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EVOLUTION AND DYNAMICS OF AGRICULTURAL PRODUCTIONS IN ȘAGU COMMUNE, ARAD COUNTY

Denis PITARIU[1], Adrian PĂCURAR[1], Delia DRĂGOI[1] Adalbert OKROS[1], Casiana MIHUȚ[1]
[1] University of Life Sciences "King Michael I" from Timisoara, Romania, Calea Aradului, 119, Timisoara, Romania
Corresponding author: adalbertokros@usvt.ro

Abstract. *The paper presents the evolution of agricultural productions in Șagu commune, Arad County, in the period 2021–2024, by analyzing the main field crops (wheat, corn, rapeseed, sunflowers, vegetables, fodder plants and vineyards). The purpose of the research was to highlight the dynamics of the cultivated areas, the productions obtained and the agricultural systems practiced in a representative area of the Western Plain. The data were collected from official sources (APIA, MADR, Șagu City Hall) and correlated with field observations. The results show that winter wheat was the dominant crop in all the years analyzed, both in terms of area and production, followed by maize and rapeseed. Sunflower and soybean crops have registered significant variations depending on the climatic conditions, and fodder plants have had a constant contribution to the agricultural structure of the commune. The year 2024 stood out for the highest total cereal production (18,831 tons), while 2023 recorded the maximum values for oil plants (9,737 tons). The study highlights the trend of modernization of local agriculture and the orientation towards a balanced crop structure, adapted to the pedoclimatic conditions in western Romania. The commune of Șagu, located in the south-western part of Arad County, is located in the High Plain of Vingăi, characterized by poorly fragmented relief and soils suitable for intensive agriculture. The geographical positioning, the proximity to the municipalities of Arad and Timisoara and the favorable infrastructure have contributed to the development of a complex and diversified agricultural system.*

Keywords*: Șagu, agricultural productions; field crops; area dynamics; agricultural system; Arad*

INTRODUCTION

Agriculture is one of the oldest and most important human activities, forming the basis of the existence and development of civilizations (LAL, 2020; AMUNDSON ET AL., 2015). Globally, the agricultural sector is responsible for ensuring food security and maintaining the balance of ecosystems through the sustainable use of natural resources (FAO, 2022; SMITH ET AL., 2018). In recent decades, climate change, soil degradation and demographic pressure have forced the adoption of sustainable agricultural practices (MONTANARELLA ET AL., 2016; PANAGOS ET AL., 2020; MIHUȚ AND NIȚĂ, 2018), and the digitization and automation of agricultural processes have redefined modern agricultural production (BASSO & ANTLE, 2020; GEBBERS AND ADAMCHUK, 2010).

At European level, the Common Agricultural Policy (CAP) promotes the strengthening of resilient agricultural systems, geared towards conserving resources and reducing greenhouse gas emissions (EUROPEAN COMMISSION, 2023; EEA, 2022). In lowland regions, adapting agricultural technologies to local soil and climate conditions plays a key role in achieving stable yields (JONES ET AL., 2020; STOLTE ET AL., 2016, DUMA-COPCEA, ET AL., 2022). In Romania, agriculture continues to be a strategic sector, contributing significantly to the national GDP (INS, 2023). The Western Plain, which also includes the commune of Șagu, is one of the most productive agricultural areas, characterized by fertile chernozem-type soils and favorable climatic conditions for cereal crops and technical plants (POSEA, 1995; RIFLE, 2002; NIȚĂ, 2007). Recent studies emphasize the importance of optimizing crop structure according to soil resources, rainfall regime, and technological factors (IMBREA, 2014; RUSU ET

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AL., 2021; MORARU & RUSU, 2012, OKROS ET AL., 2022).The commune of Șagu, located in the south-western part of Arad County, is located in the High Plain of Vingăi, characterized by poorly fragmented relief and soils suitable for intensive agriculture. The geographical positioning, the proximity to the municipalities of Arad and Timisoara and the favorable infrastructure have contributed to the development of a complex and diversified agricultural system. In this area, wheat, corn, unflower and rapeseed crops occupy predominant areas, reflecting the general trends in western Romania (POPESCU ET AL., 2022; CIOBANU ET AL., 2021, MIHUȚ ET AL., 2018). The main objective of the paper is to analyze the evolution and dynamics of agricultural productions in Șagu commune in the period 2021–2024, by comparing the cultivated areas and the productions obtained from the main field crops. The secondary goal is to identify the development trends of local agriculture, correlated with pedoclimatic conditions and current technological factors.

