The comparison of social networks between organic and conventional hazelnut producers in Samsun

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ABSTRACT

This study was carried out to reveal the sources of communication and social network of organic and conventional hazelnut producers in Samsun province. The primary and basic material of the study is the data obtained from the surveys, interviews and observations of the organic and conventional hazelnut producers in Çamlıca, Yüksekyayla villages and Ağcagüney town. Both producer groups were compared in terms of their social networks and communication channels especially on the use of different fertilizers by making suggestions on how to develop it.

The results of the research showed that socio-economic status of the organic hazelnut producers was better than conventional producers in terms of land size, income, cooperation capacity, risk management and agricultural supports. Social Network Analysis (SNA) has shown the graphs of communication networks among the producers, their relationships with different public, private and mass media information sources and especially revealed leader farmers whom functioned as source of information transfer (or even blocker) among them.

The relationships in organic hazelnut producers' communication network in the village are strong, dense and information sources are varied. On the contrary, the relationships in communication network of conventional hazelnut producers were looser, strong and information sources were uniform. The main source of technical information for both groups of producers was the experienced leader farmers; as for organic producers, the heads of the local organic producers' union was the main information source in terms of commercial, legal and organizational aspects. In other words, both organic and conventional producers rely on knowledge and experience of producers who take on the role of opinion leader within the village. Therefore, innovation and knowledge transfer to farmers can be delivered through these opinion leaders.

As a result of the research, it can be said that institutional information sources do not adequately support organic and conventional hazelnut growers. Thus, organic producers developed their local knowledge source based on their on-farm trials and experiences and shared this knowledge within their peer groups. However, this information needs to be supported with scientific findings.

Keywords:
Organic agriculture
Social network analysis
Organic hazelnut
Turkey

Samsun ilindeki organik ve konvansiyonel fındık yetiştiricilerinin sosyal ağlarının karşılaştırılması

ÖZET

Bu çalışma, Samsun ili Terme ve Çarşamba ilçelerindeki organik ve konvansiyonel fındık yetiştiricilerinin gübre kullanımı konusundaki iletişim kaynakları ve sosyal ağını ortaya çıkarmak, ağın işleyişini, ağdaki aksaklıkları ve daha iyi işleyen bir ağ geliştirmek için neler yapılabileceğini ortaya çıkarmak amacıyla yapılmıştır.Araştırmanın birincil ve temel materyalini Çamlıca, Yüksekyayla köyleri ile Ağcagüney beldesindeki organik ve konvansiyonel fındık yetiştiricilerinden anket, mülakat ve gözlem yoluyla elde edilen veriler oluşturmaktadır. Organik ve konvansiyonel fındık yetiştiricilerinin oluşturdukları iletişim ağları sosyal ağ analizi ile incelenerek karşılaştırılmıştır.Araştırma sonucuna göre; organik ve konvansiyonel fındık yetiştiricilerinin köy içi (informal) bilgi kaynakları önder çiftçilerden; köy dışı (formal) bilgi kaynakları ise kamu kurum ve kuruluşlarından oluşmaktadır. Organik fındık yetiştiricileri köy içi iletişim ağı; sık, ilişkiler kuvvetli ve bilgi kaynakları çeşitli iken

Anahtar Kelimeler:
Organik tarım
Sosyal ağ analizi
Organik fındık
Türkiye

konvansiyonel fındık yetiştiricilerinin köy içi iletişim ağı daha gevşek, ilişkiler kuvvetli ve bilgi kaynaklarının tek düze olduğu tespit edilmiştir. Araştırma sonucunda, kurumsal bilgi kaynaklarının organik ve konvansiyonel fındık yetiştiricilerini yeterince desteklemediği tespit edilmiştir. Organik üreticiler kendi deneyim ve tecrübelerini kendi aralarında paylaşmaktadırlar. Köy içerisinde var olan yerel bilgi bilimsel bilgi ile desteklenmelidir. Hem organik hem de konvansiyonel üreticilerin köy içerisinde fikir önderi rolünü üstlenen üreticilerin bilgisine ve tecrübesine güvendikleri belirlenmiştir. Bu sebeple, çiftçilere yenilikler ve bilgi transferi bu fikir önderleri aracılığıyla ulaştırılabilir.

