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# **KNOWLEDGE AND INNOVATION NETWORKS IN RAISIN PRODUCTION: KAPANCI VILLAGE, TURKEY**

## **SOLINSA SHOW CASE REPORT**

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## 1. Summary

The knowledge and innovation network for raisin production in Kapanci Village (Salihli County, Manisa Province, Turkey) was examined in this show case. The aim of the show case is to examine knowledge exchange in relation to raisin production in the village. Kapanci Village started to grow grapes for raisin production in 1952. The inputs of the 'green revolution' were used extensively after the 1970s. There are now 360 grape growers and approximately 800 hectares of vineyards in the village. Raisin yields have reached 6500 kg per hectare in Kapanci Village.

Farmers in the village have high problem solving skills. Respondents view market opportunities, needs, plant production, competition and crises (e.g. lack of water, energy sources) as drivers in learning and innovation. While soft technologies (methods) were more easily adopted until 15 years ago, increases in production costs have accelerated the adoption tendencies of hard technologies (materials, equipment, etc.) in the village. Gaining more money, improving product quality and decreasing production costs increases the value of innovations.

In the show case study, meetings and group discussions were mentioned as the most effective learning instruments by farmers. Observing and comparing the results of applications to facilitate adoption of innovations were also assessed. Farmers frequently visit vineyards in the village to observe what others do in the fields. Individual methods such as visits, interviews, and phone calls are commonly used for learning in the region. Face-to-face communications are carried out in the coffee houses and input sellers' stores. In recent years, the importance of the internet has increased as a tool to learn about innovations and to receive weather reports for the village. Cell phones are increasingly important to farmers in terms of information. For example, the public extension service now informs farmers about some applications by sending short text messages via cell phone.

The most effective actors in the raisin production network appear to be input sellers and private companies. Other innovation sources noted were private consultants (for conventional and organic production), the internet, other farmers, public advisors and researchers. University and Chamber of Agriculture extension services have quite limited roles in terms of providing information. Indeed, local / tacit knowledge is typically converted into extension advice and research studies in the region.

Surveyed farmers do not believe that their priorities and problems are sufficiently considered in the research and extension agenda in the region. Farmers view their links with public extension services as generally weak.

While decreasing production costs is the first priority of farmers it is not given sufficient priority within research and extension agendas. Farmers are more sensitive to environmental and health issues if they earn money (i.e., if there is financial incentive).

The farmers believe that local knowledge and practices are insufficient in today's farming climate. According to surveyed farmers, extension advice is usually theoretical and not applicable in the field because of limited economic validation. Extensionists, input sellers and researchers estimate that 60% of farmers' practices are based on local knowledge .The

farmers surveyed for this show case met with each other, traders, advisors, etc. in the local coffee houses. Information exchange and commercial agreements are typically done in these places. The coffee houses are important socio-cultural centers in rural areas in Turkey.

Economic expectation is accepted as an opportunity for empowering the networks in the village. Low production costs and better quality raisin production are strengthening collaborations and networks in the village. The LINSAs can thus be defined as market-orientated and pluralistic, with weak links with the formal AKIS and reliance instead upon bottom-up innovation/information exchange between farmers and others in the village.

## 2. Methods

In this show case, participatory techniques were employed for data collection and group discussions. For this objective, the sessions were held in the village, especially at night. The number of participants changed according to the daily farm practices in the village. Six sessions were carried out with between 6-13 farmers. The meetings were organized in the coffee house. The questions were prepared before going to the meetings and written on large sheets of paper. Visual materials, such as Venn diagrams, a matrix, time flows charts, and Likert scales to score some key questions (with a score ranging from between 1 (strongly disagree) and 5 (strongly agree)) were used during the discussions. These materials also helped to keep a record of key findings for the reporting phase. Coloured stickers were used to record participants stated preferences. The same methods were used to gather data from extension staff. In total, 10 respondents from the County Chamber of Agriculture and the County Public Extension service participated in the sessions. In addition to group methods, six individual interviews were also used for data collection with input sellers, an agent from a private company and public researchers. These respondents were asked similar questions to those used in the group discussion format. The main topics/questions covered in the group/interview discussions are as follows:

- Chronological development of grape growing in the village
- Farmers' relations with the other actors inside and outside of the village and the reasons behind the relations.
- How do farmers learn?
- The importance of innovations
- Why farmers do/do not adopt innovations
- The methods employed in learning
- Relations with research providers and the university
- The priority and objectives of respondents
- Local knowledge
- Communication in the village
- Description of the LINSAs in the village
- Knowledge and innovation flows in the village

### 3. Research context

During the past century, agricultural extension largely contributed to agricultural production and development all over the world. Today, rural life and agricultural production systems face many new challenges on domestic and global contexts, such as higher awareness of ecological impacts, increased concerns about quality, safety of products, public health, and international trade competition. These challenges demand a higher level of integration of knowledge and services than is required for on-farm problems and encourage local participation and client-oriented structures in extension services (Csaki, 1999; Werrij, 2005; Hartwich and Scheidegger, 2010 Falloon, 2011).

