

Determining Factors of Retaining Young Farmers in Agriculture: A Case study in Turkey and Japan

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Abstract

Young farmers have an important role as the future of food security and sustainable agriculture depends on them. However, the young farmer problem is getting serious all over the world, whether the countries are developed or developing. The objective of this study is to determine the factors that affect the willingness of young farmers to continue agriculture in the future, especially based on social and cultural factors with economic factors. Data were collected from 200 young farmers' questionnaires in İzmir, Turkey, and Niigata, Japan. Using the logistic regression model, we found that social factors play an important role in retaining young farmers in agriculture such as the respectability and importance of farming, and the multifunctional role of farming, along with economic factors such as off-farm job, farmland size, and subsidies. If countries can clarify the importance of farming and food production to young generations, they will make essential contributions to the sustainability of food security and agricultural sustainability.

Keywords

Sustainability, young farmers, Japan, Turkey, rural development

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Introduction

Young people are the most dynamic, productive, and innovative population of any society (Aggelopoulos and Arabatzis, 2010) and they are required by agriculture. Furthermore, Hamilton et al. (2015) investigated the question of whether young farmers are more profitable, productive, and innovative than older farmers and found that the 35 and 45 age range was the highest overall in terms of the whole farm and agricultural productivity. Wairegi et al. (2018) found that young coffee producers in Kenya have higher yields (609 kg/ha) than older producers even if they cultivate smaller land and they are willing to expand their businesses by leasing land under coffee to increase their income from coffee. Younger farmers have a longer planning vision for their farms. They tend to invest more in their farms and more frequently use loan capital to grow their business than older farmers (Davis et al., 2013). They are more open to learning new techniques on the farm and more likely to adopt innovative technologies to help

improve farm productivity and enlarge their farm (Hamilton et al., 2015). Young farmers usually display better financial results and employ more modern management techniques farm (Zagata and Sutherland, 2015). Moreover, Lim et al., (2022) state that young farmers make farming more sustainable and adaptive and contribute to climate action by using modern technologies. Young farmers are more likely to engage in sustainable farming practices such as organic agriculture, environmental conservation, and animal welfare (Lastra-Bravo et al., 2015; Läßle, 2012). Hwang et al. (2017) have documented that young farmers make an effort to secure agriculture competitiveness through an increase in farm size and having quality certifications (such as organic certification, and environment-friendly certification) for their products.

However, young people are not willing to engage in farming as a profession. Many researchers have proclaimed that the number of young farmers in several developed countries has decreased (May

et al., 2019). Only 11.9% of all farm holdings in the European Union are run by farmers under 40 years of age (EUROSTAT, 2022). The proportion of farm operators aged 55 and older grew by 6% points in 2016 (54.5%), increasing to 60.5% in 2021. Conversely, Canada's share of young operators was 8.6%, down slightly from 9.1% in 2016 (Statistics Canada, 2021). In Korea, only 0.7% of farmers are under 40 years old, and the number of farms managed by these young farmers dramatically declined from 91,516 in 2000 to 6,859 in 2019 (Lim et al., 2022). The average farmer age in Taiwan is 62, with 44% of farmers aged 65 and over, and 7.92% of farmers between the ages of 15 to 44 (Kuo, 2014). The average age of Japanese farmers is 68 years of age, the highest average age for farmers in the world. And more than 80% of farmers in Japan are over 60 years old, while 12% of farmers are under 45 years old (MAFF, 2020).

Additionally, recent studies in developing countries have shown that they also suffer from the young farmer problem and that youths tend to migrate, leaving their farmlands. In Thailand, the proportion of farmers younger than 45 years old is 19%, while the proportion of those 60 years and older is 33% (Jansuwan and Zander, 2021). Moreover, 25.3% of farmers are 15 to 40 years and 43.8% of farmers are in the age group of 55 years and above in Malaysia (Abdullah and Sulaiman, 2013). According to the data of the Ministry of Agriculture and Forestry of Turkey, 13.46% of farmers correspond to 18 to 40 years of age and 67% of farmers correspond to 50 years of age and above (The Ministry of Agriculture and Forestry of Turkey, 2016).