1. Introduction

Accessing information of producers and consumers are faster and easier because information and communication technologies have begun to be used at all branches of industry in recent years. The information is used in the whole production process as well as it should be used in modern production systems. Although intensive use of information makes the production process healthier, it brings some challenges at the same time. The most important issues are about how the producers or consumers get the information through which channels, what the factors preventing access to information and how these factors prevent producers from accessing the information easily. These factors need to be identified and analyzed.

The organic products market is expanding with the consumers' increasing interest in organic products. Although the inputs are not used intensely in organic farming compared to the conventional farming, accessing to the accurate and up-to-date information on the pest management, markets and input demands are very important for the sustainability of organic farming. In other words, the organic farmers' accessing to the information at each stage of the production system is important for the development of the organic marketing system.

The transition to organic farming in countries around the world has begun with traditional agricultural products of those countries. Dried fruits and nuts are the first ever organically produced products in Turkey. Today, over 42.000 farmers are involved in organic farming by producing approximately 216 different products in 380.000 hectares of land (Demiryürek, 2011). Turkey exports organic products to more than 36 countries and more than 41% of organic product export (in value) is made to Germany (Demiryürek and Aydoğan, 2010).

Organic hazelnut cultivation in Turkey began with a German company's demands for organic hazelnut in Çamlıca village in Terme district of Samsun. Organic hazelnut production is the most-produced product in 20.2 hectares production area in Samsun Province. Organic hazelnut production is heavily made in Çamlıca and Yüksekyayla villages in Terme District and in Agcagüney Town in Çarşamba District of Samsun Province (Yetgin, 2010). The amount of organic hazelnut production in Samsun Province corresponds approximately to 10% of the Turkey's organic hazelnut production (Aydoğan, 2012).

Samsun province has an important place in the organization of organic hazelnut producers and creation of marketing channels as well as organic hazelnut farming. The first organic producers association has been established in Terme district of Samsun province in Turkey. Terme Organic Agriculture and Hazelnut Producers Association, Yüksekyayla Village Cultural and Solidarity Association, Çarşamba Organic Hazelnut Producers Association and Yukarı Aksu Organic Village Farm Project have completed their organization process in terms of organic farming in the Samsun province. Local administrations and public institutions provided opportunities to consumers to reach organically produced products by providing the necessary support.

This study deals with the organic and conventional hazelnut farmers' basic information sources on using fertilizer that was the most commonly used input in production, communication structure, the structure of relations between producers, bottlenecks and opportunities in the social networks.

2. Literature Review

In agricultural extension researches, determining the transfer of information in the channels among the producers, input suppliers and other stakeholders is important. It is also important to identify key farmers in the network –the leader farmers in other words- their effects on the network and the role of leader farmers on the transfer of information between the producers and resources. For this reason, Social Network Analysis (SNA) is used to explain relationships based on information transfer between farmers through which the channels they have learned, whether the communication channels works good or not, and if there are any flaws about communication channels.

The first studies on organic farming were introduced in the 1920s and the time period in which these studies were conducted are divided into different sub-categories. These periods can be examined in three periods. The studies between 1970s and 1980s are the pioneering studies (Bellon and Tranchant, 1981; Gautronneau et al., 1981); the studies between 1990s and the early 2000s are on organic farming specialization (Padel et al., 1999; Padel, 2001; Demiryürek, 2000); and the recent studies are complex and detailed studies.

In the first period of organic farming studies, the basic production techniques and economic performance of organic farming (Sebillotte, 1997) have been examined in terms of social, economic and environmental factors (Bellon and Tranchhant, 1981). In examination of organic farming from sociological

perspective addressed the organic farmers' attitude and practice (Le Pape and Remy, 1988). These studies were about evaluating organic farming as an alternative agricultural technique that can be applied (Gautronneau et al., 1981), encouraging transition to organic farming and the studies that show the social and geographical factors in transition to organic farming (Lamine and Bellon, 2008).

In the second period of organic farming studies, rules and institutions of organic farming was started to define. The studies focused on technical issues of organic farming evaluation such as the effects of biological diversity, nutrient cycling, and energy consumption, specialization of organic farming (Allard et al., 2001) and struggling with plant pests and fertilizing.

The most recent period of organic farming studies consists of multi-dimensional studies integrated with other branches of science based on the models investigating production and market structure (Ataseven and Erdoğan, 2008), sustainability in agriculture (Turhan, 2005) and policy analysis (Demiryürek and Bozoğlu, 2007).