Innovation is not a linear process, in which research results are just transferred to farmers by extension services (Perez, et al, 2010). According to Munyua, Adams and Thomson (2002), collaboration, bottom-up information flows and horizontal linkages among contributors should characterize the model for sustaining agricultural knowledge systems. Studies on innovation indicate that ability to innovate is often related to collective action and knowledge exchange among diverse actors, incentives and resources available for collaboration, and having in place conditions that enable adoption and innovation e.g., by farmers or entrepreneurs (World Bank, 2006). Improving agricultural production and sustainability may not be achieved without relevant and reliable agricultural information. Key points mentioned by the SOLINSA (2010) project are: multiple sources, ability and motivation, reflecting on experience and the output of learning (knowledge). LINSAs make flows of information and learning processes possible between individuals/actors.

This study describes the linkages and integration of a raisin production network at a village level in Turkey. Agriculture plays a considerable part in the Turkish economy, with a 9% share in GNP, 29.5% in employment, and 4.25% in terms of export value (TUIK, 2010). Turkey produces about 30% of the global supply of raisins, with an export value of \$490 million and a production output of 300,000 ton. ([www://blog:ibp.gov.tr](http://www://blog:ibp.gov.tr)).

#### Information on the study area

Kapanci village is 9 km away from Salihli County and 46 km away from Manisa Province. It was founded (1927) as a neighborhood of town Sart (Sardis) and became a village in 1937. It has a population of approximately 1170 and there are 360 grape growers in the village. Raisin production in the village accounts for 1400 hectares of land in total and 800 hectares of land are vineyards. Other important crops are vegetables, potatoes and maize. Furthermore, there are 800 cows, 300 cattle and about 400 sheep in the village. Less than 1% of the village farmers have no land. These people provide agricultural labor.

Although the development cooperative was founded 12 years ago, only about 10% of farmers in the village are members. The number of farmers who are members to TARIS, the regional agricultural sales cooperative (TARIS) on cotton, dried fig, olive oil and raisin marketing in the Aegean Region, are about 100. As a result of subvention policies, the influence of TARIS has considerably decreased and in the last decade the number of members has decreased by

50%. Roughly 50% of farmers sell raisins to intermediary traders, 40% sell to exporters and 10% to TARIS.

### **The chronology of grape production in the village**

The origins of the village date back to 1927 but grape production started in 1952. The inputs of the so-called ‘Green Revolution’ have been used extensively for raisin production since the 1970s. Organic production began in the village in the 1980s. Today, 10% of farmers deal with organic agriculture. Economic and technologic developments have changed production patterns. Because of market circumstances, the production of cotton was abandoned completely in the village in 2003. Today most farmers in the village grow grapes. In 2013 seedless raisin yields reached 6500 kg per hectare. All the grapes are utilized as raisin. The developments in agriculture and viticulture in the village are given below in Table 1.

**Table 1: Chronology of agriculture and viticulture in Kapaci Village**

<b>Years</b>	<b>Developments</b>
1952	The first vineyard was established in the village.
1955	The first tractor was purchased in the village
1958	The raisin yield was 3000 kg per hectare.
1970	30% of farmers grow grapes for raisin production.
1981	The first high system vineyard was established in the village.
1984	50% of farmers grow grapes for raisin production. All farmers started to utilize chemical inputs such as pesticides, fertilizers, etc. Everyone owns a tractor in the village. The yield was 5000 kg per hectare. Organic raisin production began.
2003	Cotton farming abandoned completely and land use for vegetables and vineyards increased.
2013	The raisin yield reached 6500 kg per hectare. 10% of farmers grow organically

## **4. How do producers interact with the AKIS? How do they learn?**

The production of raisins for the market increases the importance of input companies and sellers. While farmers buy the inputs, technical advice is also given to farmers by input sellers. Input sellers visit vineyards and provide extension services.

Public extension workers and advisors in the Chamber of Agriculture provide information to raisin growers in the village, too. However, these services are not at the required level. When

farmers face problems, they consult other farmers in the village. Firstly, they discuss problems among themselves. If they cannot find a solution, they call private consultants or input sellers. Farmers are highly skilled in finding solutions to problems. Farmers stated that they are unique in applications compared with other villages around. Their quality and yield, in terms of raisin production, are higher than other villages in the county.

Technical subjects which farmers want to learn about are plant protection, fertilization, harvest, irrigation, pruning, grafting and new grape varieties. The subjects which farmers need to know are product quality, sales/marketing, organization skills and consumer preferences. Information on how to store grapes to maintain quality is not required by farmers (see Table 2).

Organic farming accounts for 40% of land and 10% of farmers in the village. Farmers who deal with organic agriculture share the knowledge which they get from consultants with other farmers. The consultants of organic companies thus play an important role in terms of information flows in the village for raisin growers.

**Table 2: Socio-economic information needs of farmers**

Topics	Raisin quality	Sales/marketing	Organization	Consumer preference	Storage
Level	5	5	4	3	1

*Scale: 1 not a priority; 2 low priority; 3 medium priority; 4 high priority; 5 essential*

According to farmers, plant protection, competitiveness and market opportunities trigger adoption of innovations. When the actors on the network are taken into consideration, the factors which trigger learning and innovation are determined as market opportunities, needs, plant protection, competitiveness and crises as water, energy, famine, etc. (Table 3).

