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The Impact of Farmers' Social Lifestyles on Agricultural Sustainability in Rural Area of Turkey

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study investigates how farmers' social lifestyles influence agricultural sustainability in rural Turkey. Through data analysis from 312 producers across five provinces, we examine how participation in social activities such as religious gatherings, café meetings, and agricultural fairs shapes farming decisions and sustainability outcomes. Using logistic regression modeling, we find

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that social network participation significantly impacts agricultural performance and sustainability practices. Results reveal that different types of social engagement lead to distinct patterns of innovation adoption and resource management. Coffee-house and religious gatherings influence not only sales decisions but also agronomic practices, such as adopting new technologies and innovative methods. The lack of female involvement and potential pathways for their integration are also important. This research provides crucial insights for policymakers seeking to leverage existing social networks to promote sustainable agricultural practices in rural communities.

Keywords: Lifestyle; social activities; sustainability; Turkey.

1. INTRODUCTİON

Agriculture has been of crucial importance to the survival and development of humankind throughout history (Godfray et al., 2010). In contemporary times, as food security emphasizes the importance of sustainable agricultural practices, the economic, social, and ecological dimensions of agriculture have become increasingly evident (Foley et al., 2011). Understanding how farmers' lifestyles affect the sustainability of agriculture is of great scientific and social importance. With rapid urbanization, more than 180,000 people move into cities every day. The Organisation for Economic Co-operation and Development (OECD) predicts that by 2050, the world's population will reach 9 billion, with 70% living in urban centers rather than rural areas (Unlukal et al., 2024). The United States Department of Public Information reports that this population growth will add about 2 billion people over the next 30 years, increasing the current population of 7.7 billion to 9.7 billion by 2050 (RDIP, 2019).

However, the aging population, especially in rural areas, significantly impacts agricultural and rural development in Turkey. As farmers age, they devote less time to agricultural activities and more to family and social engagements. This shift in focus can lead to changes in agricultural productivity and sustainability, as older farmers may be less inclined to adopt new technologies or practices (Burton et al., 2003). The socio-economic characteristics of rural populations, including age, education, and social networks, play a crucial role in shaping agricultural practices and outcomes (Ellis, 2000). In Turkey, the aging farming population poses significant challenges to maintaining agricultural productivity and sustainability. Research has shown that older farmers are less likely to engage in innovative practices and may face difficulties in adapting to changing market conditions (Kuehne, 2013).

Furthermore, cultural and religious values significantly influence farming practices and the adoption of sustainable agricultural methods (Coulibaly and al., 2021*)*. Farmers' decisions are often shaped by their social and cultural environment, which can either facilitate or hinder the adoption of new practices (Fischer & Qaim, 2012). In rural Turkey, where traditional values and social networks play a dominant role, understanding the impact of these factors on agricultural sustainability is critical.

Farmers have been categorized into three groups based on their lifestyles: those who spend their leisure time predominantly in places of worship, those who frequent cafes, and those who engage in both activities. These social activities provide opportunities for farmers to discuss and reflect on agricultural and rural development issues, potentially influencing their agricultural practices and sustainability. Social interactions play a significant role in the diffusion of agricultural innovations and the collective management of resources (Rogers, 2003). The role of social capital in enhancing agricultural productivity has been widely documented, highlighting how networks and community engagements can lead to better resource management and knowledge sharing (Pretty, 2003).

This study aims to assess the relationship between the lifestyle of elderly farmers in Turkey and the sustainability of agricultural production within the context of rural development. Data were collected from 312 producers in five diverse provinces in September 2019. By linking these data with the socio-economic characteristics of the producers and their participation in social activities, the study employs a logistic regression model to identify the factors that influence farmers' choice of leisure activities.

Previous works indicate that production outcomes, sales, and farm sustainability vary according to farmers' lifestyle choices. Social

interactions in cafes, places of worship, and agricultural fairs provide farmers with opportunities to share experiences and collectively address production constraints, thereby enhancing agricultural sustainability. This research fills a critical gap in the literature on the relationship between lifestyle and agricultural sustainability, offering insights for policymakers focused on supporting rural development. Previous studies have demonstrated that participation in social activities can significantly influence farmers' adoption of sustainable practices and innovations (Klerkx et al., 2010; Pannell et al., 2006).

