How to cite: Karaturhan,B., Uzmay, A., Koç, G., Factors Affecting the Probability of Rural Women's Adopting Organic Farming On Family Farms in Turkey, Ege Univ. Ziraat Fak. Derg., 2018, 55 (2):153-160, DOI: 10.20289/zfdergi.408821

Araştırma Makalesi
(Research Article)

Ege Üniv. Ziraat Fak. Derg., 2018, 55 (2):153-160
DOI: 10.20289/zfdergi. 408821

Factors Affecting the Probability of Rural Women's Adopting Organic Farming On Family Farms in Turkey

Türkiye'de Kırsal Kadınların Aile İşletmelerinde Organik Tarımı Benimseme Olasılığını Etkileyen Faktörler

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Alınış (Received): 21.08.2017 Kabul tarihi (Accepted): 04.12.2017

Key Words:

Organic farming, rural women, logit model, Aydin

Anahtar Sözcükler:

Organik tarım, kırsal kadın, logit model, Aydın

ABSTRACT

The study has three main objectives as; designating the factors affecting the probability of rural women's adopting/not adopting organic farming; rating their knowledge on organic farming and defining their practices; making recommendations on how to expand organic farming. The study was conducted in the province of Aydın, where the number of organic farmers are the highest in Turkey, and 91 women were interviewed. In designating the factors affecting the probability of rural women's adopting/not adopting organic farming, the Logistic Regression model was used. According to the results of the model, factors such as; whether farming runs in the family; education level; number of children in the family; individual's actual participation in farming practices; taking part in professional trainings; following development projects oriented in women; being oen-minded towards innovations; individual's being close to her ideal life achievements; having conceptive knowledge on organic farming; and whether the individual has/has not a personal income affect the probability of adopting organic farming. While 60.4% of women are adopting to organic farming in their family farm, but only 42% are fully aware of the definition of organic farming. 50.5% of the women participate in the decision-making process with their husband. 78% of the women who participated in the survey want to do organic agriculture in the future. In this respect, increasing the professional courses given to the women, supporting the women for becoming entrepreneurs, increasing the knowledge level of them by means of the extension activities and memberships to cooperatives have significant importance.

ÖZET

Bu araştırmanın üç önemli amacı bulunmaktadır, ilki kadınların organik tarımı benimseme/benimsememe olasılığını etkileyen sosyo-ekonomik faktörlerin belirlenmesi, ikincisi organik tarım ile ilgili bilinç düzeylerinin ve uygulamalarının ne olduğunun ortaya konması, üçüncüsü ise organik tarımın yaygınlaştırılması için öneriler getirilmesidir. Araştırma Türkiye'de organik tarım yapan üretici sayısının en yüksek olduğu Aydın ilinde gerçekleştirilmiş ve 91 kadın ile görüşülmüştür. Kadınların organik tarımı benimseyip/benimsememe olasılığını etkileyen faktörler belirlenirken lojistik regresyon modeli kullanılmıştır. Model sonucuna göre, kadının baba mesleğinin çiftçi olması, eğitim düzeyi, hanedeki çocuk sayısı, tarımsal faaliyetlere katılma durumu, mesleki eğitime katılma, kadınlara yönelik projeleri takip etme, yeniliklere açık olma, hayatında idealine yakın olup/olmama durumu, organik tarım konusunda kavramsal olarak bilinçli olup/olmama, kendine ait gelirin olması, organik tarımı benimseme olasılığını etkilemektedir. Kadınların %60.4'ü aile işletmelerinde organik tarıma adapte olmuş çalışırken, sadece %42'si organik tarımın gerçek tanımını tam olarak bilmektedir. Kadınların %50.5'i eşleriyle karar alma süreçlerine katılmaktadır. Araştırmaya katılan kadınların %78'i ilerde organik tarım yapmak istemektedir. Bu kapsamda, kadınlara yönelik mesleki kurslar verilmesi, kadınların girişimci olabilmesi için desteklenmesi, yayım faaliyetleri yoluyla bilgi düzeylerinin artırılması ve örgütlenmeleri önem taşımaktadır.

