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RESEARCH ARTICLE

Exploring Determinants of Entrepreneurial Behaviour of Agricultural Input Dealers: A Quantitative Analysis

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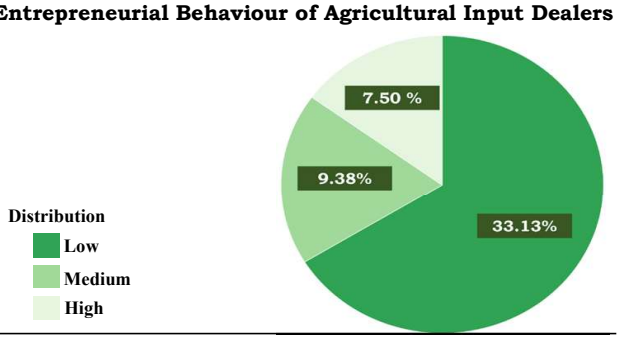
HIGHLIGHTS

- This study identified climate change adaptation strategies followed in India.
- Assessed the vulnerabilities of farmers to climate change.
- The farmers were mostly moderately affected by climate change and very few studies conducted on farmers vulnerability.

GRAPHICAL ABSTRACT



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ABSTRACT

Context: Among the diverse entities in pluralistic extension systems, agricultural input dealers have the most extensive reach to farmers due to their strategic locations, ability to build rapport, and accessibility. MANAGE plays a key role in equipping them with the skills and knowledge to act as para-extension professionals. Therefore, understanding their entrepreneurial behaviour and its influencing factors, as well as the relationship between two constructs i.e., entrepreneurial behaviour and role performance, is crucial.

Objective: The objective of the study was to assess the entrepreneurial behaviour of agricultural input dealers in West Bengal.

Methodology: The study was conducted in two districts of West Bengal, namely Purba Bardhaman and Hooghly. Ex-post facto research design was employed. Through random sampling, eighty agricultural input dealers from these districts were selected for participation. Data collection was conducted via personal interviews, encompassing a range of independent variables including personal and socio-economic factors, psychological attributes, and communication variables.

Results & Discussions: The analysis revealed that a majority of these variables significantly contributed to role performance enhancement. Notably, variables such as extension participation, credit orientation, information sharing behaviour, cosmopoliteness and age exhibited substantial positive contributions, collectively explaining approximately sixty six percent of the variation in the dependent variable. Path analysis highlighted that the extension participation exerted the most significant direct effect, while serving as the primary channel for the highest indirect effects from multiple variables.

Significance: Entrepreneurial behaviour was found to have a strong positive correlation with role performance, it should be considered as a important factor in policy advocation for input dealers.

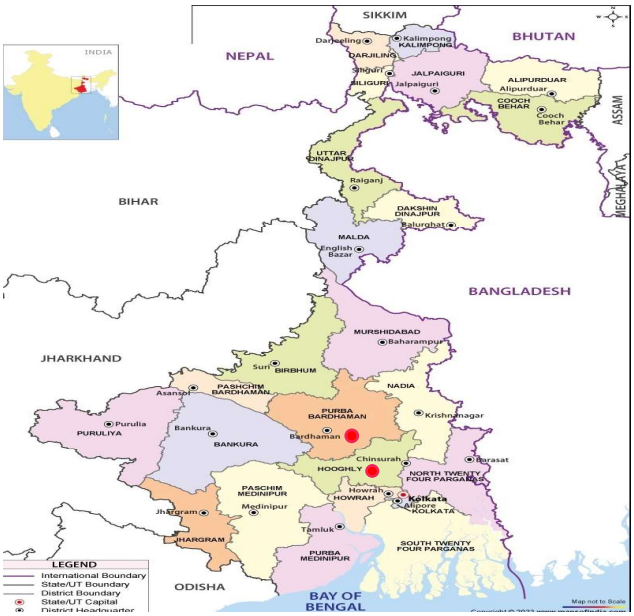
Agriculture stands as the cornerstone of India's economy, serving as the primary sector employing approximately 69% of the nation's populace for their sustenance. Notably, in the agricultural years of 2019-20 and 2020-21, India achieved record food grain production of 296.65 million tonnes and 310.74 million tonnes, respectively. Projections suggest a further increase to 316.06 million tonnes in the 2021-22 period (PIB, 2022). The Indian agricultural landscape is predominantly characterized by small and marginal producers, encompassing nearly 86.08 percent of the farming population, yet occupying less than two hectares of land each. Despite their sheer numbers, these farmers often face challenges stemming from limited access to technology, resources, and advanced knowledge. Although they collectively manage only 47.30 percent of the total crop area (Agricultural Census, 2015-16), addressing their needs through timely and effective extension advisory services is imperative. These services, encompassing information dissemination, technology transfer, and tailored assistance, should be tailored to suit the specific requirements of small and marginal farmers. Notably, the adoption of advanced technologies is hindered by widespread ignorance among farmers (Gupta *et al*., 2020), emphasizing the critical role of informed decision-making in fostering sustainable agricultural development (Sinha, 2018). However, the current state of extension services falls short of ideal standards, as evidenced by the inadequate ratio of extension agents to farmers, which remains below the recommended threshold of 1:750 (Ravi, 2019).