MATERIAL AND METHODS

The data used in the paper come from official sources, namely the Agency for Payments and Intervention for Agriculture (APIA), the Ministry of Agriculture and Rural Development (MADR), the National Institute of Statistics (INS) and the City Hall of Șagu commune. For the period 2021–2024, the cultivated areas and the productions obtained for the main agricultural crops were analyzed: winter wheat, corn for grains, rapeseed, sunflowers, soybeans, field vegetables, fodder and vine plants.

The data were statistically processed by descriptive methods (mean, annual variation, percentage of participation of each crop in the agricultural total). In parallel, field observations were made on the applied technologies, cropping systems and the degree of mechanization of agricultural holdings. The classification of crops and the interpretation of the data were carried out according to the methodology of the Ministry of Agriculture and SRTS-2012 (Romanian Soil Taxonomy System), and the analysis was completed with climatic information from the Arad Meteorological Station.

RESULTS AND DISCUSSIONS

The purpose of this paper is to highlight the situation of agriculture in the commune of Șagu, Arad county through the areas and productions obtained and the agricultural systems practiced. Between 2021 and 2024. The highest yields in all four years analyzed were for grain cereal crops, with winter wheat being the crop with the highest yields. While field vegetable crops are at the opposite pole both in terms of harvested areas and in terms of yields obtained.
Table 1 shows the main field crops in Șagu locality, from 2021

Table 1.

Field crops 2021

Crops	Harvested areas	Productions obtained
Cereals for grain - total	4147	18800
Common Autumn Wheat	2385	12640
Autumn rye	17	83
Autumn triticale	28	143
Barley	385	2002
Autumn barley	88	431
Spring oats	59	183
Corn for grains	1185	3318
Oily plants – total	2358	7460
Sunflower	438	2390
Rapeseed	1495	4485

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Soybean	425	585
Field vegetables and in solariums - total	5	50
Tomato	1	12
Dried onions	1	
Autumn cabbage	1	20
Other vegetables	2	18
Forage plants-total	601	5810
Old and new perennials	338	3380
Alfalfa for hay and green mass	63	630
Annuals for hay and green mass	200	1800

Grain corn was the second crop in terms of harvested areas, followed by warts with 385 hectares and autumn barley with 88 hectares. The first place is occupied by the common autumn wheat crop with 2385 hectares. Common autumn wheat is the crop with the highest yields within grain cereal crops in 2021, with a production of 12640 tons. The rapeseed crop has the highest harvested area, with 1495 hectares, followed by the sunflower crop and on the last place is the soybean crop with 425 hectares. The rapeseed crop in 2021 achieved 4485 tons, sunflower achieved 2390 and soybeans achieved 585 tons. Autumn cabbage ranks first in terms of productions with a quantity of 20 tons. As for fodder crops, old and new perennials have the highest harvested area since 2021 with 338 hectares. Annual hay and green grass plants achieved yields of 1800 tons in 2021. Within the main crops in 2021, field vegetables rank last in terms of harvested areas, while at the opposite pole are cereals for grains with 4147 hectares.

Table 2 shows the situation of field crops in 2022.

Table 2.

Field crops 2022

Crops	Harvested areas	Productions obtained
Cereals for grain - total	4556	12512
Common Autumn Wheat	2145	6670
Common spring wheat	160	176
Autumn rye	60	240
Autumn triticale	17	74
Barley	1230	4245
Autumn barley	74	225
Spring oats	135	165
Corn for grains	735	717
Oily plants – total	1916	2020
Sunflower	880	585
Rapeseed	766	1352
Soybean beans	270	83
Field vegetables and in solariums - total	4	37
Tomato	1	7
Dried onions	1	3
Dried garlic	1	4
Autumn cabbage	1	20
Other vegetables		3
Forage plants-total	900	990
Old and new perennials	520	560
Alfalfa for hay and green mass	40	80
Annuals for hay and green mass	340	350
Vines on the fruit - total	12	55
Grafted and indigenous vines on the fruit	12	55

