

## EVALUATION OF THE IMPACT OF AGRICULTURE-BASED INVESTMENTS ON SUSTAINABLE DEVELOPMENT: YOZGAT PROVINCE SAMPLE, TURKEY

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### **Abstract**

*In this study, the role and importance of agriculture-based investments in sustainable development were investigated. For this purpose, a situation analysis of these matters was conducted for Yozgat province, which is from the 1st Degree Priority Regions in development. In the study, interviews were conducted with managers or expert personnel of institutions and organizations related to the subject. Data obtained via the interview were the primary data of the study. Papers and books published related to the subject, and data obtained from the database of the Ministry of Agriculture and Forestry (MAF) and the Turkish Statistical Institute (TSI) were also the secondary data of this study. According to the research findings, it is seen that significant investments based on agriculture have been made in the province. Among these investments, there are sugar factory (2 units), Kabalı Integrated Orchard (Turkey's largest integrated orchard), geothermal greenhouses, flour production (12 units), milk and milk products (12 units), meat and meat products (11 units), and fruit and vegetable processing-packaging facilities (4 units). With investment depended on agriculture, there have been positive developments in per capita gross domestic product, employment, labor force participation rate and unemployment rate in the province. While in 2004, gross domestic product per capita was USD 3,272, employment rate was 31.6%, the participation rate to labor force was 36.2% and unemployment rate was 12.8%, in 2021 these were, respectively, USD 4,869, 48.5%, 55.1% and 12%. In Kabalı Integrated Orchard, which is one of the largest orchards in Turkey, in addition to orcharding, there have been animal breeding activities such as goose, sheep and beekeeping. The cherry orchard located in the integrated facility is the third-largest cherry orchard in Europe. This study is important in terms of the sustainability of investments depending on agriculture and the formation of strong expectations for rural development.*

**Key words:** agriculture-Based Investment, gross domestic product, rural employment, sustainable development

### **INTRODUCTION**

Economic development depends on agriculture. Economic development is not possible without agriculture. Agriculture contributes to economic development, especially for those three reasons. Firstly, it is the main income source for living people in rural, second one is a determinant for economic growth based on employment, and is the raw material source of most industries [2]. The share of agriculture in the total gross domestic product (GDP) is 6.5% in Turkey [9]. 15.8% of the active population is employed in agriculture [19]. Ergo, in Turkey, agriculture is an integral part of the general and rural development process. In this instance, the government must encourage investments in agriculture. For, every investment in agriculture means employment and socioeconomic development. Investments in agriculture directly contribute to rural development by creating revenue growth and employment in rural [2].

Investment in the agricultural sector of the world was initiated with the establishment of the green revolution between the 1940s and 1960s. The Green Revolution Special Studies Office was established in Mexico in 1943 to describe the complete transformation of agriculture in developing countries and to increase significantly in agricultural production. In 1951, Mexico was sufficient by itself in wheat production and even started to export wheat. The Office of Special Studies officially transformed into the International Corn and Wheat Improvement Center in 1963. Agriculture, which started the green revolution, got reciprocity the best [12].

Yozgat province, one of the important agricultural centers of Turkey, is known for its investments depended on agriculture. The investments made have been effective in increasing yield in crop production. There has been a remarkable increase in the yields of field crops such as wheat, dry beans, green

lentils, and sugar beet. Ensuring agricultural and rural development at both national and local levels will be possible by investing in agriculture. Agricultural production resources are needed to achieve national development goals, and agriculture-based investments are important in this sense. For this, it is important to mobilize agricultural production resources and make rural investment operational [5]. While investments in agriculture are important for sustainable development goals, they are also used as an effective tool in fighting poverty. Agriculture is the first and only sector in people's nutrition and the supply of nutrients [8]; [7].

With this article, findings regarding the importance of agricultural investments in sustainable development have been revealed. The importance of agricultural investments in local development is clearly stated.

Sustainable development is a combination of concepts of development and sustainability and refers to development that aims at permanent environmental, social, and economic growth. Sustainable development can be defined in various ways, but there is a development approach that seeks to meet and balance the environmental, social, and economic needs of society at its core [17]. Sustainable rural development is defined as the process of stable socio-economic development of rural areas, increasing the efficiency of agriculture, achieving full employment of the rural population, and improving their living conditions [6].

