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Araştırma Makalesi

**Local Seed Usage and Its Importance of Rural Area; Case Study of Konya Province \*\***

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**Abstract:** Rural areas are important for the realization of agricultural production and sustainability of resources. Providing to sustainable usage of resources is possible by conservation of local originated seeds, which act on principle of agriculture and inputs besides cause to an increase in ratio of 25-40% in production. The data were obtained from the family farms making production with 68 local seeds using the "Unclassified single-step simple random probability sampling based on ratios" method in 20 villages. The obtained table were created and the chi-square analysis was performed on the percentage ratios and the bilateral relations. As a result of the research, 49 local seed varieties were identified. Consequently, it is necessary to encouragement of young people for agricultural activities, a better data transfer among the stakeholders and project production for conservation of local originated seeds.

**Kırsal Alanda Yerel Tohum Kullanımı ve Önemi; Konya İli Örneği**

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**Anahtar kelimeler**

Aile İşletmesi,  
Konya,  
Yerel Tohum,  
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**Öz:** Kırsal alanlar tarımsal üretimin gerçekleştirilmesi açısından ve kaynakların sürdürülebilirliği açısından önemlidir. Tarımsal üretimin temelini ve önemli bir girdisini oluşturmasının yanı sıra üretimde ortalama %25-40 oranında artış sağlayan tohumun özellikle yerel kaynaklardaki muhafazası bitkisel üretim için büyük önem teşkil etmektedir. Araştırma ile tarımsal sürdürülebilirlik için biyolojik çeşitliliğin devamı ve gen kaynağı olan yerel tohum çeşitlerin belirlenmesi, korunması ve muhafazası yöntemleri belirlenmiştir. Veriler 20 köyden "Ana kitle oranlarına dayalı kümelendirilmemiş tek aşamalı basit tesadüfi olasılık örnekleme" yöntemi ile 68 yerel tohum ile üretim yapan aile işletmelerinden elde edilmiştir. Elde edilen veriler frekans dağılımları ve yüzde oranlar üzerinden tablolar oluşturularak yorumlanmıştır. Ayrıca, ikili ilişkilerde ki-kare analizi yapılmıştır. Araştırma sonucunda 49 adet yerel tohum çeşidi tespit edilmiştir. Çalışma sonuçlarına göre genç nüfusun tarımsal faaliyetlere yöneltilmesi amacıyla teşvik edilmesi gerektiği, konuyla ilgili paydaşlar arasında daha iyi bilgi aktarımına ihtiyaç duyulduğu ve yerel tohumlukların muhafazası için çalışma yapılmasına ihtiyaç duyulduğu söylenebilir.

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## 1. Introduction

The seed that forms the basis of biodiversity and life expresses eternal life to renew itself in every generation and maintain continuity by adapting to different conditions. The living things in any physical region are in constant communication and interaction with their surroundings and themselves. As a result of this interaction, different living environments called ecosystems are defined. From ecology to sociology, ecosystems around the world have significant effects on a wide range of ecosystems. Systems need to be protected in order to preserve this natural integrity and to use the benefits it provides. Therefore, it is essential to understand the richness of species, numbers and varieties of creatures that form the basis of ecosystems and to preserve the formation that is called biodiversity (Çepel, 2003; Işık, 2008). The richness of the biological and cultural diversity that our country possesses is prevalent almost everywhere. These two parts of diversity have a different diversity, which is the combination of biological and cultural stakeholders. Our agricultural genetic resources have been diminishing and disappearing seriously due to the mono-cultural processes in agriculture, the decrease of rural population and traditions and because of the change processes in the nature. Local varieties have been developed in accordance with the cultural needs and customs of the people living in the region and the ecologically compatible local varieties of the transfer between the natural routes and the genetic routes in traditional production during the process from the first day of production to the day. Local seeds, the main sources of traditional agriculture, have been circulating all over the world for centuries among the farmers from hand to hand. However, the widespread use of new technologies today and the increase of industrial agriculture cause the traditional agriculture to be done in confined spaces. In addition, farmers produce commercial varieties of the indigenous varieties that lead to the destruction of their sovereignty over their biological riches (Çelik, 2013). Raising consciousness of producers and consumers in order to ensure the sustainability of local seeds is of great importance in terms of identifying traditional farming methods and local seed varieties, taking protection and transferring them to future generations and sustainability, and explaining the effect of small farmers on agriculture and on the sustainability of life. The important thing in this research is that it is crucial that the seed, which is an essential element of agricultural production around the world and which is the starting point of production, can be obtained from local sources that play an important role in the development of new varieties in the direction of changing climate and consumer demand. Konya province in Turkey has a share of approximately 33% in seed production. For this reason, in Konya province, determining the current state of the local seed varieties in the hands of the producers and determining the methods and techniques of preservation of the local seed varieties constitute the main objective of the study.