Considering the methods of the studies on organic farming (Aydoğan, 2012), it is seen that the studies are conducted within three basic method frameworks as the following: experimental studies; the comparative studies based on the data collected from farms (Lampkin and Padel, 1994; Cisilino and Madau, 2007; Nieberg and Offerman, 2000); and model based studies.

The studies on comparison of organic and conventional producers focuses on socio-economic issues (Padel, 2001; Pimental et al., 2005; Demiryürek and Ceyhan, 2008), sustainability (Greer et al., 2008; Cisilino and Madau, 2007; Reganold et al., 2001; Rigby et al, 2001), adoption of innovations (Padel, 2001), motivation (Lamine and Bellon, 2008), and risk attitudes (Demiryürek et al., 2006).

In the studies that compare organic and conventional farming, data are obtained from early conducted studies (Demiryürek, 2010) and producers through questionnaire forms by face to face interviews (Padel, 2008; Demiryürek et al., 2006; Demiryürek and Ceyhan, 2008).

When the analysis methods of previous studies are examined, it is seen that most of the studies used only the descriptive statistics (Padel, 2008); however, some studies used more complex methods. These studies are seen to have used the SWOT analysis (Parrott et al., 2005), information scores (Demiryürek, 2010), sustainability index and social network analysis (Demiryürek, 2004).

In order to make a proper evaluation, the subject and nature of the relationships between organic farmers in the same or other regions should be taken into consideration. The previous studies showed that the organic producers did not act alone, constituted groups among themselves and these groups were effective in decision making process (Lamine and Bellon, 2008). In some studies, the organic farmers' form of agricultural production is seen as a marginal group by evaluating it as the reverse of the conventional agricultural production (Michelsen, 2001). Similarly, organic farmers share their production-related experiences within the network and this sharing increases the interaction. Complicated social patterns in rural areas can be examined at micro-levels through the analysis of dynamic social network (Demiryürek, 2010).

As shown in the literature review, the studies that analyze the information sources on the use of the input are confined to the comparisons between the organic and conventional farming. Therefore, the study has been conducted to contribute to the literature by adding original values.

3. Materials and Methods

3.1. Study area

This study was carried out in three different areas in Samsun Province as Agcaguney town in Çarşamba district, Çamlıca and Yüksekyayla villages in Terme district in 2012. Çamlıca village is one of the first areas in which organic hazelnut production has been started in Turkey. Organic hazelnut production in Çamlıca village began with organic hazelnut demand of a German organic marketing company in 1993. The first organic hazelnut producers association in Turkey was established in Çamlıca village by organic hazelnut producers. Transition to organic farming in Yüksekyayla village has been carried out with the project of EU Capacity Development for Transition to Organic Agriculture. Within the scope of the project, the hazelnut producers were trained to adapt their skills to organic farming. Transition to organic farming in Agcagüney town has been carried out with the project of Conservation of Land for Environmental Purposes (CLEP). Transition to organic farming has been mandated in this town located in the basin of Gökçeçakmak dam. In Turkey, conventional farming is not allowed in the basins of dams that provide drinking water. These areas were chosen purposefully due to the differences in the farmers' and settlements' transitions to organic agriculture.

3.2. Interviews and sampling

The sampling of the research is composed of organic and conventional hazelnut producers in Agcagüney town, Yüksekyayla and Çamlıca villages in Samsun province. The conventional producers were selected from the same location as organic producers in order to make a comparison in terms of socio-economic characteristics, information sources and networks. Data were collected using structured interviews with 57 randomly selected conventional hazelnut producers and all 55 organic hazelnut producers in the study area. To ensure reliability and validity, a pilot survey was tested

on a small group (10 organics and 10 conventional producers) to test and modify the interviews before conducting the main field study. Cronbach alpha was used as an index of internal reliability or consistency for a set of questions and an alpha value of 0.71 or higher was considered to indicate an acceptable level of internal reliability.

3.3. Statistical methods

The data obtained from survey forms were coded in an SPSS file. To compare organic and conventional hazelnut producers in terms of socio-economic characteristics, the variables were divided into two groups according to whether they show normal distribution or not. The parametric tests (e.g. the Student's t-test) were used to test normally distributed variables and the nonparametric tests (e.g. chi-square) were used to test variables with non-normal distribution in this research.

Social network analysis (SNA) was also used to compare the structures of the networks, in order to determine the leader farmers in the network and to interpret other implications related to the network theory. SPSS software was used to execute Student's t-test and chi-square test, while Pajek was used to execute SNA statistics and to visualize the networks.

