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ANALYSIS OF SUNFLOWER PRODUCTION, AT MACRO AND MICROECONOMIC LEVEL. CASE STUDY

GEORGIANA ROTARU, MARIANA NĂSTASE¹

Abstract: *In this study, the production technology of sunflower crop was analyzed, by comparison, in Calarasi county and a company located in Baragan area. The technological system components were analyzed regarding the technology of sunflower crop, practiced in the farm subject to the case study, namely: crop rotation; tillage; fertilization; seed and sowing; maintenance; harvesting. These components are joined by labor force and equipment used, materials and supplies consumed, way of organization and of course, corresponding costs. Also, the study is elaborated by passing from the national plan, to the county medium plan (Calarasi county) and micro, for the studied company with reference to surfaces, production, financial and economic results. The analysis made at macro and microeconomic level highlighted the importance of compliance with the technology fiche plan and with the crop and soil requirements, in terms of materials used, with particular emphasis on varieties and hybrids recently established on the market, which bring great production increases.*

Key words: *technology fiche, efficiency, average production, gross margin, crop technology.*

INTRODUCTION

For the application of some modern technologies in the farms, there are framework technologies on crops, which set out the component technical works, with general parameters to execute them. The framework technologies adapt to the local specific climatic conditions in each farm.

In determining technologies it is considered that the same average production can be achieved by using several technological options, convenient in terms of satisfaction of the plant requirements, but not equivalent in terms of economic efficiency; it requires the use of technology in unity and interdependence of technical and economic aspects. [5].

Regarding the technical aspect, we can say that the works and resources have been designed to create favorable conditions for the growth and development of plants and for obtaining some high productions per area unit.

The economic side highlights the economic effort to allocate resources and to perform works in order to achieve higher productions on area unit, with low power consumption, minimal cost, unit cost and higher profits per hectare. [4].

MATERIAL AND METHODS

The analyzed production technology in the studied companies focused on sunflower crop. All crops were mentioned successively, by: establishing the economic and plant importance, favorability areas, description of the period of vegetation, seeding, harvesting, the main varieties used, quality conditions, description of work processes by characterizing the necessary manual and mechanized labor force, agricultural machinery, materials recommended for achieving optimal quantity and quality.

The study focused on the analysis of data provided by SC Ildu Ltd, Vâlcelele commune, Calarasi county, on the data of achievements of INCDA Fundulea, as well as other specific publications in the specialized literature and scientific articles in the analyzed databases [3,4]. In analyzing the production technology of the crop, the following economic and technical indicators were used: average production per hectare (kg/ha); average production for an analyzed period; income per hectare (V), (lei/ha); direct costs per hectare (Ch d) (lei/ha) as a result of direct costs

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incurred in the crop technology; Gross margin ($MB = V - Ch d$); coefficient of variation; confidence limits for risk; determination coefficient and correlation coefficient.

RESULTS AND DISCUSSIONS

The sunflower crop has a special significance in our country; therefore, the crop is spread over large areas, being appreciated in areas with difficult climatic conditions. The sunflower fruits (*achene*) contain a of 50%, oil with exceptional food quality and high conservation degree; they are used in human food (*refined*) and in the food industry (*margarine, cans, soap, lecithin phosphatides, etc.*) [8]. The sunflower can be placed in rotation after autumn or spring cereals. It is not recommended sowing sunflower seeds after sugar beets, alfalfa, Sudan grass, as they dry ground strong and deeply. It is not recommended also to sow sunflower after rape, peas, soybeans, beans, as these crops have many common diseases (*Sclerotinia, white and grey mold, etc.*). The sunflower in crop rotation should lie on the same field not earlier than 7-8 years, in order to prevent the accumulation of soil in the seed of broomrape (*Orobanche*) and infectious diseases. It is interesting that, by the established eco conditions compliance, the sunflower should not be grown on the same site (plot, sub-plot) for more than 2 consecutive years, because it extracts from soil large amounts of nutrients and it promotes proliferation of some weeds, pests and specific diseases [8]. We believe that the failure of this condition encourages the exhaustion of the soil, in order to achieve some short-term profits by growing large areas of sunflowers. The land preparation is done in autumn or spring by superficial work in order to keep water reserve in the soil. The seedbed is prepared in a single pass with total grower or combiner, before sowing, at a depth of 5-6 cm. The germination capacity; minimum 95%; need for seed - 3.5-5 kg/ha (for an optimal harvest density of 30-50 thousand plants/ha); 5-13 thousand seeds per kg. The age of seed: you have to take into account the water reserve in the soil, the pressure of pests and diseases, weed pressure and used variety. The optimum time of sowing is in spring when the soil at 4-6 cm seeding depth recorded a temperature of 6-7 degrees. The density is determined depending on the biological potential of the variety, quality indexes seed and plant health, sowing time, seedbed quality and pressure of diseases at increased. Early hybrids 52 000-55 000; mid early hybrids 50 000-53 000; tardy hybrids 48 000-50 000; weight of 1000 grains: 50-80 g. Seed quantity per hectare: 3.5-5 kg. Seeding depth: 4-6 cm. The harvesting begins when seed moisture content is 15-16%. It is not harvested at full maturity due to large losses by shaking. The production can be obtained up to 4000 kg/ha [8]. Following the evolution of grown area (Table 1) with sunflower, an increase of 27% in 2013 compared to 2008.

