Research Tool

Indian Journal of Extension Education
Vol. 62, No. 1 (January–March), 2026, (142-147)

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

A Scale for Measuring Entrepreneurial Orientation of Farmers' Producer Companies towards Secondary Agriculture

Gyan Shukla[1] Kalyan Ghadei[2], Shubhadeep Roy[3]*, M. Chennamadhava[1] and Prashish Singh[1]

[1]Ph.D. Scholar, [2]Professor, [3]Associate Professor, Department of Extension Education, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi-221005, Uttar Pradesh, India
*Corresponding author email id: shubhadeepiari@gmail.com

HIGHLIGHTS

- Scale was constructed for measuring the entrepreneurial orientation of FPCs engaged in secondary agriculture.
- Scale consisting 38 items distributed across eight dimensions, namely innovativeness, proactiveness, risk-bearing ability, achievement motivation, self-confidence, management orientation, market orientation, and leadership orientation with a Cronbach's alpha of 0.938 and further standardised through Split-half and Pearson's correlation values 0.824 and 0.907, respectively.
- The instrument facilitates policymakers, extensionists, and researchers in diagnosing and strengthening agripreneurship among farmer-led organisations.

ARTICLE INFO

Keywords: Entrepreneurial orientation, Farmer-producer companies, Scale construction, Secondary agriculture, Reliability and Validity.

https://doi.org/10.48165/IJEE.2026.621RT01

Citation: Shukla, G., Ghadei, K., Roy, S., Chennamadhava, M., & Singh, P. (2026). A scale for measuring entrepreneurial orientation of farmers' producer companies towards secondary agriculture. *Indian Journal of Extension Education*, *62*(1), 142-147. https://doi.org/10.48165/IJEE.2026.621RT01

ABSTRACT

The Farmers' Producer Companies in India play an important role in secondary agriculture (an entrepreneurial endeavour) through collective action. The study was conducted in 2025 and aimed to construct a scale measuring the entrepreneurial orientation of FPCs' member farmers in the context of secondary agriculture. Sixty statements were shortlisted after screening of 84 statements using Edwards' criteria for relevancy test. Consequently, 38 items were observed as relevant by following the criteria RW $\geq$ 0.80 and MRS $\geq$ OMRS. The discriminatory power of scale was further tested using the t-test with a cut-off value of 1.75. The final scale covered 38 items grouped under eight dimensions, namely innovativeness, proactiveness, risk-bearing ability, achievement motivation, self-confidence, management, market, and leadership orientation. The scale showed an excellent reliability, evidenced by Cronbach's alpha value of 0.938. Split-half and Pearson correlation results obtained 0.824 and 0.907, respectively, which also confirmed high reliability. Validity was established through expert judgment. The scale may help policymakers and researchers design evidence-based interventions to strengthen agripreneurship and rural development.

INTRODUCTION

Entrepreneurial Orientation (EO) refers to a firm's propensity toward innovation, proactiveness, and risk-taking when pursuing new opportunities (Lumpkin & Dess, 1996; Miller & Le Breton-Miller, 2011; Irwin et al., 2018; Wales et al., 2021). In the context of agriculture, EO influences farmers' willingness to adopt new technologies, diversify production, and explore value-added activities, thereby enhancing their income and resilience (Wiklund & Shepherd, 2003). Secondary agriculture encompasses endeavors that add value through the primary processing of agricultural products, using locally sourced materials and engaging rural manpower, skills, and inputs, and ultimately contributing to wealth creation at the rural level (DFI report volume IX, 2018). At the individual level, however, practicing secondary agriculture, which represents an entrepreneurial endeavor, is more challenging for small

Received 24-09-2025; Accepted 07-11-2025

and marginal farmers, who account for over 86.1 percent of the farming population of India (Saha et al., 2023; Mukherjee et al., 2025). This situation underscores the need for collective approaches, which are promoted through Farmers' Producer Companies (FPCs). FPCs are farmer-led enterprises that aim to strengthen the collective capacity of farmers to access markets, credit, technology, and training (Yadav et al., 2022). By enabling aggregation, collective decision-making, and shared ownership, FPCs act as catalysts for rural economic development (NABARD, 2020; Agarwal & Goyal, 2022; Gupta et al., 2022, Gupta et al., 2023). Accordingly, their role in facilitating value addition, particularly through secondary agriculture, is significant. More specifically, secondary agriculture encompasses post-harvest processes such as grading, processing, packaging, and marketing of agricultural products; these activities help reduce wastage, improve shelf-life, and create new income streams for farmers (FAO, 2017). Chengappa (2013) defined secondary agriculture as all practices and processes that add value to primary agricultural commodities by using efficient technologies, market information, and consumer preferences. Therefore, the integration of EO within FPCs engaged in secondary agriculture holds immense potential to promote agripreneurship and rural entrepreneurship. An entrepreneurial orientation enables FPCs to actively explore opportunities in value addition, innovate in marketing strategies, and invest in processing technologies. As a result, they enhance product differentiation, generate employment, and improve farmers' income (Kumar et al., 2021).