There are many empirical studies linking economic growth with capital formation. Some of these studies are as follows: [11] in their study of the Middle East and North Africa region, stated that there is a strong causality between economic development and investments. [21], in his study in 2013, examined the relationship between investments and economic development in Sub-Saharan African countries and he stated that investments resulted in economic development. In the study conducted by [1] (2010) in Nigeria, capital formation was emphasized as the main determinant of economic growth and it was stated that capital formation is important to ensure short and

long-term, rapid, and permanent economic growth.

In this study, information and concepts regarding investments dependent on agriculture are given in the introduction part of it. Agricultural investments in Yozgat province and their importance in sustainable development are given in the findings section of the study. In the conclusion section of the study, a series of measures are also lined up as to why investment in agriculture is necessary for sustainable development.

## MATERIALS AND METHODS

The main material of this study consists of both primary and secondary data. Bilateral interviews were held with the managers or expert personnel of the Provincial Directorate of Agriculture and Forestry, Yozgat and Boğazlıyan Sugar Factories, Yozgat Chamber of Industry and Commerce, and the Provincial Coordination Office of the Agriculture and Rural Development Support Institution (ARDSI). These bilateral discussions/interviews constitute the primary data source of the study. In the study, in addition to bilateral interviews, it significantly benefited from papers and books published on the subject and the statistical database of the Turkish Statistical Institute and the Ministry of Agriculture and Forestry. These are also the secondary data of the study. In the analysis of secondary data, data for the period 2004-2021 were taken into account. In the study, bilateral interviews, used as the primary data collection tool, are a qualitative research method and are a technique based on verbal communication and taking place in a conversational atmosphere [3]; [13]. Thus, it was created for a direct meeting environment with the target organizations with this method. Information regarding the interview was enabled by note-taking. In interviews with target organizations; agriculture-based investments, employment, and production information, why these investments are needed, contribution to local and national development of investments, and sustainability issues were discussed. This information obtained from the interview was

subjected to content analysis and tables were created. Descriptive statistics were used in the interpretation and evaluation of the tables. In the study, the place of investments depended on agriculture in the development of rural areas was also examined and the management strategies to be followed were discussed.

## RESULTS AND DISCUSSIONS

### Agriculture-based investments in Yozgat province

In the light of interview held with the Provincial Directorate of Agriculture and Forestry, the scope of investments depended on agriculture was determined.

Accordingly, the general objectives of agriculture-based investments are: to increase the income level in rural, to achieve integration of the agricultural sector and industry dependent on agriculture, to support small and medium-sized businesses and small-scale family businesses, to strengthen the agricultural marketing infrastructure and the rural economic infrastructure and to create alternative new income sources in rural. To achieve these goals, in other words, to carry through rural development, the Rural Development Investments Support Program (RDISP) is prepared by Agriculture and Forestry Organizations.

Within the scope of this program, 50% grant support is also provided to investors. RDISP is implemented in the fashion of Agriculture-Based Economic Investments and Rural Economic Infrastructure Investments (Table 1), [16].

In the interview, it was determined that a total of 5,216,000 TRY support was provided by the Yozgat Provincial Directorate of Agriculture and Forestry for 2 projects within the scope of economic investments in 2022. 50% of this (2,608,000 TRY) was given as a grant. Any projects were not supported within the scope of economic investments in Yozgat province in 2021.

11 projects were supported within the scope of rural infrastructure (rural development) investments in 2022, and a total of 1,100,000 TRY support was provided. 50% of rural

development support was given as grants to investors.

Table 1. Agriculture-based investment types

Agriculture-Based Investments	
Agriculture-Based Economic Investments	Rural Economic Infrastructure Investments
<ul style="list-style-type: none"> <li>• Processing, drying, freezing, packaging, and storage investments of crops,</li> <li>• Agricultural production investments,</li> <li>• Renewable energy resources investments,</li> <li>• Aquaculture breeding investments,</li> <li>• Investments for processing, packaging, and storage of fertilizers of animal and vegetable origin.</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure systems for the development of family business activities,</li> <li>• Beekeeping and processing and packaging investments of bee products,</li> <li>• Smart agricultural practices,</li> <li>• Investments in handicrafts and value-added products,</li> <li>• Investments in silkworm breeding facility,</li> <li>• Aquaculture breeding investments,</li> <li>• Investments for machinery parks,</li> <li>• Investments in medicinal and aromatic plant cultivation.</li> </ul>

Source: [16].

Those below can apply to investments depended on agriculture [10]:

- Natural and artificial persons registered in the farmer registration system formed by the Ministry of Agriculture and Forestry,
- Collective, Limited and Stock Joint Companies, Agricultural Cooperatives, Breeders' Associations for Breeding Purposes and Agricultural Producer Associations.

