Indian Research Journal of Extension Education
SHORT COMMUNICATION

Unearthing Agricultural Influencers: Leveraging Social Network Analysis to Identify Key Communicators in the Farming Community

Tadepalli Yamini[1], P. Venkatesan[2], V. Jyothi[3], M. Rama Devy[4], V. Srinivasa Rao[5] and K. Suseela[6]

1. Ph. D. Scholar (Agril. Ext.), 3. Assoc. Prof. (Agril. Ext.), 4. Prof. (Agril. Ext.), 5. Prof. & Univ. Head. (Stat.& Comp. Applications), 6. Assoc. Prof. (Agril. Eco.), Agricultural College, Bapatla, Andhra Pradesh,
2. Pri. Scientist, ICAR-NAARM,India.

Corresponding author mail: *yaminitadepalli2131@gmail.com*

ARTICLE INFO

Editor:
Dr. Mahesh B. Tengli

Received : 12.11.2023
Accepted : 08.01.2024
Online published : 09.01.2024

doi: 10.54986/irjee/2024/jan_mar/33-36

ABSTRACT

Effective communication within agricultural communities is crucial for knowledge dissemination, technology adoption and overall productivity improvement. The key communicators serve as bridges facilitating the transfer of knowledge and innovations. This study was conducted during 2022-23 in Perali village of Bapatla district, Andhra Pradesh using an exploratory research design. A total of 60 farmers were selected randomly and interviewed for the investigation. A network graph was constructed using R software. The findings revealed a complex web of relationships within the agricultural network and identified communicators who occupied strategic positions in the network with the highest degree centrality.

Key words: Social network analysis; Key communicators; Network structure; Centrality measures.

Social Network Analysis (SNA) in agriculture is a valuable tool that involves the study of how individuals, organizations and entities within the agricultural sector are connected and interact with each other. It focuses on analyzing the structure, relationships and flow of information and resources within agricultural networks (Rohit et al., 2021). Farmers, researchers, policymakers and other stakeholders exchange information on various topics such as crop management, pest control, market trends and technology adoption. By mapping these interactions, researchers can identify key sources of information and how knowledge is disseminated. SNA can pinpoint individuals and organizations that act as central hubs in the agricultural network. These "key communicators" often play a crucial role in disseminating agricultural information (Jyothi and Kumar, 2016). The primary goal of this article is to leverage social network analysis as a powerful tool to unearth the hidden structures of influence within the farming community.

This study was conducted during 2022-23 in Perali village of Bapatla district, Andhra Pradesh located at an altitude of 7 mts from the coast of the Bay of Bengal. An exploratory research design was used for the study. A total of 60 farmers were selected for the investigation. The variables selected for the study were age, education, gender, land holding, attitude, scientific orientation, economic motivation, risk orientation and innovativeness. Data was collected using a structured interview schedule. The farmers were asked from whom they would seek advice, information or suggestions regarding the aspects related to agriculture as followed by Verma and Sharma (2017). The data was transformed into an adjacency matrix, where nodes represented individuals and edges represented connections between the individuals. To assess the network structure metrics including degree centrality, betweenness centrality and eigenvector centrality were calculated. These measures were chosen to identify influential nodes within the network and to understand the flow of information. Social network analysis was conducted using R software version 4.3.1. R packages: i-graph, stat-net and network D3 were utilized for network creation, analysis and visualization.

The personal, socio-economical and psychological characteristics of the farmers were studied and quantified. The results revealed that the majority (90.00%) of the farmers belonged to old and middle age groups, while only 10.00 per cent of the farmers belonged to the young age group. The results about age revealed that half of the respondents constituted highly experienced and mature old-age farmers engaged in agricultural activities. The considerable proportion of middle-aged farmers implied enthusiastic and efficient farmers who were interested in new ideas involved in agriculture. The respondents also constituted young individuals with the knowledge and expertise needed to excel in modern farming practices. The education of the farmers depicted that more than one-third of the farmers were illiterate (35.00%), followed by 20.00 per cent each had primary and middle school level of education, high school (10.00%), PUC (10.00%) and graduates (5.00%). An insight into the education level of farmers revealed that most of them were illiterate. The probable reason might be the illiteracy of the parents, non-realization of the importance of education, financial constraints and distant location of higher study centers from the villages.