However, despite the recognized importance of EO in secondary agricultural contexts, existing tools for measuring EO among farmer collectives remain limited. Most studies focus on individual-level entrepreneurship or broader organizational settings without accounting for the unique challenges and dynamics within FPCs involved in secondary agriculture (Kuratko et al., 2017). Earlier scales lack contextual relevance such as collective decision-making, market access challenges, or technology adoption barriers faced by FPCs (Covin & Slevin, 1989). This gap highlights the urgent need for a validated scale typically designed to assess EO of FPCs' member farmers operating in Secondary Agriculture. A reliable measurement tool may be helpful to identify the entrepreneurial orientation of these organizations, guiding capacity-building efforts and policy interventions. It also enables following researchers to assess how EO contributes to the sustainability and scalability of agripreneurial activities. In this regard, constructing and validating an EO scale tailored to the secondary agriculture context provides a foundation for evidence-based decision-making. It ensures that interventions are rooted in an accurate understanding of the entrepreneurial mindset and behaviors prevalent among FPCs. Furthermore, it contributes to academic literature by providing a standardized tool that can be adapted and used across diverse rural settings. By addressing the measurement gap, this study aims to facilitate more robust research and informed policymaking in rural entrepreneurship, thus promoting the sustainable development of farmer-led enterprises.

METHODOLOGY

In the present investigation (conducted in 2025), Entrepreneurial Orientation (EO) of FPCs in Secondary Agriculture was operationalized as the collective tendency member farmers to adopt innovations, take risks, explore opportunities, set goals, manage resources, respond to markets, and lead efforts for value addition and organizational growth. The EO scale was constructed by utilizing summated rating method developed by Likert (1932). In the beginning, a total of 84 statements were collected under eight different dimensions followed by screening based on 14 informal criteria advocated by Edwards (1957) and 60 statements were selected out of the initial 84 for further relevancy testing using the following formulas:

$$RW = \frac{MR + R + SWR + LR + NR}{MPS}$$

$$MRS = \frac{MR + R + SWR + LR + NR}{n}$$

$$OMRS = \frac{MR + R + SWR + LR + NR}{n \times s}$$

Whereas, RW = Relevancy Weightage, MRS = Mean Relevancy Weightage, OMRS = Overall Mean Relevancy Weightage, MR = Most relevant (5) R = Relevant (4), SWR = Somewhat Relevant (3), LR = Less Relevant (2), NR = Not Relevant (1); MPS = Maximum Possible Score (60 × 5 = 300); n = Number of judges (46); s = Number of Statements (60).

Experts were asked to rate each item on a five-point continuum. Based on the responses received from 46 judges, a total of 38 statements were found to be relevant for the study. These 38 statements were then used for calculating t-value and statements had a t-value ≥ 1.75 finally selected in the scale. For computing t-value, following formula was used:

$$t = \frac{\bar{X}H - \bar{X}L}{\sqrt{\frac{\Sigma(X_H - \bar{X}_H)^2 + \Sigma(X_L - \bar{X}_L)^2}{n(n-1)}}}$$

Whereas,

$\Sigma(X_H - \bar{X}_H)^2 = \Sigma(X_H)^2 - (\Sigma(X_H)^2/n$ and $\Sigma(X_L - \bar{X}_L)^2 = \Sigma(X_L)^2 - (\Sigma(X_L)^2/n$

$\bar{X}_H$ = Mean score of given statements in the high group,

$\bar{X}_L$ = Mean score of given statements in the low group,

$\Sigma(X_H)^2$ = Sum of squares of individual scores on a given statement for the high group,

$\Sigma(X_L)^2$ = Sum of squares of individual scores on a given statement for the low group,

ΣX_H = Summation of scores on a given statement for the high group,

ΣX_L = Summation of scores on a given statement for the low group, and

t = The extent to which a particular statement discriminate between the high and low group.