Table 1 The evolution of the surface, average and total productions at sunflower crop at the country level, for the period 2007-2013

Specification	UM	2008	2009	2010	2011	2012	2013	Average (kg/ha)	δ (kg/ha)	c (%)
Surface	Thousands ha	835.9	813.9	766.1	790.8	995.0	1064.8	877.8	81.4	9.3
	%	100.0	97.4	91.6	94.6	119.0	127.4	X	X	X
Average production	Kg/ha	654	1437	1433	1597	1798	1313	1372.0	354.9	25.9
	%	100.0	219.7	219.1	244.2	274.9	200.8	X	X	X
Total production	Thousands to	546.9	1169.7	1098	1262.9	1789.3	1398.2	1210.8	363.5	30.0
	%	100.0	213.9	200.8	230.9	327.2	255.7	X	X	X

Source-***MADR,2014, *Techincal plants*, <http://www.madr.ro/ro/culturi-de-camp/plante-tehnice.html> [9].

The average production per ha in the country has experienced remarkable growth, from 654 kg / ha in 2008 to 1798 kg / ha in 2012, with a variation around the average production (1372 kg / ha) of 25.9%. Calarasi county lies entirely on the plains, for which agriculture is the main economic activity, which is mainly oriented to the crop production. In Calarasi county, the main field crops are wheat, barley, maize, sunflower, canola, soybean and field vegetables [2]. During

2000-2013, the surface of grain cereals increased by 5.5% from 252,587 ha in 2000 to 266,574 ha in 2013 [1].

In the large agricultural companies crops generally prevail that have a high degree of mechanization, because of labor force shortages. The agricultural associations and family households [3], which have sufficient labor force, plants are grown which require even under advanced mechanization conditions, high consumption of labor (vegetables, sugar beet etc.).

Table 2 The evolution of average sunflower crop in Calarasi county, during 2000-2013

Specification	MU	2000	2005	2010	2013	Average (kg/ha)	δ (kg/ha)	c (%)
	kg/ha	869.1	1338.1	1669.0	1909.3	1446.4	314.3	21.7
Sun flower	%	100.0	154.0	192.0	219.7	X	X	X

Source: ***I.N.S.,2014, Territorial Statistics, Territorial Statistics _2014.pdf Adobe Reader[1].

