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Organic Agriculture Farmers' Motivation for Environmentally Friendly Practices in Turkey and Japan

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This study mainly examined organic agriculture farmers' motivations for environmentally friendly practices in Turkey and Japan. The study was conducted in Manisa Province of Turkey and Niigata Japan. A total of 260 organic agriculture farmers were interviewed. The effects of various factors on farmers' motivation are clustered according to the diversity of their motivation. In Manisa, six distinct dimensions were identified including Economic and Marketing, Community, Environmental Policy and Support, Knowledge, Awareness, and Self-responsibility. In Niigata, four dimensions emerged Environmental Policy and Support, Self-responsibility, Community, and Awareness. These results offer valuable context-specific understanding of both intrinsic and extrinsic factors ensuring the sustainability of environmentally friendly practices in the two different regions.

Key words: organic agriculture, farmers' motivation in Turkey and Japan, cluster analysis

1. Introduction

Organic agriculture in Turkey began in the mid-1980s, in response to the increasing demand for organic products from European companies. Manisa, with the highest number of organic agriculture farmers in the Aegean region (4.25%) was the pioneering center for organic production, commencing with the export of organic raisins (Turkish Statistical Institute, 2023). The number of organic farmers in Turkey increased significantly from 313 in 1990 to 80,000 in 2019, but there has been a recent decline, dropping to 50,000 in 2022 (Turkish Statistical Institute, 2023). Turkey ranks first globally in the production of specific organic products like raisins, hazelnuts, apricots, and figs, however, it has no advantage in the global market (Öztürk and İslam, 2014). Problems in organic farming are increasing, leading farmers to abandon organic agriculture practices in Turkey (Merdan, 2018). Japan's primary approach to mitigating its greenhouse gas emissions centers on endorsing and fostering environmentally conscious agriculture, particularly through financial incentives in the form of direct payment grants. Japan has taken significant steps to encourage farmers to adopt ecological sustainability practices (Maharjan *et al*., 2022). Niigata Prefecture continues to boost the highest number of farms practising organic agriculture at 3404 and has the second position nationwide (in 47 prefectures) with 7,611 hectares of land dedicated to organic farming. Niigata is top in organic rice cultivation with 2,946 farmers and 6,861 hectares devoted to this eco-conscious approach (MAFF, 2020).

This study mainly examined organic agriculture farmers' motivation toward environmentally friendly practices in Turkey and Japan. The motivations of organic farmers were examined regarding the effects of various factors and clustered according to their motivation profiles for both countries. Both the development levels and sociocultural differences in the countries and agricultural structures of the cities are quite different making it difficult to compare these two cities. Therefore, the scope of this research is not to compare countries and cities but rather to provide insights into the basic information of farmers, such as socio-economic features and their intentions regarding environmentally friendly agricultural production methods, in each unique context of both cities.

2. Analytical Framework

1) Material and methods

The main material of this research is survey data from organic agriculture farmers in Manisa and Niigata. According to the Farmer Registration System in Manisa, there were 3,172 organic agriculture farmers in 2020, and there were 3,404 organic agriculture farmers in Niigata. We used population proportion through simple random sample

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Table 1. Attitudinal Statements

Definitions of variables	Variable
I am satisfied with the income I earn from organic agricultural production methods.	(c1)
Organic agriculture increases my agricultural income.	(c2)
I am not worried about selling my organic agricultural products.	(c3)
I care about the support given by the state to protect soil and water resources during agricultural activities.	(c4)
The support provided by the state for the protection of soil and water resources contributes to the sustainability of agricultural activities.	(c5)
I am satisfied with the environmentally friendly agricultural production support provided by state.	(c6)
I am aware of organic agriculture incentives given by the state.	(c7)
I take care to use my knowledge of biological control methods during agricultural production.	(c8)
I think drip and sprinkler irrigation contributes to the sustainable use of water resources.	(c9)
I am open to learning information about using renewable energy resources that I can use on my farm.	(c10)
I care about the use of environmentally friendly agricultural inputs such as organic fertilizers.	(c11)
I believe that renewable energy resources can be used in environmentally friendly agricultural production.	(c12)
I believe that protecting soil and water resources during agricultural production contributes to the environment.	(c13)
As long as I continue agriculture, I will protect soil and water resources.	(c14)
I am aware that it is my responsibility to protect soil and water resources while doing agricultural production.	(c15)
Farmers contribute to society with their environmentally friendly agricultural activities.	(c16)
I care about other farmer doing organic farming.	(c17)
Farmers around me quit organic farming, I will also quit organic farming.	(c18)

size formula to determine the number of farmers participating in the survey. A total of 260 organic agriculture farmers were interviewed face-to-face in Manisa and Niigata. All questions in the survey were the same for both cities. For attitudinal statement questions (Table 1), a 5-point Likert scale (1 if strongly disagreed, 2 if disagreed, 3 if neutral, 4 if agreed, and 5 if strongly agreed) was used to inquire about information on organic agriculture farmers' motivation towards environmentally friendly practices. The reliability of the attitude scale was tested and Cronbach's Alpha value based on standardized items (.800 for Niigata, and .798 for Manisa) indicates the scale demonstrates a reliable measurement.

