



A Study on the Evaluation of the Socioeconomic Effects of Sugar Factories: A Case of Kastamonu¹

Araştırma Makalesi/Research Article

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ABSTRACT

Since the first periods of the Republic, great importance has been attached to the industry in Turkey. One of the most important of these is sugar factories. The sugar adventure, which started with the first opened Uşak and Alpullu Sugar Factory, continued with the Kastamonu Sugar Factory opened in 1963. In this study, it was aimed to examine the socioeconomic effects of sugar beet agriculture and sugar production on Kastamonu. For this purpose, the survey method, one of the quantitative research methods, was used in addition to the field studies carried out in the factory and district centers (Center, Devrekani, Tosya, Taşköprü and Seydiler). With the questionnaire applied to 127 randomly selected farmers, it was aimed to measure the parameters such as the path followed by the local farmer in sugar beet production, the problems experienced, earnings, sowing and harvesting. Within the framework of the meeting held with the factory representative, information was provided about the works at the factory, privatization and the general situation of the farmers interested in sugar beet farming. According to the findings, sugar production in Kastamonu province is important in terms of creating a livelihood for the farmer and employment. In addition, the migration of the young population negatively affects the number of farmers in the region. The increase in fixed costs in production affects the farmer negatively. In particular, the regulation of input costs can be suggested as the main factor that will positively affect the yield in sugar beet.

Keywords: *Kastamonu, Sugar Beet, Sugar Industry*

Şeker Fabrikalarının Sosyoekonomik Etkilerinin Değerlendirilmesine Yönelik Bir Çalışma: Kastamonu Örneği

ÖZET

Cumhuriyetin ilk dönemlerinden itibaren Türkiye’de sanayiye büyük önem verilmiştir. Bunların en önemlilerinden biri de şeker fabrikalarıdır. İlk açılan Uşak ve Alpullu Şeker Fabrikası ile başlayan şeker

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serüveni 1963 tarihinde açılan Kastamonu Şeker Fabrikası ile devam etmiştir. Bu çalışmada, şeker pancarı tarımı ile şeker üretiminin Kastamonu iline olan sosyoekonomik etkilerinin incelenmesi amaçlanmıştır. Bu amaçla araştırmada, fabrika ve ilçe merkezlerinde (Merkez, Devrekani, Tosya, Taşköprü ve Seydiler) yürütülen arazi çalışmaları yanında nicel araştırma yöntemlerinden anket metodu kullanılmıştır. Rasgele seçilen 127 çiftçiye uygulanan anket ile yöre çiftçisinin şeker pancarı üretiminde izlediği yol, yaşanan sıkıntılar, kazancı, ekim ve hasat gibi parametrelerin ölçülmesi hedeflenmiştir. Fabrika yetkilisi ile gerçekleştirilen görüşme çerçevesinde fabrikadaki çalışmalar, özelleştirme ve şeker pancarı tarımı ile ilgilenen çiftçilerin genel durumu hakkında bilgi sağlanmıştır. Elde edilen bulgulara göre Kastamonu ilindeki şeker üretimi çiftçiye geçim kaynağı oluşturması ve istihdam bakımından önemlidir. Ayrıca genç nüfusun göçü bölgedeki çiftçi sayısını olumsuz etkilemektedir. Üretimdeki sabit giderlerin artması çiftçiyi olumsuz yönde etkilemektedir. Özellikle girdi maliyetlerinin düzenlenmesi şeker pancarında verimi olumlu yönde etkileyecek ana etken olarak önerilebilir.

Anahtar Kelimeler: *Kastamonu, Şeker Pancarı, Şeker Sanayi*

INTRODUCTION

Human beings need energy and therefore nutrition in order to maintain their vital functions, to be protected against diseases, and to continue their daily work. The discovery of some plant species, their domestication and the transition to agriculture has been a great turning point for human beings. The products obtained from agriculture can be consumed directly, as well as processed in various industrial branches and offered to the use of people. In this context, agriculture is a warehouse that provides raw materials for industry. Industry, on the other hand, formed the last of the world's population in the leap stage, and has been an activity that has been the main factor in the outbreak of wars in the world until today. The sugar revolution dealt with the way it steered the colonization process and the transformation it created in human history. Thus, it gained the feature of being the only product that gave its name to the revolution in the history of the world (Higman, 2000). The raw material required for industry has been effective in the discovery of new geographical areas. It has contributed to employment with the manpower felt in the sector, and has increased the birth rates in industrial zones around the world by increasing living standards and welfare. It has been effective in turning a big economy wheel in the world by creating market areas for the sale of the produced product. In this case, it is inevitable for geographers to consider agriculture and industry as a whole.

The relationship between sugar and industry, which is one of the agricultural products used in industry and one of the basic food and energy sources of human beings, has been the subject of this research. There are two types of sugar in the world, sucrose and starch based. Sugar production, which is based on sucrose, is from sugar beet and sugar cane in the world; the starch-based one is produced from corn syrup consisting of glucose and fructose (Yaşar, 2003; Karaibiş and Emeklier, 2012). Sugar is obtained from sugar cane or sugar beet plants. Mitchell (2004) stated that sugar cane is grown in subtropical regions. The favorable climate and soil conditions of our country made it necessary to obtain sugar from sugar beet. Turkey's geographical factors such as climate, soil and other natural conditions create a favorable environment for sugar beet. The sugar beet plant, which finds its own growing conditions

in many provinces of Turkey, has become an industrial plant that has been researched and studied by geographers since it is also a subject of industry (Yavuz, 1970; Avcı, 1993; 1996; Kadiođlu, 2009; Arpacı, 2010; Akpınar et al., 2015; Demir, 2017). Sugar beet (*Beta vulgaris var. Saccharifera*), which is grown as a raw material for sugar, is an industrial plant in the Crowbar family. In addition to sugar production, it is an important industrial plant for reasons such as animal feed from by-products such as molasses, pulp, leaves and head waste, obtaining alcohol and spirit from molasses, being suitable for modern agricultural techniques and creating employment (Şiray, 1990; Yardımcı et al., 2012).