Nearly half of the farmers were marginal land holdings (46.67%) of 1 ac to 2.5 ac, followed by small (38.33%), semi-medium (11.67%) and medium land holdings (3.33%). Regarding land holding, the majority of the farmers had marginal and small land holdings which might be due to the inheritance of land from the ancestors and its distribution among the family members. Nearly two-thirds of the farmers had high level (60.00%) of economic motivation, followed by medium (31.67%) and low level (8.33%) of economic motivation. The majority of the farmers had high economic motivation. The aspiration of farmers for high returns to have a high standard of living might be the reason. About 68.33 per cent of the farmers had a medium level of innovativeness, followed by a high level (21.67%) of innovativeness and a low (10.00%) level of innovativeness. The results conform with those reported by Vijayabhinandana et al. (2018) and Jyothi and Subbaiah (2019).

It was observed that the majority of the farmers were noticed to have a medium level of innovativeness which might be due to that most of the farmers were middle-aged and might have an interest to adopt the new ideas quite earlier than other farmers. Nearly half (46.67%) of the farmers had a medium level of scientific orientation, followed by low (28.33%) and high (25.00%) levels of scientific orientation. Half of the farmers were observed to have a medium level of scientific orientation. The reason might be to get sustainable yield, quality produce and profit, the farmers need to adopt new technologies. More than two-thirds of the farmers had a medium level (63.33%) of risk orientation, while (21.67%) had high and low (15.00%) risk orientation. The results conform with those reported by Subbaiah and Jyothi (2020).

The majority of the farmers had medium and low levels of risk orientation which might be due to their low confidence levels and their financial constraints. The majority of the farmers had a medium level (60.00%) of attitude followed by a high level (30.00%) and low (10.00%) level of attitude toward social networking. Farmers' attitudes towards social networking may vary for a variety of reasons. Farming often involves long and demanding work hours, especially during planting and harvest seasons. This can limit the time available for farmers to engage in personal social activities or maintain regular contacts.

Farmers might prioritize social contacts within their farming community and local networks with less emphasis on broader personal and social contacts. Farmers, particularly in more traditional settings, might be cautious about sharing personal details or activities beyond their immediate community. Privacy concerns could lead them to limit their social networks.

Cultural and generational differences might have influenced their attitude toward social networking. Older farmers might have different perspectives on the importance of personal connections compared to younger generations. Rural areas might lack the social infrastructure found in urban settings, such as entertainment venues, social clubs, or recreational activities. The absence of these social outlets could contribute to a perception of farmers having fewer social contacts.

It's crucial to recognize that individual attitudes and behaviors vary widely among farmers, and few may actively engage in personal social contacts both within and outside the farming community. It is suggested that, as technology continues to connect people globally, farmers should increasingly find ways to balance their traditional values with a broader network of social contacts.

Network measures such as degree centrality, betweenness centrality and density were calculated to characterize actors and the entire network. The network graph consisted of 67 nodes N= {A1, B1… N3} where each node ni represented a farmer. Fig. 1 represented the network of farmers, each circle in the diagram, represented a farmer and the connecting arrows showed linkages between the different farmers. These linkages between farmers indicated any of the three types of relationships: family, work or affiliation. Node D1 was identified as the central actor in the farming network. Fig. 2 showed 9 components and a few isolates in the farming network; these sub-groups were represented with different unique colors. In the context of a graph (Fig 3) generated using R software, "hubs" typically referred to nodes (farmers) that had a high degree of connectivity. Through centrality measures and network metrics, the nodes D1, G1, W2, V2, and T2 were identified as key communicators who occupied strategic positions in the network with the highest centrality scores as similar findings reported by Vishnu et al. (2018), Tadepalli Yamini et al. (2024). Table 1 provided descriptive information about the cohesion of the farming network, which indicated that 8 per cent of the potential links between farmers that could exist in the farming network were present. The longest geodesic distance was 7 and the average path length was 2.23.