The research involved a two-stage method for data analysis. First, factor analysis was conducted to reduce the number of variables into dimensions that describe the attitudes of organic agriculture farmers toward environmentally friendly practices. Factor Analysis with orthogonal varimax rotation was used to aggregate variables that loaded highly on one factor. Additionally, The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was calculated to assess the suitability of our data for factor analysis. KMO value criterion should exceed 0.500, indicating that our datasets are appropriate for this purpose. Bartlett's Test of Sphericity represents reliability, the *p*-value should be lower than .05 (Backhaus *et al*., 2011). In the next step, a cluster analysis was conducted to classify the farmers into homogeneous groups according to their attitudes toward environmentally friendly practices. Cluster analysis results are presented in terms of center values and represent the central tendencies of each cluster. Analyses were conducted using the statistical software SPSS 29.0.

3. Result and discussion

Descriptive statistics were used to evaluate the socioeconomic characteristics of organic farmers. The mean of organic farmers age in Manisa was 53.65 years, and in Niigata was 57.83. It has been determined that the education level of the organic agriculture farmers in Niigata (39.4% High School) is higher than the education level of organic agriculture farmers in Manisa (36.6% Primary School). The average agricultural experience of organic agriculture farmers in Manisa is 32.4 years, and in Niigata is 26.28 years. In Manisa, 98% were male, while in Niigata 19% of organic agriculture farmers were female, and 81% of organic agriculture farmers were male. In Manisa, the average organic agricultural experience is 11.11 years, while in Niigata is 14.20 years. In factor analysis for Manisa, the Kaiser-Meyer- Olkin (KMO) Measure of Sampling Adequacy yielded a value of 0.656. It indicates a moderate level of suitability, suggesting that there is a reasonable degree of correlation among the variables in our

Table 2. Dimensions of Factor Analysis (Manisa)

Factors	Factor Loading	Mean	Std.
Dimension 1 = Economic and Marketing			
(c1)	0.823	2.35	1.325
(c2)	0.763	2.45	1.284
(c3)	0.735	2.67	1.456
Dimension 2 = Environmental Policy and Support			
(c4)	0.840	3.96	1.200
(c5)	0.744	3.45	1.210
(c6)	0.521	4.26	1.052
Dimension 3 = Knowledge			
(c8)	0.722	4.52	0.703
(c9)	0.755	4.13	0.965
Dimension 4 = Awareness			
(c10)	0.796	4.65	0.573
(c11)	0.684	4.85	0.357
Dimension 5 = Self-Responsibility			
(c13)	0.719	4.32	0.669
(c14)	0.660	4.57	0.589
Dimension 6 = Community			
(c16)	0.867	4.80	0.400
(c17)	0.592	4.71	0.515

*Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 10 iterations.

dataset. Bartlett's Test of Sphericity returned highly significant results ($\chi^2 = 470.688$, df = 171, $p < .001$). The high significance of Bartlett's Test indicates that our variables are indeed correlated, providing strong evidence that our dataset contains meaningful relationships among the variables. Six distinct dimensions emerged to shape these attitudes, each with unique characteristics for Manisa. Notably, the Economic and Marketing dimension exhibits strong roles of variables related to income satisfaction, organic agriculture's impact on income, and product selling confidence in shaping economic and marketing aspects of environmentally friendly practices. Moreover, the cumulative proportion of variance explained was 76.25% and it indicates the extent to which the identified factors collectively capture and account for the variability in farmers' motivations and attitudes toward environmentally friendly agricultural practices. The higher proportion of variance explained by the Economic and Marketing dimension was 28.06%, and the Environmental Policy and Support was 16.10% (Table 2).

Organic farmers in Manisa were grouped into three clusters. Cluster 1 (28.46%) prioritizes intrinsic motivations, including awareness and self-responsibility, driven by environmental concerns and personal values. Cluster 2 (21.54%) focuses on external factors, particularly environmental policies and knowledge, relying on government initiatives and industry support. Cluster 3 (50%) represents a balanced attitude profile, considering both economic factors and community involvement in sustainable agriculture practices (Table 3).