INTRODUCTION

Environment-friendly farming techniques and sustainability are conceptually broad terms and have been continuously discussed by scientists. Simply, environment-friendly farming is minimizing the negative effect on the environment and encouraging protection of soils (Merrill, 1983). These concepts aim to manage the resources of rural communities; improve their welfare; protecting biological diversity and ecosystem services; developing sustainable farming methods with better yields (Scherr and Mcneely, 2002; Mishra, 2013). It is obvious that sustainability is a universal desire, but on the other hand, there is no certain method on how to establish sustainability (Rigby and Cáceres, 2001). At the same time, the relationship between the concepts of sustainability and organic farming has been discussed in some studies and environment-friendly farming approaches. In regard to these discussions, organic farming has the leading role (Scofield, 1986; Çukur, 2015). In addition, the fact that organic farming is gaining popularity in lots of countries is the particular rationale for research solely on its relationships with sustainability (Rigby and Cáceres, 2001; Artukoğlu and Gençler, 2009). The women are more sensitive to the adoption of the environmentally friendly production techniques when compared to the men both in the organic and conventional sector (Meares 1997; Chiappe and Flora 1998; Jansen 2000). The women living in the rural area are responsible for half of the food production of the world and 60-80% of the food production in most developing countries; together with this, they could only gain one out of three of the global income (UN, 2015).

Women's role is similar in both sustainable and conventional farming, they don't have a sound objection to gender-agricultural labor ratio (Trauger, 2004). Applying pesticides, fertilizers, hormones, chemicals and mechanized works are mainly undertaken by men. Women on the other hand, mainly do wedding, nursing, harvesting, thus, involving less in intensive farming (Udry, 1996; Wells and Gradwell, 2001; Lockie and Lyons, 2001; Saugeres, 2002; Trauger, 2004; Bjørkhaug, 2006; Uzunöz et al., 2008; Kızılaslan and Yamanoğlu, 2010). Also, their food preferences are more in favor of natural food and its farming techniques compared to men (Upadhyay, 2005; Urena et al., 2008; Bellows et al., 2010; Parveen and Nazhat, 2015) and this indicates that identifying the factors causing their adoption of organic farming and taking precautions favoring their effects and will increase women's role in expansion of organic farming.

In Turkey's rural areas, 86% of the women are involved in agricultural activities and 77 % of them are non-paid, considered family labor. While the rate of the women working for themselves is 9.2%, others are casual worker (10.8%) or employer (0.1%) (TUIK, 2015).

Based on plans and programs on the environment (government studies) in Turkey, gender equality hasn't expanded within the society and there are no accurate data on "women-environment" and "women-organic farming" relationships (RTDSW, 2008).

While there are no studies on probability of women's adopting organic farming in Turkey, there are studies on factors affecting women's decision making processes (Kızılaslan and Yamanoğlu, 2010) and food safety issues (Bal et al., 2006; Uzunöz et al., 2008).

In this respect the study has three main objectives:

a) Determining the factors that affect the probability of rural women's adopting/not adopting organic farming;
b) Determining their awareness levels on organic farming
c) Making recommendations on expansion of organic farming.

MATERIAL and METHOD

The study was carried out in the rural areas of Aydın province where the number of farmers practicing organic farming is the highest in Turkey. The province of Aydın has the 5th largest organic farming area in Turkey. Total cultivation area is 370.679 ha and organic farming is practiced in 17.16% of this area. Within 875.834 ha nationwide organic farming area, 7.45% is in the province of Aydın (MFAL, 2015). Chestnut, fig and olive are produced organically. The percentages of products within overall organic farming in the area are; fruits 92%, field crops 6%, vegetables 1.50% and those gathered from nature are 0.50 %. Population of the province of Aydın is 1.041.979 and approximately 50% of the population are women (TUIK, 2014). The number of farmers is 50.545 and 24.06% are practicing organic farming (12.164 farmers).

In this respect, interview with rural women involved (temporarily/permanently) in agricultural activities on 91 family farms were planned to be undertaken through proportional sampling with 90% confidence interval and 8.5% error margin (Newbold, 1995).

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

In the equation above, n is the sample size, N is the population size (50.545), and p is the prediction rate (0.5 for the maximum sample size).

As the study area, districts and their villages where organic farming is practiced intensively were selected. In 13 districts (Çine, Nazilli, Söke, Bozdoğan, Sultanhisar, Germencik, Köşk, Didim, Efeler, İncirliova, Koçarlı, Kuyucak, Yenipazar), minimum 6 and maximum 9 women were interviewed in each district. In selecting the women to be interviewed in the districts, Aydın district Directorates of Ministry of Food, Agriculture and Livestock provided support.