## 2. Materials and Methods

The data obtained by survey technique from the producers who make productions with local seed in the mountain villages of Beyşehir, Meram, Selçuklu, Seydisehir, Karapınar, Hadim and Taşkent districts in Konya province constitutes the main material of the study. Survey applications were conducted by face-to-face interviews by the researcher. The districts were selected according to the method of "Purposive Sampling Method" as the places where local seeds are used. The data collected in the study belong to the production year 2016-2017. Besides, statistics related to the subject have also been benefited from internet sites of domestic and foreign institutions, organizations and non-governmental organizations. Since there is no record in the selected villages about the producers who make productions with the local seed, for the sample size of the research, "non-clustered, single-step random probability sampling method based on primary mass ratios" was used (Kutlay et al., 2010).

$$n = t^2 \cdot [1 + (0,02) \cdot (b-1)] \cdot (p \cdot q) / e^2 \quad (3.1)$$

n= sample volume

t: Table worth 90% of importance

b: sampling stage (this stage is taken as 1 because it is a single stage)

p: the likelihood of the event not being occurred is taken as 50%.

q: the likelihood of the event not being occurred (1-p)

e: the accepted error margin (taken as 10% in this study).

b= when taken 1, the equation becomes;  $n = t^2 \cdot (p \cdot q) / e^2$ , when the values are put

$$n = (1,65)^2 \cdot (0,5 \cdot 0,5) / (0,10)^2$$

n= found as 68.

Within the scope of the study, local seed types that local seed producers possess were determined as a result of the interviews carried out with enterprises and local names of the seeds were figured out and noted. A table was created in which Family, Species and Type names of the local seeds take place. The Chi-Square test was used to determine the relationships between the state of use of the local seeds and the age and educational status of the surveyed enterprises. Within the scope of the research, the tables regarding the approaches of the producers about the methods and techniques of local varieties have been prepared and interpreted with simple percentages and rates.

### 3. Results

#### 3.1. Geographical features of the research area

When 20 villages surveyed in the study area are examined, it is determined that 69% of these villages are mountainous and 31% are plains. The mountainous areas are places that are more than 1000 meters above sea level or whose altitudes are between 500-1000 meters and the slope is more than 17%. Smooth areas are defined as plains where agricultural activities have not been broken down by rivers that are low relative to their surroundings and mostly on which agricultural activities are carried out. Table 1 shows the distances and altitudes to the provincial and district centres of the villagers engaged in production with local seed in the survey area.

Table 1. Distances of villages in the research zone to the city centres, districts and altitude

Village/District	Population	Distance to city centre (km)	Distance to district (km)	Altitude (m)
Göçüköy/Beyşehir	386	78	12	1160
Akçalar/Seydişehir	739	105	15	1000
Dikilitaş/Seydişehir	704	107	25	1540
İncesu/Seydişehir	631	97	7	1160
Kavak/Seydişehir	520	102	14	1134
Kızılcaköy/Seydişehir	278	108	18	1210
Yeniceköy/Seydişehir	124	110	23	1270
Tol/Seydişehir	392	68	22	1180
Başarakavak/Selçuklu	1.140	36	36	1000
Selahattin/Selçuklu	225	50	50	1260
Evliyatekke/Meram	159	60	60	1500
Alakova/Meram	1.201	13	13	1012
Gökyurt/Meram	529	45	45	1400
İnlice/Meram	959	50	50	1000
Yeşilyurt/Karapınar	108	184	17	1445
Hadim	13.572	128	-	1510
Taşkent	7.094	142	-	1500