The young farmer problem has a direct relation to the issues of efficiency, productivity, food security, food self-sufficiency, sustainability, and poverty. Therefore, numerous studies have examined the reasons or factors that affect the exit of young farmers from agriculture, prevent them from entering the farm, and sustain their activity on the farm. For instance, high land value, farmland rent (Katchova and Ahearn, 2015), and lack of available land (Šimpachová Pechrová et al., 2018) prevent young farmers from entering the farm. The price of land is an important factor in the investment and management decisions of farms and the higher price may represent a barrier to entry into agriculture (Statistic Canada, 2021). The most important factor for young people not entering farming in Benin, a West African country, is the difficulty of accessing agricultural land (Ameglagno and Soglo, 2019). And young people

in Madagascar, Malawi, South Africa, Zambia, and Zimbabwe, have noted a major problem accessing farmland because of the unwillingness of parent farmers to relinquish land (Lindsjö et al., 2020; SACAU, 2013). The needs of European young farmers were addressed by Zondag et al. (2015) as access to land and financial capital. Kristensen and Birch-Thomsen (2013) reported that the most important problems are accessing the necessary capital and credit to use in agricultural enterprises for young farmers in Uganda and Zambia. It has been reported that young farmers in Kenya face similar problems in entering agriculture (Leavy and Hossain, 2014). Furthermore, Norsida (2012) in a paper titled "Unleashing youth potentials in developing the agriculture sector" found that the lack of capital (88.1%) is one of the main factors among Malaysian youth from getting involved in agriculture. Goeringer et al. (2012) reported that young farmers need an amount of capital in the initial phase, and they face problems accessing credits and loans. In addition, it is argued that low agricultural income is the most important factor that makes young farmers unwilling to continue agriculture in Akhisar Turkey (Arli et al., 2014). It was reported that young farmers tend to leave the rural area of Turkey because of income inefficiency and lack of job opportunities (Yalcin and Kara, 2016; Zirhlioglu, 2010). Young farmers in Kenya face fragmentation of land problems because of inheritance, and they could not earn enough income from small farmlands (Andhani, 2017). The migration of Malaysian youth from agriculture and rural areas is largely due to the traditional view that agriculture is a low-paying hard job and does not directly promise a good future for younger people (Abdullah and Sulaiman, 2013). Lim et al. (2022) analyzed the perception, attitude, and willingness to participate in the investment scheme for Korean young farmers. They found that young farmers have a positive attitude toward investment schemes although the fund is insufficient for capital-intensive farms. Lim et al. (2022) state that this might be because young farmers have financial constraints exist. Moreover, agriculture has many risks which are related to climate change and natural disasters, which lead to increased product costs, the volatility of the agricultural markets, and product prices (Jansuwan and Zander, 2021). It causes low and unstable agricultural income which makes farming an unattractive profession for young people. In addition to economic factors, social factors also caused young people to not be attracted to agriculture. Young people perceive farming as a profession

with a low social status and education level (Asciutti et al., 2016; Susilowati, 2015). And farming is not seen as a suitable occupation for well-educated Malaysian farmers (Abdullah and Sulaiman, 2013). Thai young farmers do not want to cultivate their land, as they see agriculture as a grueling occupation with low pay and a heavy workload. Furthermore, they think the prestige of the profession is low due to the low income of the farming profession, and non-agricultural professions can earn high prestige and a higher income (Ruiz Salvago et al., 2019). And the Philippines farmers expressed the opinion that rice farming is physically tiring and not financially rewarding (Palis, 2020).