In sugar beet production, climatic features have important effects on beet quality. It is known that an extremely dry summer or an extremely rainy autumn adversely affects beet quality and reduces root quality yield in sugar beet. (Johnson et al., 1977). In Turkey, it was stated that sugar beet cultivation in the Central Black Sea Region is suitable in terms of sun exposure, wind, temperature, humidity and soil parameters, but frost and irrigation problems in the region negatively affect sugar yield (Gürbüz, 2019).

Investments in sugar factories, which are described as "centers of culture and civilization" (Alexander, 2010), increased even more in Turkey, especially after the proclamation of the republic, and the sugar industry took its place among the first factories to be established.

In this study, Kastamonu sugar factory, state run, which is the subject of research, was established in 1963. Since the day it was founded, its economic and cultural influence on Kastamonu has gradually increased. The fact that no previous study has been conducted to evaluate the sugar factory in Kastamonu and its socioeconomic effects constitutes the original value of this study. The information obtained as a result of the research reveals the place and importance of the region in the sugar industry, its contributions to the regional economy and its socioeconomic effects.

1. LOCATION AND CHARACTERISTICS OF THE RESEARCH SITE

The research area is in Kastamonu, where the average elevation is 775 m, 74,6% of it is mountainous and forested, 21,6% is plateau and 3,8% is plains. The valleys and the plains around the valleys draw attention in the province, which mostly consists of rough terrain. The most important of these are the Merkez, Daday, Taşköprü, Gökırmak and Devrez valleys. These valleys formed by the Araba and Devrekani streams, which are smaller than these, are the other plains in the province.

There are 20 districts in Kastamonu province (Figure 1). Although sugar beet is cultivated in some of these districts, 90% of the production is made in Kastamonu Central District, Devrekani, Tosya, Taşköprü and Seydiler districts. Generally, the needs of the sugar factory are met from the villages in Daday, Devrekani, Seydiler, Taşköprü, Tosya, Ilgaz, Germece, Tüney, Gökçeagaç, Boyabat and

Yenice district with 113 km. The nearest weighbridges the one located in Taşköprü with a distance of 24 km. The weighbridges located the research area are as follows: Devrekani weighbridge, Seydiler weighbridge, Lake weighbridge, Taşköprü weighbridge, Tosya weighbridge.

Figure 2. Distribution of Regions and Weighbridge Areas Connected to Kastamonu Sugar Factory



Source: Turkey Sugar Factories Inc., <https://www.turkseker.gov.tr/?ModulID=10&MenuID=45>. Acc. date: 15.06.2019.

There are 4 regional chiefdoms attached to the factory. As of 2018, 40.600 decares of beet has been planted in these chiefdoms. 20.600 tons of wasted beet and 191.000 tons of net beet were delivered. In addition, a total of 84.600 tons of beetroot was brought from Ankara Polatlı, Yenice Weighbridge and Çarşamba Factory from outside the region. A total of 267.200 tons of beets were processed at the factory in 2018. In addition, as of the 2017/2018 Campaign Year, 34.750 tons of crystal sugar, 67.468 tons of fresh pulp and 10.978 tons of molasses were produced. Again in this period, the presence of polar sugar in beet was determined as 16,26% according to the 2017 Annual Report. Sugar yield per hectare is 8,79 tons/ha.

In Table 1, the cultivation areas and production status of sugar beet for the last ten years are given. In this table, it is seen that since 2008, the sugar beet cultivation areas of Kastamonu Sugar Factory and the number of farmers cultivating beet have decreased. The decrease in the number of farmers is related to the migration of the farmers out of the region and the increasing costs of the farmers dealing with beet cultivation to other areas. While there was an increase in the number of farmers producing sugar beet between the years 2008-2010, a decrease has been observed since the 2011-2012 campaign period. Campaign durations varied between years, depending on the changing climatic conditions. While the

yield per decare was 3,69 tons on a 6.330,0 ha area in the 2008-2009 campaign years, it was 5,56 tons on a 3.559,2 ha area in the 2017-2018 campaign years. Despite the decrease in cultivation areas, it is seen that the yield per decare has increased.

Table 1. Sugar Beet Planting Areas and Production Status of Kastamonu Sugar Factory between 2008 and 2018

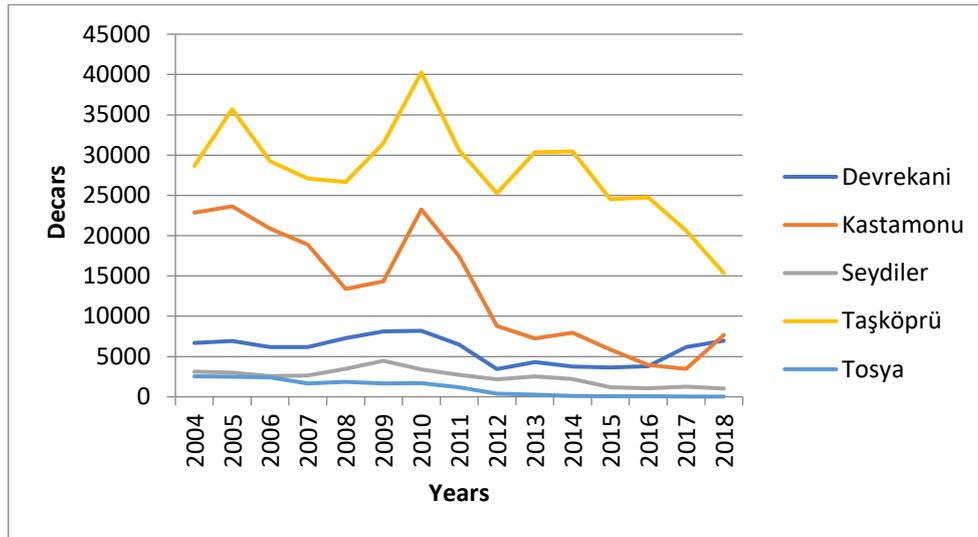
| Campaign Period | Camp. Time (Day) | Beet Cultivation Area (Hectares) | Yield (Decare/Tons) | Number of Sowing Villages | Number of Farmers Planting | Processed Beet (Tons) | Crystal Sugar Production (Tons) |
|-----------------|------------------|----------------------------------|---------------------|---------------------------|----------------------------|-----------------------|---------------------------------|
| 2008-2009 | 64 | 6.330,0 | 3,69 | 215 | 6.120 | 224.600 | 31.348 |
| 2009-2010 | 76 | 6.750,0 | 4,35 | 206 | 5.801 | 282.000 | 42.900 |
| 2010-2011 | 86 | 8.600,0 | 4,09 | 210 | 6.349 | 331.300 | 39.160 |
| 2011-2012 | 62 | 6.630,0 | 3,49 | 205 | 5.317 | 226.000 | 32.274 |
| 2012-2013 | 44,25 | 4.342,0 | 3,63 | 156 | 3.476 | 153.400 | 21.664 |
| 2013-2014 | 50 | 4.791,0 | 4,10 | 141 | 3.314 | 187.500 | 27.975 |
| 2014-2015 | 60 | 4.877,0 | 2,05 | 132 | 3.040 | 226.000 | 25.760 |
| 2015-2016 | 46 | 3.787,0 | 4,63 | 116 | 2.392 | 162.000 | 17.900 |
| 2016-2017 | 51 | 3.673,0 | 5,06 | 109 | 2.146 | 181.000 | 23.800 |
| 2017-2018 | 76 | 3.559,2 | 5,56 | 106 | 2.090 | 267.200 | 34.750 |

