

Preferences of Irrigation Methods by Sugar Beet Producers, Their Age and Educational Levels for Konya - Çumra Region of Turkey

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Abstract: Agriculture is one of the most important strategic sectors in terms of the social and economic ways for Turkey. Approximately 35% of the population has lived in rural areas and there is a huge inactive labor force in such regions. Success and sustainability of agricultural activities depends on the education and social structures of farmers. Irrigation and irrigation technologies are possibly the most important inputs in agricultural activities. This study was conducted in Konya where it has the greatest agricultural land of Turkey with 25% of the total sugar beet production of Turkey. The preferences of irrigation methods by sugar beet producers, age distributions, education status, and number of person in family were researched by face to face technique. The percentages of farmers in 20-30, 31-40, 41-50 and 51-60 years old were 18.2% , 22.7%, 35.2% and 23.9%, respectively. The education levels of those farmers graduated from university, high, and primary schools were determined as 12.5%, 23.3%, and 64.2%, respectively. The number of person in most family varied from 5 to 8. The 95% of the farmers have preferred sprinkler irrigation method. The preference of drip irrigation method was 4.7% for high school graduated farmers. The 89.3% of the farmers defined that irrigation charges were expensive. The overall result of the study showed that increasing the education level in farmers contributed sensitivity of farmers for the water saving irrigation technologies

Keywords: Agriculture, Education, Sugar Beet Producers, Irrigation Method.

Introduction

The utilization of water resources and studies about these subjects are as old as human history. In the past, development of the society was in the areas where the fresh water resources were plenty. Water is the prime element for life on earth but, it is not exist in desired place, amount and time on earth. It is the strategic natural resource and will be also very important in future affected to the whole human life due to the limiting source.

Agriculture is the most important top strategic sector in respect to the socially and economy in Turkey. The almost 35% of population has lived in urban in Turkey and there is a huge amount of inactive labor force in such areas.

The success of activities and their sustainability depend upon the education level and social structures of farmers. The most important inputs in agriculture are irrigation and irrigation technologies. The availability of water resources, presence of much amount of agricultural areas and good facilities of

crop growth in Turkey has contributed the sustainable agricultural potential. Turkey has 78 million ha surface area and 28 million of this is suitable for agriculture with 5.1 million ha of land are being irrigated at present (Anonymous 2008).

In general, the climate is arid and semi-arid in Turkey but, climate change is different in seasons and regions. The total annual consumable water potential of Turkey is 110 km³ (Çiftçi & Kutlar 2007; Çiftçi et al. 2009a; Çiftçi et al. 2009b). According to 2009 records, the population is almost 72.5 million in Turkey. The annual per capita water potential is 2500 m³ and consumable of 1517 m³. Agriculture has used about 70-75% of total fresh water resources in Turkey. It has been estimated that available water resources of 75 km³ will be used in agriculture in next 20 years.

Education has very important role to play in efficient use of resources, performing accurate political selection, overcoming well management, obtaining qualified human for employment. It is also effective tool for obtaining well decision and development in democracy. The importance of education has increased gradually in whole our life as well as in agriculture in developed and changing world. The increase of the agriculture production is not only important in meeting the food supply of the nations but, high quality production is also very important. To success this, experienced agriculture trainers as well as skillful producers or farmers are needed.

Productivity is the base of the agricultural development and the base of the productivity is education. One of the most important problems, therefore, in Turkey is agricultural education. Although agricultural education is unique, it can be divided into two forms: -Theoretical scientific, and practical - training educations.

Under no or insufficient rainfall conditions, crop water requirement is not met by natural rainfall. Under such conditions, soil moisture deficit is met by applying water artificially and this is defined as irrigation. However, every random water applications have not accepted as irrigation. The main purpose of the irrigation is to meet the crop water requirement. By succeeding this goal, crop yield increases. Irrigation networks and systems are constructed to overcome this purpose.

Water resources are fairly scant in Konya basin of Turkey. Water scarcity is very serious in region especially summer season. Wheat, barley and sugar beet are very common field crops in this region. The most important problem in region is inefficient use of water resources. The losses are very high in irrigation due to the excess water applications.