4. Results

4.1. Socio-economic characteristics

Both organic and conventional hazelnut producers were over 50 years of age (Table 1), and there was no statistical difference between their ages (p > 0.05). In other words, it can be said that age is not effective on the identifying production system. The results related to the age variable were similar with the results of previous studies conducted in the same area (Demiryürek, 2000; Demiryürek, 2010) and the studies in other regions (Rahman and Yamao, 2007).

Table 1. Comparison of socio-economic characteristics

Variables	Organic producers		Conventional producers		T test
	Mean	Std dev.	Mean	Std dev.	p
Age (years)	56	13.3	53	11.5	-
Education time (years)	6.7	2.9	6.3	2.5	-
The presence of land (da)	49.1	44.5	33	23.5	*
The presence of leased land (da)	3.3	12.3	0.4	3.3	*
Hazelnut production area (da)	47.5	44.3	30.9	19.7	*
Need for external labor force (people)	79.3	77.5	52.1	46.2	*
Hazelnut sales price (TL/kg)	4	0.3	3.8	0.2	*
The share of agricultural income in total income (%)	53.9	-	42.4	-	*
Agricultural insurance coverage status (%)	9.1	-	1.8	-	*

Although the education level of the organic hazelnut producers is expected to be higher than the conventional hazelnut producers (Demiryürek, 2000; Demiryürek, 2010; Padel, 1994; Padel, 2001), no statistical difference was found in terms of education levels (p > 0.05). Due to the demographic structure of the region, only people over a certain age have lived in the villages. Therefore, education levels of both organic and conventional hazelnut producers were similar.

Organic and conventional hazelnut producers were compared in terms of land size, leased land size and size of hazelnut production area and it has been found that organic hazelnut producers had more farming lands (p>0.05). Organic hazelnut producers have increased their current land size through leasing. The organic hazelnut producers allocated most of their land size to organic hazelnut production compared to conventional hazelnut producers (p>0.05). Organic hazelnut producers had bigger land size than conventional hazelnut producers. This can be explained with the fact that the organic marketing company wants to be the object of less organic hazelnut producers. Therefore, the organic marketing companies prefer to contract with the organic hazelnut producers having bigger hazelnut production area (Demiryürek, 2010).

The sales price of organically produced hazelnut was higher than conventionally produced hazelnut (p<0.05). Due to the marketing problems and insufficient demand, organic hazelnut producers could only sell 18.2 % of their organic hazelnut products as organically. Nevertheless, differences between the sales prices of organic and conventional hazelnut were based on contract farming model in organic farming. Even if organically produced hazelnuts are sold conventionally, the sales price may be higher. Producers that produce organic hazelnut needed for 65 % more external labor forces compared to the producers producing hazelnut conventionally (p<0.05). This situation could be explained by the increased use of lime, manure and organic fertilizers in organic hazelnut farming. These plant maintenance applications require the use of intensive labor. Organic hazelnut producers' share of agricultural revenues in their total farming revenue was statistically different from conventional hazelnut

producers' share of agricultural revenues in their total enterprise revenue (p<0.05). Economic performance of organic hazelnut producing was better than conventional production thanks to providing additional premium for organic farming, purchase and price match guarantee in contract farming in organic hazelnut production, obtaining certification premium as a grant and not using chemical inputs in organic farming. In both organic and conventional production systems, willingness to take out insurance was low but the number of organic producers who took out insurance was higher (p<0.05). The reasons for taking out insurance were statistically different between organic and conventional hazelnut production systems. According to organic hazelnut producers, they did not have enough information about agricultural insurance and the insurance premiums were expensive. As for conventional hazelnut producers, they did not need the taking out insurance and they had land ownership problems. In other words, in conventional production system the ratio of joint land using was higher than organic production system. 16% of organic producers stated that they would take out insurance in the next production periods. Organic hazelnut producers' willingness to join agricultural organizations differed statistically from conventional hazelnut producers' willingness. Organic hazelnut producers establish their own agricultural organizations (e.g. union, association, cooperative), while conventional producers were not organized by themselves and their willingness to join pre-established agricultural organizations was lower.

4.2. Communication networks and measuring of social capital

Analyzing the communities' social networks contributes to the development of understanding of the dynamics and relationships within the community. In a social network, some actors may have more contacts than others and some of them may be in a position to control the transfer of information among groups. These central actors can access information easier than others and they may have good opportunities to spread the innovations thanks to their position. The concept "central actor" refers to leader farmers. Demiryürek (2010) states that the leader farmers in rural communities have important roles such as accelerating the spread or blocking of innovation and impressing other people.