Source: Turkey Sugar Factories Inc. (Compiled from the website http://www.turkseker.gov.tr/data/dosyalar/Faaliyet_Raporlari2020_10_30_16_57_43_562.pdf. Access Date: 07.11.2019)

The distribution of the cultivation areas of the districts where sugar beet is cultivated in Kastamonu province by years is shown in Figure 3, compiled from the data of the Turkish Statistical Institute (TUIK). When this figure is examined, there are fluctuations over the years in Taşköprü and Merkez districts. Especially in recent years, it is seen that sugar beet cultivation areas have decreased in all districts except Devrekani district. The sudden decrease seen in all districts in 2007 is due to the 2007 crisis. In this period, the bad course of the economy also affected food prices negatively. Especially in recent years, student migration out of the region for educational purposes causes a decrease in the active population and a decrease in the labor force to work in agriculture. Although the farmers try to solve this deficiency by mechanized agriculture and by bringing in workers from outside, this increases the costs and people turn to products that bring them more income.

The fragmentation of land ownership is the biggest problem of the fields in Taşköprü district. In addition, Taşköprü is the district where the most planting is done in Kastamonu and where the factory is located. This district is followed by Devrekani and Central districts. The lands where sugar beet is cultivated in Seydiler and Tosya are less than in other districts. The existence of irrigable lands suitable for rice cultivation in Tosya district has led this district to rice agriculture.

Figure 3. Distribution of Cultivation Areas (Decares) of Counties where Sugar Beet is Cultivated in Kastamonu Province by Years



Source: Turkish Statistical Institute (TUIK), (https://www.tuik.gov.tr/PreTablo.do?alt_id=1001, Last Access Date: 08.02.2019).

2.1. Contribution of Kastamonu Sugar Factory to Local Economy and Social Effects

Kastamonu Sugar Factory has been an important source of income in the region with its increasing production area and number of farmers since its establishment. Producers not only make a living with the advance money they receive, but also meet the sugar needs of the family from the factory. Since the majority of sugar beet producers live in rural areas, they are also engaged in animal husbandry activities along with agriculture. This has also played an important role in the opening of large farms where modern livestock farming activities are carried out near the plantations attached to the factory.

When the harvest time comes, especially with the increase in mechanization recently, the owners of the dismantling vehicles make an agreement with the farmers on a daily basis, and this situation creates a new line of business. Separating the leaves of the extracted sugar beet from its stem and loading it on trailers are also done by workers who work for a certain wage. In addition, the transportation of beets, which are ready for delivery to the factory, from the fields to the factory created a need in the field of logistics, and the delivery of more sugar beets to the factory in a short time had a positive effect on the transportation activities carried out with trucks.

The workforce needed during hoeing and harvesting provides job opportunities for families from within the region. These workers work on acreage or per capita daily wages. Even in some areas, the number of these workers is not enough, and people from outside the region (especially from provinces such as Konya and Şanlıurfa) constitute seasonal worker migration with their families. Local women contribute to the household economy with daily wages in the process of purifying the weeds from the sugar beet plant.

It should not be thought that the sugar factory is open only during the harvest period. The factory, which is open all year, needs more labor force during the campaign periods, and it hires temporary workers during these periods. Apart from this, civil servants, engineers, servants work in the factory and the production wheel continues to operate in this way.

Sugar beet farming has also led to the establishment of enterprises that sell or rent agricultural tools to be used in production, and spare parts workshops. In addition, the cultivation of sugar beet and the need for fertilization revitalize the fertilizer, medicine and seed sectors that sell on this subject in the region.

Molasses is also made from sugar beet in the region. People who make molasses both provide food to their own homes and contribute to the home economy by selling these products in the markets. Apart from this, sugary products such as "pulling halva", which is a local product and whose main ingredient is sugar, supports the industry in a positive way.

The social activities of the factory are limited to the trainings given to the farmers. From the planting stage to the delivery to the sugar factory, the factory officials inform the farmers about sugar beet cultivation. This information is provided through conferences held by the authorities and brochures. Thus, farmers have a more efficient production process by having knowledge about sugar beet cultivation.

3. RESEARCH METHOD

The survey method, which is of great importance in geographical research, is one of the largest documented data collection methods, especially in Human and Economic Geography research. (Doğanay, 2002). These surveys, which are carried out for the people to be researched, both provide first-hand sources and provide more reliable results in the analysis and interpretation of the information obtained. In this context, the necessary information is obtained from the interviews with the Kastamonu Sugar Factory official and the feedback to be received from the producers living in four important districts where beet farming is carried out, from the information of organizations such as the General Directorate of Meteorology (MGM), State Hydraulic Works (DSİ), Mineral Research and Exploration (MTA), Kastamonu It was obtained from the Provincial Directorate of Agriculture. The information obtained through the questionnaire was calculated in Excel and presented in the form of tables and graphics, and their interpretations were made.

Both quantitative and qualitative research methods were used in the research. Qualitative research has been carried out in order to reveal perceptions and events in a realistic and holistic way in the natural environment, using qualitative data collection techniques such as observation, interview and document

analysis (Yıldırım and Şimşek, 2006). In the evaluation phase, one of the quantitative research methods, the scanning model used to describe the existing situation was used.