In that respect of this background, our study aims to determine the factors that affect the willingness of young farmers to continue agriculture in the future. The research question is below: What factors have an impact on young farmers to continue agriculture in the future? Specifically, we aim to investigate the social, cultural, and economic factors that influence their willingness to continue agriculture in the future. To determine the factors affecting the willingness of young farmers to continue farming in the future, statement questions were formed the factors based on the literature. AGE, SUBSIDIES, PROFESSION, FARMLAND, and EXPERIENCE factors have been examined by many studies (Jansuwan and Zander, 2021; Hlouskova and Prasilova, 2020; Faysse et al., 2019; Morais et al., 2017). Based on young people's negative perception of farming (Rigg et al., 2018; Morarji, 2014), and their view of farming as a low-prestige and neglected profession (Ruiz Salvago et al., 2019; Aguilhon, 2017; Asciutti et al., 2016; Susilowati, 2015), we assumed RESPECTABLE and FARMING IMPORTANT will be factors in our research. FARMING NOT TIRING factor was formed from farming was seen as a tiring occupation with a heavy workload by young people (Jansuwan and Zander, 2021; Ruiz Salvago et al., 2019). In addition, we added the SOCIAL LIFE factor. WILLING TO GROW factor has associated with young farmers being highly motivated to seek productivity and tend to invest more to enhance their farms (Hamilton et al., 2015; Davis et al., 2013).

The young farmer problem is getting serious all over the world, whether the countries are developed or developing. Based on this, it has required reflection on whether the young farmers of two countries with different cultures, societies, different geological locations, as well different development

levels, might be influenced by the same factors. The sub-question of the research is: What factors are common and different for young farmers in Turkey and Japan to continue their agricultural activities in the future? The young farmer is an important issue that needs to be addressed in both countries. Although Turkey has a high youth population, young people living in rural areas are rapidly leaving agriculture. Moreover, the aged population problem in Japan has apparent itself more strongly in the agriculture sector and triggered the food self-sufficiency problem, so it is a problem that needs to be seriously addressed. This research could essential contributions to the sustainability of food security and agricultural sustainability, as well as literature. However, it is believed that considering the two countries together in the research namely Turkey and Japan might add a different perspective to the young farmer problem in the literature. Hopefully, cooperation studies between different countries might contribute positively to the global image of agriculture in the future.

Materials and methods

Quota sampling was used to obtain primary data from young farmers in İzmir and Niigata. Taking the age factor as the reference for quota sampling, surveys were conducted with the farmers in Turkey who were 20 to 40 years old, and in Japan who were aged 20 to 45 years old. These age ranges were specified by each country's young farmer definition. The Ministry of Agriculture and Forestry of Turkey has defined young farmers as those who are under 40 years, residing or wanting to reside in rural areas. And one of the conditions of the Ministry incentive called Youth Farmer Projects Support was to be less than 40 years old (The Ministry of Agriculture and Forestry of Turkey, 2018). According to Japan's Ministry of Agriculture Forestry and Fisheries, young farmers were specified as less than 45 years of age and it was one of the conditions for the Young Farmer's Fund incentive (MAFF, 2018).

According to the Farmer Registration System for İzmir, there were 47,000 farmers in 2017 (İzmir Directorate of Provincial Agriculture and Forestry, 2017), and there were 62,368 farmers in Niigata, according to the latest agricultural census (2015) (MAFF, 2015). In determining the sample size, using the proportional sampling method, for a finite population of size N , the sample volume formula according to the known or predicted proportion (p) of those with a particular characteristic is given

below (Newbold, 1995).

The sample size was determined as follows:

$$n = \frac{Np(1-p)}{(N-1)\sigma_{\hat{p}_x}^2 + p(1-p)} \quad (1)$$

n = Sample size

N = Number of farmers in İzmir and Niigata (İzmir: 47,000; Niigata: 62,368)

p = Young farmer proportion (taken as $p = 0.50$ to attain maximum sample volume)

σ = Deviation of population (95% confidence interval and 10 % error margin)

A total of 200 young farmers were interviewed in both İzmir (96 + 4 with backup questionnaires = 100) and Niigata (96 + 4 with backup questionnaires = 100).

The survey form used in the research is composed of two main sections. The first section contains questions about young farmers' socio-

economic characteristics and farming problems. The second section is made up of statement questions that determine factors affecting the willingness of young farmers to continue agricultural activities. And 7-point Likert scale (1 if strongly disagreed, 2 if disagreed, 3 if somewhat disagreed, 4 if neutral, 5 if somewhat agreed, 6 if agreed, and 7 if strongly agreed) was used to inquire about information on young farmers' willingness to continue agriculture in the future. The 7-point Likert scale was preferred as it could provide a more accurate measure of farmers' true assessment (Finstad, 2010).

