self- belief (49.2%) and goal-oriented approach (48.4%), are also exhibited 'high' among entrepreneurs. This reflects the ability of agripreneurs to adapt to uncertainty and manage the risks associated with agribusiness activities. Resilience has been widely recognized as a key factor in positive youth development and enterprise sustainability. However, relatively higher shares in the 'low' category were observed for stress management ability (23.2%) and self-control orientation (21.6%).

Table 2. Psychological and strategic and modern competencies

	Item	Low	Medium	High
III	*Psychological Competencies*			
1	Achievement motivation	16.4	30.8	52.8
2	Self-confidence	17.6	32.0	50.4
3	Emotional resilience	19.6	34.8	45.6
4	Stress management ability	23.2	36.8	40.0
5	Goal orientation	18.0	33.6	48.4
6	Entrepreneurial mindset	19.2	36.0	44.8
7	Calculated risk-taking	15.6	37.6	46.8
8	Self-control orientation	21.6	38.4	40.0
9	Adaptive resilience	18.4	35.2	46.4
10	Self-belief competency	16.8	34.0	49.2
IV	*Strategic and Modern Competencies*			
1	Opportunity identification skill	15.2	34.4	50.4
2	Business planning competency	18.4	32.8	48.8
3	Demand anticipation skill	20.0	36.4	43.6
4	Situational awareness ability	16.8	31.2	52.0
5	Information acquisition skill	14.8	34.0	51.2
6	Digital promotion competency	23.2	38.0	39.2
7	Agri-tech adoption ability	20.8	36.0	43.2
8	Strategic forecasting ability	19.2	36.8	44.0
9	Competitive intelligence	21.6	37.6	40.8
10	Innovation planning skill	18.4	35.6	46.0

Table 3. Sustainability and innovation competencies

	Item	Low	Medium	High
V	*Sustainability and innovation competencies*			
1	Sustainable resource utilization	19.2	39.2	42.4
2	Eco-friendly farming orientation	22.4	36.8	40.8
3	Waste management skill	25.6	38.4	36.0
4	Renewable technology awareness	23.2	35.2	42.0
5	Sustainable market linkage	20.8	37.6	41.6
6	Innovation diffusion ability	16.4	36.4	47.2
7	Climate adaptation planning	22.8	34.4	42.8
8	Green entrepreneurship orientation	19.2	35.2	46.0
9	Sustainable input management	22.0	38.0	40.0
10	Resource conservation skill	20.0	36.0	44.0

Source: Authors computed from primary data

Dimensions such as situational awareness ability belong to the 'high' share in the high category (52.0%), followed by information acquisition competency (51.2%). This suggests that the respondents are capable of identifying market opportunities and responding to dynamic agricultural conditions. Similarly, opportunity identification (50.4%) and business planning competency (48.8%) also show a notable concentration in the 'high' category. These findings imply that entrepreneurs possess the ability to formulate enterprise strategies and align innovation. These results revealed that agripreneurs demonstrated relatively higher competency levels in agri-tech adoption ability (43.2%) and strategic forecasting ability (44.0%), indicating growing adaptability towards modern agricultural practices.

However, digital promotion competency recorded relatively higher (38.0%) quotient among organic agricultural entrepreneurs in Palakkad. From the Table 3, it is evident that innovation diffusion ability records the highest share in the high category (47.2%) followed by green entrepreneurship orientation (46.0%) while sustainable resource utilization account only 41.6%. These findings imply that the respondents demonstrate a positive attitude towards traits such as efficient resource use, climate resilience, and environmentally responsible enterprise practices. However, certain areas such as waste management skill show a relatively higher proportion in the 'low' category (25.6%), It indicates that practical knowledge related to waste recycling requires improvement. Subsequently, the present research attempted to extract the summary of agripreneurial competencies. In this analysis, factor analysis was employed to identify the major dimensions of agripreneurial competencies.