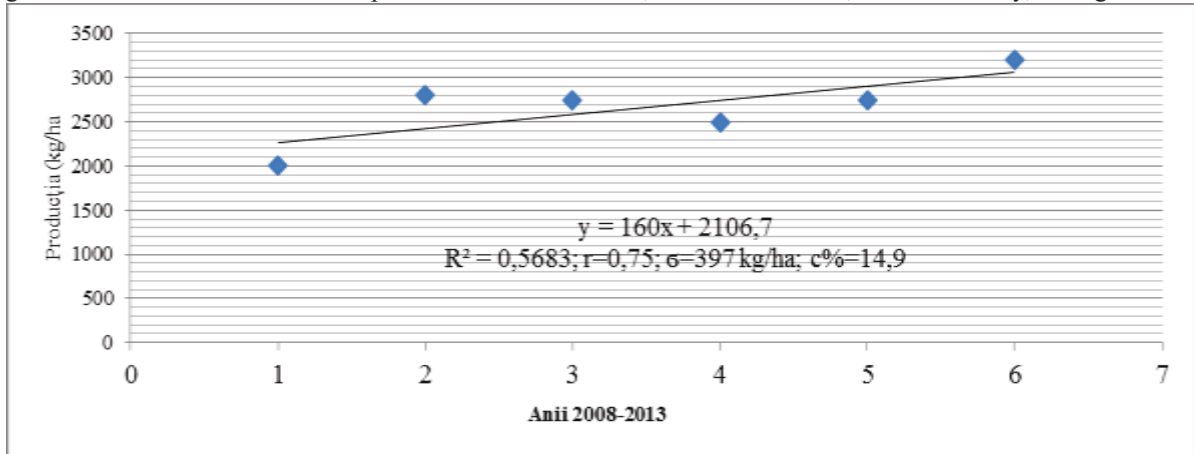
In the farm SC Ildu Ltd, the sunflower crop provides a high productivity. SC ILDU Ltd- is Romanian legal person, privately owned. SC Ildu Ltd was established in 1994, privately owned company; single associate is Vasile Iliuta . The company has as main activity “Growing cereals and other crops and livestock, farm work to obtain milk. [7] The geographical position near Calarasi town ensures sale market for the products. It has access to EAFRD program to complement the technical and material and agricultural machine able of operation in terms of efficiency of agricultural land in use and at the same time allowing farm expansion, the company has made in recent years investment from its own resources, embodied in agricultural machinery of good quality [6].

Table 3 The evolution of the main indicators characterizing the technology of sunflower crops in SC Ildu Ltd, Vâlcelele comon, Calarasi county, during 2008-2013

Specification	Sunflower	Years						average	standard deviation	c (%)	standard deviation quadratic (kg/ha)	average interval quadratic90%($t=2,13$)			
		2008	2009	2010	2011	2012	2013					min	Max	DEv (+/-) to medium	%
average production	kg/ha	2000	2800	2750	2500	2750	3200	2667	397	14,9	162	2321	3012	691	25,9
sale price	USD/to	659	712	1337	1397	2035	1050	1198	511	42,7	209	754	1643	890	74,2
income	USD/ha	1318	1994	3677	3493	5596	3360	3240	1487	45,9	607	1946	4533	2588	79,9
Gross margin	USD/ha	118	494	1777	1293	3096	1020	1300	1056	81,3	431	381	2218	1837	141,4

Source: Data from records SC Ildu Ltd, Vâlcelele comune, Călărași county[7]

Figure 1 The evolution of sunflower production in SC Ildu Ltd, Vâlcelele comune, Calarasi county, during 2008-2013



In recent years, the income was quite similar, except for 2012, the income reached a higher threshold of 5596 kg / ha (Figure 2). The average gross margin is 1300 lei / ha, with a large deviation of 1056 lei / ha and a coefficient of variation of 81.3% (Figure 3).