Table 1 shows the independent variables that will affect the willingness of young farmers to continue agriculture (dependent variable).

The socio-economic characteristics of young farmers and the problems faced by young farmers were analyzed using descriptive statistics in SPSS 22.0. The logistic regression model estimated the factors affecting the willingness of young

Variables	Description	Unit of measurement
Dependent Variable		
FARMERPREF	1 = young farmer is willing to continue agriculture 0 = otherwise	1 = yes 0 = no
Independent Variables		
AGE	The age of farmers	in years
SUBSIDIES	Benefiting from state subsidies when started farming	1 = yes 0 = no
PROFESSION	Off-farming job	1 = yes 0 = no
FARMLAND	Total cultivated area	in hectares
EXPERIENCE	Having agricultural experience before becoming a farmer	1 = yes 0 = no
SOCIAL LIFE	I think workload continuity which is necessary for agricultural activities does not negatively affect my social life	1 = strongly disagree 7 = strongly agree
RESPECTABLE	I think that the farming profession is seen as respected by society	1 = strongly disagree 7 = strongly agree
FARMING IMPORTANT	I think that farming is seen as an important profession by society	1 = strongly disagree 7 = strongly agree
WILLING GROW FARM	I think I am willing to enlarge my farming in the future	1 = strongly disagree 7 = strongly agree
FARMING NOT TIRING	I think the farming profession is not a difficult and tiring profession	1 = strongly disagree 7 = strongly agree
MULTIFUNCTIONAL	I think farming serves multifunctional such as protecting the environment, feeding the society	1 = strongly disagree 7 = strongly agree
NOT NEED SUBSIDIES	I think that I can continue farming even without state subsidies	1 = strongly disagree 7 = strongly agree
TECHFACILITATE	I think that developments in agricultural technology facilitate agricultural activities	1 = strongly disagree 7 = strongly agree

Source: Own processing

Table 1: Description of variables.

farmers to continue agriculture. The logistic regression model was preferred since the dependent variable is discrete, and the independent variable can take both discrete and continuous values. In the logistic regression model, the observed value of the dependent variable takes the value (1) if the farmer is willing to continue and (0) if the farmer is not willing to continue (Walker and Duncan, 1967).

The assumptions regarding the logistic regression models are briefly shown in the function below.

$$P_i = E(Y=1/X_i) = \alpha + \beta X_i \quad (2)$$

$$P_i = E(Y_i=1/X_i) = \frac{1}{1+e^{-(\alpha+\beta X_i)}} \quad (3)$$

$$= \frac{1}{1+e^{Z_i}} \quad (4)$$

Here

$$Z_i = \alpha + \beta X_i$$

Equation (2) is called the logistic regression model, also known as the logit model (Park, 2013). Since the exponential term in the function will always be positive when X takes any value, the lower limit of P_i is also 0. This function fulfills $0 \leq P_i \leq 1$

condition required for probability. β = coefficient, β_i = the parameter to be estimated for each independent variable, X_i = denotes the i^{th} independent variable (İnal et al., 2006). The logit transformation of the nonlinear logistic regression function given in the equation can be applied and linearized.

$$L_i = \text{Ln} \left(\frac{P(Y)}{1-P(Y)} \right) = \text{Ln} e^{\beta_0 + \beta_1 X_1} = \beta_0 + \beta_1 X_1 \quad (5)$$

The linear model shows how much 1 unit of change in the independent variable x causes a change in the dependent variable. However, in the logit model, it shows how much change in logit is caused by 1 unit of change in X (Aldrich and Nelson, 1984; Hosmer et al., 2013).