Exploratory factor analysis (EFA) using principal component analysis (PCA) extraction method with varimax rotation was employed to identify the major dimensions of agripreneurial competencies. Variables with factor loadings 'above 0.50' were retained for interpretation. The extracted factor structure confirmed the existence of five major competency dimensions among agripreneurs in organic farming. The summary results of the analysis

Table 4. Summary of extracted factors of agripreneurial competencies

No.	Factor	No. of Variables	Eigen Value	Variance Explained (%)	Cumulative Variance (%)
I	Personal and Behavioural Competencies	10	5.842	21.36	21.36
II	Agribusiness Management Competencies	10	4.716	17.24	38.60
III	Psychological Competencies	10	3.928	14.36	52.96
IV	Strategic and Modern Competencies	10	3.214	11.75	64.71
V	Sustainability and Innovation Competencies	10	2.120	7.75	72.46

are exhibited in Table 4. It is clear that there are 50 skill variables grouped into five distinct factors. Personal and behavioural competencies, has an eigenvalue of 5.842 and explained 21.36% of the total variance, making it the most dominant factor. Agribusiness management competencies, explain 17.24% of the variance with an eigenvalue of 4.716. Similarly, psychological competencies, strategic and modern competencies, and sustainability and innovation competencies explain 14.36%, 11.75%, and 7.75% of the variance respectively. Factors with an 'eigenvalue' greater than 1 are considered statistically significant and suitable for retention. The cumulative variance explained by the five factors is 72.46%, which is also considered satisfactory. Since all the extracted factors have eigenvalues higher than 1, the factor structure is considered statistically valid and meaningful. Thus, results confirmed that the identified competency domains are statistically reliable and suitable for further empirical analysis.

Based on the results, it was noticed that these domains are responsible for 72.46% of the total variance. Subsequently, it was necessary to apply The Kaiser-Meyer-Olkin (KMO) to measure the adequacy of samples in the present investigation. The Kaiser-Meyer-Olkin (KMO) measure is used to assess the adequacy of the sample for factor analysis (Garcia, 2020; Goretzko & Ruscio, 2024). The KMO value is 0.842. It indicates that the variables included in the study share sufficient common variance for extracting meaningful factors. The calculated chi-square value is 2156.38 with 300 degrees of freedom. The significance value is 0.000, which is less than the conventional 5% level of significance. It indicates that the variables are significantly correlated and suitable for factor extraction. Therefore, the null hypothesis stating that the correlation matrix is an identity matrix was rejected. Hence, the KMO and Bartlett's test results confirm the adequacy and validity of the data for conducting exploratory factor analysis.

These extracted factors provide a strong conceptual foundation for understanding the multidimensional nature of agripreneurial skills among entrepreneurs in organic farming. The Multinomial logistic regression is an appropriate statistical tool when the dependent variable consists of more than two unordered categories. The model was employed to identify the factors influencing medium and high agripreneurial competency levels, taking the low competency group as the reference category. Results of estimated multinomial logit coefficients are exhibited in Table 5. It was revealed that training exposure has a positive and statistically significant effect on both medium and high competency levels, with odds ratios of 2.147 and 1.912, respectively. It indicates that trained respondents are more

Table 5. Estimated multinomial logit coefficients of factors influencing agripreneurial competency

Skill Level	Explanatory Variables	B	Std. Error	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
						Lower	Upper
Medium	Intercept	18.624	3.842	.000			
	Age	-0.168	0.298	.573	0.845	0.471	1.518
	Farming experience	-0.087	0.041	.034	0.917**	0.846	0.995
	Training exposure	0.764	0.284	.007	2.147*	1.231	3.744
	Digital media exposure	0.582	0.236	.014	1.790**	1.128	2.841
	Landholding status	0.438	0.198	.027	1.550**	1.052	2.283
	Access to institutional credit	0.392	0.181	.031	1.480**	1.038	2.111
	Annual farm income (Low)	-3.862	1.145	.001	0.021*	0.002	0.196
	Annual farm income (Medium)	-2.914	1.082	.007	0.054*	0.006	0.462
	Low income from agri-enterprise	-18.764	1.526	.000	<.001*		
High	Intercept	21.358	2.116	.000			
	Age	0.294	0.176	.095	1.342***	0.949	1.897
	Farming experience	0.118	0.049	.016	1.125**	1.022	1.239
	Training exposure	0.648	0.221	.003	1.912*	1.239	2.949
	Digital media exposure	0.405	0.168	.016	1.499**	1.078	2.083
	Landholding status	0.486	0.193	.012	1.626**	1.114	2.372
	Access to institutional credit	0.537	0.214	.012	1.711**	1.124	2.604
	Annual farm income (Low)	-4.624	1.287	.000	0.010*	0.001	0.088
	Annual farm income (Medium)	-3.508	1.104	.001	0.030*	0.004	0.221
	Low income from agri-enterprise	-19.864	1.542	.000	<0.001*		

likely to attain higher competency levels. Similarly, digital media exposure exerts a positive and significant influence in both categories. It suggests that access to online information and digital platforms improves agripreneurial competencies.