Agriculture-based investments are also supported by the Agriculture and Rural Development Support Institution (ARDSI). In the interview with the Provincial Coordination Office of ARDSI [23], it was stated that 442 rural development projects have been supported and 206,5 million TRY grant support has been provided since 2011. Thanks to the grants, total rural development investments in the province reached 400,8 million TRY. With rural development investments, Yozgat province was provided to 92 dairy farms, 42 breeding farms, 3 poultry meat production facilities, one milk processing facility, 3 milk collection centers, 4 red meat processing facilities, 225 plant

production, processing, and marketing projects, 42 beekeeping projects, 8 craftsmanship and value-added products projects, 17 rural tourism facilities, 1 aquaculture production facility, 2 machinery parks and 2 renewable energy facilities.

In the interviews with the Yozgat Chamber of Industry and Commerce [15], and the Provincial Directorate of Agriculture and Forestry [16], agriculture-based investments were determined by sub-sectors in Yozgat province and given in Table 2.

Table 2. Investments depended on agriculture in Yozgat Province

Subjects	Number
Milk and milk products	7
Redmeat and redmeat products	11
Fruit-Vegetable Processing-Packing	4
Cereals and Pulses Production	7
Tea Sugar Production (excluding packaging)	2
Pastry Products Production	57
Flour Production	12
Bakery Products Production	110
Egg Packaging	11
Frozen food	1
Honey, Pollen, Royal Jelly, and Honeycomb Production and Packaging	2
Animal feed	6
Other	14

Source: [15], [16].

Major agriculture-based projects in Yozgat province:

### ***Kabalı Integrated Orchard Project***

An interview with the Yozgat Governorship was had for the Kabalı Integrated Fruit Garden project. According to this, it was stated that the first stage of the project was started in 2009. The project was carried out in Kabalı village of Kadişehri district. The facility is one of the rare examples of public, private sector and citizen cooperation in Turkey and covers a total area of 5,640 decares (Photo 1). In the project, irrigation and fertilization are carried out using a fully automated radio frequency system. It has Turkey's largest pond for irrigation purposes (25,000 tons of water capacity). The project includes 47,772 cherries, 276,021 semi-dwarf apples, 44,113 fully dwarf apples, 25,150 various peach and nectarine saplings, and 17,900 pear saplings. In Kabalı Integrated

Orchard, which is one of the largest orchards in Turkey, in addition to fruit growing, animal breeding activities such as goose, sheep and beekeeping are also carried out. The cherry orchard in the garden is the third-largest cherry orchard in Europe.

Kabalı Integrated Orchard Facility is of great importance as it is an exemplary facility in Turkey. In the first stage of the project, 806 parcels of 353 farmers were combined and a huge Integrated Orchard was created. In the merged parcels, the farmer's ownership was left untouched and a rental method was used. Bozok Agricultural Products Production Market, which was established by the Kadişehri District Governorship, used the peasant lands. Tic. Inc. for 25 years [20]. Thus, the management of the project is carried out by this company.

Water is pumped to the Integrated Orchard from the Çekerek River. By means of this project, Kabalı village farmers, who have generated low revenue in arid terms, have obtained more income from rental.

In addition, approximately 60 people from the village were employed in permanent status and 600 people in seasonal status [4].

Thus, this project has also made a significant contribution to the employment problem in the region.

Even, some families who left the village returned to their villages.



Photo 1. Kabalı Integrated Orchard Facility  
 Source: [14].

### ***Geothermal greenhouses***

Geothermal is a renewable energy source that can be used for direct heating or electricity generation. It aims to keep the climate inside greenhouses as close to optimum growing conditions for plants as possible. Geothermal

energy requires the usage of advanced computerizes to control the climate within the greenhouse. Geothermal energy can play a very important role in the energy balance, especially in developing countries.

Geothermal greenhouse farming is a plant production activity carried out in greenhouses in a geothermal heat environment by utilizing geothermal energy resources. Geothermal greenhouses are an important axis of agricultural development. Geothermal energy sources are extensively used in electricity production and in some areas of agriculture particularly in greenhouse heating. Geothermal energy, which is renewable energy, can attract attention within the framework of agricultural practices and economic and social development of rural areas because it is clean and usable.



Photo 2. Geothermal Greenhouse (Sorgun district)  
Source: [22].



Photo 3. Geothermal Greenhouse (Boğazlıyan district)  
Source: [22].