Result and discussion

Descriptive and inferential statistics were used to assess young farmers' responses. Table 2 represents the socio-economic characteristics of young farmers in İzmir and Niigata. The average age of young farmers in İzmir was 32.45 years, and in Niigata was 34.62. It has been determined

Variable	Description	İzmir (%)	Niigata (%)
Age	Min	20	20
	Max	40	45
	Mean	32.45	34.62
Education level	Primary	14	0
	Secondary	32	0
	High school	43	17
	2 years collage	9	27
	Bachelor's degree	2	53
	Master's degree	0	3
Agricultural experience	Less than 1 year	0	5
	1 to 5 years	15	28
	5 to 10 years	19	31
	10 to 20 years	49	29
	20 years and more	17	7
Gender	Female	7	32
	Male	93	68
Having agricultural experience before becoming a farmer	Yes	82	73
	No	18	27
Off-farming job	Yes	42	36
	No	58	64
Benefiting from State supports	Yes	69	52
	No	31	48

Source: Own calculations

Table 2: Characteristics of young farmers in İzmir and Niigata.

that the education level of the young farmers in Niigata (53% bachelor's degree) is higher than the education level of the young farmers in İzmir (43% High School). While 49% of young farmers in İzmir had agricultural experience between 10 and 20 years, 31% of young farmers in Niigata had agricultural experience between 5 and 10 years. In İzmir 7% of young farmers were female and 93% of farmers were male, while in Niigata 32% of young farmers were female, and 68% of young farmers were male. More than 70% of young farmers in both İzmir and Niigata stated that they had agricultural experience before starting as farmers. The study found that 42% of young farmers in İzmir and 36% of young farmers in Niigata have off-farm jobs. It has been determined that 69% of young farmers in İzmir province and 52% of young farmers in Niigata prefecture have benefited from state support provided for young farmers.

Most young farmers in İzmir (98%) and Niigata (97%) have been faced with agricultural problems while continuing their agricultural activities. It has been found that the problems faced by most young farmers in İzmir and Niigata are common. These problems were indicated as high production costs, an inability to spare time for a social life due to farming, and problems in agricultural marketing (Table 3).

Young farmers were asked if they would like to continue their agricultural activities in the future. And it has been found that 57% of young farmers in İzmir, and 89% of young farmers in Niigata are willing to continue their agricultural activities in the future.

The logistic regression model estimates young farmers' willingness to continue their agriculture activity based on explanatory variables. Table 4 shows the test of the models for İzmir and Niigata. The Hosmer and Lemeshow test of the goodness of fit suggests the model is a good fit to the data as ($p > 0.05$) for both Niigata and İzmir. For İzmir, the overall model was found to be statistically significant (Chi-squared value = 68.66, $p < 0.05$), with Nagelkerke R-squared value of .730, indicating 73% relationship between the predictor variable and the outcome variable. The overall percentage of correct recognition of the model is 76% accurate. For Niigata, the overall model was found to be statistically significant (Chi-squared value = 39.77, $p < 0.05$), with Nagelkerke R-squared value of .661, indicating 66.1% relationship between the predictor variable and the outcome variable. The overall percentage of correct recognition of the model is 93.8% indicating that the model provides a correct classification of the cases.

As a result of the logistic model, four factors affect the young farmers' likelihood of willingness to continue farming in the future for İzmir. These are as follows: I think that the workload continuity necessary for agricultural activities does not negatively affect my social life (SOCIAL LIFE, $p = 0.01$), I think I am willing to enlarge my farming in the future (WILLING GROW FARM, $p = 0.00$), I think that the farming profession is seen as respected by society (RESPECTABLE, $p = 0.01$), I think farming serves multifunctional such as protecting the environment, feeding the society (MULTIFUNCTIONAL, $p = 0.02$).

Problems encountered	İzmir (%)	Niigata (%)
High production costs	92	66
Problems encountered in product marketing	35	55
The problem of not being able to spare time for social life due to farming	66	49
Cannot cultivate sufficiently sized agricultural land	18	21
Does not have own agricultural land	13	16
Inadequate agricultural machinery tools and equipment	14	27
Shortage of farm labor	23	3
Insufficiency of agricultural education	6	25
Underestimating farming profession	4	11
The inability of social activities in the rural areas	25	7
Transportation problems from residence to the urban areas	5	0
Lack of school, hospital around the residence areas	7	0
Physical challenges of farming	14	7

Source: Own calculations

Table 3: The problems young farmers encounter problems while farming.