#### 3.2. Population of enterprises

The population average of the enterprises surveyed is 4.07, 52% of which are males and 48% are females. According to the ages, 5% of the population consists of 0-6 age group, 10% 7-14 age group, 58% 15-49 age group and 28% 50 and over. When analysed according to age groups, for every enterprise size, the majority of the population as male and female constitutes the active population in the 15-49 age group.

Table 2. Distribution of population by age group in research area

Age groups	0-6 age		7-14 age		15-49 age		50 + age		Total		
Gender	M	F	M	F	M	F	M	F	M	F	M+F
Average of Enterprises	0,12	0,09	0,19	0,19	1,29	1,06	0,53	0,60	2,13	1,94	4,07
Ratio to Total Population	3,00	2,00	5,00	5,00	32,00	26,00	13,00	15,00	52,00	48,00	100
Ratio of Age Groups to Total Population	5,00		10,00		58,00		28,00		100		

The active population consists of people who commute to city centres with the reasons of business, education etc. who carry out production activities. That's why 50 and over age group was encountered in the research area with a percentage of 28 and only elderly population was found to be the guardian of and user of local seeds. The elderly population places great emphasis on the use of traditional methods and on local varieties.

### 3.3. Educational status of population in enterprises

Educational status of the population in the research area was analysed by population over 6 years. 63.5% primary school graduates, 1.8% secondary school graduates or students, 13.4% high school graduates or students, 13% college graduates or students and 1.1% college graduates or students are included in the survey. When the non-agricultural activities of producers are analysed, it is found out that 6% are retired, 20% are farmers, 29% are housewives and 30% are students. The remaining 15% are local authorities, grocery store people, tradesman, electrician etc. The producers are interested in other professions as well as farming

Table 3. Educational status in the enterprises

	M	%	F	%	M+F	%
Illiterate	10	50,0	10	50,0	20	7,2
Secondary School Student or Graduated	84	46,4	97	53,6	181	65,3
High School Student or Graduated	23	62,2	14	37,8	37	13,4
University Student or Graduated	28	71,8	11	28,2	39	14,1
Total	145	52,3	132	47,7	277	100

### 3.4. Status of workforce in enterprises

The labour force of each farmer's family is separately calculated as men and women from the producers interviewed in the research area (table 4). The total labour force in the enterprises surveyed is calculated as EIB 2.33. The enterprises do not take benefit of foreign labour force because they are farming with family business and self-consumption purpose. The highest working population in the enterprises is the population of 15-49 years old men and women. 1.44 EIB between 15-49 years was determined.

Table 4. Labour force status in the enterprises examined (EIB)

Age Groups	Male	Ratio (%)	Female	Ratio (%)	M+F	Ratio (%)
7-14	0,10	36,12	0,10	63,88	0,19	100
15-49	1,29	90,03	0,14	9,97	1,44	100
50-+	0,40	56,84	0,30	43,16	0,70	100
Total	1,79	76,78	0,54	23,22	2,33	100