Konya has share of 25% sugar beet production in Turkey and Konya-Çumra plain has one of the most intensively irrigated lands. Sugar beet is the highest water consuming crop in region so, it is the main target that irrigation water should be applied with minimum loss in sugar beet production.

Sprinkler irrigation method has been commonly used and subsidized for many years due to the high irrigation efficiency and easy in labor uses in sugar beet irrigation. The farmers who have the great technical and theoretical information deal with sugar beet farming.

In present study, education level, their age, number of family member and irrigation methods preferences of sugar beet producers in Konya-Çumra Plain Turkey was researched by face to face survey technique.

Material and Methods

This study was conducted Çumra Plain of Konya-Turkey. Konya has the greatest agricultural land with 25% of total sugar beet production in Turkey. In study, preferences of irrigation methods, age distributions, education level, family number of sugar beet producers were researched by using the face to face technique.

Konya, in Central Anatolia Peninsula, is located at South of Central Anatolia Region. It has the greatest surface area in Turkey with an average 1016m above the sea level. Soils in plain are mainly heavy, medium in some parts and light in very little parts. It has the rich of lime content and uniform topography as 0-1% land slope. The least rainfall of 326 mm has observed in Konya plain of Turkey. Annual average temperature is 11.5°C. Konya has steppe climate so irrigation is vital important in crop growth period due to the insufficient rainfall.

Irrigation water is obtained from both surface and groundwater resources. Groundwater is received from General Directorate of Sate Hydraulic Works (GDSHW), irrigation cooperatives and wells constructed by farmers. The surface water resources are Beyşehir Lake and Çarşamba Stream (Çiftçi & Kutlar 2007). Konya plain is one of the government irrigation regions in near history. Konya has the almost

2 million population with 1870000 ha arable and 1644000 ha irrigable lands. It has the shares of 11%, 13.7% and 25% in wheat, barley and sugar beet in Turkey, respectively. The land opened to the irrigation in Konya is 377000 ha (Çiftçi et al. 2010).

Results and Discussion

Age and Education of Farmers

Share of agriculture has decreased in national income while the importance of agriculture in the economy has remained. On the other hand, active population and employment ratios are high in agriculture. Average income of human rises when the ages increased under different education levels. Conventional agricultural structure is very common in agricultural activities of Turkey and those activities have continued by family farms. In recently, there is acceleration in education level in rural areas of Turkey. The age of farmers is more than medium in Turkey. The reason is that the highest-aged farmer is the leader in agriculture. The ages and education levels of farmers in our research are presented in Table 1.

Education Level		Age Ranges				Total	
		20-30	31-40	41-50	51-60	Number	%
University	Number	10	7	5	0	22	12.5
	%	45.5	31.8	22.7	0	100	
High School	Number	9	12	15	5	41	23.3
	%	22.0	29.2	36.6	12.2	100	
Elementary School	Number	13	21	42	37	113	64.2
	%	11.5	18.6	37.2	32.7	100	
Total	Number	32	40	62	42	176	
	%	18.2	22.7	35.5	23.9	100	

Table 1. Ages and Education Levels of Sugar Beet Producers

It can be seen from Table 1 that percentages of farmers were determined as 18.2%, 22.7%, 35.5% and 23.9% in 20-30, 31-40, 41-50 and 51-60 age ranges, respectively. The young population, 20-30 years old, was lowest and percentage of over the medium-aged (41-60 years old) farmers was 59.4%. Increase of the age resulted in improvement of experiences and qualifications. Accordingly, age of farmers in sugar beet production was observed mostly in 41-60 years old. Education has very important role to obtain the qualified labor forces for meeting economic and social requirements as well as for the population who are healthy and ready to work.

Education is the human right and is necessary for sustainable development. The education levels of farmers were elementary school in 64.5%, high school in 23.3% and university in 12.5%, (Table 1). Most farmers were graduated from the elementary school accordingly. This indicates that education levels of farmers were found lower than the expectation. Education level is also important for training of farmers about irrigation innovations. It is also vital important for learning the irrigation technologies as well as soil-crop-water relationships. The age was between 20-30 years in most university graduated farmers (45.5%) and all of them were younger than 40 years old. This shows that farmers have noticed the importance of university in agriculture.