In the study, possibilities of women's adopting organic farming (women who actually take part in agricultural activities) were taken as the dependent variable. In doing so, farmers practicing organic farming in their family farms were taken into consideration as the ones "adapted to organic farming" 60.4% of the women stated that they were actually practicing organic farming on their farms and their farms were certified.

The Logit model was used to determine economic, intellectual, social and personal factors that affect the possibility of rural women's adopting/not adopting organic farming on their family farms. In the logit model, the dependent variable is discrete and the estimated probability values vary between 0 and 1. While estimating the value of the dependent variable in the linear regression analysis, the realization probability of one of the values that shall be taken by the dependent variable in the logistic regression analysis is estimated. The logit model that is dependent on the cumulative logistic probability function is expressed as follows (Gujarati, 1995).

$$P_i = F(z_i) = F(\alpha + \beta X_i) = \frac{1}{1+e^{-(zi)}} = \frac{1}{1+e^{-(\alpha+\beta X_i)}} \qquad (1)$$

P_i= i' individual's probability of choosing a certain option, F= Cumulative probability function,

z= α+βXi, α= constant coefficient, β= parameter predicted for each independent variable, X_i= i' ordinal number of an independent variable.

Re-organizing the above equation and taking natural algorithms of both sides of the equation, the below equation is obtained;

$$L=\ln\left[\frac{P_i}{(1-P_i)}\right] = z_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots\ldots\ldots\ldots + \beta_n X_n \qquad (2)$$

In the logistic regression model; whether the occupation of the father is farmer (FF), age (AGE), educational level (EDU), marital status (MS), number of children (NC), the income of the family (INCM), personal income status (PINCM), the status of participation in the agricultural activities (PAA), participation in the professional education (PPE), following the projects regarding the women (PW), innovativeness (INNV), the belief in closeness to the ideals (BIDL), individual's awareness about organic farming (BAO) were taken as independent variables. According to the results of the model estimation; the formed model has been found as meaningful at the level of $P<0.05$. The correct classification rate is 0.835 in the model. This rate shows that 83.5% of the independent variables in the model have been correctly assigned to the groups. The -2LLR value attained for the model has been found as 60.202 and it is significant in 5% error level.

RESULTS AND DISCUSSION

The average age of the women took part in the study is 44.39 ± 12.35. Out of total, 33% had primary education and 21% are university graduates. The average household population is 4 (3.82 ±1.19) and 21% of the households have 3 children and 50% have 2 children. The ratio of women whose fathers' are also farmers is 71%. Additionally, 65% of the women are permanent farmers (Table 1). In the family farms, olive (53.19%), fig (25.53%), vegetables (36.17%), chestnut and citrus (10.8%) and honey (4%) are produced organically.

According to the results of logistic regression, whether farming runs in the family; education level; number of children in the family; individual's own income; individual's participation (temporarily/ permanently) in farming practices; taking/not taking part in professional trainings; following/not following development projects oriented in women; being open-minded towards innovations; individual's being close to her ideal life achievements; individual's awareness about organic farming are effective on probability of women's adopting organic farming on their family farms (Table 2).

The probability of adoption of organic farming by women, who take part in agricultural activities permanently, increases 4.7 times and that of those, whose fathers are farmers, increases 9.6 times compared to those of the otherwise. This situation can be considered as the positive effect on the women due to the fact that organic farming has been practiced in the region for a long time. In fact, a study conducted in Izmir region also reported that women, who had been involved in agricultural activities since their childhoods, instantly preferred agricultural activities instead of others (handcrafts etc.) when it comes to entrepreneurship (Uzmay and Karaturhan, 2015).