The population of this research consists of people living in Kastamonu and engaged in sugar beet farming, and the sample consists of farmers who participated in the survey conducted in districts where sugar beet farming is concentrated. In order to determine the socio-economic effects of sugar factories, a questionnaire was applied to 127 farmers in the districts where cultivation is concentrated.

In the study, "A Questionnaire for the Evaluation of the Socioeconomic Impacts of Sugar Factories" consisting of 25 questions; Kastamonu Sample" measurement tool was used. The questions in the questionnaire were determined together with expert lecturers. The obtained results were calculated in Excel and converted into percentage expressions and transferred to work with graphs and tables. 8 of the 135 weighbridges used were not included in the evaluation because they contain incomplete information. The evaluation results of the sugar beet production of the 127 farmers participating in the research were calculated as a percentage. A face-to-face interview was held with the authorized personnel of Kastamonu Sugar Factory, and the "Semi-Structured Interview Form" was used in this meeting.

4. RESULTS

4.1. Demographic Characteristics of Participants

85,04% of the farmers participating in the survey are male and 14,96% are female. This is due to the fact that men procure more materials such as fertilizer and seeds, and play a more active role in delivery to the factory and in other works. Information on the demographic characteristics of the farmers participating in the survey is given in Table 2. Young adults aged between 26-34 and 35-44 constitute a significant part of the participants. When the educational status of the farmers is examined, it is seen that the primary school graduates, who constitute 49,61%, are more than the other education levels. The total rate of graduates from high-level educational institutions such as high school or university is 17,32%.

The proportional distribution of education levels shows that the education level of the farmers participating in the survey is low. It is seen that the number of farmers with a monthly income of 3000 ₺ and above is higher with a rate of 44,09% compared to the monthly income of the farmers. This is followed by the farmers with an income between 2000-2999 ₺ with a rate of 37,80%, while the farmers with the lowest income are those with an income of 1-999 ₺ with a rate of 1,57%.

Table 2. Proportional Distribution of Participants' Demographic Characteristics

| Demographic variables | Groups | Number (N) | Percent (%) |
|-----------------------|---------------------------|------------|-------------|
| Gender | Woman | 19 | 14,96 |
| | Man | 108 | 85,04 |
| Age Groups | 18-25 | 8 | 6,29 |
| | 26-34 | 25 | 19,68 |
| | 35-44 | 77 | 60,62 |
| | 45 years and older | 17 | 13,38 |
| Education level | Illiterate | 6 | 4,72 |
| | Primary school graduate | 63 | 49,61 |
| | Secondary school graduate | 36 | 28,35 |
| | High school graduate | 16 | 12,60 |
| | Associate degree graduate | 3 | 2,36 |
| | Bachelor's degree | 3 | 2,36 |
| Monthly Income (TL-₺) | 1-999 ₺ | 2 | 1,57 |
| | 1000-1999 ₺ | 21 | 16,54 |
| | 2000-2999 ₺ | 48 | 37,80 |
| | 3000+ ₺ | 56 | 44,09 |

4.2. Findings and Comments on the Results of the Survey Form "Socioeconomic Effects of Sugar Beet Production" Applied to Farmers

The majority of the findings regarding the results of the questionnaire called "Socioeconomic Effects of Sugar Beet Production" applied to the farmers are shown in Table 3. In the survey, "How many years have you been dealing with agriculture?" When the answers given to the question are examined, it is seen that 55% of the respondents have been engaged in agriculture for 15 years or more. This is followed by farmers who have been farming for 10-14 years with a rate of 34%. When the most important livelihoods of the region are examined, it is seen that the number of people who have been engaged in agriculture for many years is high since the main economic activities are agriculture and animal husbandry.

It is seen that those who give the answer of 15 years and over with a rate of 65% to the survey question about how many years they have been planting sugar beet are in the first place. It can be concluded that sugar beet has been preferred as an agricultural product for many years in the region. This rate is followed by the farmers engaged in sugar beet farming for 10-14 years, 5% for 5-9 years, and 5% for 1-4 years, respectively, with 26%.

The answers given to the question "Do you think sugar beet production is a profitable business?" are as follows: 50% of the respondents answered "Yes" and declared that they think sugar beet production is a profitable business. While 21% say "Partially", 20% say "I am undecided", those who say that beet cultivation is not a profitable business constitute 9% of the participants.

Table 3. Results of the Survey Form titled "Socioeconomic Effects of Sugar Beet Production" Applied to Farmers

| Survey Questions | Response Groups | Percentage (%) |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| How many years have you been engaged in agriculture? | 1-4 | 2 |
| | 5-9 | 8 |
| | 10-14 | 34 |
| | 15 years and above | 56 |
| How many years have you been dealing with sugar beet farming? | 1-4 | 4 |
| | 5-9 | 5 |
| | 10-14 | 26 |
| | 15 years and above | 65 |
| Do you think sugar beet production is a profitable business? | Yes | 50 |
| | Partially | 21 |
| | No | 9 |
| | Undecided | 20 |
| Do you think that the promotional activities of Kastamonu Sugar Factory for producers are sufficient? | Yes | 28 |
| | Partially | 35 |
| | No | 18 |
| | Undecided | 19 |
| Does the factory have any support for the manufacturer other than purchasing products? | Yes | 20 |
| | Partially | 17 |
| | No | 42 |
| | Undecided | 21 |
| Do you think that the use of technology in the works of Kastamonu Sugar Factory is sufficient? | Yes | 44 |
| | Partially | 25 |
| | No | 17 |
| | Undecided | 14 |
| From where do you get fertilizer and seeds in sugar beet production? | Cooperative | 58 |
| | Factory | 25 |
| | Self | 17 |
| *What are the fertilizers you use in sugar beet production? | Phosphate | 84 |
| | Nitrogen | 97 |
| | Potassium | 49 |
| *What are the points that challenge you in sugar beet production? | Hand hoe | 76 |
| | Machine | 51 |
| | Using both methods | 36 |
| *Which methods do you use in sugar beet irrigation processes? | Keel irrigation | 56 |
| | Sprinkler irrigation | 71 |
| | Using both methods | 62 |
| Why Do You Produce Sugar Beet? | <ul style="list-style-type: none"> • To contribute to the country's economy, • It creates our source of income financially, • It is more profitable than other products, • We have our own field to plant, • It is compatible with the climatic conditions of the place we live in, • It meets our needs such as sugar and pulp, • Our fields are suitable for sugar beet cultivation, • We do not have any problems with irrigation, • It is an important industrial plant, • The government provides guarantees in the purchase, • We have planting areas close to the factory, • Both the state and the farmer earn, because they are our main source of income in the village. | |

*More than one answer was given to these questions by the farmers.