### **3.5. Local seed usage status of the enterprises and supplementation type of available local varieties**

The enterprises surveyed in the research area are performing family vegetable farming. Family vegetable farming is the vegetable farming in small parcels of house gardens in the city or in the countryside to meet the vegetable needs of family members (MEB, 2007). Due to the climate of Konya region, the producers prepare the products they produce in summer to consume in winter months by keeping the vegetables in different conditions. For this reason, they produce local varieties in their gardens or small landscapes. As a result of the research, 49 local varieties were identified. The local varieties of the population are structured to be well adapted to regional and organic conditions from different angles. Moreover, although these varieties are not original, hundreds or even thousands of generations are produced in the region where they are grown; so they are very well adapted to the dominant biotic and abiotic conditions (Agong et al., 2001). The adaptation of local varieties to the regions in which they are used provides high yields in the land and climatic conditions in that region. However, it is increasingly difficult to continue the production of indigenous varieties in terms of a single type of production and market dynamics in agricultural production. Despite this, seeds that are durable to drought are the result of selections obtained by local varieties and natural species. Therefore, the preservation of local varieties of seeds, that is, the genetic diversity, is also important in terms of food safety. A significant portion of the world's food is still being produced and collected by local communities and farmers, utilizing local knowledge, local technology and local resources (Salalı, 2012).

### **3.6. Local seed usage of enterprises and local seed varieties found**

The enterprises surveyed in the research area are performing family vegetable farming. Family vegetable farming is the vegetable farming in small parcels of house gardens in the city or in the countryside to meet the vegetable needs of family members (MEB, 2007). Due to the climate of Konya region, the producers prepare the products they produce in summer to consume in winter months by keeping the vegetables in different conditions. The preparations made by the producers are usually product drying, pickles, bulgur, tarhana and so on. so the products are prepared as a result of their own methods and experiences. Local seed varieties cultivated in the research area are given in Table 5.

Table 5. Local seed varieties cultivated in the research area

Familiya	Tür adı (Bilimsel adı)	Yaygın adı	Yerel adı
Solonaceae	<i>Capsicum annuum</i>	Biber	İnce sivri biber Acı biber Dolma biber Tatlı köy biberi Tatlı sivri biber
		Domates	Pembe Domates Etili Domates Şakka Domates Kollu Domates Kolsuz Domates Top domates
Malvaceae	<i>Solanum melongena</i>	Patlıcan	İncesu Patlıcanı Közlemelik Tol patlıcanı İnce çizgili patlıcan
		Bamya	Kırmızı Bamya Çiçek Bamya Uzun Bamya Ayşe Kadın Şeker Dene
Leguminosae	<i>Phaseolus vulgaris</i>	Fasulye	Binbaşı(Kaymakam) Çalı fasulye Sıra fasulye
Fabaceae	<i>Faboideae lupinus</i>	Termiye (acı bakla)	
Cucurbitaceae	<i>Cucurbita pepo</i>	Kabak	40 gün kabağı Çekirdek Kabağı Sakız Kabağı Çerezlik kabak
		Bal babağı	İri Kabak Kırmızı Kabak
	<i>Cucurbita moschata</i>	Acur	Acır
	<i>Cucumis melo spp. flexuosus</i>	Kavun	Çizgili sarı kavun
Cucurbitaceae	<i>Cucumis sativus</i>	Hıyar	Sarı hıyar İri hıyar
	<i>Citrullus lanatus</i>	Karpuz	Kışlık beyaz Karpuz
Gramineae	<i>Triticum durum</i>	Buğday	Bolavadin(Ak Buğday) Kırmızı Kelle
Alliaceae	<i>Allium cepa</i>	Soğan	Sarı soğan Kırmızı soğan
	<i>Allium porum</i>	Pırasa	
	<i>Allium sativum</i>	Sarımsak	
Amarenthaceae	<i>Spinicia oleracea</i>	Ispanak	
Apiaceae	<i>Petroselinum hortense</i>	Maydonoz	
Pedaliaceae	<i>Sesamum indicum</i>	Susam	
Ranunculaceae	<i>Nigella sativa</i>	Çörekotu	
Panicaideae	<i>Zea mays</i>	Mısır	Renkli mısır Bişegen mısır İri daneli mısır Patlatmalık mısır Beyaz mısır

The origin is the richness of the local populations of a cultural plant regardless of the central country, which is indicative of agricultural biological diversity namely, germplasms (Kaya & Düzyaman, 2012). Existing natural resources and the environment we live in have been increasing the importance of the genetic resources required to feed the increasing world population day by day. Genetic resources contain genes that guide the development of living things. The different combinations of these genes provide for the formation of genetic diversity, which is extremely important in terms of past and present plant breeding work conducted in the future (Karagöz et al., 2010). The collection, storage and use of genetic resources have gained importance in order to increase crop production and enable sustainability and it has been figured out that the protection of herbal genetic resources for the future is the greatest wealth for the countries (Salalı, 2012).