Node D1 was the central actor in the farming network and he exemplified the knowledge transfer. Node D1 was an Input dealer who was identified as a key source of information as farmers relied mostly on input dealers who offered a one-stop-shop for a wide range of agricultural inputs including seeds, fertilizers, pesticides and machinery. Farmers have found it convenient to get both their supplies and information in one place. The relationship that developed over time between farmers and input dealers had made dealers the most trusted sources of information. The nodes that were identified as hubs (Fig. 3) represented the individuals who had many connections or interactions with other individuals or entities in the network. These nodes often play a central role in the network and may be important for various network-related tasks such as information dissemination, influence or control.

Table 1. Cohesion Measures for Farming Network	
Measure	
Density	0.08
Diameter	7
Average path length	2.23

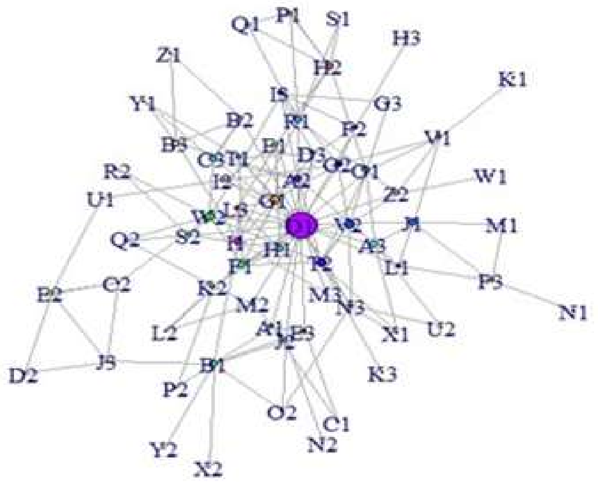

Fig 1. Network patterns between the farmers

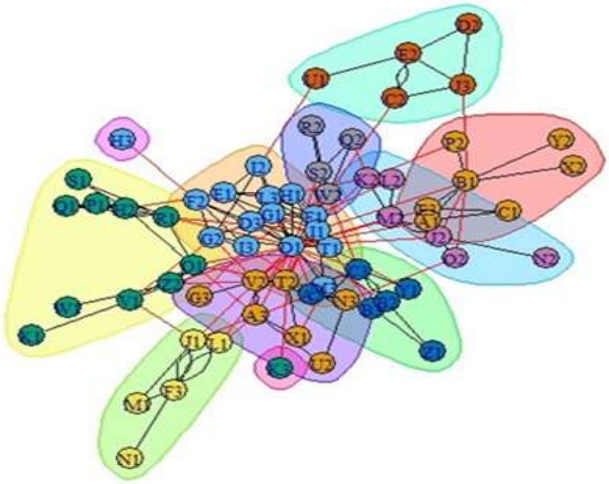

Fig 2. Densely connected networks

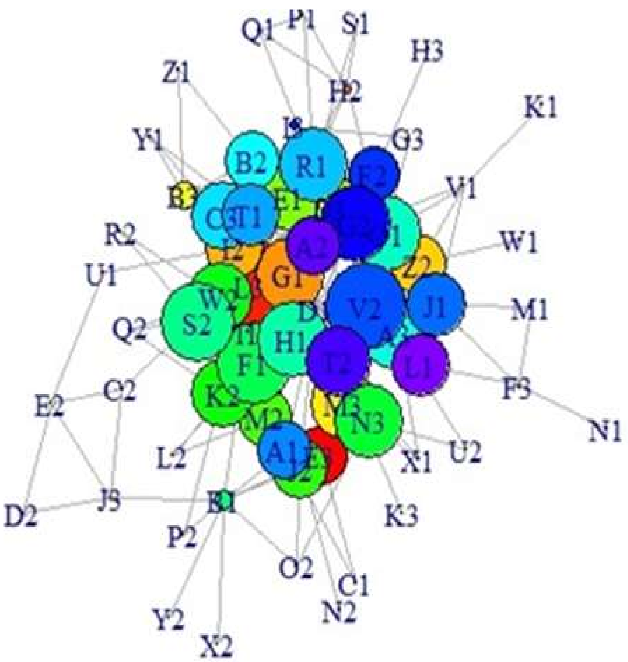

Fig 3. Graph representing the hubs in the farmers network

CONCLUSION

The study demonstrates the value of Social Network Analysis as a tool for finding the hidden dynamics of communication within agricultural networks. Identifying key communicators through social network analysis in agriculture facilitates more efficient and targeted communication strategies. By focusing efforts on individuals with influential positions in the network, agricultural organizations and policymakers can amplify their impact and promote positive changes within communities. Key communicators can act as a channel between the organizations and farmers and aid in collecting feedback from the agricultural community. This two-way communication is essential for understanding the needs and concerns of farmers and improving agricultural interventions accordingly.

Funding:

There is no separate funding for the research.

Declaration of competing interest:

Authors have no competing interests.