	İzmir			Niigata		
Omnibus tests of model coefficients	Chi-square	df	Sig.	Chi-square	df	Sig.
Step	68,665	25	,000	39,774	21	,008
Block	68,665	25	,000	39,774	21	,008
Model	68,665	25	,000	39,774	21	,008
Model Summary	İzmir			Niigata		
-2 Log likelihood	51,010 ^a			29,057 ^a		
Cox and Snell R square	,546			,334		
Nagelkerke R square	,730			,661		
	İzmir			Niigata		
Hosmer and Lemeshow test	Chi-square	df	Sig.	Chi-square	df	Sig.
	5,644	8	,687	2,593	8	,957

Note: ^a Estimation terminated at iteration number 20 because maximum iterations has been reached.

Source: Own calculations

Table 4: Test of models for İzmir and Niigata.

Independent Variables Description	B	S.E.	Wald	df	Sig.	Exp(B)
PROFESSION	.013	.562	.001	1	.982	1.013
SUBSIDIES	1.174	1.015	1.338	1	.247	3.236
SOCIAL LIFE	.348	.142	6.003	1	.014	1.416
WILLING GROW FARM	.505	.159	10.083	1	.001	1.657
NOT NEED SUBSIDIES	.218	.124	3.081	1	.079	1.243
RESPECTABLE	.510	.216	5.595	1	.018	1.666
TECHFACILITATE	.382	.391	.954	1	.329	1.465
MULTIFUNCTIONAL	-.610	.277	4.853	1	.028	.543
AGE	.077	.052	2.210	1	.137	1.080
Constant	-6.337	3.273	3.750	1	.053	.002

Source: Own calculations

Table 5: Results of the logistic regression model for İzmir.

In the logistic regression model, Exp (B) value is known as the exponential value of B (coefficient of the variable) and is defined as an odds ratio. Therefore, the young farmers' agree change to one higher unit scale with the statements; I think that the workload continuity necessary for agricultural activities does not negatively affect my social life, they are 1.41 times, I think I am willing to enlarge my farming in the future, they are 1.65 times, I think that the farming profession is seen as respected by society, they are 1.66 times, more likely to be willing to continue farming in the future. However, the statement of the MULTIFUNCTIONAL B value is negative, and it was not as expected. Moreover, off-farming job (PROFESSION), benefiting from state subsidies when started farming (SUBSIDIES), farmer age (AGE), and the statements "I think that developments in agricultural technology facilitate agricultural activities" (TECHFACILITATE), and "I think

that I can continue farming even without state subsidies" (NOT NEED SUBSIDIES), do not have a statistically significant effect on the willingness of young farmers to continue farming in the future (Table 5).

According to the results of the logistic model examined, seven factors affect young farmers' likelihood of willingness to continue farming in the future for Niigata. These are as follows: off-farming job (PROFESSION, $p = 0.02$), total cultivated area (FARMLAND, $p = 0.03$), benefiting from state subsidies when started farming (SUBSIDIES, $p = 0.01$), I think that farming is seen as an important profession by society (FARMING IMPORTANT, $p = 0.01$), I think that farming is not a difficult and tiring profession (FARMING NOT TIRING, $p = 0.02$), I think that I can continue farming even without state subsidies (NOT NEED SUBSIDIES, $p = 0.04$), I think that the farming profession is seen as respected

Independent Variables Description	B	S.E.	Wald	df	Sig.	Exp(B)
PROFESSION	3.868	1.691	5.233	1	.022	47.857
FARMLAND	.067	.032	4.364	1	.037	1.069
SUBSIDIES	3.827	1.551	6.089	1	.014	45.913
FARMING IMPORTANT	2.364	.925	6.527	1	.011	10.638
FARMING NOT TIRING	1.682	.735	5.233	1	.022	5.375
NOT NEED SUBSIDIES	1.154	.575	4.031	1	.045	3.172
RESPECTABLE	-1.833	.740	6.141	1	.013	.160
TECHFACILITATE	-.555	.490	1.279	1	.258	.574
EXPERIENCE	-.742	1.440	.266	1	.606	.476
AGE	-.086	.086	1.006	1	.316	.917
Constant	-10.819	5.404	4.008	1	.045	.000

Source: Own calculations

Table 6: Results of the logistic regression model for Niigata.

by society (RESPECTABLE, $p = 0.01$).