Further, landholding status and access to institutional credit show positive and significant coefficients. It implies that productive assets and financial support enhance the probability of achieving better competency levels. Farming experience exhibits a negative but significant effect in the medium category and a positive significant effect in the high category. It advocates that greater practical exposure strengthens advanced competency levels over time. The coefficients of annual farm income (low and medium) are negative and statistically significant in both categories. This evidence supports that respondents with lower income are less likely to attain higher competency groups. Most importantly, findings confirmed that variables such as training, digital exposure, financial access, and resource ownership are major factor which influenced them. These factors would have positively influence agripreneurial competency levels.

DISCUSSION

Results indicate that behavioural characteristics such as decision-making ability, and problem-solving skills play a critical role in shaping agripreneurial capacity. In addition, factors such as training, digital exposure, continuous learning orientation, financial access, and resource ownership were positively influenced competency levels of entrepreneurs in organic farming. These findings seem to be mentioned in the previous literature on entrepreneurial success. For instance, entrepreneurial success is rooted in behavioural attributes and competencies at the personal level especially in rural contexts (Yi et al., 2023; Kumar et al., 2025; Siddiqui & Rokade, 2026).

'Agribusiness management competency' is a major factor in determining entrepreneurial performance in organic farming. This finding seems to be indirectly validated by the previous literature on agribusiness management competencies, particularly in pricing strategy, negotiation skills, and risk management (Toledo-López et al., 2012; Raina et al., 2016; Garima et al., 2023; Suman et al., 2025).

Research inferred that psychological competencies can reinforce the internal motivation in agripreneurship. Agripreneurial performance require psychological traits such as motivation, self-confidence and resilience. This finding seems to be similar in some of the earlier findings on entrepreneurial competency. For instance, earlier research argues that traits such as self-efficacy, self-control, emotional regulation skills. optimism, and resilience would enhance entrepreneurial outcomes (Luthans & Youssef-Morgan, 2017; Ismail et al., 2023; Kademani et al., 2024; Kesari et al., 2024; Kademani et al., 2026).

It was revealed that strategic and modern competencies are relatively well-developed among the argipreneurs in Palakkad. This reflects an increasing adaptability to execute dynamic agricultural environments with respect to evolving market conditions. These findings are implied in the previous literature on competency of entrepreneurs and their performance (Klerkx et al., 2019; Garima et al., 2023).

Finally, this study found that sustainability and innovation competencies have a positive orientation towards environmentally responsible agribusiness practices. In particular, organic agripreneurs require competencies such as system certifications, traceability mechanisms and sustainable farm management practices. High levels of green entrepreneurship orientation and innovation diffusion ability indicate a growing awareness of sustainable agriculture and climate-resilient practices. Some previous findings implicitly mentioned on interrelationship between entrepreneurial performance and sustainability management practices (Gills et al., 2013; Chouaibi et al., 2022; Cornejo et al., 2024).

Apart from these insights on competencies, this study attempted to identify the determinants of these competencies. It was revealed that factors like such as training exposure to structured skill development programmes and digital media exposure are essential. In addition, economic characteristics such as landholding status and access to institutional credit have shown a strong and positive association with competency levels. Unsurprisingly, inadequate income from agri-enterprise exhibits a strong negative effect. It indicated that financial constraints significantly limit the upward mobility of agripreneurs. These findings appear to be supported by the previous revelations on entrepreneurial performance and its determinants (Nain et al., 2018; Kobba et al., 2021; Bahaw et al., 2024; Kljucnikov et al., 2025).

CONCLUSION

A considerable proportion of respondents were found to have high competency levels. However, certain areas such as stress management ability, waste management skill, and digital promotion competency require further improvement. The major determinants that which influence the competency levels are training exposure, digital media exposure, landholding status, farming experience, and access to institutional credit. In a nutshell, the present study demonstrates that agripreneurial competencies are shaped by a complex interaction of behavioural traits, psychological factors, strategic capabilities, and socio-economic conditions. While the findings indicate a favourable competency base among entrepreneurs in organic sector, the presence of moderate-level competencies across several dimensions suggest that agripreneurship requires urgent attention. Therefore, present research suggests that policy interventions focusing on skill development, digital empowerment, financial inclusion, and practical training are inevitable and urgent.

DECLARATIONS

Ethics approval and informed consent: Informed consent was obtained from all respondents during the course of the research. Participation in the research was voluntary, and confidentiality of the information provided by the respondents was maintained throughout the investigation.

Conflict of interest: The authors declare that there is no conflict of interest regarding the publication of this paper. The research was conducted in the absence of any commercial or financial relationships that could be interpreted as a potential conflict of interest.