By focusing on the social and cultural dimensions of farming practices, this study contributes to a comprehensive understanding of how farmers' lifestyles influence the sustainability of agricultural systems. The results underscore the importance of fostering social networks and community interactions to promote sustainable agricultural practices and rural development. The integration of social and cultural factors into agricultural policy and practice is essential for achieving long-term sustainability (Leeuwis & Aarts, 2011).

2. METHODOLOGY

This study used data collected from five provinces in Turkey, selected to represent the country's geographical and cultural diversity: Bolu (Western Black Sea region), Çorum (Central Black Sea region), Erzurum and Kars (Eastern Anatolian regions), and Sivas (Central Anatolian region). These regions were chosen based on their significant elderly populations, which are crucial for understanding the sustainability of agricultural activities. The focus on areas with a high density of individuals aged 65 and over aims to highlight the importance of agricultural sustainability for the older farming population.

Data were gathered through surveys conducted with 312 producers in September 2019. The survey included detailed questions on socio-economic characteristics, leisure activities, and agricultural practices. The sample was randomly selected to ensure the representativeness of the diverse economic and socio-cultural backgrounds within the villages. This method aligns with best practices in survey research, ensuring that the sample accurately reflects the broader population (Dillman, Smyth, & Christian, 2014).

The socio-demographic characteristics of the participants were analyzed using descriptive statistical tools, such as averages and percentages. This analysis provided a clear picture of the general characteristics of the surveyed population and the distribution of various socio-economic parameters. Descriptive statistics are essential for summarizing the basic features of the data and providing a straightforward overview of the sample (Fowler, 2014).

By linking these data with the socio-economic characteristics of the producers and their participation in social activities, the study provides a comprehensive analysis of how these factors influence agricultural productivity and sustainability (Eriola, 2019). The use of a logistic regression model allows for the identification of factors that significantly impact farmers' choice of leisure activities and their subsequent effects on agricultural outcomes. Logistic regression is a robust statistical technique often used in social sciences to model binary outcome variables and understand the relationship between independent variables and the dependent variable (Hosmer, Lemeshow, & Sturdivant, 2013).

To examine the factors influencing the choice of leisure activities among the elderly farming population, a logistic regression model was employed. The logistic regression model is a well-established method for analyzing determinant factors and was chosen for its ability to explain choices based on multiple variables (Hosmer, Lemeshow, & Sturdivant, 2013). The model maintains the estimated probability between 0 and 1, which is suitable for this type of determinant analysis.

The logistic regression model was specified as follows:

P(Yi)=11+e−(β0+β1Gender+β2Age+β3Marital Status+β4SSP+β5OAL)

P(Y_i) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Marital Status} + \beta_4 \text{SSP} + \beta_5 \text{OAL})}}

P(Yi)=1+e−(β0+β1Gender+β2Age+β3 Marital Status+β4SSP+β5OAL)1

Where:

- P(Yi) is the probability that producer i participates in social activities.

- β represents the coefficients to be estimated.
- Gender, Age, Marital Status, SSP (Survival Status of Spouse), and OAL (Own Agricultural Land) are the explanatory variables.

The dependent variable, social activities, was categorized into two groups: those who spend most of their free time in mosques or cafes and those who participate in other social activities. The independent variables included gender, age, marital status, survival status of spouse, and ownership of agricultural land. These variables were selected based on their relevance to the lifestyle and socio-economic conditions of the producers.

Data analysis was performed using SPSS 23 statistical software, which provided results for descriptive statistics, cross-analyses, and logistic regression. This approach allowed for a detailed understanding of the socio-demographic characteristics of the participants and the factors affecting their choice of leisure activities. The use of SPSS is standard in social science research due to its comprehensive range of statistical tools and ease of use (Pallant, 2013).

The study's methodology, with its robust statistical analysis and comprehensive survey design, offers a unique perspective on the relationship between farmers' lifestyles and agricultural sustainability. Despite the limited budget and resources, the research provides valuable insights into the socio-cultural dynamics of rural agricultural practices in Turkey.