The scale's reliability was assessed using the split-half technique, and its validity was established through a content validity. The reliability coefficient (R) of the entire scale was calculated using the formula:

$$R = \frac{2r}{1+r}$$

Where "*r*" represents the Pearson's product-moment correlation between the two halves. Data analysis was carried out with the help of MS Excel and SPSS software.

RESULTS

The statistics shown in Table 1 includes 38 statements measuring Entrepreneurial Orientation of Farmers' Producer Companies (FPCs) in Secondary Agriculture. These items were finalized for the scale after carrying out the relevancy test followed by reliability and validity analysis.

Table 1. RW, MRS, OMRS and t-value of each selected statement

S.No. Statements	RW	MRS	t-value
I. Innovativeness			
1. I actively seek information on emerging opportunities in secondary agriculture.	0.809	4.043	5.167
2. I actively explore innovative solutions to overcome challenges in secondary agriculture.	0.813	4.065	6.089
3. I invest in modern technologies to enhance post-harvest processing and value addition.	0.830	4.152	6.283
4. I take the initiative to launch new agricultural products before others in the market.	0.809	4.043	5.553
II. Proactiveness			
5. I frequently experiment with new farming techniques to improve product quality.	0.817	4.087	3.466
6. I am usually first in my community to implement new Secondary agricultural practices.	0.800	4.000	6.626
7. I consistently monitor agricultural trends to maintain a forward-looking approach.	0.865	4.326	5.252
8. I routinely update my farming, processing and marketing practices to stay competitive.	0.839	4.196	7.370
9. I properly allocate resources to identify and explore untapped markets for my products.	0.813	4.065	3.929
II. Risk-Bearing Ability			
10. I am willing to invest in new secondary agricultural ventures despite potential losses.	0.830	4.152	4.668
11. I am comfortable with the possibility of failure when trying new methods.	0.835	4.174	4.870
12. I assess the risks and benefits before making significant investments.	0.817	4.087	4.331
13. I have contingency plans in place for potential setbacks.	0.822	4.109	3.704
IV. Achievement Motivation			
14. I set measurable goals to increase our farm's profitability.	0.843	4.217	6.579
15. I seek recognition for our firm's achievements in secondary agriculture.	0.848	4.239	3.128
16. I am motivated by the success stories of other innovative farmers.	0.839	4.196	3.945
17. I set challenging yet attainable targets for farm expansion.	0.843	4.217	5.392
18. I use setbacks as motivation to work harder towards our objectives.	0.830	4.152	5.379
V. Self-Confidence			
19. I trust my skills in implementing secondary agricultural practices.	0.826	4.130	4.379
20. I believe I can overcome challenges in value-added production.	0.817	4.087	4.311
21. I am confident in teaching fellow farmers in innovative secondary agricultural techniques.	0.804	4.022	2.009
22. I trust my judgment in selecting high-potential agricultural ventures.	0.848	4.239	2.361
23. I am self-assured in marketing our farm's value-added products.	0.809	4.043	6.497
VI. Management Orientation			
24. I develop detailed plans for integrating secondary agriculture into our operations.	0.809	4.043	4.347
25. I organize resources efficiently and delegate tasks appropriately to enhance productivity and accomplishing targets.	0.813	4.065	5.529
26. I make strategic decisions that align with our long-term goals in secondary agriculture.	0.848	4.239	4.710
27. I regularly review and update our farm's business plan to adapt to changing circumstances.	0.822	4.109	2.750
28. I allocate time for regular team meetings to discuss farm operations and address any issues.	0.813	4.065	3.098
VII. Market Orientation			
29. I adjust our product offerings based on feedback from buyers and market trends.	0.848	4.239	3.685
30. I explore new markets to expand the reach of our firm's value-added products.	0.809	4.043	4.488
31. I participate in agricultural fairs and exhibitions and other platforms for promoting our products among potential buyers.	0.813	4.065	5.367
32. I gather customer feedback to improve the quality and appeal of our products.	0.804	4.022	3.166
33. I stay updated on pricing trends to competitively price our value-added products.	0.861	4.304	5.185
VIII. Leadership Orientation			
34. I inspire and motivate team members to achieve our firm's objectives in secondary agriculture.	0.843	4.217	4.077
35. I provide clear direction and guidance to ensure alignment with our firm's vision.	0.878	4.391	5.511
36. I foster a collaborative environment where team members feel valued and heard.	0.826	4.130	3.188
37. I encourage open communication to share ideas, address challenges, manage conflicts.	0.822	4.109	2.319
38. I recognize and reward team members' contributions to our firm's success.	0.804	4.022	2.784