Data availability:

Data would be made available on request

Acknowledgement:

I would like to express my sincere gratitude to the farmer respondents and to my supervisor and members for unwavering support throughout the entire research process.

Authors' contribution:

The corresponding author is a Ph.D. scholar, is the primary contributor to the design and execution of the study. The other authors contributed to conceptualizing, operationalizing, guiding the study, providing feedback, and reviewing the manuscript. The content of the manuscript approves the specific contributions of each author.

REFERENCES

Deepika Verma and Gyanendra Sharma. 2017. Communication betwork of women vegetable growers of nainital district of Uttarakhand. *Indian J. Ext. Edu.,* **53**(3):58-62.

Jyothi, V. and Kumar, M.S. (2016). Socio-metric study for dissemination of agricultural information. *Indian Res. J. Ext. Edu*., ***13***(1): 136-138.

Jyothi, V. and Venkata Subbaiah, P. (2019). Front line demonstrations on improved management practices in redgram - A cluster approach. *Indian Res. J. Ext. Edu.,* **19**(4):70-74

Rohit, J.; Nirmala, G.; Anshida, B.; Ravi, S.K.; Nagasree, K.; Pankaj, P.K.; Sindhu, K. and Singh, V.K. (2021). Structural analysis of social network among farmers for information acquisition in rainfed areas: A study on farmers' information acquisition dynamics. *Indian J. Ext. Edu*., **57**(1): 1-6.

Tadepalli Yamini; Venkatesan, P.; Jyothi, V.; Rama Devy, M.; Srinivasa Rao, V. and Suseela, K. (2024). Construction and validation of farmer's attitude scale towards social networking. *J. Com. Mobi. and Sust.Dev.*, **19** (1):1-6.

Venkata Subbaiah, P. and Jyothi, V. (2020). Effect of improved management practices on yield and economics of rabi pulse crops. *Agril. Sci. Digest*, **40**(2):129-133.

Vijayabhinandana, B.; Jyothi, V. and Venkata Subbaiah, P. (2018). Enhancing the role of tenant farmers in achieving nutrition sensitive agriculture. *Indian Res. J. Ext. Edu*., **18**(1):15-21.

Vishnu, S.; Gupta, J. B. and Subash, S. P. (2018). Social network structures among the livestock farmers vis a vis calcium supplement technology. *Info Proc Agri*.

• • • • •