**Table 3: According to the actors, factors affecting learning and adoption of innovations**

Factors affecting	Farmer	Public extension worker	Advisor in the chamber of agric.	Input seller	Research	mean
Market opportunities	3	5	4	5	5	4.4
needs	5	4	5	4	3	4.2
plant protection	5	3	4	5	4	4.2
competitiveness	4	4	4	4	4	4.0
crises as water, energy, famine, etc.	1	4	2	4	5	3.2

*Scale: 1 not a priority; 2 low priority; 3 medium priority; 4 high priority; 5 essential*

## How to learn better?

Surveyed farmers commented that coffee house meetings are quite useful. Presentations and discussions among attendants are shown as effective techniques in learning. Moreover, field days and demonstrations are found to be very effective. In this village, learning by seeing and doing are the most popular learning techniques, as they are everywhere. Seeing the result and making comparison facilitates adoption. Farmers stated that learning from their colleagues is more convincing. The villagers also want extensionists and researchers to visit vineyards more often and to provide regular information flows.

## 5. The importance of innovations

Farmers give most importance to innovations that enable them to be competitive. Innovations gain importance to earn more, to produce quality and to decrease costs. In the last four years, three of the grape growers (3 out of 360) started to produce a new table grape variety. Workers who come from another village prune and in doing so bring new pruning techniques. In the last few years, undercutting bunches of grapes has been learnt from farm workers who come from different villages and siphon irrigation has been learnt from consultants and these techniques are now common place.

In terms of plant protection and fertilization applications, input sellers, extensionists, and pesticide companies are effective. Potassium leaf fertilizers have been utilized in the last decade in the village. As a result of drip irrigation, the amount of fertilizer usage has decreased by significant levels. In the previous application, 150-200 kg nitrogen fertilizers were given per hectare, but with drip irrigation the amount has decreased to 50 kg. For the last 30 years, 400 liter tanks have been used in spraying, but for the last few years 1-2 ton tanks have been used and fuel costs for spraying has been reduced significantly.

Drilling machines, spring hoe machines, drip irrigation, and V Shape systems are the innovations which were adopted in the last 10 years in the village. Hard technologies (tools, equipment, materials) which came to the village in the last decade and the adoption rates are given in Table 4.

The most important obstacle in adoption of such innovations is the absence of resource. Other main obstacles are customs and distrust (Table 5).

**Table 4: The hard technologies and adoption rates in the village in last decade**

Hard technologies	Adoption rates of farmers (%)
Drilling machine	100
spring hoe machine	100
New fertilizers (potassium, leaf fertilizers, etc.)	100
V System	50
Large capacity sprayer tanks	80
Adhesive traps (for plant protection)	40
Drip irrigation	30
New grape varieties	1

**Table 5: According to the actors why farmers do not adopt the innovations in the village**

Reasons	Farmer	Public ext. worker	Advisor in the chamber of agric.	Input seller	researcher	mean
Absence of resources	5	4	4	4	4	4.2
Customs	1	3	3	4	5	3.2
Unsuitable conditions of farmers	1	2	2	3	4	2.4
Differences on priorities.	1	2	2	3	4	2.4
Distrust	1	3	3	2	3	2.4
Low level education	1	3	3	1	3	2.2
Lack of skills	1	2	2	1	2	1.6
Lack of information	1	2	2	1	1	1.4

*Scale: 1 not a priority; 2 low priority; 3 medium priority; 4 high priority; 5 essential*

The sources of innovation were put to farmers and other actors. There are differences among actors' in terms of information and innovation sources. Companies and input sellers seem to be the most important actors in the system. The sources of innovation range from public and private consultants (in conventional and organic farming), the internet, farmers and researchers. The roles of university researchers and the Chamber of Agriculture are very limited in the village.

While examining innovations and their sources in grape production in the last decade, ten stickers were given to each farmer. The farmers were asked to distribute the stickers (each representing an innovation) in relation to innovation sources on a matrix. The process was repeated with advisors and input sellers. The share of innovation sources in the system has been calculated (see Table 6).

**Table 6: Innovation sources in raisin production in the last decade**

Innovation sources	Farmer	Public extensionist	Advisor in the chamber of agriculture	Input seller	Mean
Input seller company	30	25	22	85	39.5
Public extension	12	21	9	-	11.8
Consultant	25	10	9	-	11.5
Internet	2	10	19	10	10.3
Farmers	17	5	12	5	9.8
Research	3	21	4	-	7.0
Book, journal, etc.	1	3	10	-	3.5
Chamber of agric.	10	-	3	-	3.3
University	-	-	11	-	2.8
Trader	-	5	1	-	1.5
Total	100	100	100	100	100.0

Information/innovation comes mostly to input sellers via companies. The internet, colleagues and university researchers are other important sources. Innovations and related experiences are learnt via the internet. Input sellers also get information from their colleagues about particular innovations. Input sellers have contact with different sources to understand the accuracy of their advice. According to input sellers, being useful, solving problems and commercial benefits are important motivational factors in their learning. Information flows between university staff and researchers on the ground are quite limited.