### 3.7. Production status with local seed in the research area

When the research results are taken into consideration, 98.5% of the producers produce local seed and 1.5% does not use local seed. Local varieties have emerged as a result of farmers' choice of individuals with high quality traits that have been adapted to the region over time and in selections of successive generations and maintaining farming with those individuals preferred. Today, local varieties are those that are produced by using small inputs in mountainous small areas where commercial varieties are not cultivated. Local varieties with broad genetic variations are qualified as vital gene sources for the suppression of the potential of the evolutionary potential to which they belong, due to differences in the stress factors, disease and harmful pests and quality characteristics (Şehirli et al., 2005). The relationship between producers using local seeds and age groups was tested by Chi-square analysis. According to Chi-square test results, the Pearson Chi-Square value was found to be lower than 0.05.

Table 6. Relationship between age groups and local seed growing in the examined enterprises

Age Groups	Yes		No		Total	
	Nr	%	Nr	%	Nr	%
15-29	-	-	1	1,50	1	1,50
30-45	16	23,90	-	-	16	23,50
46-90	51	76,10	-	-	51	75,00
Total	67	98,50	1	1,50	68	100

$X^2=68,000^a$   $p<0,01$

There appears to be a relationship between age groups and local product productions in the enterprises investigated. As a result of the research conducted, 76.1% of producers who make production with local seeds are between 46-90 age group. Producers in this age group are responsible for ensuring the sustainability and preservation of local seeds. Studies conducted on the subject have also indicated that local seed protection is undertaken by women who are over middle age (Çelik, 2013). The average age of producers using local seeds was 53. Consequently, it has been determined that producers who make productions with local seeds are usually producers who are over middle age (table 6).

### 3.8. Factors affecting local seed usage levels of the enterprises

67.6% of producers interviewed in the research area produce local varieties for family consumption, 11.8% for price, 13.2% for consumer demand. 47.1% of the producers sell the products they produce and 52.9% use the products to meet their own needs. The best way to secure the presence of seed and plant varieties is to conserve by producing those varieties and to ensure that the products reach the consumer directly. A significant portion of the world's food is still being produced and collected by local communities and farmers, using local knowledge, local technology and local resources (Salalı, 2012). In table 7, the factors affecting local seed usage levels were examined.

Percentage of factors are 57.4% healthy, 58.8% natural, 60.3% local, 45.5% more delicious, 55.9% seed continuity 39% self-made happiness, and 30.9% are influenced by consumer demand factors. Using the local seed varieties, the producers have determined that they do not give up the flavours that they are accustomed to and that they are producing with the aim of ensuring the continuity of the seeds.

Table 7. Factors affecting local seed usage levels

Factors	5	%	4	%	3	%	2	%	1	%	Total	%
Healthy Product	24	35,29	39	57,40	4	5,90	1	1,50	-	-	68	100
Natural Product	23	33,82	40	58,80	4	5,90	1	1,50	-	-	68	100
Suitable for Locals	19	27,94	41	60,30	8	11,80	-	-	-	-	68	100
More Delicious	31	45,59	32	47,10	5	7,40	-	-	-	-	68	100
Providing Local Seed Continuity	17	25,00	38	55,90	10	14,70	3	4,40	-	-	68	100
Self-Made Happiness	7	10,29	27	39,70	30	44,10	4	5,90	-	-	68	100
Consumer Demand	1	1,47	21	30,90	30	44,10	16	23,50	-	-	68	100

5-Definitely agree, 4-Agree, 3- Uncertain, 2-I disagree, 1-I definitely disagree

According to a study conducted by Song and Li in 2011 on three different fields in the Karst Mountains region in Southwest China, the reasons for using local seeds of 53% of farmers who make productions with local seeds are respectively local seeds' being more delicious, strong adaptation features, easy access, durability to natural events such as drought. Owing to the fact that local varieties attach importance to cultural values and thanks to their economic benefits, growing local varieties keeps its presence instead of hybrid varieties. Other studies on the research matter show that the flavours of local varieties, being healthy and the sustainability of the seeds affect the producers' usage levels of their products.