Author responsibility statement: The authors confirm that the manuscript has been carefully prepared, reviewed, revised, and edited. The authors take full responsibility for the final content of this publication.

REFERENCES

Bahaw, P., Baboolal, A., Mack, A. J., & Carter-Rogers, K. (2024). Exposure to entrepreneurship education interventions reveal improvements to vocational entrepreneurial intent: a two-wave longitudinal study. *Discover Education*, *3*(1), 145. https://link.springer.com/article/10.1007/s44217-024-00241-4

Bhuriya, R., & Gour, C. L. (2025). Entrepreneurial behaviour of vegetable farmers at Barwani district of Madhya Pradesh, India. *Journal of Experimental Agriculture International, 47*(6), 221–228. https://doi.org/10.9734/jeai/2025/v47i63483

Chopra, S., & Rathore, R. (2024). Entrepreneurial behavior of vegetable growers and determinants: A study in Ferozepur district of Punjab, India. *Archives of Current Research International, 24*(10), 8–15. https://doi.org/10.9734/acri/2024/v24i10903

Chouaibi, S., Chouaibi, J., & Rossi, M. (2022). ESG and corporate financial performance: the mediating role of green innovation: UK common law versus Germany civil law. *EuroMed Journal of Business*, *17*(1), 46-71. https://doi.org/10.1108/EMJB-09-2020-0101

Cornejo, G. A., Lamiño, P., & Trejos, B. (2024). Climate change: Relationship between knowledge and perception in students of an agricultural-based university in Ecuador. *Sustainability*, *16*(13), 5548**.** https://www.mdpi.com/2071-1050/16/13/5548

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297-334. https://doi.org/10.1007/BF02310555

Garcia, C. (2020). Sustainable Knowledge Economy Index. *Journal of Educational and Human Resource Development (JEHRD)*, *8*, 1-15.

Garima, Dhingra, A., Bishnoi, D. K., Lemma, H. R., & Lamba, R. (2023). Large and powerful or small and lovely: opinions of first-generation agricultural entrepreneurs on agribusiness success factors. *Frontiers in Sustainable Food Systems*, *7*, 1194981. https://doi.org/10.3389/fsufs.2023.1194981

Gills, R., Singh, R., & Nain, M. S. (2013). Extent of adoption and perceived reasons for organic cardamom production in Idukki District of Kerala. *Journal of Community Mobilization and Sustainable Development, 8*(1), 41-47.

Gills, R., Singh, R., & Nain, M. S. (2021). Sustainability and organic farming – A case of organic cardamom (*Elettaria cardamomum*) growers in Kerala State of India, *Indian Journal of Extension Education, 57*(1), 8-14.

Goretzko, D., & Ruscio, J. (2024). The comparison data forest: A new comparison data approach to determine the number of factors in exploratory factor analysis. *Behavior Research Methods*, *56*(3), 1838-1851. https://link.springer.com/article/10.3758/s13428-023-02122-4

Gupta, S. K., Nain, M. S., Singh, R., Mishra, J. R., & Lata, A. (2023). Exploring the entrepreneurial climate and attributes of agripreneurs and its determinants. *Indian Journal of Extension Education, 59*(2), 93-97. http://doi.org/10.48165/IJEE.2023.59220

Ismail, S., Potgieter, I. L., & Coetzee, M. (2023). Self-regulatory employability attributes and competency: the strengthening role of grit. *Frontiers in Psychology*, *14*, 1298299. https://doi.org/10.3389/fpsyg.2023.1298299

Kademani, S., Nain, M. S., Singh, R., & Roy, S. K. (2024). Analysis and profiling of agri-entrepreneurship promoting institutions. *Indian Journal of Extension Education*, *60*(1), 35-40 https://doi.org/10.48165/IJEE.2026.62202

Kademani, S., Nain, M. S., Singh, R., Dhull, S. K., Parsad, R., Sharma, D. K., & Roy, S. K. (2026). Personal and institutional determinants of an effective entrepreneurial intervention, *Journal of Agricultural Science and Technology*, *28*(1), 87-101. https://doi.org/10.48311/jast.2026.16843

Kerala Economic Review (Various Years). Kerala State Planning Board, Government of Kerala. https://spb.kerala.gov.in

Kesari, S., Pradhan, H., & Mukhopadhyay, S. D. (2024). Entrepreneurial behaviour of farmers: A review in Indian perspective. *International Journal of Agriculture Extension and Social Development, 7*(7), 79-88. https://doi.org/10.33545/26180723.2024.v7.i7Sb.777