Advisors in the Chamber of Agriculture learn information and innovation from private companies, their colleagues, the internet and farmers. However, the validity of information sourced via the internet is confirmed from different sources and then transformed into extension suggestions. Moreover, there are rare applications which are learnt from farmers and turned into extension suggestions. Advisors in the Chamber of Agriculture start to search for information when demand comes from farmers or when a problem occurs in the field.

Adoption of innovations triggers socio-economic change. In the adoption process affordability, information, belief in the benefit, acceptance of other farmers and ease of application are effective factors.

Soft technologies (methods) were adopted faster 15 years ago compared to hard technologies (tools, equipment, material) but the increase in production costs has also accelerated the adoption tendency of hard technologies. It has been observed that farm size and the education level of farmers are effective components in the adoption of innovations. Large farms (in this case over 2.5 hectares vineyards) and more educated farmers adopt innovations more easily. Farmers often visit other local vineyards to see what has been done. They consult each other on subjects related to grape production. However, their tendency to visit and consult farmers from other villages is low.

Advisors in the Chamber of Agriculture cooperate mostly with farmers, and then with input sellers, private companies, public extension services (at the county and province levels), other chambers of agriculture, private consultants (conventional and organic), research and university centers, agricultural credit cooperatives and commodity exchanges.

According to surveyed advisors, private companies are very effective in the innovation process and the Ministry of Agriculture directs the network via agricultural support, subsidies, regulations, etc.

## 6. The methods employed in learning

Learning is an important factor which motivates change and the success of learning is increased with the usage of different techniques. The usage of techniques varies due to the facilities of the organizations in question and due to the features of the target groups and the information characteristics that is going to be transferred.

In the study area, the usage level of individual methods is high. Face-to-face contacts mostly occur in coffee houses and input seller shops. The tendency of having immediate communication via cell phone is also high. Farmer meetings are desired meetings but according to farmers surveyed this is a method which cannot be organized in sufficient numbers. Moreover, demonstrations, field days and tours are organized in limited numbers.

TV programmes, posters and brochures are the main media-based tools used. In the last few years, the number of farmers using the internet to find out about innovations and weather forecasts has increased. Information is also provided by public extension services via SMS, especially regarding plant protection applications. Every actor in the network benefits from its immediate vicinity. In general, private companies, input sellers, the internet, extensionists, other farmers, researchers, universities and books/journals/newspapers are important actors and tools in informing farmers about innovations related to raisin production (Table 7).

**Table 7: Information sources of the actors**

Information sources	Farmer	Public extensionist	Advisor in Chamber of Ag.	Input seller	researcher	Mean
Other colleagues	5	5	5	4	4	4.6
Input sellers and Private companies	4	4	5	5	4	4.4
Internet	3	4	4	5	5	4.2
Extensionists	3	1	5	2	3	2.8
Farmers	5	2	1	3	3	2.8
researchers	1	2	1	2	4	2.0
University	1	1	1	2	4	1.8
Book-journal-papers	1	1	1	1	4	1.6

Scale: 1 not a priority; 2 low priority; 3 medium priority; 4 high priority; 5 essential

Input sellers often use individual methods, field visits and demonstrations, whereas public extensionists and advisors in the Chambers of Agriculture often use individual methods and farmer meetings to transfer knowledge about innovations. Researchers often prefer meetings to share information and research findings.

## **7. Relations with the research community**

There is a viniculture research station 45 km from the village. In the 1990s there had been farmers who had bought plants, but in the following years there had been very few farmers who had visited the station. Today, the farmers have no idea about the studies which are conducted in the research station and they do not even know whether there are studies related with their problems or not.

Researchers cooperate with farmers through meetings, selling plants, field visits, and experiments in farmers' fields. According to the researchers, less than 5% of grape growers in the region visit the station. Farmers who come to the research station mostly do so to purchase plants and continue their relationships with the research station later on.

Research-extension relations are defined with the adjective “good”. In-service training is given to extension workers by researchers and joint activities are organized for farmers.

When there is a problem related with the vineyard, researchers firstly examine and then analyze plants/vines in the laboratory. They also take opinions from various researchers due to their specializations.

The relation between public extension and research is therefore moderate; the relation of input sellers with research is very weak and the relation with universities is very weak in both of the groups. The relation of public extension and input sellers with private companies is strong in the county. There are advisors in the Chamber of Agriculture who report problems farmers face in the field to researchers.

### **Interaction with universities**

Ege University Faculty of Agriculture –EUZF (in Izmir Province) is 100 km from the village. Farmers have never visited the faculty which was established in 1955. In fact, farmers only visit the university for health-related problems via the Faculty of Medicine or in some cases have contact with the university campus as a consequence of their children's education.

Farmers felt that they are not taken into consideration by research, extension and universities. They also commented about the weakness of relations with public extension, except for bureaucratic affairs. Sometimes there are academics who come to the village for research, but these visits are mostly limited to data collection rather than knowledge exchange/interaction. The correspondence of prior targets of the actors means a harmony in the system. The absence

of common targets reduces cooperation in the network. In the study, the main five targets of agricultural production (yield increase, growing quality raisins, reducing production costs, environment protection and farmer-consumer health) have been placed in the preference matrix and dual comparisons have been made. The participants were asked which of the two targets had priority for them. In the discussions, the priority of farmers related to reducing the costs, whereas for the other actors this target was the third and fourth priority target respectively (see Table 8). The target of farmers firstly focuses on economic benefits. The other actors give priority to subjects related to the environment and farmer/consumer health. Farmers stated that if they had economic satisfaction, they would become more concerned about environment and health-related issues. Pesticide residues in raisins are a significant common quality concern.