### 3.9. Producers conservation methods of local seed varieties

It has been established that producers conserve their local seeds by using natural methods and without using any preservative substances to transfer them to next year to the next generations. The producers conserve the seeds in cloth bags, glass jars, bottles and so on (Table 8).

Table 8. Local Seed Conservation Types of Producers

	N	%
Bottles	13	19,1
Cloth Bags	37	54,4
Tin Boxes	4	5,9
Glass Jars	14	20,6
Total	68	100

### 3.10. Factors those are effective in the disappearance of local seeds

When other factors affecting the disappearance of local seeds were examined, 42.6% of the producers indicated that the presence of hybrid varieties similar to the local seeds was effective. 30.9% of the producers declared that the demand of the consumers for the certified products, which are called as commercial varieties, affects the disappearance of the domestic seeds (Table 9). The fact that the local varieties are not recognized by consumers is another factor. In response to the widespread mass

production, and in accordance with demands of industrial agriculture producer and consumer, along with dominance of productive and quality varieties on the market, local varieties with low durability to diseases and with low pest resistance were abandoned.

Table 9. Local seed destruction causes

	n	%
Inadequate recognition of local varieties by the consumer	10	14,7
More demand for commercial varieties	21	30,9
No suitable market for local varieties	8	11,8
Production of hybrid varieties similar to local varieties	29	42,6
Total	68	100

However, while excessive fertilizer and drug applications applied for high yield and quality cause deterioration of biological equilibrium; agricultural friendly systems have come to the agenda. One of the goals of these systems is to protect the existing bio-diversity found in the country.

### 3.11. Opinions of producers about expanding local seed varieties

In the research area, 98.5% of the producers exchange seeds, while 1.5% do not share the seed with other producers. 94.1% of the exchanged seeds are exchanged among neighbours and relatives, and 6% are exchanged with nearby and distant villages. In a similar research, producers pointed out that they supply seeds by making exchanges with those who they trust. It was determined that they exchanged seeds with rather close neighbours and relatives, and with people from close villages just for the sake of recognition of their seeds. They rarely share their seeds with farmers in distant villages (Çelik, 2013). 77.9% of local varieties producers have no information about seed exchange fairs and 22.1% stated they know about those fairs but they have not participated before.

Table 10. The role of the producer in the seed exchange festivals

	N	%
Opening Local Product Stand	10	20,0
By Exchanging Seeds	21	42,0
Participating in the event	19	38,0
Total	50	100

## 4. Discussion and Conclusion

Consequently, in this study carried out in Konya within the scope of the thesis study, 49 different local seeds were found related to the use of local seeds and it is determined that the use of these seeds still continues. According to the results of the research, it can be said that these seeds should be evaluated within the context of sustainability, especially in the evaluation of marginal land in mountainous areas. As in the research area, factors such as the age of the population living in the villages, the detachment of young people from agricultural activities, the lack of awareness of the importance of local seeds by young people and the tendency of producers to commercial seeds in recent years cause decrease and destruction of gene resources. For this reason, it is essential to encourage young people to farm, to make ecological villages or permaculture agriculture projects, in which traditional methods are introduced and to ingratiate village life and natural life for young people. Another issue that is as important as local seeds is traditional methods. The producers make productions with their own methods and share their knowledge with each other. Decrease in the number of farmers producing local seeds leads to a decrease in the amount of traditional knowledge. The most important way to prevent the disappearance of local seeds is to ensure that traditional language, knowledge, reservoir and experience are compiled and transmitted, especially to young people. For this very reason, the institutions involved in the related activities should use the traditional structure and culture to apply the plans and programs for the development of gene resources.

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