Marital Status and Number of Family Members

In Turkey as well as in the world, population density can be described as the dividing population of farmers who deal with crop and animal production to agricultural land size. The population density varies in different regions and cities. It is highly influenced by the elevation such as mountainous or plain as well as number of the active farmers. It is high in mountainous areas while it is low in large plains. The active

population ratio was lower by comparison to developed countries while unemployment is fairly high in Turkey.

The distributions of marital status and family member numbers of farmers in respect to education levels are given in Table 2.

Education Level		Marital Status			Number of Family Population			
		Married	Single	Total	1-4	5-8	<8	Total
University	Number	17	5	22	8	9	0	17
	%	77.3	22.7	100	47.1	52.9	0	100
High School	Number	39	2	41	14	25	0	39
	%	95.1	4.9	100	35.9	64.1	0	100
Elementary School	Number	109	4	113	26	72	8	106
	%	96.5	3.5	100	24.5	67.9	7.6	100
Total	Number	165	11	176	49	107	9	165
	%	93.8	6.2	100	29.7	64.8	5.5	100

Table 2. Distributions of Marital Status and Family Member Number of Farmers

The percentages of farmers with married and single were determined as 93.8% and 6.2%, respectively. The percentages of university, high school and elementary school graduated farmers were 77.3%, 95.1% and 96.5%, respectively. Most farmers were married and this indicated that agricultural farms were family farms. The percentages of farmers in family as 1-4, 5-8 and <8 were found as 29.7%, 64.5% and 5.5%, respectively.

The highest family number of farmers was obtained from 5-8 as 64.8%. The number of farmers more than 8 was observed in only elementary graduations. The family number of 1-4 was only observed in university graduated farmers and those were also young.

The Reason in Sugar Beet Production Preferences of Farmers

In Turkey, sugar has been produced by sugar beet that is a very important fundamental food in whole human life. Sugar beet is also very important rotation crop. The yield and income obtained from unit area are good enough. In Turkey, about 400000 or 450000 farmers have obtained their incomes from sugar beet farming (Anonymous 2010). Konya city has the 25% total Turkey sugar beet production and irrigation is necessary prerequisite for sugar beet growth.

In examine the crop patterns, sugar beet is highly water consuming crop in region so water saving should be done in sugar beet farming. However, water resources are fairly scant and insufficient. The one of the highest sugar beet production centers of Konya is Çumra province. The Reasons in Sugar Beet Production preferences of farmers and production areas are presented in Table 3.

Farmers	Sugar Beet Production Preferences					Sugar Beet Production Area (ha)				
	Easy growth	Market Guarantees	Addiction	Low income of other crops	Total	20>	20-50	50-100	100<	Total
Number	9	140	20	7	176	20	80	48	28	176
%	5.1	79.5	11.4	4.0	100	11.4	45.4	27.3	15.9	100

Table 3. The Reason in Sugar Beet Production Preferences of Farmers and Production Areas

As seen from the Table 3, 79.5% of the farmers have preferred sugar beet production due to the market guarantees while 20% and 5.1% of them have preferred due to the addiction and easy growth, respectively.

As sugar beet production has been performed contraction with the farmers as quotas in the region, and Pankobirlik (*General Directorate, representative and senior organization of Beet Cooperatives, which are performing supply, distribution, supervision and coordination of all kinds of inputs, which are being used during the agricultural activities of its partners with the capitals, formed by its members' efforts*) guarantee of the production has been the most important reason for preference.

Like the all over the world as well as in Turkey, preference of crop production has affected mainly from the market guarantee in Turkey. The sizes of sugar beet production areas of 2, 2-5, 5-10 and <10 ha were 11.4%, 45.4%, 27.3% and 15.9%, respectively. In general, land size of sugar beet production varied from 2 to 5 ha (45.4%).