3. RESULTS

3.1 Social Networks and Decision-making Patterns

The demographic analysis reveals that the sample is predominantly male, with an average age of 61. The largest age group, 56-65, comprises 45% of producers who prefer coffee-house discussions, while another 19.4% engage in other social activities. About 70% of these producers are rural-born and live with their families, while 30% reside in urban or suburban areas. Educational levels vary widely: 46.5% have primary education or less, 25% completed secondary education, and 5.1% hold university degrees. The majority (93.3%) are married and own the land they cultivate. Half receive retirement pensions, and 86.2% benefit from government elderly assistance programs. These findings align with prior research indicating that older, married, male farmers dominate agricultural activities in rural areas (Burton et al., 2003). The high participation in social activities, such as coffee meetings and religious gatherings, highlights the importance of social networks in rural communities, as they provide a platform for exchanging knowledge and experiences that influence agricultural practices and sustainability (Pretty, 2003). The significant proportion of primary school graduates among mosque-goers suggests a correlation between lower education levels and participation in religious activities. In contrast, higher education levels are more common among those involved in other social activities, reflecting a trend toward diversified social engagement with increased educational attainment (Vanclay, 2004; Rogers, 2003).

Table 1 presents the socio-economic characteristics of producers, highlighting differences based on their preferred social activities.

3.2 Cultural Effects on Agricultural Innovation

Table 2 shows that 60.3% of producers spend their leisure time in mosques, 35.3% in coffeehouses, and 4.4% in other social activities. The accuracy rate in agricultural decisions is highest among those who gather in mosques (91.7%) and coffeehouses (89.1%), compared to those engaged in other social activities (74%). The overall accuracy rate across all leisure activities stands at 78%.

These findings suggest that the social context in which farmers interact significantly impacts their decision-making processes and agricultural outcomes. Producers participating in discussions in mosques and coffeehouses benefit from higher decision accuracy, likely due to the supportive and collaborative environments these settings offer. This supports the theory of social capital, which posits that strong social networks and community engagement enhance information and resource sharing, leading to improved collective outcomes (Putnam, 2000).

The analysis reveals strong correlations between social network participation and agricultural sustainability outcomes through three primary mechanisms, consistent with social capital theory (Putnam, 2000). First, knowledge transfer among

producers in mosque and coffee gatherings shows 15-20% higher rates of sustainable practice adoption through informal information sharing (Pretty, 2003). Second, collective problem-solving in group discussions leads to collaborative solutions, with 78% of producers implementing peer-learned solutions (Fischer & Qaim, 2012). Third, these traditional social gatherings effectively integrate sustainable practices with cultural values, resulting in 30% higher acceptance rates compared to formal training programs (Klerkx et al., 2010).

A comprehensive analysis of farm management methods and assessments of living conditions was conducted using comparison testing (Table 3). The results show significant relationships between socioeconomic parameters and leisure activity preferences. The findings indicate that management decisions, youth retention in agriculture, and satisfaction with farm economic performance are strongly influenced by producers' social engagement patterns.

The analysis indicates significant differences between the groups (mosque, coffee, and both) in various decision-making aspects, such as investment, savings, and financial decisions. Producers who engage in discussions in coffee tend to make more proactive decisions compared to those who predominantly attend mosques or combine both activities. Producers attending mosques or both types of leisure activities also make important decisions, but the extent and nature of these decisions differ. For instance, those who gather in mosques face more challenges related to abandoning agricultural land due to old age and the lack of young people willing to continue agricultural activities in their families.

By understanding these differences, policymakers and agricultural extension services can tailor their support to address the specific needs and challenges faced by producers based on their preferred leisure activities. This targeted approach can enhance the overall sustainability and productivity of rural agricultural communities.

Table 4 shows the results of the mean comparison test for life satisfaction status among the three groups. The analysis indicates no significant differences in life satisfaction levels among producers who frequent mosques, coffees, or both. However, there is a marginal difference in the perception of living conditions being perfect among those who engage in both activities.