Table 1. Descriptive Statistics of Variable

Dependet variable (Y)	Type of Variable	Description	Frequency	Percent(%)
	Dichotomus	0: The women for not adopting the organic farming on family farm 1: The women for adopting the organic farming on family farm	36 55	39.6 60.4
Independent variables (X)				
Age (AGE)		0: x≤40 year 1: x>40 year	42 49	46.2 53.8
Whether the occupation of the father is farmer (FF)	Dichotomus	0: Otherwise 1: farmer	26 65	28.6 71.4
Education (EDU)	Ordinal Categorical	1: primary school 2: middle school 3: high school 4: university	31 15 26 19	34.1 16.5 28.6 20.9
Familiy Income level (INCM)	Ordinal Categorical	0: x≤4000 TL 1: x>4000 TL	68 23	74.7 25.3
Personal Income Status (PINCM)	Dichotomus	0: No 1: Yes	43 48	47.3 52.7
Marital Status (MS)	Dichotomus	0: Other 1: Married	15 76	16.5 83.5
Number of children (NC)	Ordinal Categorical	0: No 1: One children 2: Two children 3: Tree children 4: Four children	16 9 45 19 2	17.6 9.9 49.5 20.9 2.2
The status oft participation in the agricultural activities (PAA)	Ordinal Categorical	1:limited 2:often 3:continuous	12 20 59	13.2 22.0 64.8
Participation in the professional education (PPE)	Dichotomus	0:No 1:Yes	58 33	63.7 36.3
Following the projects regarding the women (PW)	Dichotomus	0:No 1:Yes	42 49	46.2 53.8
Being aware of the organic farming (BAO)	Dichotomus	0:No 1:Yes	53 38	58.2 41.8
Innovativeness (INNV)	Dichotomus	0:No 1:Yes	54 37	59.3 40.7
The belief in closeness to the ideals (BIDL)	Dichotomus	0:No 1:Yes	58 33	63.7 36.3

Table 2. Statistical Results of Logit Model

	B	S.E.	Wald	df	Sig.	Exp(B)
FF	2.263	.925	5.986	1	.014**	9.614
AGE	1.324	.853	2.408	1	.121	3.759
EDU	.887	.488	3.308	1	.069*	2.427
NC	1.090	.551	3.917	1	.048**	2.975
MS	-.459	1.138	.163	1	.687	.632
INCM	-.910	.857	1.127	1	.288	.403
PINCM	-1.994	.903	4.879	1	.027**	.136
PAA	1.540	.694	4.930	1	.026**	4.665
PPE	2.224	.904	6.052	1	.014**	9.240
BILD	1.540	.937	2.703	1	.098*	4.665
INNV	2.019	.963	4.391	1	.036**	7.528
PW	1.411	.723	3.816	1	.051*	4.102
BAO	1.452	.841	2.976	1	.085*	4.270
Constant	-9.679	3.083	9.857	1	.002	.000
Variables in the Equation Model Summary	.424	.214	3.908	1	.048**	1.528
Model Summary	-2 Log likelihood 60.202		Cox & Snell R Square 0.494		Nagelkerke R Square 0.668	

**Significant at p<0.05. * Significant at p<0.10.

The probability of adoption of organic farming by the families with a higher number of children per household increases 2.97 times compared to that of those with fewer number of children per household. Some other studies revealed that leaving a natural environment to their offspring is important to women and their level of knowledge for environment-friendly farming techniques increases as the number of children per household increases (Sumner, 2003; Rayanagoudar et al., 2012). This is attributed to the fact that women are biologically dissatisfied because pesticides and chemicals are transferred to the breastfed child.

Therefore, women's approach to natural food, organic farming and organic produce is positive and they are easily convinced (Pedersen and Kjærgård, 2004; Belows et al., 2010; Parveen and Nazhat, 2015). The probability of adoption of organic farming by women, who are university graduates, increases 2.4 times compared to the ones who had primary education and it folds 4.1 times for the ones that are aware of women oriented development projects against the ones those who are not. Different results on the effects of education factor on probability of adopting organic farming have been reported in some other studies. Rayanagoudar and et al. (2012), reported a negative relationship between education and knowledge level on organic farming and they attributed this result to the fact that educated women have a reluctant approach to organic farming because yields are low in first years. Taluğ (1982) reported that there is no relationship between individuals' education levels and farming techniques. However, many other studies report positive relationships between education level and organic farming (Beltrán et al., 2012; Hosseini and Ajoundani, 2013; Shaban, 2015). On the other hand, a study (Kaya and Atsan, 2012) conducted in the province of Bayburt in the eastern Black Sea region and Erzurum and Erzincan provinces in Eastern Turkey reported the fact that 41.8% of the rural women are illiterate, has a negative effect on the expansion of the impacts of organic farming. This was also confirmed by another study (Yurttaş et al., 2005) as a fact that 37% of the rural women are illiterate, and this has a negative effect on expansion of the impacts of organic farming.