The pluralistic extension system emerges as a viable solution to address the pressing issue at hand. The collaboration among multiple agencies in both input provision and service delivery is pivotal in augmenting the efficacy of extension advisory services. This approach demonstrates success particularly in regions where farmers face resource constraints, offering tailored technologies and comprehensive extension services, inclusive of marketing infrastructure (Mukherjee & Maity, 2015). Numerous studies underscore the pivotal role of agricultural input dealers within the social networks of farmers, serving as crucial sources of agricultural information and knowledge acquisition. In India, the expansive network of approximately three hundred thousand input dealers stands as a cornerstone of agricultural information dissemination, second only to progressive farmers. Leveraging their strategic positioning, profound understanding, and accessible nature, input dealers are instrumental in fostering the adoption of scientific farming practices, which inherently hinges upon farmers' knowledge base (Nain & Chandel, 2013). Hence, there is a pronounced emphasis on prioritizing localized information sources for fostering credibility (Bhagat *et al*., 2004; Nain *et al*., 2015; Panda *et al*., 2019), with agricultural input dealers epitomizing this localized knowledge hub. Training with respect to subjects such as identification of different pest and pesticides, diagnostics of symptoms, crop management etc. holds prime importance (Singh *et al*., 2015). In 2003, the National Institute of Agricultural Extension and Management (MANAGE) established the Diploma in Agricultural Extension Services for Input Dealers (DAESI) with the objective of equipping them with the necessary skills and knowledge to function as para-extension professionals and recognising their critical role (MANAGE, 2012). It also has a significant role in transforming from production driven to market driven extension approach (Kumar *et al*., 2012). Against this backdrop, a study was conducted to assess the entrepreneurial behaviour of agricultural input dealers in the state of West Bengal.

METHODOLOGY

Locale of the study: The study was purposively conducted in the state of West Bengal (latitude 20°31′N to 31°12′N and longitude 85° 50′E to 89° 52′E) with specific focus on two districts, namely Hooghly and Purba Bardhaman.

Population and sampling: Each of these districts comprised four sub-divisions, from which one block



Study area map

was chosen randomly for inclusion in the study, resulting in a total of eight selected blocks. Following this, ten (10) agricultural input dealers were randomly selected from each block, bringing the total number of agricultural input dealers in the sample to eighty (80). Respondents were chosen on the basis of their adherence to certain requirements: successful completion of the Diploma in Agricultural Extension Services for Input Dealers (DAESI) programme, consistent licence renewal as a dealership, and operation in regions with a significant concentration of input dealers.

Data collection and analysis: Entrepreneurial behaviour was operationally defined as the amalgamation of a number of skillful, cognitive, affective, and socio-psychological characteristics exhibited by a single agricultural input dealer in order to operate his enterprises profitably and generate greater economic returns. Entrepreneurial behaviour of agricultural input dealers was measured by a scale developed by Shirur (2015) with slight modifications. The scale consisted of eleven dimensions and were measured through four-point continuum viz. Mostly Agree (MA), Agree (A), Somewhat Agree (SWA) and Disagree (NA). The respondents were classified into three groups determined by the mean and standard deviation of the total score: low, medium, and high entrepreneurial behaviour. The information was gathered via personal interviews and with a pre-tested structured schedule.