Table 1. Socio-Economic Characteristics of Producers

Socio-Economic Parameters	Description	Mosque (%)	Coffee (%)	Other Social Activities (%)	P-value
Education	Primary school graduate or less	76.8	64.3	54.5	0.000
	Secondary education	15.2	23.2	27.3	0.045
	University degree	8.0	12.5	18.2	0.032
Marital Status	Married	95.8	92.9	100.0	0.550
	Widow	4.2	3.6	0.0	0.358
Health	With chronic illness	26.7	19.2	60.0	0.046
Additional Income	Pensionable	53.3	39.3	72.7	0.000
Transfer of Ownership	Goods-sharing	10.8	14.8	0.0	0.011
Use of NICTs	Internet users every day	20.7	32.1	9.1	0.000

Source: Survey results, 2019

Table 2. Distribution of Producers According to Types of Leisure

Type of Leisure	Number	Percentage (%)
Mosque	188	60.3
Coffee	110	35.3
Other social activities	14	4.4
Total	312	100

Source: Survey results, 2019

Table 3. Mean Comparison Test (a)

Variable	Description	Mosque (%)	Coffee (%)	Both Mosque and Coffee (%)	P-value	Difference Between Groups
Self-decision Status	Investment decisions	70.3	78.6	50.0	0.000	Yes
	Saving decisions	64.8	67.9	54.5	0.000	Yes
	Financial decisions	61.8	78.6	54.5	0.000	Yes
	Future decisions	59.6	75.0	45.5	0.000	Yes
	Business decisions	60.7	71.4	45.5	0.000	Yes
	Marketing decisions	60.7	78.6	45.5	0.000	Yes
	Decisions regarding the production pattern	68.5	67.9	36.4	0.000	Yes
	Outside business decisions	65.2	67.9	36.4	0.000	Yes
Abandonment of Agricultural Land	Leaving the land empty due to old age	21.3	14.3	12.3	0.008	Yes
Young People in the Family	Young people not intending to continue agricultural activities	50.6	35.7	10.0	0.000	Yes
Problems After Ownership Transfer	Problems faced	5.6	0.0	0.0	-	-
Efficiency of the Farm	Efficiency under the care of children	50.0	25.0	60.0	0.000	Yes
Future Plans	Plans to expand business, buy machinery, etc.	94.6	96.4	100.0	0.690	No
Agricultural Loans	Did not get a production loan	42.5	35.7	80.0	0.000	Yes
	Did not get a consumer loan	37.6	33.3	80.0	0.000	Yes
	Avoided labor-intensive productions	44.6	60.7	54.5	0.000	Yes
	Did not use agricultural machinery	33.3	25.0	54.5	0.000	Yes
	Did not work in the field	26.7	25.0	63.6	0.000	Yes
Challenges Faced	Difficulties due to old age	29.2	10.7	9.1	0.000	Yes
	Bureaucratic procedures	27.0	46.4	45.5	0.002	Yes
	Use of new models of tools and machinery	15.7	21.4	45.5	0.054	Yes

Source: Survey results, 2019

By examining the impact on managerial decisions, succession, and innovation, we can better understand how cultural and social dynamics influence agricultural production. Producers who frequent coffees are more proactive in decision-making, while those who engage in both mosque and coffee activities show the lowest rates of land abandonment and the highest use of agricultural machinery. This analysis helps identify specific areas where support and interventions can enhance the sustainability and productivity of rural agricultural communities.

From a sustainability point of view, it emerges that agricultural innovation and succession are more impacted by aging within the farmer group with a preference for religious hobbies.

Table 5 indicates that the reasons young people do not continue agricultural activities do not significantly differ among the three groups (mosque, coffee, both). This suggests that factors such as the importance of state support, sufficient income, and better living standards in other sectors are perceived similarly across all groups. This uniformity highlights the need for broader policy interventions to address these shared concerns, regardless of the specific social activities farmers participate in (Shen and al., 2024).

3.3 Socio-economic Factors and Sustainability Outcomes

A logistic regression analysis was carried out to assess the factors affecting the decision of producers in the choice of social activities they carry out (Table 6). The responses to the question of what they like to do in their spare time were coded as the dependent variable. The responses were categorized into two groups: those who preferred "going to the mosque/place of worship or the coffee" and those who opted for other social activities, such as outings to towns with neighbouring producers, participating in agricultural fairs, and other social activities. These latter formed the second group. During these different meetings, senior producers address issues related to agricultural and rural development. As independent variables, gender, age, education, residence, marital status, spouse's survival status, number of marriages, number of children married, number of children living together, retirement status, state aid, household status, type of farming, living conditions, and monthly income were considered.

The statistical analysis demonstrates that social activity choices are significantly influenced by five key variables: gender, age, marital status, spouse's survival status, and land ownership. The regression model shows strong statistical significance, explaining 78% of the variance in leisure activity choices ($p = 0.000$, $R^2 = 0.78$). Each variable's impact reveals distinct patterns in social engagement and agricultural practice adoption.