In this study, the networks consist of organic and conventional hazelnut producers, the actors outside the village and public domain workers/institutions. Individual statistical tests were used to make inferences about the network. Density and degree centralization scores were calculated to make inferences about the graph. The degree score was calculated to make inferences about the central actor role among the leader farmers. In any networks, the actor who had the highest score was determined as "central actor".

4.2.1. Interaction network

In the study, organic and conventional hazelnut producers were likely to exchange information with each other because they have been selected from same study area. According to this approach, organic and conventional hazelnut producers living in the same social environment were considered as a network. The network was named as interaction network. In this network, the communication channels used by organic and conventional hazelnut producers and their information sources on technical issues such as farming and input usage investigated. In the interaction network, there were 55 organic hazelnut producers, 57 conventional hazelnut producers and 65 external sources. In Figure 1, organic producers, conventional producers and external information sources were respectively shown in green, red and yellow to see the relationships between producers and all other actors. In the same way, the actors were indicated by circle and the relationships between the actors were indicated by arrows. The size of circles indicates the severity of the actors.

In the interaction network, 174 out of 177 actors shared information with at least one actor. One organic and three conventional hazelnut producers were isolated in the interaction network. In other words, there were four actors exchanged information regardless of other actors. The interaction network density is 0.0103. Network density score changes between 0 and 1 (Mrvar, 2011). While zero (0) means that there is no relationship among the actors, one (1) means that every actor has relationships with all other actors in the network. The interaction network's density indicates that the number of relationships between the actors is very lower than the number of probable relationships. In terms of the network density, it can be concluded that there is no intensive technical information exchange between the actors. The interaction network is a low-density network. In other words, this network has a very low tendency to create social capital. The frequency rate of the relationship established between the actors in this social network is realized as 1.03%. Every actor approximately communicates with 3.64 actors in organic and conventional hazelnut producers' interaction network. Innovations, information and services related to the use of fertilizer and hazelnut cultivation begin to spread through the group leaders of each village. The actors gather around certain opinion leaders and they adopt these opinion leaders as main information sources (Figure 1).

In addition to organic hazelnut producers, these central opinion leaders have high organizational involvement. On the other hand, the official agricultural consultant in Agcagüney town is the main information source for many actors in the network. Having looked at the interaction network, it is seen that there are multiple groups and central actors.

In Figure 1, sixteen central actors were identified in

the network. Demographic characteristics of the central actors are as follows: the actor 143 is a retired agricultural engineer and now freelance agricultural consultant. The actor 130 is an agricultural engineer and official agricultural consultant employed by the Ministry of Agriculture and Forestry within Development Project of Agricultural Extension (TAR-GEL). He is the only information source of the vast majority of both organic and conventional hazelnut producers. The actor 34 is the former president of organic hazelnut producers association and shifted from organic hazelnut farming to conventional hazelnut farming. Except these three specific central actors, all the central actors are organic hazelnut producers. Having analyzed the general characteristics of the leader actors in the interaction network, it is seen that leadership traits and technical information are the key factors of being leader farmers (Table 2).
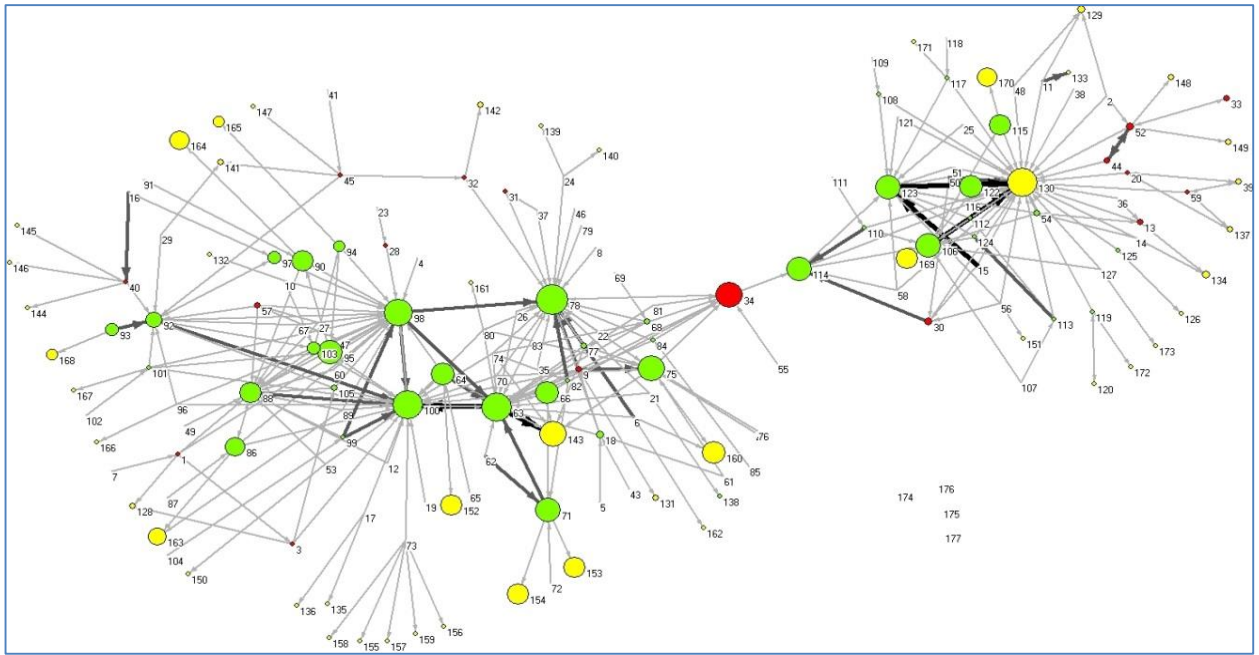