RW = Relevancy Weightage; MRS = Mean Relevancy Score; OMRS = Overall Mean Relevancy Score OMRS = 3.992

Relevancy analysis

In the present study, an initial pool of 84 statements was developed for measuring the entrepreneurial orientation of Farmers' Producer Companies (FPCs) in the context of secondary agriculture. These statements were first screened using the fourteen informal criteria proposed by Edwards (1957), which are widely applied in scale development to ensure clarity, relevance, and non-redundancy of items. After this screening, 60 items were retained for further analysis and proposed for relevancy testing by a panel of experts. A total of 160 experts from different professional backgrounds were approached, including academicians, extension professionals, researchers, and officials working in relevant fields. However, out of the 160 experts contacted, 46 judges possessing desirable subject knowledge and adequate professional experience responded within the stipulated time frame of one month. The responses of these judges were carefully compiled, and each statement was analyzed with the help of Microsoft Excel to determine its Relevancy Weightage (RW) and Mean Relevancy Score (MRS). These two parameters ensured that only the items meeting both statistical and conceptual criteria were selected. Specifically, statements with a relevance weightage of 0.80 or higher, along with an MRS equal to or greater than the overall mean relevance score (OMRS), were considered suitable for inclusion (Panigarhi et al., 2024; Vavilala et al., 2024; Singh et al., 2025). As a result of this rigorous analysis (Table 1), 38 statements out of the original 60 were retained for subsequent testing. These 38 items were then subjected to a t-test to examine their discriminatory power between respondents with high and low levels of entrepreneurial orientation. As suggested in previous methodological studies (Lal et al., 2014), the t-value is an effective measure for assessing the extent to which each statement distinguishes between the two groups. Considering the earlier researches of Shitu et al. (2018); Vijayan et al. (2022); Chandra et al. (2024); Panigarhi et al. (2024); Vavilala et al. (2024); Kademini et al. (2025) for computation of t-statistics, data were collected from 60 FPC's member farmers of non-sampled area through personal interviews for each item, and the items found a t-value of 1.75 or higher were finalized, which is the criteria determined by Edwards (1957). This ensured that only the most relevant and discriminating items were included in the final scale.

Table 2. Reliability Statistics of Entrepreneurial Orientation of Farmers' Producer Companies (FPCs) in Secondary Agriculture

Cronbach's Alpha	Part 1	Value	.923
		N of Items	19[a]
	Part 2	Value	.862
		N of Items	19[b]
	Total N of Items		38
Correlation Between Forms			.701
Spearman-Brown Coefficient	Equal Length		.824
	Unequal Length		.824
Guttman Split-Half Coefficient			.796

a. The items are: S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S18, S19.

b. The items are: S20, S21, S22, S23, S24, S25, S26, S27, S28, S29, S30, S31, S32, S33, S34, S35, S36, S37, S38.

Reliability and validity analysis

Reliability means how consistent the results are when the same thing is measured many times. In this study, the Cronbach's alpha coefficient was used to check internal consistency of the tool (Shukla et al., 2024; Bandhavya et al., 2025). Table 2 that the Cronbach's alpha value was 0.938, which indicates excellent level reliability of the scale. To further confirm reliability, the split-half method was used, where the Spearman-Brown coefficient was 0.824 and Pearson's correlation was 0.907, both showing strong consistency (Prabex et al., 2025). Validity shows whether a scale measures what it is meant to measure. Content validity (also employed by Chandra et al., 2024; Mallappa & Gadde, 2025; Shanila & Helen, 2025) focuses on whether the items in the scale properly cover the subject area. In this study, content validity was ensured by selecting items from related literature and by taking opinions from experts in extension who have good experience in this field (Lal et al., 2015).