The study utilised correlation analysis to examine the relationship between the selected independent variables and the entrepreneurial behaviour of agricultural input dealers. Multiple linear regression was then applied to determine the individual contributions of these independent variables and the way in which they collectively influenced entrepreneurial behaviour. Path coefficient analysis was subsequently utilized to elucidate the mediating effect of the independent variables on the role performance of agricultural input dealers. All statistical analyses and visual representations were conducted utilizing several statistical packages within the R environment.

RESULTS

The entrepreneurial behaviour of agricultural input dealers was assessed utilizing an adapted scale encompassing eleven dimensions (Table 1). The analysis revealed that a predominant proportion of input dealers exhibited characteristics indicative of medium entrepreneurial behaviour, with 18.75 per cent of respondents demonstrating low entrepreneurial behaviour, and only 15 per cent displaying high entrepreneurial behaviour. The mean score for the overall distribution was calculated to be 265.73, with a standard deviation of 10.32. These findings are in line with Fayaz *et al*. (2016), Lawrence and Ganguli (2012) and Mudoi *et al*. (2020).

Table 1. Descriptive statistics of dimensions for measuring of entrepreneurial behaviour of agricultural input dealers (n=80)

Variables	Mean	SD	Category	(%)
Innovativeness	22.1	2.52	Low	18.75
			Medium	57.5
			High	23.75
Achievement motivation	20.6	2.28	Low	17.5
			Medium	62.5
			High	20.00
Economic motivation	25.5	3.31	Low	23.75
			Medium	55.00
			High	21.25
Technical competency	24	2.46	Low	22.50
			Medium	61.25
			High	16.25
Decision making ability	24	2.82	Low	22.50
			Medium	55.00
			High	22.50
Risk bearing ability	24	2.24	Low	15.00
			Medium	71.25
			High	13.75
Information seeking behaviour	38.5	5.17	Low	18.75
			Medium	61.25
			High	20.00
Scientific orientation	19.1	2.23	Low	17.50
			Medium	63.75
			High	18.75
Leadership orientation	16.4	1.88	Low	18.75
			Medium	61.25
			High	20.00
Management orientation	31.7	3.58	Low	25.00
			Medium	56.25
			High	18.75
Marketing orientation	19.7	2.56	Low	16.25
			Medium	67.50
			High	16.25
Overall entrepreneurial behaviour	265.73	10.35	Low	18.75
			Medium	66.25
			High	15.00

Relationship between independent variables and entrepreneurial behaviour of agricultural input dealers : The correlation analysis (refer to Figure