Irrigation Method Preferences of Farmers

Application form of water through the crop root zone may be defined as irrigation method. Irrigation water is brought to the irrigation area by conveyance and distribution Networks. The aim of the irrigation is to apply right amount water uniformly within the root zone depth. For success this, irrigation method is very important.

The suitability of the various irrigation methods, i.e. surface, sprinkler or drip irrigation, depends mainly on the following factors (Kara 2005); - natural conditions such as soil type, slope, climate, water quality and availability, - type of crop, -type of technology, -previous experience with irrigation, -required labor inputs, and -costs and benefits.

Pressurized irrigation methods can be defined as conveying irrigation water to the crops by closed pipes with a certain pressure. The most widely used pressurized irrigation system is sprinkler irrigation in Çumra Plain of Konya. To use this method, farmers should know the system accurately and have the proper information. The irrigation method preferences of farmers in region are presented in Table 4. The percentages of irrigation methods preferences were 95.0 % and 1.1% in sprinkler and drip irrigation, respectively. The sprinkler irrigation is the most suitable method in respect to the cost, management and irrigation technique. It was preferred as 95.1%, 90.6% and 96.6% for university, high school and elementary graduated farmers.

Education Level		Irrigation Methods				Which is the most Suitable Irrigation Method in Sugar Beet?				
		Surface	Sprinkler	Drip	Total	Surface	Sprinkler	Drip	No Idea	Total
University	Number	1	19	0	20	0	18	2	0	20
	%	5.0	95	0	100	0	90	10	0	100
High School	Number	2	39	2	43	0	42	2	2	46
	%	4.7	90.6	4.7	100	0	91.4	4.3	4.3	100
Elementary School	Number	4	112	0	116	0	97	9	4	110
	%	3.4	96.6	0	100	0	88.2	8.2	3.6	100
Total	Number	7	170	2	179	0	157	13	6	176
	%	3.9	95.0	1.1	100	0	89.2	7.4	3.4	100

Table 4. Irrigation methods Preferred in Sugar Beet

The highest preference of sprinkler irrigation method as 95% in region shows that farmers have great experiences about this method. Surface irrigation method, highest irrigation water losses, has been preferred the lowest as 3.9%. Although water application efficiency is high in drip irrigation method, it was

preferred low as 1.1%. The disadvantage of such irrigation method is high management cost. Most farmers preferred drip irrigation method were graduated from the high school.

Technical qualifications as well as irrigation management cost are very important in water management. This is evidence that most farmers were chosen sprinkler irrigation. The percentages of farmers about the suitable irrigation method for sugar beet were found as 89.2% for sprinkler irrigation, 7.4% for drip irrigation and 3.4% for no idea. None farmers have chosen the surface irrigation as a suitable method.

In examine the education level, university graduated farmers were accepted sprinkler irrigation as 90% and drip irrigation as 10%, as a suitable irrigation method. The 91.4% and 4.3% of farmers preferred sprinkler and drip irrigation methods, in high school graduation, respectively. These were 88.2% and 8.2% in sprinkler and drip irrigation methods for elementary education, respectively. Improvement of education level resulted in increase for the use of technological systems as well as capability of accurate irrigation management. Education level is not only needed for successful use of irrigation technologies, but also experiences of farmers are very important. Sugar beet producers, therefore, have considered low water losses and small management cost by preferences irrigation methods.

Conclusions

Education is very important for all sectors in a changing world especially in agriculture. Agriculture is strategic sector and should be improved in Turkey. The increase of the income in such sector like the central residential areas is necessary prerequisite. To obtain the goal, necessary policies should be performed and applied permanently. Irrigation water is the most important input in agriculture and is the highest share of water resources as 70-75% in Turkey. It is very important to reduce the water losses and minimize the irrigation costs for sustainable water resources. It can be achieved by selection of suitable irrigation method. This method should be high technical characteristics with low irrigation management cost. However, sometimes high technological methods are not preferred by farmers due to some difficulties and great management costs. The base of agricultural production is productivity and education is the base of the productivity. Improvement of education levels of farmers will contribute proper training and accurate management of irrigation Technologies.

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