DISCUSSION

The present study constructs and validates a reliable scale to measure Entrepreneurial Orientation (EO) of Farmers' Producer Companies (FPCs) in the context of secondary agriculture. The findings indicate that the developed instrument demonstrates both high reliability and validity, thereby confirming its suitability for assessing EO in farmer-led collectives (Chandra et al., 2024; Mallappa & Gadde, 2025; Shanila & Helen, 2025). The Cronbach's alpha coefficient of 0.938 reflects excellent internal consistency, suggesting that the items included in the scale consistently capture the underlying construct of EO. The strong split-half and Pearson correlation values further strengthen the robustness of the tool, aligning with recommendations of Edwards (1957). The study highlights the multidimensional nature of EO among FPCs, encompassing innovativeness, proactiveness, risk-bearing ability, achievement motivation, self-confidence, management orientation, market orientation, and leadership orientation. These dimensions aligned with the conceptualization of EO by Lumpkin and Dess (1996), who emphasize the role of innovation, proactiveness, and risk-taking in entrepreneurial success. The high relevancy scores and significant t-values of the selected items indicate that farmers perceive these orientations as critical for value addition, risk management, and organizational sustainability. The inclusion of 38 refined statements out of an initial pool of 84 ensures both contextual relevance and conceptual clarity, consistent with earlier research on scale adaptation in organizational studies (Covin & Slevin, 1989). The results indicate that FPCs are progressively embracing entrepreneurial approaches that correspond to the evolving requirements of value-added agriculture. Farmers recognize the importance of experimenting with new technologies, exploring market opportunities, and developing systematic management strategies. In agricultural contexts, Kumar et al. (2021) and FAO (2017) emphasize that innovation in post-harvest processing and market integration plays a crucial role in strengthening rural entrepreneurship. The present study confirms that such orientations are reflected in the collective decision-making and practices of FPCs.

The strong reliability and validity of the tool also imply its potential use in future research and policy interventions.

Policymakers and extension professionals can apply the findings to design capacity-building programs that strengthen leadership, encourage innovation, and improve market orientation. This aligns with NABARD, (2020) and Wales et al. (2021), which stresses the role of FPCs as vehicles of rural economic empowerment. The scale provides a standardized framework to assess the entrepreneurial mindset of FPCs member famers across regions and commodities. The tool can further serve as a diagnostic mechanism for identifying areas where FPCs require targeted support, such as risk assessment, marketing skills, or managerial efficiency. Overall, the study contributes to bridging a significant methodological gap in agricultural extension and rural entrepreneurship research. By offering a validated EO scale tailored to secondary agriculture, it facilitates evidence-based planning and supports the promotion of agripreneurship in India. The findings reaffirm the importance of fostering entrepreneurial orientation in farmer collectives to enhance their resilience, profitability, and long-term sustainability.

CONCLUSION

The study develops and validates a reliable and context-specific scale for measuring Entrepreneurial Orientation (EO) of member farmers of Farmers' Producer Companies (FPCs) engaged in secondary agriculture. The Entrepreneurial Orientation scale consists of 38 statements and has been empirically tested for reliability and validity. It is broadly categorized into eight key dimensions. The results confirm that EO plays a decisive role in enhancing collective decision-making, value addition, and sustainability of FPCs. The present scale has significant implication across the researchers, policymakers, and extension professionals. It provides a validated tool for assessing EO in farmer-led organizations, enabling evidence-based interventions. Policymakers can use it to design targeted programs that strengthen managerial capacity, innovation, and market integration. Extension agencies can apply the tool as a diagnostic measure to identify gaps in entrepreneurial behaviour and provide tailored support. Ultimately, the scale contributes to promoting agripreneurship, improving farm profitability, and advancing rural economic development.

DECLARATIONS

Ethics approval and informed consent: Informed consent was sought from the 46 judges of the statements/ items regarding the study during the course of the data collection.

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 authors declare that during the preparation of this work, they thoroughly reviewed, revised, and edited the content as needed. The authors take full responsibility for the final content of this publication.