Fig. 2. The evolution of income per hectare of sunflower in SC Ildu Ltd

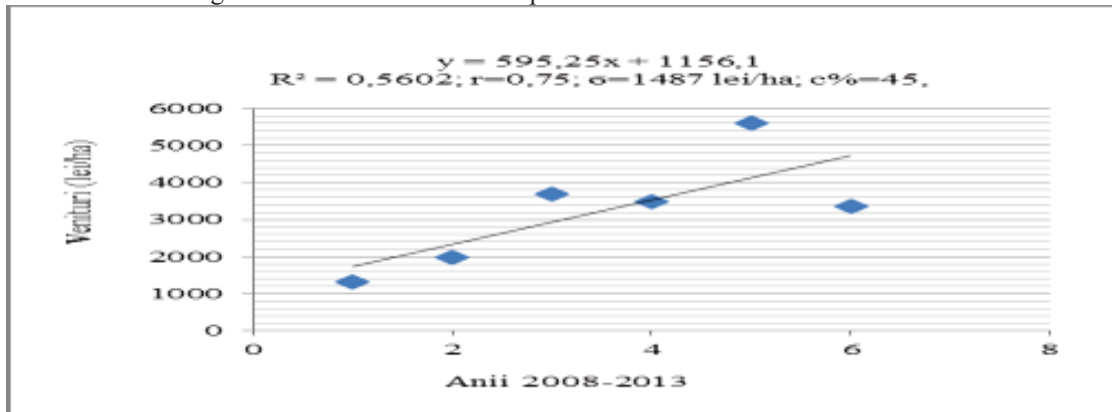


Figure 3 The evolution of sunflower gross margin in SC Ildu Ltd

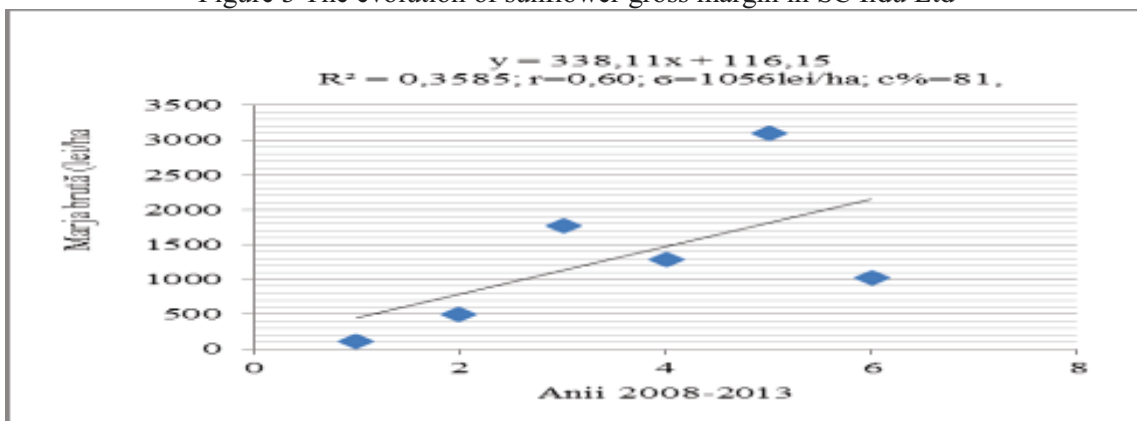


Table 4. Sunflower hybrids grown in SC Ildu Ltd the period 2008-2013

Crop / year	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Sun flower	LA PAMPA	LA PAMPA	AMIGO, LA PAMPA	Gt FLORINIS	PR ₃₉ A ₁₅

Source: Data from records SC ILDU LLC, Valcelele, Calarasi county[7].

Hybrid LA PAMPA: accented stay-green but quickly loses water at maturity; high ecological plasticity; tolerant to broomrape (*Orobanche Cumana*) - to G race; good resistance to *Phomopsis* sp. and other specific disease; MMB = 60 g; MHL = 40 kg seed oil content = 50-52%; potential production: 4.5 to 4.7 t / ha.

CONCLUSIONS

1. The agricultural technologies are characterized by joining work processes with natural biological processes. It is necessary that the sequence of works and operations necessary for the completion of each technology components must be determined according to this specific.

2. Since the production technology requires a set of work processes, dependent on the nature and structure of used production resources, its optimization is not only a technical activity, but also an economic one. The two sides of production technology, technical and economic must be addressed in interdependence, because each technology component involves the allocation of resources and of expenditure.

3. To organize and lead the application of technology means ordering components to achieve their sequence according to the technical, economic, energy and green criteria.

4. In Romanian agriculture, technologies of a high area variety are needed and depending on the form of land use.

5. The vast majority of farms does not have sufficient resources for the practice of modern technologies because only existing varieties and hybrids can not become performing without proper use of other factors (fertilizer, water, etc.).

6. While strengthening the private sector in agriculture, new technological options are required that will meet the cooperation and integration on food chains organized in the conditions of functioning on the free market. The future technologies must be simple, effective, low energy, protect the environment, they must not favor food pollution. The new technologies must ensure obtaining products in large lots, unpolluted, superior quality and cheap.

7. The factors in elaborating these technologies are scientific research institutes, industries and technical means for agricultural materials, agricultural specialists, guidance bodies and orientation of agriculture.

8. The new policies and agricultural strategy will have to implement proper agricultural technologies for the soil use and protection in order to preserve the quality of natural resources, creating an ambient environment to promote healthy prosperous agriculture, a sustainable economy, an increased chance for food security of the population;

9. The case study, by characterizing the main indicators of sunflower crop has revealed the following:

- Compliance with safety technology plan is of great importance in improving the production plan;

- Use of high quality varieties and hybrids, adapted to environment conditions specific to the crop, leading to extra quality and quantity of production;

- The use of inputs such as fertilizers, herbicides and plant protection products must be carried out as required and soil culture and their quality must be respected;

- SC Ildu Ltd is specialized in the field of crops than the growing of the main cereal crops with good results for its development;

- SC Ildu Ltd, presented a high stability of production, managing to have high production increases.

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