Figure 1. General interaction network

Table 2. Characteristics of leader farmers

Actor number	Characteristics
88	Elected village headman
98	İmam (religious leader) of the village
95	Elected village headman
100	President of Terme Organic Hazelnut Producers Association
63	Head of the village development co-op.
71	Deputy president of Terme Organic Hazelnut Producers Association, imam of the village and company representative.
123	President of Çarşamba organic hazelnut producers association
106	Elected village headman
114	Elected village headman
78	Organic producer with very high technical knowledge
66, 64, 75	Organic producers with high technical knowledge

In interaction network, there is only one conventional hazelnut grower who played the role of leader farmer. The farmer is a former organic hazelnut producer and the founder of Terme Organic Hazelnut Producers Association. As shown in Figure 1, organic and conventional hazelnut producers consult to the farmers who have high technical knowledge and to the agricultural organizations' executives who are experienced and reliable.

In addition to network density and degrees of actors in a social network, strength of the relationships between the actors should also be analyzed. In this study, strength of the relationships between the actors was determined by multiplying the frequency of meetings and utility scores. Although the density of the interaction network and frequencies of relationships in

that network is low, the relationships are strong between the actors. In other words, the socially tied actors highly depend on the decisions of each other. Disruptions and obstacles during information transfer are extremely low. Strong relationships between the actors mean relatively high density and high commitment. In a community, weak ties between the actors may create new opportunities and new ideas for individuals. The strong relationships in a network make the introduction and dissemination of new information harder. In other words, existing information constantly circulates in the network and strong relationships make the new information difficult to enter into the network to a certain extent.

The interaction network was divided into two sub-networks as formal and informal information sources in order to investigate how the organic and conventional hazelnut producers interact with each other and whether there is a difference between the referenced information sources

4.2.2. Informal information sources' networks

Communication networks in the village can be defined as networks of face-to-face relationships formed by kinship, friendship or neighborly relations. All actors in these networks know each other (Hoang et al., 2006). In this part of the study, organic and conventional hazelnut producers' informal networks were respectively analyzed and then compared.

Organic hazelnut producers' informal information sources network consisted of 55 organic hazelnut

producers and 2 actors outside the villages (Figure 2). The network density is 0.05 and the average degree is 5.1. In other words, the ratio of actors' communication with each other in organic hazelnut producers' network realized as 5.1%. This network's density is higher compared to the interaction network density (Section 4.2.1).

It has been determined that the actors in organic hazelnut producers' informal information sources network exchange information with the actors in the same village. There are three sub-groups in the informal network. In geographically urban areas, family and neighborly relations are important factors on the formation of these sub-groups. The generated information in the organic hazelnut producers' informal network and hence the social capital were transferred to the sub-groups by leader farmers and executives of agricultural organizations. The farmers in every sub-group communicated only with the actors in their own group. The leader of every sub-group communicates with the leaders of other sub groups. At the same time, information owned by group leaders can be spread quickly due to the strength of relations between the groups.