Publisher's note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organisation, or those of the publisher, the editors, and the reviewers. Any product/process or technology that may be evaluated in this article, or a claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

REFERENCES

Agarwal, S., & Goyal, S. K. (2022). Progression of farmer producer organisations in India. *The Indian Journal of Agricultural Sciences, 92*(12), 1490-1495. https://epubs.icar.org.in/index.php/IJAgS/article/view/118068/48777

Bandhavya, M., Sailaja, V., Kumar, P. G., Hemalatha, S., & Murthy, B. R. (2025). A methodological pathway to quantify subjective well-being of organic paddy farmers in Andhra Pradesh: An OECD based approach. *International Journal of Agriculture Extension and Social Development, 8*(8): 369-376. https://www.extensionjournal.com/archives/2025.v8.i8.F.2290

Chandra, S., Ghadei, K., Chennamadhava, M., & Ali, W. (2024). Development and validation of a farmer's focused digital literacy scale. *Indian Journal of Extension Education*, *60*(1), 111-115. https://epubs.icar.org.in/index.php/IJEE/article/view/142948/53564

Covin, J. G., & Slevin, D. P. (1989). Strategic Management of Small Firms in Hostile and Benign Environments. *Strategic Management Journal*, *10*(1), 75-87. https://www.sciencedirect.com/science/article/pii/S2352673418301033

Edwards, A. L. (1957). Techniques of attitude scale construction. Vakils, Feffer and Simons Inc. New York.

FAO. (2017). The State of Food and Agriculture 2017: Leveraging food systems for inclusive rural transformation. Food and Agriculture Organization of the United Nations, Rome. https://openknowledge.fao.org/server/api/core/bitstreams/58fe36c1-b29a-45d7-b684-d3b3287f3f60/content

Gupta, M. K., Lal, S. P., Prakash, S., & Shukla, G. (2023). Comparative impact assessment of diverse farmers producers organisations (FPOs) in Bihar: An inter-FPO variation analysis using Post Hoc Tukey's HSD Test. *Biological Forum- An International Journal*, *15*(9), 644-648.

Irwin, K. C., Landay, K. M., Aaron, J. R., McDowell, W. C., Marino, L. D., & Geho, P. R. (2018). Entrepreneurial orientation (EO) and human resources outsourcing (HRO): A "HERO" combination for SME performance. *Journal of Business Research, 90*, 134-140. https://www.sciencedirect.com/science/article/pii/S0148296318302510

Kumar, S., Meena, D. K., & Meena, V. S. (2021). A case study of dairy-based farmer producer company in Haryana: Collective action approach for enhancing farmer income. *Asian Journal of Agricultural Extension, Economics & Sociology*, *39*(4), 78-87. https://ageconsearch.umn.edu/record/357992/?v=pdf

Kuratko, D. F. (2017). Corporate entrepreneurship 2.0: research development and future directions. *Foundations and Trends® in Entrepreneurship*, *13*(6), 441-490. https://www.nowpublishers.com/article/Details/ENT-082

Lal, S. P., Kadian, K. S., Jha, S. K., Singh, S. R. K., Goyal, J., & Kumar, R. S. (2015). A resilience scale to measure farmers' disenchantment towards agriculture in national calamity hit region of India: An innovative tool. *Journal of Community Mobilization and Sustainable Development*, *10*(1), 13-19. https://mobilization.org.in/pdf/Jan-June%202015%20(1).pdf#page=19

Lal, S. P., Kadian, K. S., Jha, S. K., Singh, S. R. K., Goyal, J., Kumar, R. S., & Singh, S. P. (2014). A resilience scale to measure farmers' suicidal tendencies in National Calamity hit region of India. *Current World Environment, 9*(3), 1001-1007.

Likert, R. A. (1932). A technique for the measurement of attitude. *Archives of Psychology, 22*(140), 1-55. https://psycnet.apa.org/record/1933-01885-001

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135-172. https://journals.aom.org/doi/abs/10.5465/amr.1996.9602161568

Mallappa, V. K. H., & Gadde, S. (2025). A tool to measure livelihood vulnerability of climate-sensitive farming communities. *Indian Journal of Extension Education*, *61*(4), 160-164. https://doi.org/10.48165/IJEE.2025.614RT01

Miller, D., & Le Breton–Miller, I. (2011). Governance, social identity, and entrepreneurial orientation in closely held public companies. *Entrepreneurship Theory and Practice*, *35*(5), 1051-1076. https://journals.sagepub.com/doi/full/10.1111/j.1540-6520.2011.00447.x

Mukherjee, A., Roy, S., Pradhan, K., Yadav, V. K., Shubha, K., Singh, D. K., Anand, S., Barua, S., Rakshit, S., Raman, R. K., Kumar, U., Sainath, B., Pal, A. K. & Das, A. (2025). Current challenges and solutions for sustainability of Farmers Producer Organisations through grassroots organisational ecosystem. *Current Science*, *128*(7), 699-709. https://www.currentscience.ac.in/Volumes/128/07/0699.pdf