When the answers given to the question “Do you think that the promotional activities of Kastamonu Sugar Factory for producers are sufficient?” were examined, it was stated that the promotional activities of the factory were at a sufficient level by saying "Partially" with 35% and "Yes" with 28%. The rate of those who find it insufficient constitutes 18% of the participants. Increasing the promotional activities of the factory towards the farmer for the cultivation of sugar beet will further increase the yield from sugar agriculture.

As in every stage of agriculture, it is an indisputable issue that technology is an important element in the delivery and processing of the products produced to the factory. The products brought are firstly examined in the laboratories and quality controls are carried out. The beets cleaned with pressurized water are sent to different belts for chopping and shredding, and then they are transformed into sugar, pulp and other by-products by going through different processes. For this, the use of state-of-the-art machinery and tools ensures continuity in production and ensures the fastest use of production. Opinions of the farmers regarding the use of technology in the factory were taken and a question was included in the survey. “Do you think that the use of technology in the works of Kastamonu Sugar Factory is sufficient?” 44% of the answers given to the question “Yes” stated that the factory is at a sufficient level in the use of technology. Those who said “partially” were 25%, those who said “No” 17%, and 14% said “I am undecided”.

According to the feedback received from the farmers participating in the survey, 72% of the producers are partners in the beet cooperative. Beet cooperatives are organizations established in order to help farmers get the best results from their production, in matters such as soil care, tillage and productivity increase. Cooperatives inform the farmers by distributing oral and written brochures both before and during planting. The participants were asked whether they benefited from the services of the beet cooperative and it was concluded that 76% of the participants benefited from the services of the cooperative. When it is examined whether the farmers are members of agricultural organizations such as the Chamber of Agriculture, unions, foundations, associations, and cooperatives, it is concluded that 72% of the farmers participating in the survey are members of an agricultural organization. Non-members of agricultural organizations are 28%. When the members of the agricultural organization are asked to write which agricultural organization they are members of, the answers received can be listed as follows:

- Chamber of Agriculture,
- Agricultural Credit Cooperative,
- Beet Cooperative,

- Irrigation Association,
- Rural Development Cooperative.

When an answer was sought to the question “Where do you get fertilizer and seed in sugar beet production?”, 58% of the farmers stated that they bought the seeds from the cooperative, 25% of them bought the seeds from the factory, and 17% of them stated that they obtained the seeds by their own means.

In order to determine whether the factory directs the farmers and provides the necessary information flow in sugar beet planting, 60% of the farmers answered "Yes" and stated that the factory guided them about planting. 40% answered that no guidance was given by the factory.

Knowing the content of the soil, fertilizing and spraying in line with the necessary determinations will increase the yield to be obtained from the soil. In this direction, it was investigated whether soil analyzes were carried out by any institution in the cultivation areas of the farmers. 82% of the farmers who participated in the survey stated that they did not have a soil analysis. 18% had soil analyzes done.

When the farmers who had their soil samples taken were asked where they had their lands analyzed, the answer was: Kastamonu Provincial Directorate of Agriculture and Private Laboratories. When asked whether the farmers who had their lands analyzed were producing according to the results of this analysis, 11,81% of the participants stated that they took the results into account when fertilizing, while the rest stated that they did not take these analysis results into account.

Hoeing and weeding in sugar beet is another factor that is at least as effective as fertilization. In addition to sugar beet, with the fertilizers thrown, unwanted weeds may grow in the soil. Apart from this, it is known that the seeds that fall frequently from the machine during planting will adversely affect root development in the later stages. In order to eliminate this, the farmers in the region perform hoeing with hand hoe, which is a traditional method, and with machines within the possibilities of modern technology. The fact that the machine hoeing method increases the losses by damaging the plant roots has also directed the local people to the manual hoeing method. Although mechanized agriculture tends to become more widespread in the region in recent years, traditional methods maintain their importance. The best proof of this is that the growers ask, “What are the points that make you difficult in sugar beet production?” In their answers to the question, it can be shown that the most challenging point for them is the worker-expenditure costs. The most common use of workers is hoeing and harvesting. This can also be seen in the widespread use of hand hoe for dilution and weed removal.

Although the release irrigation method in sugar beet is negative in terms of carrying the well-developed and fertile part of the soil, it continues as a traditional method in the region today. In addition, the sprinkler irrigation method requires less labor, gives more successful results than the flood irrigation method on sloping lands, and is a more ideal irrigation method by allowing the soil to absorb water slowly. In this context, the farmers who produce in the region were asked what method they used to irrigate, and according to the answers they gave, it was concluded that sprinkler irrigation is used more widely.

Based on the answers to the question“Why Do You Produce Sugar Beet?”, it is concluded that the farmers prefer sugar beet as an agricultural product, as it is a plant that provides economic income and adapts to the local climate.

The answers given to the question“How Much Is Your Sugar Beet Production Area and Production Amount?” are shown in Table 4. Some 29,92% of the participants are engaged in sugar beet farming on 51-100 decares of agricultural land. This is followed by lands between 26-50 decares with a rate of 21,26%. At least, it grows sugar beet with a rate of 5,51% on an area of 500 decares or more. The size and smallness of agricultural lands vary according to the fragmentation of the land. The fact that the land is fragmented is due to its fragmentation by inheritance and topography conditions. While the beet cultivation lands were wider in Devrekani district, it was revealed that the lands were more fragmented in Taşköprü district. Since the lands are not fragmented, it will facilitate the use of machinery in agriculture and will increase the yield to be obtained from the unit area.