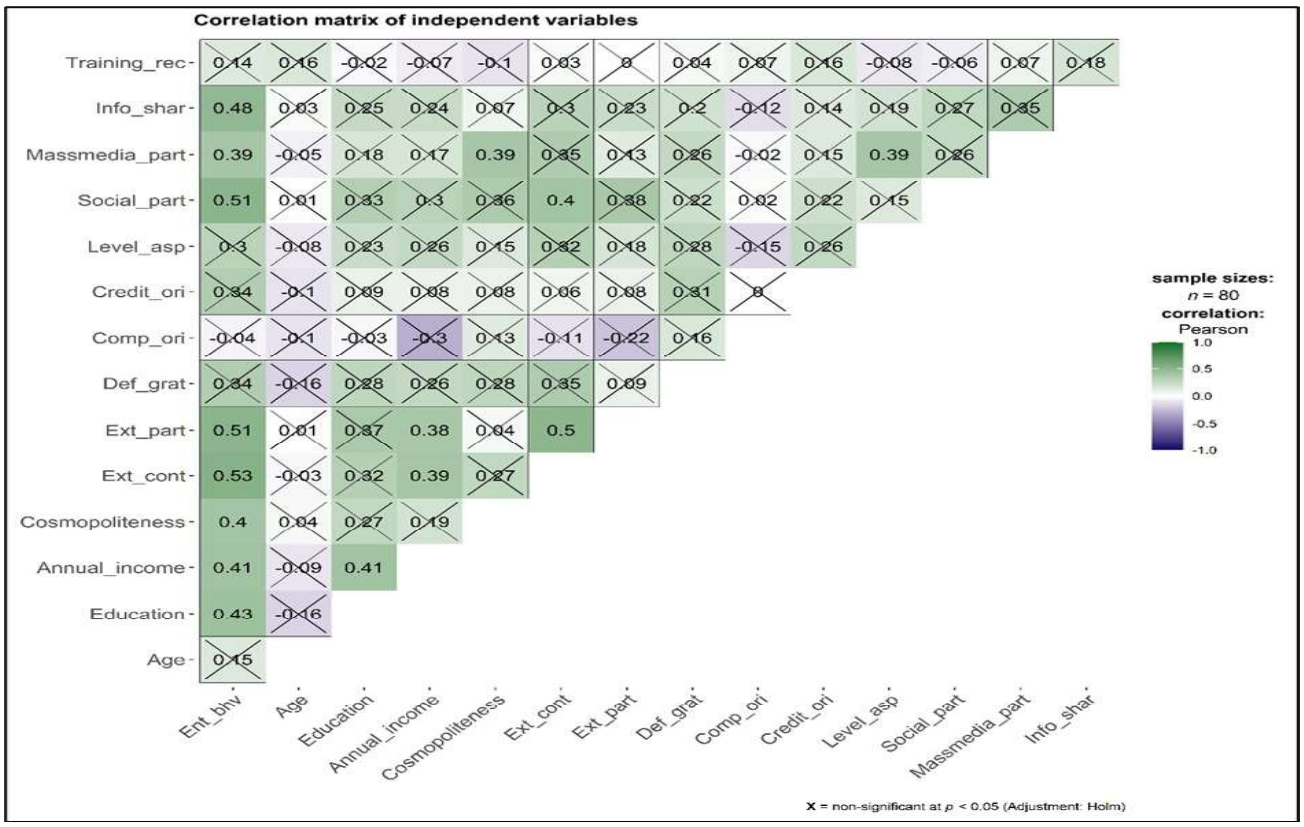


Fig 1: Correlation matrix between independent variables and entrepreneurial behaviour

1) unveiled a significant positive correlation, at the one percent level of significance, between extension contact, extension participation, social participation, and information sharing behaviour of agricultural input dealers, and their entrepreneurial behaviour. Additionally, the study identified significant positive correlations, at the five percent level of significance, between entrepreneurial behaviour of agricultural input dealers and factors such as education, annual income, cosmopoliteness, and mass media participation.

Furthermore, it is noteworthy, as depicted in Figure 1, that the independent variables exhibited interactions amongst themselves and displayed positive correlations. This underscores the necessity to explore the direct and indirect effects that these variables exert on entrepreneurial behaviour. Such an examination was conducted through path analysis, the findings of which will be elaborated upon later in this article.

The study aimed to assess and quantify the influence of significant variables, along with their predictive capacity, in elucidating the entrepreneurial behaviour of the respondents through multiple linear regression analysis. The multiple R squared value indicated that the combined effect of all variables could account for 66.36 per cent of the variation observed in the entrepreneurial behaviour of agricultural input

Table 2. Regression analysis between independent variables and entrepreneurial behaviour of agricultural input dealers (n=80)

	Estimate	SE	t value	Pr(>|t|)
(Intercept)	-20.8998	8.799979	-2.375	0.02051*
Age	0.185733	0.075184	2.47	0.01613*
Education	0.09114	0.074273	1.227	0.22422
Annual income	0.095228	0.081634	1.167	0.24767
Cosmopoliteness	0.154821	0.073723	2.1	0.03961*
Ext.contact	0.12642	0.082267	1.537	0.12922
Ext.participation	0.229892	0.085988	2.674	0.00948**
Deferred gratification	0.017124	0.081134	0.211	0.8335
Competition orientation	0.065842	0.07019	0.938	0.35169
Credit orientation	0.189543	0.071138	2.664	0.00972**
Level of aspiration	0.008986	0.066291	0.136	0.89259
Social participation	0.067432	0.06649	1.014	0.31427
Mass-media participation	0.049076	0.068354	0.718	0.47535
Info. sharing behaviour	0.181526	0.06864	2.645	0.01024*
Training received	0.053631	0.072947	0.735	0.46486