NABARD (2020). Farmer Producer Organisations - Frequently Asked Questions (FAQs). National Bank for Agriculture and Rural Development, Mumbai. https://www.nabard.org/demo/auth/writereaddata/File/FARMER%20PRODUCER%20ORGANISATIONS.pdf

Panigarhi, S. P., Ghadei, K. G., Nikhil, J., Chennamadhava, M., Sethi, K., & Gupta, R. P. (2024). Construction and standardisation of agripreneurial performance scale. *Indian Journal of Extension Education, 60*(3), 88-92. https://epubs.icar.org.in/index.php/IJEE/article/view/151732/55036

Prabex, S., Rahman, S., Verma, H., & Saran, V. (2025). Development of a Standardised Scale to Measure Farmers' Attitude towards Indigenous Cattle Conservation: A Methodological Approach. *Indian Journal of Extension Education*, *61*(3): 92-96. https://epubs.icar.org.in/index.php/IJEE/article/view/164485/60813

Saha, S., Pradhan, K., Mukherjee, A., Roy, S., & Yadav, V. K. (2023). Association of farmers producer organization (FPO) farmers' progressiveness with socio-economic characters: A case study of sub-Himalayan region. *Journal of Community Mobilization and Sustainable Development*, *18*(2), 365-372.

Shanila, S., & Helen, S. (2025). Development of a scale to assess Kerala farmers' attitude towards digital technologies in agriculture. *Indian Journal of Extension Education, 61*(4), 165-169. https://doi.org/10.48165/IJEE.2025.614RT02

Shitu, G. A., Nain, M. S., & Kobba, F. (2018). Development of scale for assessing farmers' attitude towards precision conservation agricultural practices. *Indian Journal of Agricultural Sciences*, *88*(3), 499-504.

Shukla, G., Ansari, M. N., & Lal, S. P. (2024). Assessment of agricultural information needs offarmers: Triangulating reliability of standardized information need index. *Gujarat Journal of Extension Education*, *36*(2), 26-29.

Singh, P., Ghadei, K., Roy, S., Halder, J., Kumari, J., & Paliwal, H. (2025). Development and Standardization of a Scale to Measure Vegetable Growers' Attitude towards Safety Measures in Pesticide Application. *Indian Journal of Extension Education*, *61*(4), 185-189. https://doi.org/10.48165/IJEE.2025.614RT06

Sujay, K., Nain, M. S., Singh, R., Roy, S. K., Prabhakar, I., Ranjan, A., Karjigi, D. K., Patil, M., Das, D., & Wasaful, Q. Sk. (2025). Quantifying support for agripreneurs: a multidimensional scale development and analysis of institutional mechanisms, *Journal of Global Entrepreneurship Research, 15*, 12. https://doi.org/10.1007/s40497-025-00429-4

Vavilala, P., Singh, V. K., Singh, D. K., & Singh, L. B. (2024). Attitude of the Staff Towards Farmer Producers Organization – Development and Standardization of the Scale. *Indian journal of extension education, 60*(1), 116-119.

Vijayan, B., Nain, M. S., Singh, R., & Kumbhare, N. V. (2022). Knowledge test for extension personnel on national food security mission, *Indian Journal of Extension Education, 58*(2), 191-94. http://doi.org/10.48165/IJEE.2022.58246

Wales, W. J., Kraus, S., Filser, M., Stöckmann, C., & Covin, J. G. (2021). The status quo of research on entrepreneurial orientation: Conversational landmarks and theoretical scaffolding. *Journal of Business Research*, *128*, 564-577. https://www.sciencedirect.com/science/article/pii/S0148296320307177

Wiklund, J., & Shepherd, D. (2003). Knowledge based resources, entrepreneurial orientation, and the performance of small and medium sized businesses. *Strategic Management Journal*, *24*(13), 1307-1314. https://sms.onlinelibrary.wiley.com/doi/abs/10.1002/smj.360

Yadav, V. K., Mukharjee, A., Roy, S., Pradhan, K., Pan, R. S., Kumar, U., Yadav, D. K., Kumar, A., Singh, A. K., & Raghav, D. K. (2022). Analyzing the constraints as perceived by the board of directors in the initial development phase of the farmer producer organizations. *Indian Research Journal of Extension Education*, *22*(3), 170-175. https://www.cabidigitallibrary.org/doi/full/10.5555/20220378006