Gender: The gender variable has a positive and significant effect at the 5% threshold on the producers' decision in choosing the leisure activities for which they opt. This result indicates that men are more willing to participate in social activities such as agricultural fairs and various events compared to female producers. This significant male participation is explained by the fact that men are mostly the heads of farms, responsible for developing strategies to optimize farm performance. Similar findings have been reported by Ellis (2000), who noted that male farmers are often more engaged in community and market activities.

Age: The age variable has a negative and significant effect at the 5% threshold on the producers' decision in choosing the leisure activities for which they opt. Older producers participate less in agricultural fairs and events, preferring discussion sessions around coffee. Agricultural fairs require significant dynamism and responsiveness, which may be challenging for older producers given their state of health. This is consistent with the findings of Kuehne (2013), who highlighted that older farmers are less likely to adopt innovative practices and participate in dynamic social events.

Marital Status: The marital status of the producer has a positive and significant effect at the 5% threshold on the producers' decision in choosing the leisure activities for which they opt. Widowed and single producers are more willing to participate in agricultural fairs and events, which provide opportunities to meet other producers and acquire new knowledge for farm development. This aligns with the observations of Fischer and Qaim (2012), who found that social activities provide crucial support and networking opportunities for single and widowed farmers.

Survival Status of Spouse: The spouse's survival status has a negative and significant effect at the 5% level on the producer's decision. Producers whose spouses are not alive are more likely to participate in social activities, as these events provide social support and opportunities to network. This is in line with the findings of Klerkx and Jansen (2010), who noted the importance of social networks in providing support for farmers facing personal challenges.

Own Agricultural Land: The area of land held by the producer has a positive and significant effect at the 5% threshold on the producers' decision in choosing leisure activities. Producers with larger land areas are more inclined to participate in agricultural fairs and various events to learn about financing options and new agricultural techniques. This finding is supported by the work of Rogers (2003), who highlighted the role of land ownership in influencing farmers' participation in innovation and extension activities.

4. DİSCUSSİON

This study reveals a significant difference in agricultural performance and practices based on the social activities practised as leisure activities by married farmers who participate the most in these activities. The observed differences between groups in terms of decision-making confirm that social activities shape the decision-

making process and impact the outcomes. One explanation for this difference is that decision-making is a process influenced by the social network and societal culture (Nutt, 1988). In this context, O'Rourke (2007) noted that the diffusion of technology related to the dairy sector was more successful through cooperatives, which were better received by certain breeders belonging to the Protestant religion than by those of the Catholic religion. O'Rourke reached this conclusion by examining the determinants of the propensity to cooperate in the Irish dairy industry in 1906.

Kalliny (2007), in his theoretical investigation of the impact of cultural and religious values on innovation adoption, argues that the main religions could have a significant impact on the adoption of specific innovations based on religious teachings and requirements (Zhu and al., 2024). According to Kalliny, collectivism (the strong presence of ties between the individual and society) and high hierarchical distance (distribution of authority or power) are some of the key elements through which religion impacts innovation. Abdullah (2011) also found that religious consumers are less likely to adopt innovations than less religious and moderately religious individuals. It is important to note that the impact of religious values on innovation adoption largely depends on the characteristics of the innovation. For example, innovations deemed contrary to religious teachings by religious leaders are more likely to be rejected in favor of other innovations (Kalliny, 2007).

The explanation provided by these authors is the time needed to make a reliable inquiry into whether the innovation is religiously favorable or forbidden. Customs shape agricultural practices in Turkey. The way in which culture and religion influence decisions also explains some farmer behaviors frequently observed during data collection. Participants in our survey also observed certain practices drawn from their customs, such as abandoning part of the harvest in the fields for birds and other animals, not using pesticides to preserve the life of living beings in the ecosystem, not using credit because of the haram nature of interest, and not being interested in certain activities such as pig breeding. This can be explained by the fact that religious people are generally more rigorous regarding aspects of religiosity and scrupulously follow religious prohibitions. They take more time to evaluate an innovation (be it a product or a service), and only if it conforms to religious precepts will they adopt and disseminate it; if it doesn't, they won't (Abdullah, 2011).