Table 4. The Proportional Distribution of the Sizes of the Fields Growing Sugar Beet by the Producers in the Surveyed Districts

| Size of Beet Sowing Area (da) | Number | Percentage (%) |
|-------------------------------|--------|----------------|
| 1-10 | 9 | 7,09 |
| 11-25 | 12 | 9,45 |
| 26-50 | 27 | 21,26 |
| 51-100 | 38 | 29,92 |
| 101-250 | 19 | 14,96 |
| 251-500 | 15 | 11,81 |
| 501+ | 7 | 5,51 |
| Total | 127 | 100 |

Another question in the survey is about the privatization of sugar factories (Table 5). As a result of the research conducted in the districts, 71,65% of the farmers who participated in the survey answered "No" to the question and stated that they did not want the factories to be transferred. The rate of those who said "Yes" is 8,66%, the rate of those who answered "Partly" is 15,75%.

Table 5. Opinions of Farmers on Privatization of Kastamonu Sugar Factory

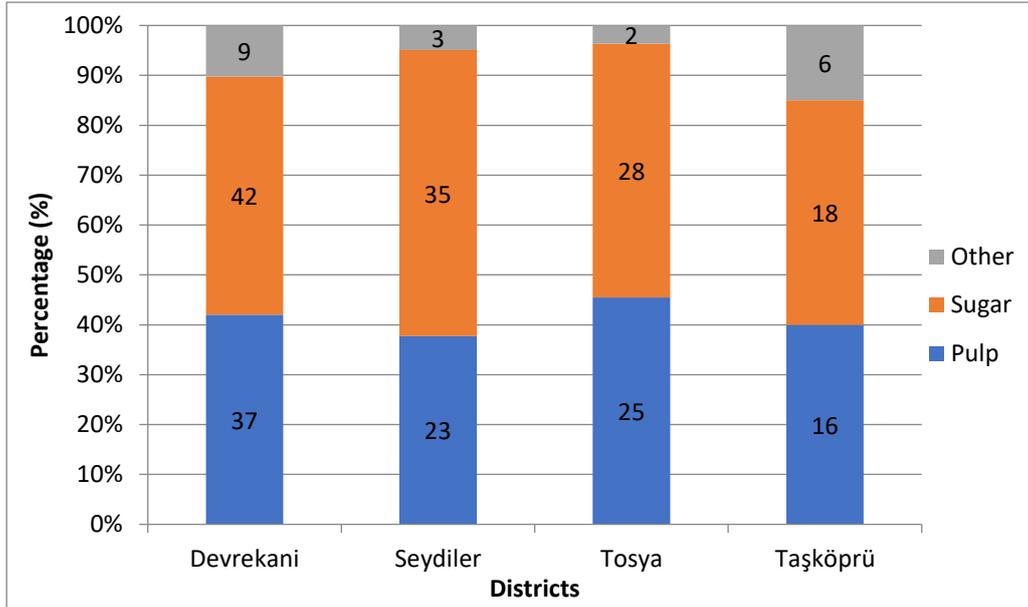
| District | Yes | | Partially | | No | | Undecided | |
|-----------|--------|-------------|-----------|-------------|--------|-------------|-----------|-------------|
| | Number | Percent (%) | Number | Percent (%) | Number | Percent (%) | Number | Percent (%) |
| Devrekâni | 6 | 4,72 | - | - | 32 | 25,20 | 10 | 7,87 |
| Seydiler | 2 | 1,57 | 4 | 3,15 | 21 | 16,54 | 2 | 1,57 |
| Tosya | - | - | 1 | 0,79 | 23 | 18,11 | 6 | 4,72 |
| Taşköprü | 3 | 2,36 | - | - | 15 | 11,81 | 2 | 1,57 |
| Toplam | 11 | 8,66 | 5 | 3,94 | 91 | 71,65 | 20 | 15,75 |

When asked why those who advocate that the Sugar Factory should not be privatized adopt this view, the following answers were collected:

- It is believed that the factory will work more systematically and regularly when it stays in the state.
- There is no guarantee that the factory will not close if the desired efficiency cannot be obtained when it is privatized.
- Farmers are in a difficult situation and sugar beet production decreases.
- If it is privatized, we cannot get the full value of our production.
- Since sugar beet is a strategic product, it should be under state control.
- The farmer cannot fully cover the cost and becomes unable to plant. This causes damage to the transporter, workers and other sectors, especially the manufacturer.
- Economic circles should be run by the state,
- As a farmer, we do not want to go out of state support.
- Sugar factories are the property of the farmer and the state, they should not be privatized.
- Private companies cannot provide as much as the state.
- The economic loss in the private sector is directly reflected on the producer and we suffer damage.
- It should not be transferred for a more systematic operation and service.

Sugar beet pulp is a product preferred by livestock farmers. In the survey, the farmers were asked which services of the factory they benefit from and their answers are given in Figure 4.

Figure 4. Proportional Distribution of the Answers Given to the Question “What Services Do You Benefit from Kastamonu Sugar Factory?”



In all four districts, it is seen that the rate of those who benefit from the sugar and bagasse services of the factory is high. This situation is caused by the fact that sugar is one of the basic foodstuffs and the farmer who produces beet in the region is engaged in animal husbandry activities besides agriculture because he lives in the countryside.

In the survey, “Is Sufficient Information About Sugar Beet Cultivation Provided to You by the Factory/Cooperative? Indicate the Places You Have Obtained Information About Planting”, 74,02% of the producers said "Yes" while 25,98% answered "No". With the answers obtained, it is possible to list the places where the producers received information about planting as follows:

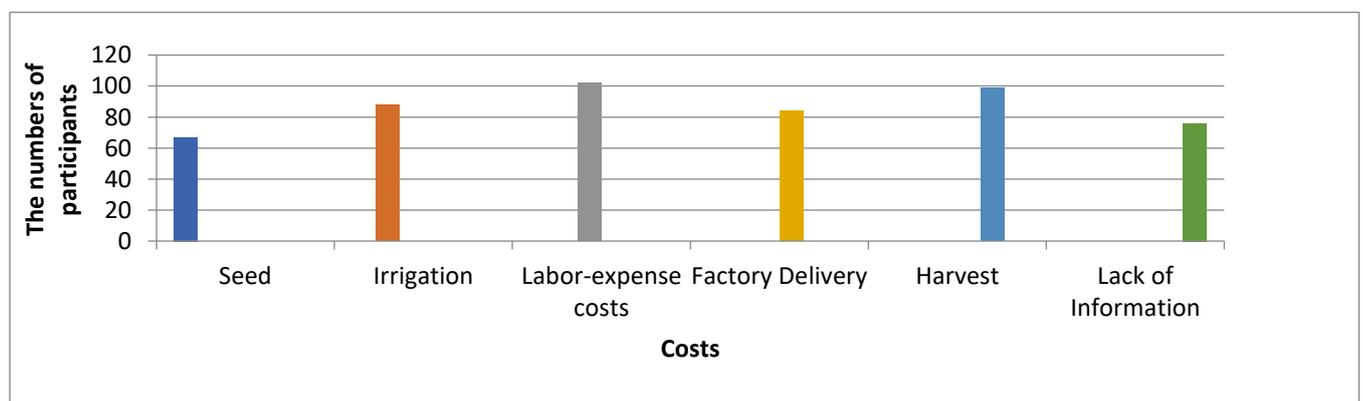
- From the Sugar Business District,
- Beet Cooperatives,
- From Beet Chiefs,
- Chamber of Agriculture,
- Sugar Factory Regional Chief
- From Kastamonu Sugar Factory,
- From Agricultural Engineers,
- From the presentations and booklets given by agricultural organizations before planting.

For the farmers both engaged in beet farming and animal husbandry in the region, pulp makes a great contribution to animal husbandry. In this context, questions were asked to the farmers who were surveyed in the research area to find out whether they are engaged in animal husbandry, whether they give sugar beet pulp to their animals or not, and their thoughts on the contribution of pulp to animal husbandry. It is known that people living in rural areas are generally engaged in animal husbandry as well as agriculture. This situation is also very common in the research field. According to the data obtained from those who participated in the survey, the rate of those who do animal husbandry is 86%, and the rate of those who do not keep livestock is 14%. In the region, especially in the winter months, the closure of the pastures with snow leads the animal breeders to feed, hay and other nutrients such as grass. Beet producers provide this by-product obtained from beet pulp, which has a high energy rate, to their animals to be fed. While 76% of the participants use the pulp as animal feed in the nutrition of their animals, 24% do not give it to their animals. In addition, the leaves at the head of the beet are used for feeding animals during the harvesting process.

Another question in the survey is to obtain information about how they evaluate the contribution of sugar beet production to animal husbandry (in terms of milk or meat costs). 44,1% of the participants answered "Very Important", 48% "Important", and 5,1% "Important". In the light of these results, it can be concluded that the farmers participating in the survey consider the by-products obtained from sugar beet, such as pulp and bagasse, to be important in animal husbandry.

Farmers face various expenses in the process ranging from the supply of seeds to the delivery of sugar beet to the factory, and there are some points that make the farmers economically difficult in production. In this regard, researches were carried out in the survey area, and more than one answer was received from the participants. It has been determined that farmers have the most problems in worker-expenditure costs (Figure 5). In addition, delivery to the factory and harvesting are other issues that increase the cost of farmers.

Figure 5. Proportional Distribution of the Answers Given to the Question “What Are the Issues that Make You Difficult in Terms of Costs in Sugar Beet Cultivation?”



4.3. Findings and Comments on the Interview with Kastamonu Sugar Factory Officials

Within the scope of the research, a mutual meeting was held with Deputy Manager at Kastamonu Sugar Factory on 08.01.2019. In the interview, the questions prepared in advance were conveyed to the participant in order and answers were received. During the meeting, information was obtained about the establishment of Kastamonu Sugar Factory and some of its features, and information was provided about the general situation of the farmers engaged in sugar beet farming in Kastamonu.

As a result of the interview, it was learned that Kastamonu Sugar Factory was opened on October 14, 1963. "It has an average of 3.800 tons of sugar beet processing capacity per day." The factory, which is expressed as, processed 267.200 tons of beets in the 2017/18 campaign period. "There are four regional chiefdoms affiliated to Kastamonu Sugar Factory. These; Center, Çankırı, Devrekani and Taşköprü (they have different scales)". When we look at the locations of the regional chiefdoms, it is seen that they are concentrated in the centers where the cultivation is high." information was obtained. "As of 2018, 40.600 decares of sugar beet has been planted in the cultivation areas of these four chiefdoms, 91 thousand 356 tons of beet, 206.000 tons of wasted beet, and 191.000 tons of net beet have been delivered." information has been transferred. In addition, during the meeting, it was learned that a total of 60.000 tons of beets were brought from Ankara Polatlı, Yenice weighbridge and Çarşamba Factory from outside the region. As of the 2017/2018 Campaign Year, the factory produced 28.300 tons of sugar, 67.468 tons of fresh pulp, and 10.300 tons of molasses. Considering the production diversity in the factory, it was learned that sugar, pulp and molasses were produced from sugar beet. We learn that the molasses produced here is sent to the yeast factories. In addition, depending on the existence of the sugar factory, it has been learned that in the same region, besides sugar, there are also industrial branches that appeal to sugary products such as rolled halva and hard candy.

Within the scope of harvesting, it has been determined that harvesting with workers and machines has become widespread. While this situation is effective for the farmers to make planting and production easier, it also increases the yield from the unit area. Information on this subject was given as "We see that agriculture, especially with dismantling machines, has increased in Devrekani district". The labor force provided for the lands where the use of machinery is low is as follows: "It is seen that the labor in Kastamonu is expensive, the population in the village has decreased due to the migration of the population of working age to the cities, and accordingly, there is an external labor force supply, and the employment of workers from Konya has increased recently, especially around Devrekani". specified. With the increase in mechanized agriculture, the number of workers needed by the farmer will decrease and this will increase the farmer's earnings by eliminating labor costs for the farmer.

The authorized personnel, who was interviewed, was asked what kind of training activities are carried out for the local farmers: “In our regional chiefdoms, both our friends on the field, our workers and our engineers are informed in writing and verbally through one-on-one interviews or a planter course held before planting.” expressed as. In addition, it is understood that the producers were informed about planting by distributing booklets to beet growers. In addition, the authorized personnel said, “The socio-economic impact of the sugar factory on the development of the region cannot be denied. It both provides employment and affects the cultural structure of the region where it is located. Not only the farmer, but also the transporter and the worker earns, and it is a factory that appeals to all segments of society”.