Corn for grains is a cereal crop where 717 tons were obtained, made from an area of 735 hectares. The barley crop achieved a production of 4245 tons on an area of 1230 hectares. Common autumn wheat is the first crop in terms of both 6670 tons of production and 2145 hectares of harvested area. In the 2022 oil plant crop, soybeans are located on the last step, with 270 hectares, from which only 33 tons were harvested. At the rapeseed crop, 1352 tons harvested from an area of 766 hectares were obtained, and the sunflower crop achieved 585 tons from an area of 880 hectares. At the 2022 autumn cabbage crop, the production obtained was 20 tons, production from an area of 1 hectare, and for the tomato crop, 7 tons were made from a harvested area of 1 hectare. The harvested area of old and new perennials was 520 hectares, where a production of 560 tons was achieved. Within the alfalfa crop for hay and green mass, a production of 80 tons was obtained, production made from an area of 40 hectares. A production of 55 tons on an area of 12 hectares was achieved in the fruit vineyard crop. 2020 tons were harvested for the plants intended for oil production, a quantity harvested from an area of 1916 hectares.
Table 3 shows the situation of field crops for 2023.

Table 3.

Field crops 2023

Crops	Harvested areas	Productions obtained
Grain cereals - total	1720	21723
Common Autumn Wheat	280	15161
Autumn rye	38	76
Autumn triticale	42	95
Barley	735	4037
Autumn barley	105	324
Corn for grains	520	2030
Oily plants – total	2672	9737
Sunflower	625	1562
Rape	1965	8052
Soybean beans	82	123
Field vegetables and in solariums - total	6	145
Tomato	1	24
Dried onions	1	15
Dried garlic	1	1
Autumn cabbage	1	15
Other vegetables	2	90
Forage plants-total	820	5382
Old and new perennials	250	1743
Alfalfa for hay and green table	250	1743
Annuals for hay and green table	320	1896
Vines on the fruit - total	31	155
Grafted and indigenous vines on the fruit	31	155

In 2023, corn production was 2030 tons, production on an area of 520 hectares. The first place in terms of production, within cereal crops is occupied by the common autumn wheat crop with 15161 tons, production carried out on an area of 280 hectares.
The sunflower crop was harvested from an area of 625 hectares, and the production obtained was 1562 tons, and the soybean crop for grains produced a production of 123 tons from a harvested area of 82 hectares. The production obtained for the tomato crop was 24 tons, production made from an area of 1 hectare. As for the autumn cabbage crop, the harvested area was 1 hectare, where a production of 15 tons was achieved. At the annual plant crop for hay

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and green mass, the harvested area was 320 hectares, and the production obtained was 1896 tons in 2023. The crop of old and new perennials in 2023 was harvested from an area of 250 hectares and the harvest obtained was 1743 tons.
Table 4 gives the situation of culture for 2024.

Table 4.

Field crops 2024

Crops	Harvested areas	Productions obtained
Cereals for grain - total	4692	18831
Common Autumn Wheat	2575	11890
Autumn rye	57	270
Autumn triticale	84	412
Barley	885	4160
Autumn barley	151	400
Corn for grains	780	1490
Sorghum grains	160	209
Oily plants – total	2066	3051
Sunflower	818	801
Rapeseed	1137	2160
Soybean beans	111	90
Field vegetables and in solariums - total	6	49
Tomato	1	12
Dried onions	1	10
Dried garlic	1	5
Autumn cabbage	1	20
Other vegetables	2	2
Forage plants-total	770	7000
Old and new perennials	120	1100
Alfalfa for hay and green table	120	1100
Annuals for hay and green table	530	4800
Vines on the fruit - total	31	124
Grafted and indigenous vines on the fruit	31	124

In 2024, the production of common autumn wheat was 11890 tons, production made from an area of 2575 hectares. At the grain sorghum crop, the harvested area was 160 hectares, and the production obtained was 209 tons. The dried garlic crop was harvested from an area of 1 hectare and the production obtained was 5 tons and for the dry onion crop the production was 10 tons, production made from an area of 1 hectare.

CONCLUSIONS

The year 2021 is the year in which the largest amount of fertilizer was applied in all the years analyzed with a quantity of 640 tons.

In 2024, the grain sorghum crop is present in grain cereal crops, which is also the only year in which this crop is present.

Cereal crops for grains dominated the agricultural structure of Șagu commune, autumn wheat being the crop with the largest areas and productions in all the years analyzed.

Yields varied significantly depending on annual climatic conditions and fertilization levels, with 2024 being the most productive year in terms of cereals.

Rapeseed remained the main oilseed crop, and sunflower and soybean had greater annual variations, determined by the rainfall regime.

The area occupied by fodder crops remained relatively constant, ensuring a stable component of the local agricultural system.

The results highlight the trend of crop diversification and the orientation towards a sustainable agricultural management, adapted to the pedoclimatic conditions specific to the Western Plain.

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