Multiple R-squared: 0.6636, Adjusted R-squared: 0.5912, F-statistic=9.161**, Significant codes: '**' 0.01 '*' 0.05

Table 3. Path analysis between independent variables and entrepreneurial behaviour of agricultural input dealers (N=80)

Independent variables	Direct effects	Indirect effects	Total effect	Highest indirect effect
Age	0.191	-0.041	0.150	X14
Education	0.103	0.327	0.430	X6
Annual income	0.107	0.303	0.410	X6
Cosmopoliteness	0.196	0.204	0.400	X5
Extension contact	0.139	0.391(II)	0.530(I)	X6
Extension participation	0.254 (I)	0.256	0.510(II)	X5
Deferred gratification	0.020	0.320	0.340	X4
Competition orientation	0.083	-0.123	-0.040	X4
Credit orientation	0.216(III)	0.124	0.340	X13
Level of aspiration	0.022	0.278	0.300	X6
Social participation	0.091	0.419(I)	0.510(III)	X6
Mass-media participation	0.053	0.337(III)	0.390	X13
Info. sharing behaviour	0.228(II)	0.252	0.480	X6
Training received	0.056	0.084	0.140	X13
Residual Effect = 0.3344396				

dealers (Table 2). This variability in the dependent variable was statistically significant at the one percent level of significance. Notably, extension participation and credit orientation made substantial contributions at the one percent significance level among all the independent variables. Additionally, variables such as age, cosmopolites, and information-sharing behaviour significantly contributed to explaining the variation in entrepreneurial behaviour of agricultural input dealers at a five percent level of significance.

Direct and indirect effects of independent variables on entrepreneurial behaviour of agricultural input dealers ; Path analysis was employed to investigate, quantify, and comprehend the manner in which independent variables mediate the relationship between the dependent variable, entrepreneurial behaviour, and the former (Table 3). Path analysis is a method aimed at determining both direct and indirect effects among various variables, facilitating a quantitative interpretation of the interrelationships within a known or assumed causal system present in a specific population (Acharya *et al*., 2023). In terms of overall impact, extension contact demonstrated the highest total effect (0.530), followed closely by extension participation (0.510) and social participation (0.510). Notably, extension