Klerkx, L., Jakku, E., & Labarthe, P. (2019). A review of social science on digital agriculture, smart farming and agriculture 4.0: New contributions and a future research agenda. *NJAS: Wageningen Journal of Life Sciences*, *90*(1), 1-16. https://www.tandfonline.com/doi/full/10.1016/j.njas.2019.100315

Kljucnikov, A., Civelek, M., Kupec, V., & Badie, N. B. (2025). Breaking down entrepreneurial barriers: exploring the nexus of entrepreneurial behavior, innovation, and bank credit access through the lens of the theory of planned behavior. *International Entrepreneurship and Management Journal*, *21*(1), 13. https://link.springer.com/article/10.1007/s11365-024-01025-w

Kobba, F., Nain, M. S., Singh Rashmi, & Mishra, J. R. (2021). Determinants of entrepreneurial success in farm and non-farm sectors: A comparative analysis. *Indian Journal of Agricultural Sciences, 91*(2), 269-73. https://doi.org/10.48311/jast.2026.16843

Kumar, A., Singh, R., Gupta, R., & Sinha, P. K. (2025). Entrepreneurial competencies influence subjective well-being of subsistence entrepreneurs: Examining the mediating role of business performance. *Journal of Small Business Management*, *63*(2), 819-848. https://doi.org/10.1080/00472778.2024.2358878

Luthans, F., & Youssef-Morgan, C. M. (2017). Psychological capital: An evidence-based positive approach. *Annual Review of Organizational Psychology and Organizational Behavior*, *4*, 339-366. https://www.annualreviews.org/content/journals/10.1146/annurev-orgpsych-032516-113324

McElwee, G., & Bosworth, G. (2010). Exploring the strategic skills of farmers across a typology of farm diversification approaches. *Journal of Farm Management, 13*(12), 819-838. https://irep.ntu.ac.uk/id/eprint/3994/

Mukharjee, M., & Ghosh, S. (2025). Behavioural Determinants of Secondary Agriculture-based Entrepreneurs in Assam. *Indian Journal of Extension Education*, *61*(4), 90-95. https://doi.org/10.48165/IJEE.2025.61415

Nain, M. S., Singh, R., Mishra, J. R., & Sharma, J. P. (2018). Scalability of farmer led innovations (FLIs): A study of perceived determinants and required capacities. *Indian Journal of Agricultural Sciences, 88*(8), 1312-1315.

Pathania, A., & Meena, S. S. (2025). Constraints faced by rural youth for opting entrepreneurship as career: A case study of Haryana. *Indian Journal of Extension Education, 61*(1), 99-103. https://doi.org/10.48165/IJEE.2025.611RN01

Raina, V., Bhushan, B. H. A. R. A. T., Bakshi, P., & Khajuria, S. (2016). Entrepreneurial behaviour of dairy farmers. *Journal of Animal Research*, *6*(5), 1-7. https://irep.ntu.ac.uk/id/eprint/3994

Siddiqui, A., & Rokade, V. (2026). Entrepreneurial orientation, competencies, and access to finance in MSMEs: a PLS-SEM analysis of business innovation and performance. *Future Business Journal*, *12*(1), 158. https://doi.org/10.1186/s43093-026-00868-9

Suman, S., Deb, A., & Prusty, A. K. (2025). Constraints and strategic suggestions for enhancing integrated farming systems among Bonda tribal family farms. *Indian Journal of Extension Education, 61*(3), 132-136. https://doi.org/10.48165/IJEE.2025.613RN05

Toledo-López, A., Díaz-Pichardo, R., Jiménez-Castañeda, J. C., & Sánchez-Medina, P. S. (2012). Defining success in subsistence businesses. *Journal of Business Research, 65*(12), 1658-1664. https://www.sciencedirect.com/science/article/abs/pii/S0148296312000380

Trivedi, M. Y. P., & Patel, B. I. (2024). A study on the impact of agri-entrepreneurship in the development of the agricultural sector resulting in upliftment of the Indian economy. *The International Journal of Commerce and Management, 4*(2), 37-47. https://doi.org/10.56360/DIJCM/4.II.2024.2404

Yi, H., Meng, X., Linghu, Y., & Zhang, Z. (2023). Can financial capability improve entrepreneurial performance? Evidence from rural China. *Economic research-Ekonomska istrazivanja*, *36*(1), 1631-1650. https://doi.org/10.1080/1331677X.2022.2091631