The probability of adoption of organic farming by women, who took professional training increases 9.2 times compared to those who didn't. When subjects were asked which training subject from among the list of subjects for professional trainings to be offered by the ministries of Food, Agriculture and Livestock and Ministry of Family and Social Policies, they preferred to be trained, answers were; conditions of eligibility for agricultural subsidies by 45%; women health by 32%; organic farming and other environment-friendly farming techniques by 11%; subsidies for women entrepreneurship 9.9%; and agricultural organizations by 2.2%. This brings about the fact that women prioritize agricultural subsidies due to economic issues. No statistical differences have been found between those adopted organic farming on their family farms and their training preferences (Pearson Chi-Square, 2,824, P (0.588)>0.05). In a study conducted in Poland by Kania (2000) women's needs for information and training were listed. Women wanted more information and trainings on healthy food production, bio-dynamic vegetable farming and family nutrition (Kania, 2000). In addition, a study conducted in Australia reported that not only farmers but also other professionals (researchers, publishers, government officials etc.) in agriculture developed a more positive approach to organic farming as their knowledge and experience increased on the subject (Wheeler, 2008).

The probability of adoption of organic farming by women who completely know the definition of organic farming and environment-friendly farming techniques is 4.2 times higher than those who don't. The ratio of women with complete knowledge on organic farming is 42% in our study. Similar to that, the ratio of those who stated that they pay absolute attention to human health is 42%.

A study conducted in Eskişehir and Afyon Karahisar, Turkey reports that most participants living in rural areas are knowledgeable on organic farming by 81.13% but they had limited knowledge ratios on issues such as, sustainable development, global warming and depletion of ozone layer by 4-23% (Akça et al., 2007). Rayanagoudar et al. (2012) reported that 73% of women in villages where organic farming is practiced have high level of knowledge; 26% have moderate and 1% have low knowledge on organic farming. It was pointed out that the fact that a university conducts agricultural training and this might have an important role in women's having high level of knowledge.

56.2% of the participant women stated that reading the using instructions of pesticides and chemicals is very important; some others by 18% said it is important; some, by 16.9%, stated that they were indecisive on this issue and 9% of the women said it was not important for them. As for the question on using proper dosages when applying pesticides, 58.4% said it was very important and 16.9 said it was important. Indecisive ones and those who think it was not important were 18% and 6.7% respectively. Additionally, 76.4% stated that timing was very important when applying pesticides. While 63% of the women said they get the information on organic farming from TVs, radios and newspapers, 37% gets them from trainings organized by District Agriculture Directorates and agricultural consultants/advisors. According to a study conducted in Tokat province, Turkey by Kızılaslan and Yamanoğlu (2010); 78.13% of the women preferred being trained through courses organized by District Agriculture

Directorates; 52.34% preferred TV and radio programs and 8.59% preferred newspapers and magazines. Women's sources for information in the USA are primarily WIC (Women, Infant, and Children) programs followed by their families and TV programs (Kwon et al., 2008).

The probability of adoption of organic farming by women, who have their own income, is 7.14 times less than those who don't have personal income. Ratio of women with no personal income is 52.8%. For the ones who have personal income, for 13%, the income is from their own business; 16.6% have parental financial support and 17.2% live on salaries from jobs and sectors other than agriculture. The negative effect of personal income can be attributed to the fact that family income of 75% of the women is below the poverty threshold in Turkey and therefore, personal income is likely to be used for purposes other than agricultural purposes. In fact, having sufficient financial resources for sustainability of a family farm can also be considered as a parameter in terms of adoption of environment-friendly farming techniques and organic farming (Engindeniz, 2008, Emekli and Topakçı, 2009; Kaya and Atsan, 2012; FAO, 2014). Ratio of women who are members of a cooperative is 29.7%. No meaningful relationship was found between cooperative membership and probability of adopting organic farming on family farms (Pearson Chi-Square, 0.623, P (0.430)>0.05). In terms of making decision for agricultural activities, 50.5% of the women stated that they make decisions with their husband; 7.7% said they make decisions on their own; family elderly make decision in 9.9% of the families and in 31.9% of the families, husbands alone make decision. A meaningful difference was found between practicing organic farming on family farm and making decision for agricultural activities (Pearson Chi-Square, 6.640, P (0.084)<0.10).