The communication between the sub-groups is provided through the producers on the boards of the organic hazelnut producers union. The communication in the sub-groups was provided through the leader farmers whom they are trusted for their technical knowledge, skills and kinship relations. In contrast to the interaction network, external actors were not
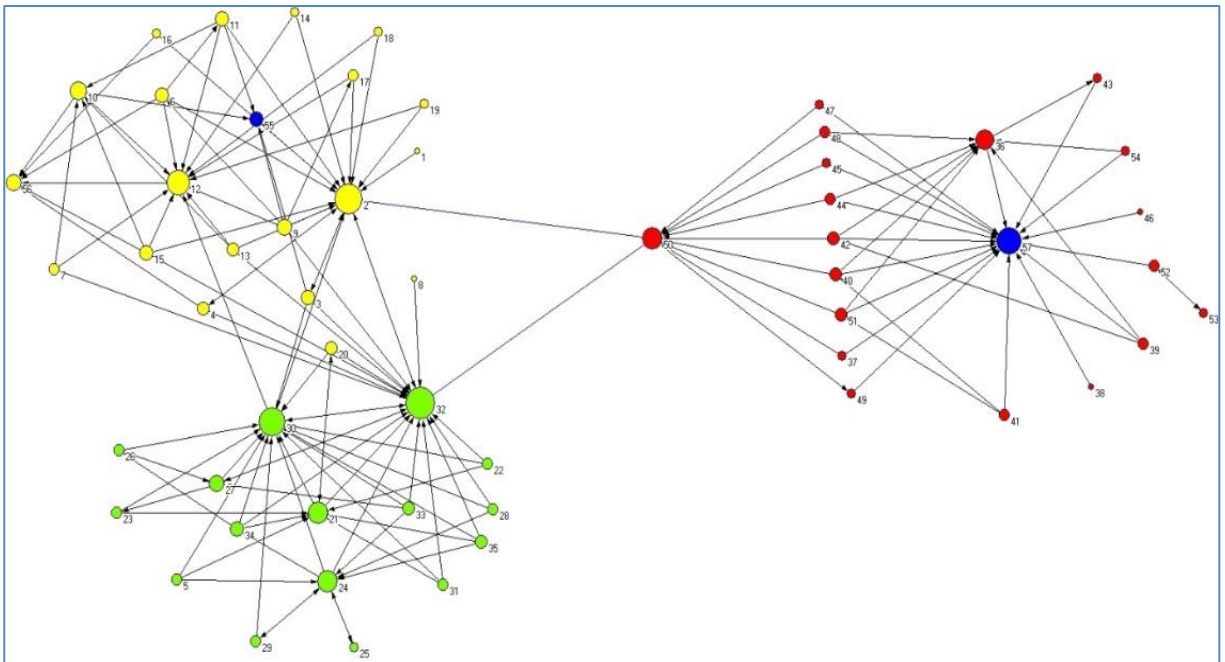

Figure 2. Organic hazelnut producers in the village: (informal) communication sources

consulted to as a source of information in organic hazelnut producers' informal network. Briefly, organic hazelnut producers exchanged information only with organic hazelnut producers. The official agricultural consultant (57) and freelance agricultural consultant (55) were the leaders in their own sub-groups; however, they had no connection with other groups. Organic hazelnut producers in Çamlıca village were connected by kinship relations. Organic hazelnut producers in Yüksekyayla and Ağcagüney towns were connected by neighborly relations and organizational relations.