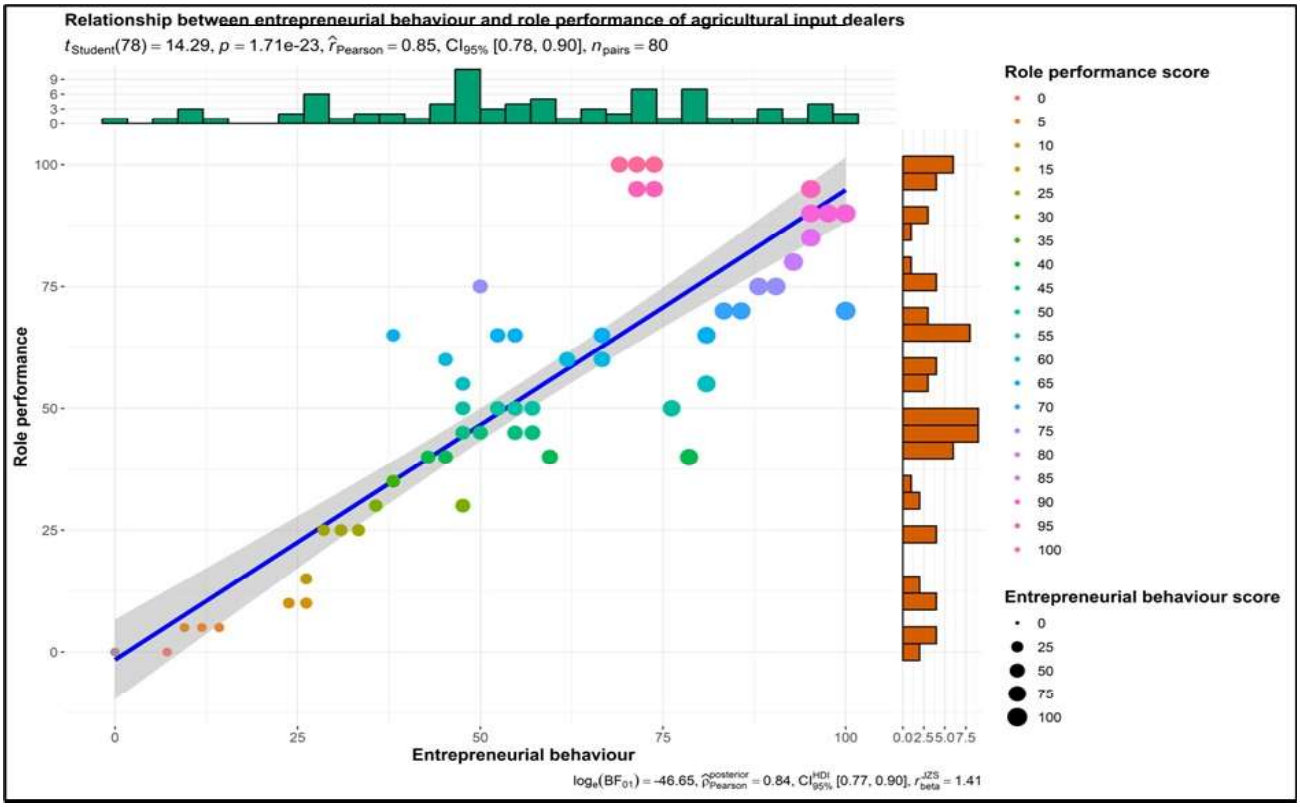


Fig 2. Scatterplot showing correlation between entrepreneurial behaviour and role performance of agricultural input dealers

participation exhibited the greatest direct effect (0.254), succeeded by information sharing behaviour (0.228) and credit orientation (0.216). Concerning indirect effects, social participation displayed the most significant impact (0.419), followed by extension contact (0.391) and mass media participation (0.337). Extension participation emerged as the variable through which the highest proportion of indirect effects were channelled. Thus, the analysis underscores the significance of input dealers' engagement in extension-related activities such as contact and participation, which serve as key determinants in enhancing their entrepreneurial behaviour and warrant promotion for policy advocacy initiatives.

Relationship between entrepreneurial behaviour and role performance of agricultural input dealers: The study also intended to empirically measure the relationship between two different constructs of agricultural input dealers i.e., entrepreneurial behaviour and role performance towards providing agro-advisory services. To empirically substantiate this notion, the role performance scores of agricultural input dealers, as analysed and expounded upon by Panja *et al*., (2022), were taken into consideration. Upon correlating these scores with entrepreneurial behaviour scores, a strong positive correlation between the two variables was observed (Figure 2). Hence, an enhancement in the entrepreneurial behaviour of agricultural input dealers is likely to lead to an improvement in their performance in providing agricultural advisory services. Given that they serve as the primary point of contact for a majority of farmers in rural areas, an enhancement in role performance would also translate into benefits for farmers.

DISCUSSIONS

Agricultural input dealers have the foremost role to play in providing first contact agro-advisory services to the farmers (Ganiger, 2012; Madhu Latha, 2022). As the primary point of contact for farmers, they frequently provide agro-advisory services, updates on technology, and steps for improvement. Simultaneously, there is an urgent requirement for agricultural input dealers to enhance their entrepreneurial conduct, capacity to endure risks, and comprehension of the market, in order to maintain their operations (Elakkiya, 2022). The outcome of the current study delineates the entrepreneurial behaviour of agricultural input dealers in West Bengal.

Notably, a substantial proportion of the respondents possessed medium entrepreneurial behaviour (Table 1). Their position in the medium category of entrepreneurial behaviour is likely influenced by their participation in the DAESI training programme. This flagship programme has demonstrated significant potential for transforming agricultural input dealers into para-extension professionals (Handa and Khan, 2024; Kumar *et al.,* 2022). From a dimensional perspective, this distribution pattern is likely a result of the majority of respondents falling into the medium group across each dimension used to assess the entrepreneurial behaviour of agricultural input dealers.