A significant difference was found between the young farmers who have off-farming job and those who have no off-farming job. Therefore, young farmers who have off-farming job are 47.85 times more likely to continue farming in the future. In addition, agricultural area harvested by young farmers was found as significant. Thus, young farmers who harvest one more unit of agricultural land, they are 1.06 times more likely to continue farming in the future. Young farmers who benefited from state subsidies when started farming have found a significant impact on their willingness to continue farming in the future. Therefore, young farmers who benefited from state subsidies when starting farming are 45.91 times more likely to continue farming in the future.

Furthermore, the young farmers' agree changes to one higher unit scale with the statement; I think that farming is seen as an important profession by society, they are 10.93 times, I think that farming is not a difficult and tiring profession, they are 5.37 times, I think that I can continue farming even without subsidies, they are 3.17 times, more likely to be willing to continue farming in the future. However, B value is negative of the statement RESPECTABLE, not as expected.

Having agricultural experience before becoming a farmer (EXPERIENCE), farmers age (AGE), and the statement "I think that developments in agricultural technology facilitate agricultural activities" (TECHFACILITATE), do not have a statistically significant effect on the willingness of young farmers to continue farming in the future, according to the logistic regression model established for the Niigata.

Discussion

This study finds that İzmir's and Niigata's young farmers encountered common problems while farming. These problems are high production costs, marketing problems, and not being able to spare time for a social life due to farming. For the young farmers of both provinces, ensuring diversification of the marketing channels, especially directing them towards utilizing e-marketing channels, could facilitate the marketing of their agricultural products. Furthermore, the efficiency of cooperatives should be increased to reduce farm costs for young farmers. Cooperatives should be more active in young farmers' input supply, packaging, and marketing. In addition, agricultural policies for using innovative agricultural technologies might be implemented in both countries so that young farmers will decrease their workload. If appropriate governmental policies with using technology on farms incentives are laid down young educated people will move into agricultural farming were stated by Kwakye et al. (2021). It might be possible for young farmers to spare time for social life since the resources will be efficiently used, and labour productivity will be ensured on the farms where innovative agricultural technologies are utilized.

Although the agricultural problems faced by young farmers in İzmir and Niigata show similarities, the factors that affect young farmers' maintaining their agricultural activities indicate differences. Young farmers are willing to enlarge their farms, they can spare time for a social life during farming, and farming is seen as respected by society, these factors affect young farmers to continue farming in the future for İzmir. Girdziute et al. (2022) identified the factors of youth's motivation to work in agriculture toward their individual, economic,

and social perceptions case of Lithuania. They found that the opinion related to unsatisfactory social life in rural areas for young people was associated with decreased priority among young people to work in agriculture, similar to our result. In addition, 66% of the Lithuanian youth surveyed agree that a flexible work schedule can be a motivating factor for choosing to work in agriculture (Girdziute et al., 2022). Jansuwan and Zander (2022) have applied path analysis to examine what physical and psychological factors affect Thai young farmers' decisions to continue farming and how they farm. They found the full-time group farmers are the better-educated and younger ones, and they have positive attitudes towards farming and multiple non-monetary benefits. Multifunctional transitional processes in their farm business, provide safe and healthy food among the community's members and environmental benefits from more sustainable production. This result is related to our research however, we found B value of farming is multifunctional such as feeding society and protecting the environment (MULTIFUNCTIONAL) as negative. The reason might be that 43% of the young farmers' education level in high school is insufficient (only 2% of them being a bachelor's degree). This shows us that young farmers in İzmir might be less aware of the importance of farming, such as protecting the environment and feeding society. Extreme climatic events have increased in recent years, which may require farms to adapt to more sustainable practices, so it is important to provide awareness-raising policies to young farmers in this direction (Balezantis et al., 2020).