Table 3. Final Cluster Center Value (Manisa)

Factor groups	Cluster 1	Cluster 2	Cluster 3
Frequency	**N (37)**	**N (28)**	**N (65)**
Dimension 1	-0.835	-0.142	0.529
Dimension 2	0.374	1.313	0.437
Dimension 3	-0.117	0.310	0.069
Dimension 4	0.337	0.291	-0.029
Dimension 5	0.409	-0.430	0.114
Dimension 6	-0.609	0.023	0.320

For Niigata, statistical assessments, including the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (0.663) and Bartlett's Test of Sphericity ($\chi^2 = 471.558$, df = 120, $p < .001$), indicate a reasonable degree of correlation among variables and support further exploration of factors influencing organic agriculture farmers. Four dimensions were identified. Environmental Policy and Support dimension showed strong factor loadings for variables related to state support for soil and water resource protection, indicating their significant role in shaping farmers' perceptions. In addition, the Community dimension displayed diverse responses among farmers, reflecting varying perspectives. The cumulative proportion of variance explained was 73.47%, with Environmental Policy and Support explaining 20.22% and Awareness explaining 16.83% (Table 4).

Farmers in Niigata were divided into 3 different clusters. Cluster 1 (47.69%) prioritizes environmental concerns and community support, emphasizing Environmental Policy and Support (0.671) and Community (0.347). Cluster 2 (22.31%) uniquely focuses on intrinsic motivations (Awareness: 0.749, Self-responsibility: 0.386) while relying less on external factors like community and environmental policies and support. Cluster 3 (30%) strikes a balance between economic factors and community involvement, considering environmental policies but placing less emphasis on them compared to Cluster 2 (Table 5).

In discussion, descriptive statistics revealed distinct differences in demographics, educational levels, and agricultural experience between the two regions. For instance, farmers in Manisa tend to have more extensive agricultural

Table 4. Dimensions of Factor Analysis (Niigata)

Factors	Factor Loading	Mean	Std.
Dimension 1 = Environmental Policy and Support			
(c4)	0.666	3.96	0.894
(c5)	0.766	3.53	1.069
(c6)	0.600	3.39	1.373
(c7)	0.637	3.42	1.314
Dimension 2 = Awareness			
(c8)	0.801	4.02	1.000
(c10)	0.731	4.09	1.035
(c12)	0.607	4.06	0.973
Dimension 3 = Self-Responsibility			
(c14)	0.853	4.21	0.916
(c15)	0.715	4.35	0.921
Dimension 4 = Community			
(c18)	0.759	3.60	1.101
(c16)	0.634	3.80	1.044
(c17)	0.455	3.53	1.149

*Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 10 iterations.

Table 5. Final Cluster Center Value (Niigata)

Factor groups	Cluster 1	Cluster 2	Cluster 3
Frequency	**N (62)**	**N (29)**	**N (39)**
Dimension 1	0.671	-1.020	-0.304
Dimension 2	0.293	0.749	0.342
Dimension 3	0.101	0.386	0.453
Dimension 4	0.347	-0.722	0.157

experience, whereas Niigata has a higher level of education among its organic farmers. These variations in socioeconomic characteristics likely influence how farmers perceive and engage in environmentally friendly agricultural practices. Factor analysis further illuminated the complexity of these motivations. In Manisa, farmers appear to prioritize economic motivations based on environmental policy support and organic agriculture income. Some studies reported that farmers' motivation is based on economic factors such as profit maximization, and financial incentives (Home *et al*., 2014).

In contrast, Niigata's organic farmers lean more towards intrinsic motivations, reflecting a strong sense of environmental responsibility and community support. This is because of the higher level of education among Niigata's organic farmers who participated in our research, indicating that they have greater knowledge and awareness of environmentally friendly practices. Moreover, Maharjan *et al*. (2022) found that farmers' awareness and knowledge about climate change and/or its effects may have promoted the high number of Sado Island farmers practising and intending to continue environmental conservation agriculture. Zadeh *et al*. (2015) supported that farmers' adherence to personal norms, their sense of responsibility, and their commitment to environmental protection were the most influential factors impacting the environment.

4. Conclusion

This study has provided valuable insights into the attitudes and motivations of organic agriculture farmers in the regions of Manisa and Niigata. These findings provide a foundation for tailored interventions and policy strategies to promote the sustainability of environmentally friendly practices in both regions, taking into account the diverse motivations (intrinsic and extrinsic factors) and attitudes of organic farmers. Furthermore, the practical significance of these dimensions within the context of sustainable agriculture and the broader implications for policy and practice warrant further exploration and consideration for Turkey and Japan.

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