**Table 8: Comparison of the priority objectives of the actors in the network**

Priority	Farmer	Public extension	The chamber of agriculture	Input seller	Research
<b>1</b>	Reducing the cost	Farmer/consumer's health	Raisin quality	Raisin quality	Raisin quality
<b>2</b>	Yield increase	Environmental protection	Yield increase	Environmental protection	Yield increase
<b>3</b>	Raisin quality	Raisin quality	Farmer/consumer's health	Farmer/consumer's health	Reducing the cost
<b>4</b>	Farmer/consumer's health	Reducing the cost	Reducing the cost	Reducing the cost	Environmental protection
<b>5</b>	-	Yield increase	Environmental protection	Yield increase	-

## 8. How important is local knowledge and how can it be utilized in learning?

According to the farmers, extension advice provides theoretical information which is not practical in the field. These forms of advice have not been economically validated in some cases. Also some companies and input sellers give priority to their own economic benefits.

The villagers believe that local information is no longer sufficient. Changes in irrigation applications require, for example, more than local know how. Indeed irrigation has changed the production pattern and system.

Old farmers left their farms to their children. The complete change of production patterns in the last 30 years and subsequent technologic developments has meant that old farmers' knowledge is invalid and insufficient. According to farmers, old knowledge/applications are not forgotten but sometimes they become insufficient. For instance, with recent increases in rainfall the copper vitriol application became less and the usage of systemic chemicals became more.

*Examples of local knowledge in the village include:*

- the copper vitriol and powdered sulfur application systems;
- no application during the bloom period;
- young buds are not cut until 21<sup>st</sup> June each year;
- irrigation in the vineyard is not started before combustion;
- insect outputs observed in the light of the moon (today, traps are used);
- the grape harvest starts each year on 20<sup>th</sup> August.

Extensionists are not in favour of copper vitriol and powdered sulfur applications since repetitions are needed after rain. For this reason they advise systemic chemicals. Villagers who follow the traditional system make an application of copper vitriol and powdered sulfur when the sun shines just after the rain.

The villagers find some extension advice costly. For example, they stated that they used less fertilizer according as a result of soil analysis.

One of the sustainable agricultural applications is an animal manure application but the absence of a place to keep the manure is seen as an important obstacle.

Due to researchers, the farmers trust their own experience/applications on the subjects of plant protection and feeding. About 40 % of farmer information is local knowledge. For instance, farmers do not prune in the moon light; they prefer pruning time when there is no moon light as the insect population is higher in this period and they hide out in the pruning slits.

It is stated that local knowledge has not been a subject for research but it is observed by research. In particular, different farmer applications in pruning are being monitored closely.

According to surveyed researchers, farmers start to harvest in vineyards on the 20th of August. In this case, 1 kg of raisin is produced from 5 kg of fresh grapes. When the harvest is made due to solids, 1 kg of raisin is produced from 4 kg of fresh grapes. Because of the rain risk during the drying process, farmers prefer an early harvest. For the quality of raisin, research and extension advisors have made suggestions about high system drying in the last 30 years. Traditionally grapes are dried in 7-8 days on the ground and 13-14 days on high system drying. Because of the establishment and labour costs of high system drying farmers mostly prefer the traditional ground drying system.

According to input sellers, 80% of farmers' applications are based on local knowledge, which includes, for example, not entering the vineyard and not spraying pesticides during the bloom period. However, fertilization and irrigation must also be done in this period. Input sellers transform farmers' knowledge and applications into extension advice and share the results of innovations with company representatives.

Advisors in the Chamber of Agriculture think that about 10% of farmers' applications are local knowledge but the usage rate of local knowledge changes according to the subject. For instance, copper vitriol and sulfur are used by 60% of farmers.

It is expressed that there are differences in the applications of farmers when tacit and explicit knowledge are taken into consideration. It is stated that there is a paradox and that farmers apply the suggestions of input sellers less but the suggestions of extensionists more.

## **9. How is local knowledge communicated between producers and what sort of informal relations are there for shared learning?**

### **Communication in the village**

There are two coffee houses in the village. All of the farmers visit these coffee houses. Coffee houses open at 5am and close at about 11pm. Coffeeshouses are important socio-cultural centers in the rural area. Farmers have contacts with each other, traders, extension workers and many others via the coffee houses. Information transfer and commercial agreements are made in these places. Coffee houses help social groups to be formed and help them to meet. When cooperation levels are examined, it is seen that the information transfer among farmers is high and the solidarity in many subjects (illness, weddings, funerals, etc.) is very strong in the village. Almost all farmers in the village share their information and experiences.

### **How does information spread among the farmers?**

As far as farmers are concerned, they learn most effectively by hearing and seeing from each other. There are about 10 opinion leaders (2.8 % of the grape growers) in the village. These 'leader farmers' have more frequent contacts with the actors outside the village and they share information and skills with other farmers in the village. The most frequent information transfer is realized among farmers. Input sellers and private companies are the most effective actors in terms of diffusing innovations in the village. Communication is provided with the input (pesticides, fertilizer, machine, etc.) sellers about buying the inputs and their usage. Then input sellers visit vineyards and conduct demonstrations.