The study revealed an important positive correlation between education and annual income with the entrepreneurial attitude of agricultural input sellers. The result was in similar line with Shirur (2015), Patel *et al.* (2014), Chaudhari (2006). The respondent's strong educational background enhanced their technical, management, and risk-taking ability. The level of education was shown to have a strong correlation with the performance of agricultural input dealers in providing agro-advisory services (Panja *et al*., 2022). Their educational experience expanded their knowledge of current agricultural situations, allowing them to offer farmers customised agricultural advice and efficient problem-solving solutions.

Robust extension contacts and participation, facilitated by consistent engagement with experts, manufacturers, extension agents, KVKs, and fellow input dealers, alongside involvement in diverse activities like training and demonstrations, fostered enhanced learning and exposure conducive to assuming the role of a para-extension worker (Figure 1). This, in turn, contributed to an improvement in their performance in delivering agro-advisory services to farmers (Panja *et al*., 2022). Furthermore, the effective information-sharing behaviour of respondents proved advantageous in bolstering their entrepreneurial reputation and garnering trust from customers and peers. Timely dissemination of pertinent information to farmers not only strengthened their rapport but also enabled them to fulfil the responsibilities of a professional para-extension worker proficiently. Respondents emphasized the importance of maintaining regular contact with social institutions for the smooth operation of their enterprises. Exposure to external influences through cosmopoliteness and mass media participation facilitated the acquisition of new knowledge, skills, and information critical to entrepreneurial behaviour. Interaction with experts

further enriched their understanding of the latest agricultural information, technologies, and best practices from various sources. These findings align closely with prior research conducted by Anitha (2005), Ganiger (2011), Singh *et al*. (2016), Sharma (2017), Khandave *et al*. (2019), Maity *et al*. (2023), Madhu *et al*. (2022), Mehta and Sonawane (2012) and Mamatha (2018). The independent variables that had a significant impact on the variation in entrepreneurial behaviour among agricultural input dealers were age, cosmopoliteness, and information sharing behaviour at a significance level of five percent. Additionally, extension participation and credit orientation had a significant impact at a significance level of one percent. The concept of entrepreneurial behaviour is highly influenced by the availability and reliance on credit, and agricultural input traders are no exception to this. The timely availability of institutional credit is a crucial factor during the sustainability phase of an entrepreneurial cycle.

Interestingly in the path analysis, variables such as extension contact and extension participation was found to have high impact in influencing the dependent variable. While extension contact had the highest indirect effect, extension participation had the highest direct effect and second highest indirect effect. Also, majority of the other independent variables channelled their indirect effects through extension participation. Along with other important factors such as credit orientation, social participation, information sharing behaviour and mass media participation; high extension contacts and extension participation enabled the agricultural input dealers in improving their entrepreneurial performance, managerial capacity and risk bearing abilities (Kalasariya *et al.,* 2022). Enhancing the entrepreneurial behaviour of agricultural input dealers, resulting in improved performance in providing agro-advisory services, would create a mutually beneficial situation for both the input dealers and the farmers. This gives a clear direction of inclusion of more extension advisory services and participatory extension approaches towards the policy advocation regarding agricultural input dealers, which shall also foster growth in their role of provision of agro-advisory services for the farmers (Figure 2).

CONCLUSION

Agricultural input dealers are identified as the most effective intermediaries within the pluralistic extension system for reaching farmers and delivering new technologies, vital inputs, and additional advisory services. A significant portion of respondents perceive their role in offering agricultural advisory services as an integral aspect of their business operations. Findings indicate that a majority of agricultural input dealers exhibit characteristics aligning with medium entrepreneurial behaviour. Notably, factors such as extension participation, social participation, extension contact, and information sharing behaviour displayed highly significant positive correlations with the entrepreneurial behaviour of agricultural input dealers. Extension participation, information sharing behaviour, and credit orientation exerted the strongest direct effects on the dependent variable, with extension participation serving as the primary channel for the indirect effects of other independent variables. Furthermore, the research emphasised a noteworthy positive correlation between entrepreneurial conduct and the effectiveness of agricultural input dealers in providing agro-advisory services.

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Authors contribution: Both first and second author has conceptualised the research problem collected, analysed and interpreted the data. Third and fourth author has provided support with statistical software and analysis. First author has written the manuscript. All the authors have read and approved the final manuscript.

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