The question “What should be done to increase yield and quality?” was answered as "Especially in the center and Taşköprü districts, the fields are very small, so this affects the yield and quality negatively." "The average is around 5-10 decares. This situation is slightly better in Devrekani. The more the land is consolidated, the more the farmer's income will increase." From here, it can be concluded that one of the biggest problems in beet production in Kastamonu is the low income due to the fragmentation of the lands. Besides, "One of the biggest problems of the region is the high immigration. The population to be employed in agriculture is decreasing. In recent years, the cultivation area, especially in Devrekani, "I believe that agricultural areas will increase, especially if fuel, fertilizer and labor input costs are reduced." expressed an opinion.

Finally, when the authorized personnel was asked about his views on the privatization of sugar factories, he said, “Our factory has not been sold yet, no one has aspired, and now it's gone. Everyone looks at this issue from their own perspective. As long as he stays in the state, he cannot work more efficiently, there is no investment. When there is privatization, investments will increase. We have a shortage of qualified personnel, we are also experiencing a shortage of trained personnel as there is no demand for short-term jobs. Of course, there were also privatized factories. It is also useful to wait and see for them right now, they will also shed light on this darkness so that we can see the results” expressed his thoughts.

CONCLUSION AND RECOMMENDATIONS

Migration, which accelerates Turkey's transition from rural society to urban society, reduces the number of people engaged in agriculture and negatively affects sugar agriculture, like all agricultural activities. Seed supply, fertilization, pest control, credit supply and irrigation are the main inputs in sugar beet. Accordingly, the increase in these inputs, climate changes, diseases in sugar beet, quota application, privatization of factories, and the decrease in the number of people engaged in sugar

agriculture are other reasons. Sugar that cannot be obtained from sugar beet causes factories that need sugar to turn to chemical sweeteners and products containing Genetically Modified Organisms (GMO). Since Turkey is dependent on foreign countries in terms of chemical sweeteners, this situation increases exports and harms the country's economy.

Achieving the targeted income in terms of the development of rural areas and thus agriculture can only be achieved by increasing productivity, reducing costs, providing loans under favorable conditions, supporting the producer economically or socially from planting to marketing, but only by organizing and institutionalizing the producer first by himself and then by non-public institutions. These organizations are cooperatives, producer unions, associations and foundations, respectively. In this context, the membership of the farmers to any agricultural organization will make the farmers more effective in the production and marketing of sugar beet.

Sugar factories are important for the region both in terms of creating a livelihood for the farmers and with the permanent and seasonal employment they create within the factory. Apart from its contribution to the breeder, it is also important in terms of contributing to socioeconomic development. Since it also triggers livestock, transportation, fertilizer industry and other sub-sectors, it makes an important contribution to reducing the development gap between regions.

Apart from meeting the sugar needs of our country, it is of great importance for agricultural areas due to its use as animal feed and the fertilizer effect of its leaves left in the soil after harvest. Kastamonu Sugar Factory has an average of 3.800 tons of beet processing capacity per day with its increasing processing capacity since its establishment. There are 4 regional chiefdoms attached to the factory. Sugar beet, which requires great effort at every stage from planting to harvesting, is an indispensable agricultural product for Kastamonu farmers. In this context, the following results were obtained in sugar production in Kastamonu as a result of surveys and examinations with the participants engaged in farming in the region;

- The biggest challenge for farmers is increasing costs in production. The need for labor force, especially in the districts where there is a lot of out-migration, caused the producers to bring workers from outside, which increased the costs. Advance money should be given on time for these expenses of farmers before and after planting and should be increased in proportion to the increasing costs.
- Yield loss as a result of the incomplete modernization in agriculture puts the farmers in a lot of trouble. Although mechanized agriculture is widely practiced in some districts, agriculture with human power still continues. This causes a loss of efficiency and slows down the production process.

- Most of the growers in the region do not have their soil analyzed. This brings along unconscious fertilization and causes the desired yield from the soil to not be obtained sufficiently.
- Migrations out of the region, increase in costs, replacement of sugar obtained from sugar beet by chemical sweeteners and lack of incentives direct the farmers to other areas. Most farmers give up on beet cultivation due to the increase in costs but not providing the desired income, and turn to other income-generating products such as bread or animal husbandry.

Considering the results of the research, some suggestions that may be effective for the region are listed as follows:

- Sugar beet prevents migration out of the region with the required manpower and the employment opportunities it provides to the adjacent areas. Therefore, sugar beet production should be supported and people should be encouraged to produce.
- Payments, which are defined as advance money, should be made on time and farmers should be supported in modernization in agriculture by supporting the farmer in the supply of fertilizers, seeds and agricultural tools to be used in the transition to modern agriculture.
- According to the results of the survey, it is seen that the rate of farmers having soil analysis is very low. Farmers should be made aware of this issue, and agricultural lands should be fertilized according to the data prepared as a result of the analysis.
- Farmers should be made aware of everything from the first stage of production to the harvest stage, and it should be ensured that the best yield is obtained from the soil by conscious agriculture.
- Sugar beet production should be supported in order to ensure competition with chemical sweeteners that have emerged especially in recent years and to prevent foreign dependency in this regard.
- Sugar beet fields should be fertilized at appropriate times with the guidance of the cooperatives and the factory, and soil and leaf analyzes should be made absolutely. Inappropriate time and excessive fertilization is not beneficial, on the contrary, it harms the soil and creates a great cost for the farmer.
- When the planting areas that provide raw materials to Kastamonu Sugar Factory are examined, the small and fragmented fields, especially in the Center and Taşköprü district, affect the yield and quality negatively. This situation not only hinders mechanized agriculture, but also causes the farmer's income to decrease. Consolidation of the lands will both increase the income of the farmer and the suitability of the land for mechanized agriculture will be ensured.
- Irrigation canals are especially high in Devrekani district, where sugar quality is the highest. Expanding these canals in other production areas will make irrigation easier and increase efficiency.

- One of the most important problems in sugar cultivation in Kastamonu is migration out of the region. In particular, the migration of the young population out of the region increases the need for labor and affects the number of farmers who will produce. Meeting the labor force need by bringing in workers from outside the region is another factor that increases the cost. The increase in expenses for fuel, fertilizer, transportation, etc. affects the farmer negatively. Reducing this and similar input costs will affect the farmer positively, and will positively affect the yield in sugar beet.

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