There are greenhouse enterprises where soil less greenhouse farming is carried out in a closed area of 30,000 m<sup>2</sup> (Photo 2) in Yozgat's Sorgun district and 60,000 m<sup>2</sup> (Photo 3) in Boğazlıyan district. Tomatoes grown in a geothermally heated greenhouse established by a company with the encouragement of the municipality in the Sorgun district are

exported. Geothermal greenhouse farming activities are carried out successfully in Yozgat province, which has a continental climate. A company that makes a greenhouse investment of 10 decares or more in Yozgat province can receive regional incentives from the Ministry of Economy [4]. In geothermal greenhouse farming, which is brought into the economy, the cost is lower than coal and natural gas and the productivity also increases.

#### ***Sugar Factories***

Yozgat Sugar Factory, which depends on Türkşeker, and Boğazlıyan Sugar Factory, which belongs to a private enterprise are active in Yozgat province. A total of 1,678 personnel work, 678 in the Yozgat Sugar Factory and 1,000 in the Boğazlıyan Sugar Factory. A total of 1,678 personnel work in these two factories. Sugarbeets produced in the region are processed in these factories.

#### ***Yozgat Sugar Factory***

The Yozgat Sugar Factory, whose foundation was laid on August 23, 1990, was put into service on February 15, 1998. The factory, which had a daily sugar beet processing capacity of 3,000 tons when it was established, has increased its production capacity significantly with time. In the interview with Yozgat Sugar Factory officials [24], it was stated that a total of 678 people worked in the factory, 378 of whom were permanent staff and 300 were seasonal workers, thus contributing significantly to the Yozgat economy in terms of employment.

358,500 tons of sugar beet were processed, 50,500 tons of beet sugar, and 113,140 tons of beet molasses were produced at Yozgat Sugar Factory during the 2022 campaign period.

#### ***Boğazlıyan Sugar and Products Integrated Facility***

In the interview with Boğazlıyan Sugar and Products Integrated Facility officials [25], it was stated that production has been made with the latest technology in the facility. The facility started production in 2006.

The facility was built on an area of 920 decares. It has a normal capacity of 10,000 tons/day and it has a maximum capacity of 12,000 tons/day. About 1,000 people were employed at the facility. Facility contributes

significantly to the regional economy through employment and production. During the 2022 campaign period, 1,068,000 tons of sugar beet was processed, 157,000 tons of sugar and 30,000 tons of molasses were produced.

**The role of investments depended on agriculture in sustainable development**

***Developments in animal existence and animal product production value***

Developments in animal product production were given in Table 3 in Yozgat province for 2004-2021 period.

When the table is examined, it is seen that there was an increase in both animal existence and animal product production value in the examined period [19]. It can be stated that agriculture-based investments have a significant impact on in development of animal breeding production.

***Developments in the yield of field crops***

Yield status and total production value of some of the most produced field crops were given in Table 4 in Yozgat province for 2004-2022 period. During the examined period,

there were significant increases in the yield of crop products and their production value [19]. There was an 80.6% increase in especially sugar beet yield from these crops.

Table 3. Animal existence and animal product production value in Yozgat province

Years	Sheep	Cattle	Animal Product Production Value (1,000 TRY)
2004	281,942	159,845	141,273
2005	279,282	215,242	159,173
2006	268,110	207,800	163,781
2007	281,159	207,785	180,430
2008	271,860	197,372	184,432
2009	258,034	194,426	220,024
2010	248,055	220,390	547,741
2011	285,332	210,203	235,847
2012	337,444	252,917	284,932
2013	377,269	273,412	348,943
2014	396,123	247,804	383,642
2015	407,867	244,350	427,068
2016	312,306	206,035	379,068
2017	348,673	235,527	488,058
2018	378,798	247,809	535,758
2019	340,094	245,825	508,089
2020	414,230	254,030	702,826
2021	456,097	242,653	-

Source: [19].

Table 4. Yields of the most produced field crops in Yozgat province

	Wheat (Kg/da)	Dried beans (Kg/da)	Chickpea (Kg/da)	Green lentil (Kg/da)	Sugarbeet (Kg/da)	Silage corn (Kg/da)	Crop product production value (1,000 TRY†)
2004	207	114	100	89	3,979	4,352	636,559
2005	235	101	109	96	4,575	3,591	655,057
2006	183	106	100	96	4,225	3,605	525,872
2007	149	116	101	79	3,648	3,966	505,815
2008	187	100	101	89	4,940	4,011	662,054
2009	249	120	120	105	5,258	4,063	755,713
2010	233	118	115	112	5,373	3,904	895,629
2011	259	135	126	116	5,258	4,092	1,017,775
2012	199	122	128	143	5,215	4,449	897,634
2013	254	135	120	95	5,458	4,512	979,970
2014	197	127	103	113	5,720	4,487	1,008,714
2015	283	138	116	122	5,700	4,550	1,326,712
2016	245	140	116	123	5,931	4,593	1,316,232
2017	225	117	106	132	5,930	4,615	1,540,165
2018	222	141	127	132	5,497	4,483	1,573,861
2019	193	131	114	109	5,516	4,263	1,841,168
2020	246	122	121	109	7,130	4,257	2,529,895
2021	161	186	104	90	6,091	4,563	2,688,175
2022	242	197	130	109	7,187	4,809	-