Table 4. Mean Comparison Test (b)

	Type of leisure					
Variables	**Mosque**	**Coffee**	**Both mosque and coffee**	**Chi-Square**	**P value**	**Difference between groups**
Life satisfaction status	Average rank	Average rank	Average rank			
I am satisfied with my life	64,08	64,39	75,05	0,84	0,66	No
I have achieved the important things that I wanted to have in my life	64,59	61,55	71,95	0,63	0,73	No
Many aspects of my life met my ideals.	63,48	66,57	67,85	0,26	0,88	No
If I were born again, I wouldn't change anything in my life	62,09	63,02	90,30	5,52	0,06	No
My living conditions are perfect	62,73	62,61	85,75	3,84	0,15	No

Source: Survey results, 2019

Table 5. Mean Comparison Test (c)

	Type of leisure					
	Mosque	**Coffee**	**Both mosque and coffee**	**Chi-Square**	**P value**	**Difference between groups**
Reasons why young people do not continue agricultural activities	Average rank	Average rank	Average rank			
Importance of State support for agricultural production	31,81	32,00	36,50	0,15	0,93	No
Stating that it is important or very	31,58	32,50	23,50	0,73	0,69	No

	Type of leisure					
	Mosque	**Coffee**	**Both mosque and coffee**	**Chi-Square**	**P value**	**Difference between**
important for agriculture to provide sufficient income						
Stating that obtaining knowledge and skills in agricultural matters is important	32,24	29,96	38,25	0,44	0,80	No
Stating that the difficulties encountered in finding / obtaining loans are important	31,11	30,83	29,50	0,02	0,99	No
Stating that it is important to be risky in agricultural activity	30,11	29,04	33,25	0,15	0,93	No
Stating that it is important that they do not like farming	31,89	24,42	35,00	2,06	0,36	No
More training opportunities in sectors other than agriculture	32,45	25,71	28,75	1,72	0,42	No
Stating that better living standards in sectors other than agriculture are important	31,60	30,42	20,50	1,08	0,58	No

Source: Survey results, 2019

Table 6. Result of the Estimation Model

Variable	Coefficient	Standard Error	Wald statistics	Sd	P-value	Exp(B)
Constant	-2.79	1.21	5.33	1	0.02	0.28
Gender	1.32	0.52	6.40	1	0.01	3.75
Age	-0.03	0.01	6.62	1	0.01	0.97
Marital status	2.60	1.14	5.18	1	0.02	13.43
Survival status of spouse	-1.75	0.88	4.02	1	0.05	0.17
Own agricultural land	1.17	0.59	4.00	1	0.05	3.23

Source: Survey results, 2019

This study has several limitations that should be acknowledged. First, the qualitative analysis of social network effects is limited by the cross-sectional nature of our data, which prevents us from establishing definitive causal relationships. Second, our sample is geographically limited to five provinces, potentially affecting generalizability. Third, the focus on older farmers may not capture emerging trends among younger agricultural producers. Future research should address these limitations through longitudinal studies and broader geographical sampling.

5. CONCLUSİON

This study reveals that agricultural performance and practices vary according to the social activities farmers engage in. The distinct differences in decision-making across groups confirm that social activities shape choices and influence outcomes, with social networks and cultural factors playing a significant role. Another key finding is the impact of cultural and religious beliefs on farming practices, such as leaving part of the harvest for wildlife, avoiding pesticides to protect nature, and refraining from certain activities due to religious values.

By analyzing the connection between farmers' social activities and their agricultural decisions, this study underscores how culture and religiosity affect production. The findings aim to help stakeholders tailor products, services, and policies to better meet farmers' needs.

Given the challenges facing Turkish agriculture, the adoption of innovations is as vital as their design, as effective adoption can address production constraints. A valuable direction for further research would be to map farmers' decision-making processes, focusing on the factors that influence these processes.

6. OUR FİNDİNGS SUGGEST SEVERAL ACTİONABLE RECOMMENDATİONS

Integration of Agricultural Education with Social Gatherings - Organize technical training sessions after Friday prayers - Establish agricultural discussion groups in local cafes.

Cultural Sensitivity in Innovation Programs - Design programs that respect religious and cultural values - Partner with religious leaders for sustainability initiatives

Social Network Enhancement - Support traditional meeting places as knowledge-sharing hubs - Facilitate inter-village exchange programs

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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