On the other hand, having support when they start farming, having an off-farming job, and increasing the harvested agricultural farmlands are more critical for young farmers to maintain their agricultural activity in the future for Niigata. With the increase in harvested agricultural land, young farmers will be able to earn higher incomes from agriculture. Girdziute et al. (2022) state that more than 73% of youth respondents agree that a higher salary could be the motivating factor for choosing to work in agriculture. In addition, Bubela (2016) argued in his research about off-farm income can sustain young farmers in smoothing the variability that farm income generates throughout the farm's economic cycle, expanding, and succeeding in agriculture. May et al. (2019) claimed that even when young farmers are highly motivated, economic conditions that negatively affect the agricultural sector can strengthen

the decision to leave the farm. The effect of these economic factors on the agricultural activities of young farmers cannot be ignored.

According to the logistic regression model for İzmir, having support when young farmers start farming did not significantly affect their willingness to continue farming in the future. This might be because of the insufficient amount of support for young farmers who start farming in Turkey. Many studies are conducted in different parts of Turkey to evaluate Young Farmer Project (YFB) benefits. However, they stated that YFP in Turkey is insufficient (Tarhan et al., 2021; Çağlayan et al., 2020; Özkan and Alkan, 2019; Gedik, 2019; Doğan et al., 2018; Unakıtan and Başaran, 2018). The payment for young farmers (PYF) scheme under the Common Agriculture Policy was introduced in 2014 to European farmers. Balezantis et al., (2020) found that analysis of the perceived benefits of the PYF scheme in Lithuania suggests this scheme mostly contributes to income level support, encourages investments, and continues farming activities. The PYF scheme has benefited small farmers, such as creating additional sources of income, helping in finding new markets for production, creating more opportunities for diversification of economic activity, determining the decisions to continue farming and to stay in the countryside, and encouraging the development of farming entities. Moreover, their finding matches Severini et al., (2016) about the importance of direct payments for small agricultural units for stabilizing their income (Balezantis et al., 2020). As the young farmers in İzmir encounter problems such as high production costs and marketing problems while farming, it is thought that it can provide a solution for young farmers in İzmir as well as in Lithuanian small farmers.

The problem of young farmers has become a common problem in all countries, and solutions have been sought with various financial support. The impact of financial support to attract young people to farming is undeniable. In addition, as well as financial factors also social influences also have an impact on young farmers to continue in agriculture. It has been found significant that the young farmers in Niigata and İzmir continue to farm in the future and that farming is regarded as a respected and essential profession by society. This shows us that when society perceives farming as a respected and important profession, young farmers might tend to farm and be willing to continue farming.

Conclusion

This research was conducted in Japan and Turkey to estimate factors that affect young farmers' willingness to farm in the future. It is essential to support young farmers at the initial stage of farming. Therefore, to direct young people to agricultural activities, countries have tried to make farming more attractive with financial support. In addition, supporting young farmers to continue their agricultural activities is critical for sustainable agriculture and food security. To ensure that farmers continue agriculture in the future, it is necessary to understand the factors that affect these.

In this study, supporting young farmers when they start farming and increasing their farm incomes were essential for young farmers to continue agriculture in the future. Moreover, the result of this study supports that increasing the respectability and importance of farming in society provides young farmers to continue in agricultural activities. It should be emphasized that farming is a multifunctional profession, not only producing food but also an innovative, entrepreneurial, employer, and environmental

protection. If countries can clarify the importance of farming and food production to young generations, they will make essential contributions to the sustainability of food security and agricultural sustainability. For future studies, cooperation between different countries might contribute positively to the global image of agriculture. Countries must retain educated young farmers and support agricultural activities to positively change the image of agriculture and use sustainable and innovative farming systems.

Ultimately, the research has limitations as the sample size of our study was relatively small and limited to specific provinces for both countries. While the methods can be applied elsewhere, the results may not be generalized across the country.

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