Although the office of public extension is in the village, cooperation between farmers and public extension offices is insufficient. The consultants in organic farming help in terms of knowledge transfer and marketing. Farmers are in cooperation with TARIS (the regional agricultural sales cooperative), private consultants and traders.

The relations between farmers and the public extension service / Chamber of Agriculture is generally low. The Chamber of Agriculture has started to employ extension staff in the last few years. The chamber provides extension services for farmers who have contracts. Farmer tendencies to organize as a cooperative or association is very low in the village. The municipality provides infrastructure investments to local villages. Furthermore, it gives financial support to projects for the development of agricultural production in the village.

## **10. The diffusion of new ideas and innovation in the village**

Farmers can produce local innovations about soft technologies like pruning techniques. These innovations, which originated in farmer contexts, diffuse fast in the village. There are about 10 innovative farmers in the village (the total number of grape growers in the village is approximately 360). Farmer-to-farmer discussion about their applications with these people is the main means of diffusion.

## **11. What are the conditions (policy, economic, commercial, culture) that might allow the emergence of producer groups (LINSA) who can learn together and utilize their local knowledge?**

As a result of the socio-cultural structure, farmers share their knowledge and experience with each other like other farmers all around the world. Especially when a problem occurs about the vineyard, sharing of information becomes faster and more frequent.

### **Opportunities and impediments in the development of the network**

Economic expectations and supports are seen as opportunities in the strengthening of the network. Farm size and as a result income differences are mentioned to be factors which obstruct cooperation.

However, low production costs and quality raisin production makes the network stronger. Information sharing is more with farmers who are successful in these subjects. Economic expectations and better quality production increase cooperation in the village.

### **Cooperation among farmers in raisin production**

The trend of farmers engaged in collective action is not at the desired level. The low level of organization capacity shows this. On the other hand, individual help is seen among farmers on practical subjects such as tool and equipment usage. There is solidarity among everyone on subjects about plant protection. The farmers stated that they warned each other about the applications of plant protection products. Less than 1% of the farmers do not want to share their experience with others.

## Collective action

The farmers stated that they do not need much help from each other and they are individual enterprises since they have their own equipment. However, common benefits sometimes encourage common action. For example, in 2013 20 farmers bought pesticides together and got a discount of 35% from the company. Common action is thought to be a power in bargaining. It is thought that this experience is going to motivate the desire of collective action in the future.

According to researchers financial support and benefits encourage actor linkages in the network.

Input sellers think that if mutual benefits occur, common actions can be realized. For example, in plant protection applications adhesive traps are used and spraying time is announced and farmers follow the announcements in the village.

According to advisors in the Chamber of Agriculture, factors like economic reasons, unreliability, jealousy and absence of leader farmers affect common action in the village.

For the contacts among the actors, it is mentioned that if the actors have met before, informal relations and cooperation are structured fast. Otherwise the bureaucratic process is said to reduce effectiveness. For regular relations, collaboration mechanisms must be established. Collaboration mechanisms such as demonstrations, field days, meetings, tours and periodic visits to each other will provide sustainable linkages in the network.