While 85.7% of the women, who make decisions on their own, practice organic farming, only 22.2% of the women, whose elderly in their family make the decisions, practice organic farming. Whereas 54.3% of the women, who make decisions with their husbands, practice organic farming, 48.5% of the women, whose husbands alone make decision, do organic farming. These findings show that when more women can make decisions, organic farming will expand. A study conducted in Bayburt in Eastern Blacksea region reports that in 56% of the family farms, decisions were made by husbands alone (Yavuz et al., 2014). Other studies also report that rural women in Turkey are usually ineffective in decision making (Özçatalbaş, 2001; Kulak, 2011; Kutlar et al., 2013). Studies conducted in Australia report that rural women's decisions have recently been more effective in terms of strategic planning, production and marketing (Bock and Shortall, 2006; Pannell and Vanclay, 2011). Another study conducted in Australia also reports that 90.4% of the rural women make decisions with their husbands for both agricultural and non-agricultural high cost activities (Hay and Pearce, 2014).

When Europe is concerned as a whole, it is noticed that women take part intensively in food production and processing activities on the farm either as a co-owner or part of family labor force. They work in food and farming establishments as qualified professional work force and managers as well (FAO, 2004). On the other hand, a study conducted in Norway reported that average age of the women practicing organic farming was 46 and 80% of them practiced organic farming together with their husbands. 60% of the wife's of male farmers, who practice conventional farming, weren't involved in agricultural activities (Bjørkhaug, 2006). This proves that when women take part in decision-making processes and got actually involved in agricultural activities, they positively contribute to the expansion of organic farming.

The probability of adopting organic farming for those who describe themselves innovative, increase 7.5 times compared to those who don't.

Women who state that they are close to their ideal lives increase the probability of adopting organic farming techniques 4.6 times and their ratio is 36.3%. In a study conducted on women entrepreneurship in Izmir, 23% of the women subjects stated that they were definitely close to their ideals in their lives; 29% were close to their ideals and the rest were indecisive on this issue or they were not close to their ideals (Uzmay and Karaturhan, 2015). A study conducted in Switzerland reports that two third of rural women are happy with their lives (BLW, 2012).

While the ratio of farmers who are currently practicing organic farming on their farms is 60.4%, that of those who want to practice organic farming in future is 78%.

A study conducted with farmers who grow ecological sultanas in Izmir and Manisa, in the same region with Aydın, reported that respectively 82%, 51.3% of the farmers wished to continue producing ecological sultanas in the future as well (Karaturhan and Boyacı, 2005). Hall and Mogyorody (2007) reported that rural women are involved in rather vegetable farming, mixed livestock and cash crop farm activities and their management instead of heavily mechanized high-cost field cultivation. The reason for rural women's intention for organic farming is primarily because they are enthusiastic about growing produces for their home without using pesticides and having this experience later becomes effective on their adopting commercial organic farming on their family farms (Jansen, 2000). Reasons for those women, who don't want to practice organic farming in the future (22%) are; more costly (25%); less yield (20%); not knowing organic farming

techniques (30%); not having organic farmers within their close surroundings. The answer "I don't know" was by 12%.

CONCLUSION

In this study; while farming runs in the family, education level, number of children in the family, the status of participation in the agricultural activities, taking part in professional trainings, following development projects oriented in women, being open-minded towards innovations, individual's being close to her ideal life achievements, having conceptive knowledge on organic farming positively affect the probability of adopting the organic farming, the existence of a personal income belonging to the women negatively affects. The absence of 49% of the women from the participation in the decision making processes in the family farms prevents especially more application of the organic agriculture in the family farms. However; in this study, while the fact that 60.4% of the woman participants make organic agriculture in their family farms, 78% of the women who participated in the survey would like to conduct it in the future is important. In the study; the fact that the majority of the women (75%) have the family income that is below the poverty line of Turkey changes the subjects followed and cared by the women primarily. Within this scope; the socio-economic developments that shall provide the rural development shall ensure the participation of the women in the decision making process and shall increase the adoption of the organic agriculture that is common in Aydin. Increasing the professional courses given to the women, supporting the women for becoming entrepreneurs, increasing the knowledge level of them by means of the extension and memberships to cooperatives have significant importance. On the other hand, the improvement of the databases with the studies to be conducted in especially the rural areas and conducting the studies simultaneously in all the regions are of significant importance in terms of solving the problems related to the women.

ACKNOWLEDGEMENTS

We thank the project executors (The Ministry of Family and Social Policies, Aydin, The Ministry of Food, Agriculture and Livestock and Aydin Chamber of Agriculture) with the subject of "Agricultural Production and Supporting the Social Life" that have helped us conduct this study and the women participants attending to our study.

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