†TRY: Turkish currency

Source: [19].

***Developments in gross domestic product (GDP) per capita***

In the study, gross domestic product per capita was also examined in Yozgat province for the 2004-2021 period, and given in Table 5 [19].

According to this, gross domestic product value per capita declined partially after 2018. But, it increased generally during the examined period.

Table 5. Gross domestic product value per capita in Yozgat province

Yillar	Total GDP (\$)	GDP per capita (\$)
2004	1,739,757,143	3,272
2005	2,062,017,910	4,002
2006	2,085,672,535	4,075
2007	2,553,726,923	5,147
2008	2,805,802,325	5,789
2009	2,471,233,116	5,072
2010	3,158,722,214	6,505
2011	3,249,271,257	6,873
2012	3,166,347,486	6,846
2013	3,181,002,105	7,078
2014	3,234,499,541	7,357
2015	2,884,959,409	6,769
2016	2,911,323,255	6,901
2017	2,597,287,912	6,173
2018	2,288,744,720	5,558
2019	2,134,443,738	5,037
2020	2,126,651,428	5,033
2021	2,069,249,265	4,869

Source: [19].

### Developments in exports

Total exports and agricultural export data were also given in Table 6 for 2004-2021 period.

Table 6. Export figures for 2004-2021 period

Yillar	Total exports (1,000 \$)	Agricultural exports (1,000 \$)
2004	10,884	472
2005	4,683	2,455
2006	7,340	1,713
2007	19,518	1,013
2008	5,155	740
2009	4,235	1,128
2010	11,393	5,044
2011	14,644	7,828
2012	16,405	7,688
2013	21,495	7,763
2014	16,921	8,434
2015	11,091	5,332
2016	10,648	5,256
2017	11,952	4,294
2018	9,522	3,105
2019	13,499	6,840
2020	15,284	3,726
2021	18,485	3,628

Source: [19]; [18].

When the table is examined, it is seen that the total exports of the province increased by

years, but agricultural exports in total exports increased until 2014 and decreased after 2014 [18]; [19]. When the 2021 Basic Labor Force Indicators of Yozgat province were examined, the labor force participation rate was 55.1%, the employment rate was 48.5% and the unemployment rate was 12%. When these data were compared with the data from 2004, it was determined that there were significant improvements in all three. The study also examined the sectoral distribution of employment. Accordingly, in 2021, the service sector formed 53.5% of the total employment of the province, the industrial sector 26.1%, and the agricultural sector 20.4% [19].

### CONCLUSIONS

Agriculture fulfills a very important function in food security for societies and providing self-sufficiency in food. Since economic development depends on agriculture, it is necessary to invest much more in agriculture. In this study, investments depended on agriculture and their standing in sustainable development were researched. Investing in agriculture means improving rural infrastructure, use rationally of land and water resources, reducing rural poverty, increasing employment, and contributing to sustainable development, that is, a "win-win" strategy. Investment in agriculture must be absolutely made for food supply. Although most of these investments are made by the public sector, they must be also carried out by the private sector. Public investments have an effect the facilitating and encouraging private investments.

The social benefits of investing in agriculture are examined under four headings:

1) Earning: Investors can generate a high net cash flow from agricultural investment and a good operating income.

2) Appreciation: The arable land has decreased due to its abandonment and non-agricultural use. Since this made agricultural lands very more valuable, it became a good investment area for investors. Especially if agricultural land is a in residential area, or

close to transportation, its value can increase much more.

3) Improvements: An investor investing in agricultural land can bring add value to their properties by making improvements to the land. This may be in the way of growing various crops on uncultivated land. In addition, higher-yield organic farming rather than conventional agriculture can further increase the value of the investment. Such applications can provide greater added value to the land investor.

4) Income stability: The value of agricultural lands has much less fluctuation than other types of investments, and so agricultural land investment provides constant stability.

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