## 12. Conclusion

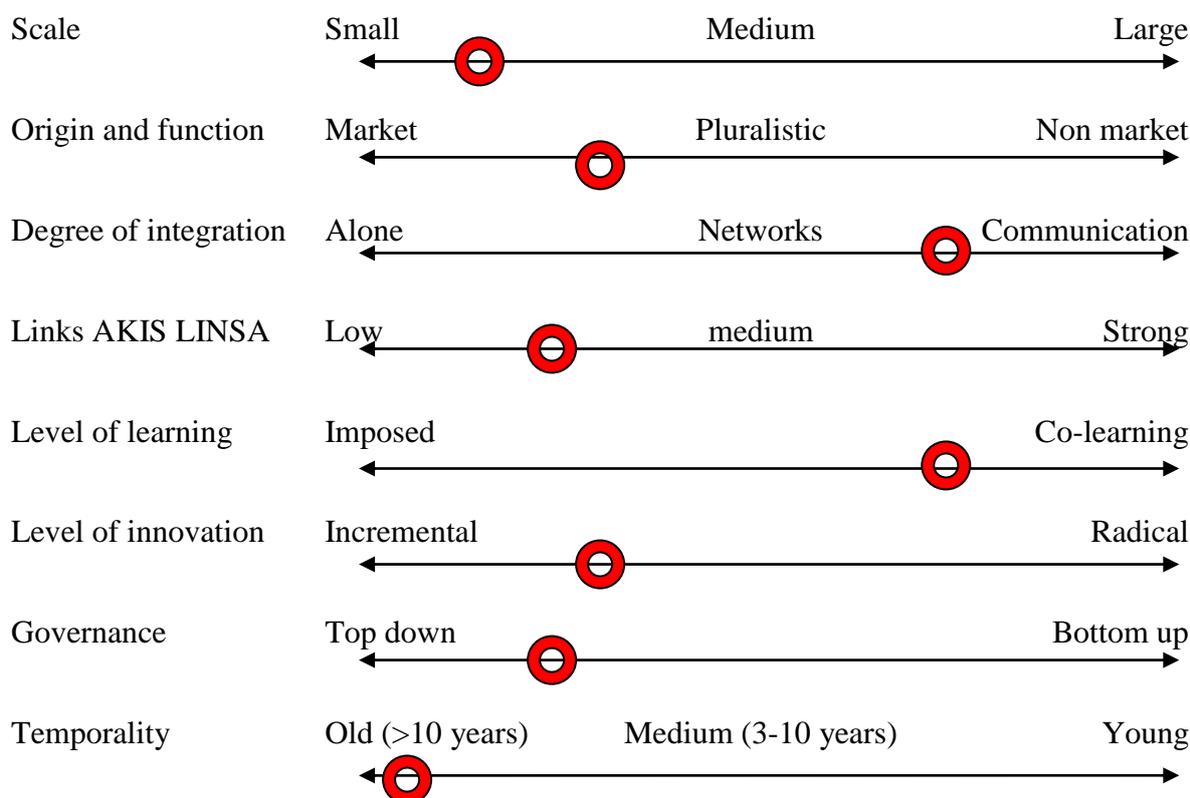
LINSA are networks of producers, users, experts, and formal AKS components that create mutual engagement around sustainability goals in agriculture and rural development. They co-produce new knowledge by creating conditions for communication, share resources and cooperation on common initiatives. LINSA as alternative knowledge systems are constituted by communication patterns, communication infrastructures, access to information and validation of information (SOLINSA, 2010). The core organizing principle of these LINSA is based on social learning and correlation of knowledge as opposed to the “transfer of knowledge”. Social learning as interactive process occurs when the experiences, ideas and environment are shared with others (Oreszczyn, et al., 2010). Participation of diverse actors is advantageous for diverse forms of learning and knowledge flow, leading to innovations. Participant engagement is promoted by several shared frames, be they technical, technological, economic, sustainability, and/or sectoral.

Trust is important for sharing information in networks. There is a sense of trust which facilitates sharing of information and knowledge. The raising production LINSA in Kapanci Village is summarized in Figure 1. According to the show case findings, the LINSA can be described as local and small, market-based and pluralistic, with a well-developed communication and network among farmers. However, there are weak linkages between farmers and more formal AKIS components, such as research stations, the local university, and public extension organizations. There is a well-developed process of co-learning between

farmers, although this is very informal. Farmers have connections with different actors. Top-down information flows into the network. Funding and market opportunities influence the adoption of innovations. Sustainability of the system depends on economic validation of innovations and beneficial gains of farmers.

Well developed LINSAs have established formal patterns of communication, where networks are less developed the sharing of knowledge is based on direct, mostly bilateral flows of information / knowledge. It can be said that the village has a well-developed LINSAs, through strong communication among farmers and good skills in terms of problem solving between farmers. Trust is important for sharing information for most LINSAs. There is a sense of trust which facilitates the sharing of information. There is evidence of openly sharing experiences with others in terms of field days, seminars, skills sharing, etc. Through the innovation process, all actors put their expectations, knowledge and skills towards change and by sharing experiences they jointly create new knowledge and products.