The central actors in conventional hazelnut producers' informal network were the central actors in the organic hazelnut producers' informal network (Figure 3). As shown in Figure 3, conventional hazelnut producers were symbolized with circle and organic hazelnut producers were symbolized with square. There were three basic sub-groups and small groups in these basic groups in the conventional hazelnut grower's network. It can be said that the settlement was effective on the formation of these three sub-groups. In the conventional hazelnut producers' informal network, the leader of every group was an organic hazelnut grower and exchange of information between the groups was provided by the organic hazelnut producers.
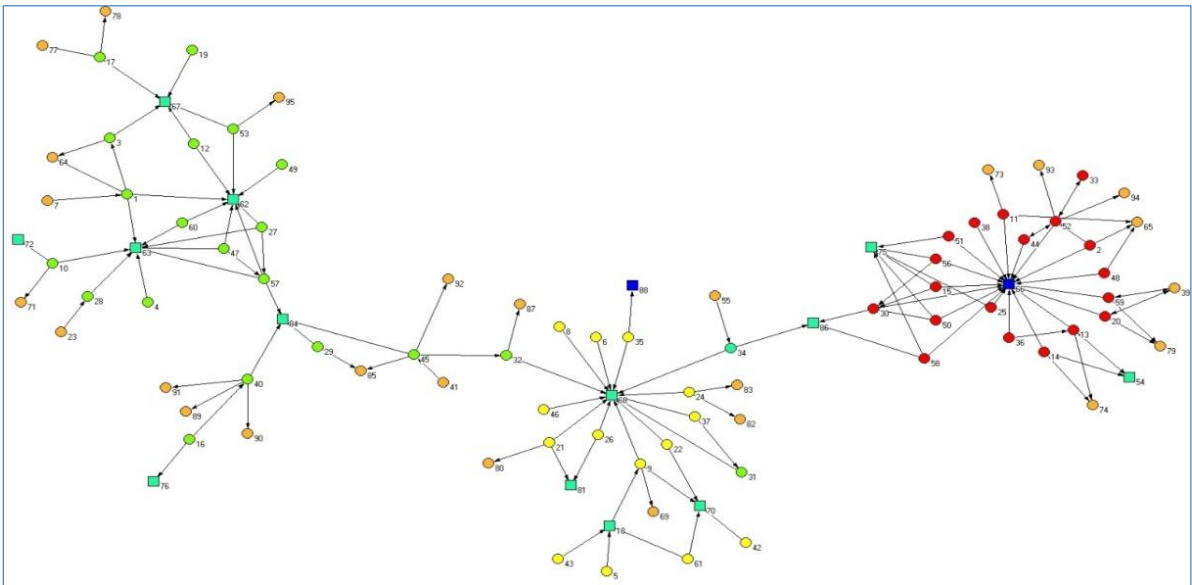

Figure 3. Conventional hazelnut producers' informal network

Conventional hazelnut producers' informal network density was 0.015 and average degree was calculated as 2.67. In other words, the ratio of actors' communication with each other in conventional hazelnut producers' network realized as 1.5%. This ratio was lower than the organic hazelnut producers' informal network density. It can be said that organic hazelnut producers had more information sources compared to conventional hazelnut producers. The existing limited relationships between the actors were strong although information exchange was not common in both organic and conventional hazelnut producers' informal networks. It can be summarized that the farmers in the study area did not consult to the leader farmers so often; however, when they did so, they highly relied on the information provided by the leader farmers. It can be interpreted that the formation of informal networks depends on kinship relations, neighborly relations or elements of mutual trust. Therefore, disruptions and obstacles during the transfer of knowledge in the village were extremely low. While information sources in the organic and conventional hazelnut producers' informal communication networks were different from each other, formal information (external) sources were similar. Both organic and conventional hazelnut producers consulted to the official extension services according to the principle of proximity. Generally, hazelnut producers' external information sources were agricultural district offices.

5. Discussion

The syntheses obtained from the research results and recommendations for solving the problems addressed by the research are introduced in this section. Organic farmers' organizations should be encouraged and supported for the protection of the farmers' economic interests and to help them have an active role in organic market.

The farmers in the organic hazelnut producers' network should be supported with more technical information provided by the sources outside the group; it has been seen that the new information does not flow sufficiently. Organic hazelnut producers should be provided with government extension services in order to reach new or alternative information. Another solution

suggested for organic hazelnut producers is to obtain the new information they need through their organizations and private agricultural consultants.

The new information and innovations are introduced and disseminated into organic and conventional hazelnut producers' network by head of producers' union, religious leader (imam), elected headman of the village or opinion leaders whom they are trusted for their technical knowledge. Therefore, transferring new information from external resources should be carried out by the leader farmers into this networks.

Based on the research findings, it has been determined that conventional hazelnut producers consult to the organic hazelnut producers. Taking organic hazelnut producers as a model can yield more effective results for conventional hazelnut producers in order to help conventional farmers adopt more eco-friendly and sustainable farming techniques.

In the research area, a correlation has been found between the fertilizer supply source and the actors' information sources. Conventional producers' main purchasing source is the fertilizer dealers. Therefore, the fertilizers should be sold based on the results of soil analysis in order to transfer the information of proper fertilization to farmers by fertilizer dealers

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