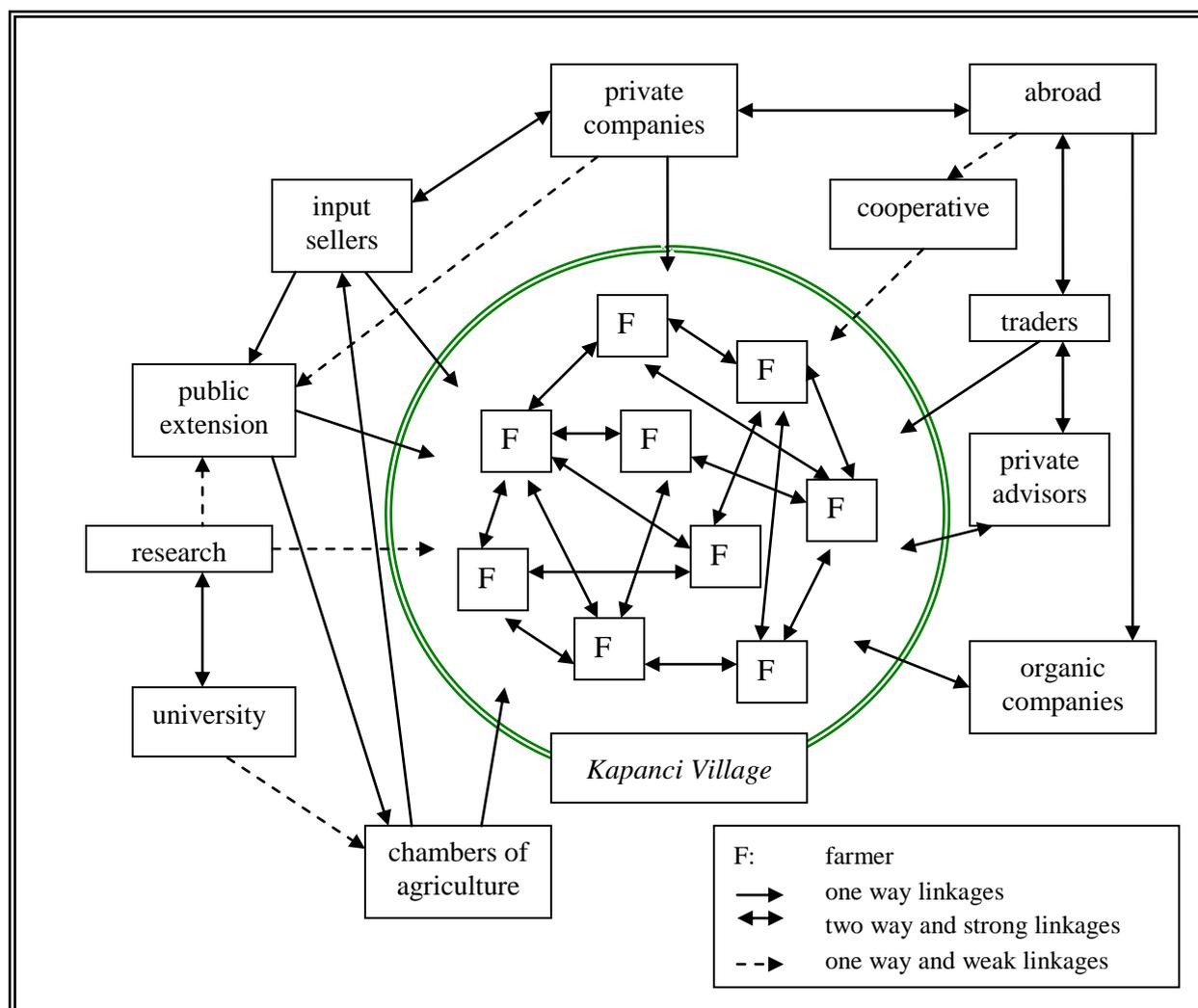
**Figure 1: Brief description of Linsa in the Village**



The process needs interactive learning and action and depending on dynamic and interactive networks. Research institutions have been accepted as the basic actors in creating knowledge and innovation in conventional farming systems. It creates innovation and extension introduces them to the users. The knowledge and innovation flows and linkages among the actors are summarized in Figure 2. The roles are important in the formal AKIS but farmer

participation is very limited in the region. Farmers' social networks are central for facilitating the learning process in the village. The most important actors are input sellers and private companies (firms). They sell inputs and give extension services to farmers. They also have some relations with public extension services and the Chamber of Agriculture for some extension activities, such as demonstrations, field days, etc. Private firms also have strong links with international input producer companies for input production products and marketing. The performance of public extension services is reduced because of their bureaucratic burden. Research and university actors have quite limited contact with other actors. Furthermore, traders and agricultural sales cooperatives have contact abroad for raisin marketing. In total, 90% of raisins produced are exported from Turkey. Market opportunities and expectations on raisin quality are an important component for international trade.

Some farmers have contact with private consultants and organic companies. These farmers do not hesitate to share information with other farmers. The Chamber of Agriculture started to employ extension staff to link with farmers. In the near future the effectiveness of the chamber is expected to increase in the network. Farmers have strong links among themselves for sharing the experience and knowledge learnt in the village (see Figure 2).



**Figure 2: Knowledge and innovation flows in Kapanci Village**

**A summary of integration and learning in the network:**

- A few farmers started to produce table grapes because of market circumstances. It is expected the number of table grape growers will increase in the village in near future.
- In last few years the Chamber of Agriculture started to employ extension staff (advisors) in the county. Following the meeting in this study, 30 farmers signed a contract with the Chamber of Agriculture to receive extension services.
- Leadership is an important problem. There is not a leader for collective action in the village but there are some ‘innovators’ who bring new practices and technologies to the village.

- The link between farmers and researchers is very poor in the village. Following the group discussions farmers decided to visit the viticulture research station after grape harvest.
- Learning usually answers to the specific needs of farmers.
- Different mechanisms of learning commonly co-exist, including peer-to-peer learning, knowledge transfer and dissemination/experience sharing.
- Learning is done mostly at the level of the individual farmer.
- Farmers have a high degree of independence in deciding on what to learn.
- Knowledge learned elsewhere is mainly transferred verbally between the farmers in the village.
- Formal and informal training activities are carried out, but there is little coordination between actor activities.
- Private companies and input sellers are the key players in the village.
- Knowledge on economic performance is quickly shared between farmers in the village
- Knowledge flows are diverse and different actors (public, private, NGO, research, traders) have roles in terms of knowledge flows
- Learning in informal individual networks is the most important component in daily applications for farmers in the village.
- Farmers learn experientially in their fields and there is a significant level of tacit knowledge. These experiences do not take place in the formal AKIS.
- Relations in the village are not formalized. All formalized learning is part of the AKIS mainstream. Exchange happens in farmers meetings, field days, publications and in-service training for extension staff.

Local participation and rural priorities must be considered in the network for empowering the LINSAs in the village. To create a trustworthy environment between the different actors reviewed in the show case joint activities must be regularly organized at the field level. Field level activities are also a good opportunity for sharing experience, collective action and creating collaborations in the network.

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