THE MAIN INDICATORS ANALYSIS THAT CHARACTERIZE THE CULTIVATED CROPS TECHNOLOGY IN THE AGRICULTURAL HOLDING SC TOMA SRL, VILLAGE MODELU, CALARASI COUNTY

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Abstract

The case study was conducted in the Călăraşi County, County cultivated mostly with cereals. The production technology study was performed in the agricultural holding SC Toma SRL, village Modelu, Calarasi County. The agricultural holding S C Toma S.R.L it is entirely a private owned company, established and operating pursuant to law 31/1990. The agricultural holding is currently operating in the area of 360 hectares of arable land. SC TOMA S.R.L., has a vegetal profile, cultivate especially cereals (wheat, maize and barley) and technical crops (sunflower, rape). We had as subject for analysis the main indicators of the holding, the data being processed using statistical formulas that emphasizes the differences between trends, and the efforts profitability made by the enterprise. This work is part of a comprehensive study conducted in the Calarasi County.

Key words: *agricultural holding, crop technology, production indicators*

INTRODUCTION

Călăraşi County is one of the youngest counties in the country, it was created in January 1981. The main richness is the natural agricultural land , which occupies over 84% of the County area. Soils, most of them are different types of chernozem and alluvial soils , they have a high fertility, which allows a large scale agriculture, predominantly being the cereal character of vegetal production[3].
Modelu Village is situated in the southern part of Călăraşi County on the left bank of the Borcea branch, between the municipalities Roseti at East, Dragalina and Perisoru at North, Stefan Voda and the city of Calarasi to the West and in South Constanta County.
Modelu, like most villages in Calarasi county, has an agricultural profile , the inhabitants developing activity in this area, taking advantage of the special soil conditions and climate for the development of cereal grains and technical plants.
The crops that were subject of analysis are the main crops in our country and in the world,

occupying a very important place in the national and international economy.All five cultures studied are used in human and animal nutrition, biofuel and many other uses.

MATERIALS AND METHODS

In the paper we used the following indicators: arithmetic mean, standard deviation, mean square deviation, coefficient of variation, confidence limits for a given risk, average annual growth rate, the limits amplitude for a given risk towards the average and statistical significance of these indicators.
The formulas used to calculate these indicators are presented : [2] [6]

For the arithmetic mean = $\overline{x} = \frac{\sum xi}{n}$; where:

$\overline{X}$ = the arithmetical mean; Xi = The average production values for a number of years (i);
n = number of years taken into account
The annual average growth rate [5] =

$$r2008-2013 = \sqrt[8]{\prod(p1/p0)-1}$$; where:

r2008-2013 = average annual growth rate;
∏p1/po = entangled growth indicators

For the standard deviation =

$$\partial = \sqrt{\frac{\sum(\bar{x}-xi)^2}{n-1}}$$; where:

∂ = standard deviation; xi = the average values for a number of years

n = number of years taken into account

For mean square deviation =

$$\partial x = \sqrt{\frac{\sum(\bar{x}-xi)^2}{n(n-1)}}$$; where:

∂x = mean square deviation;

The confidence limits corresponding to a given risk X = +/-ðx * tp, in which:

X = the arithmetic average; average square deviation;

tp = tabular value for the probability of transgression (risk)[1].

Amplitude of oscillation of the limits of confidence [7] =

= ((X + ðx * tp)-(X-ðx * tp)/(X)) * 100

Coefficient of variation = $$C = \frac{\delta}{\bar{X}}x100$$,where:
C-coefficient of variation (expressed as a percentage)

Coefficient of variation can be: between 0-10% variation; between 10-20%-sized variation; more than 20%-large variation

The data used was source: internal database of SC Toma SRL, the data from the literature.

RESULTS AND DISCUSSIONS

1.The main indicators analysis that characterize the wheat crop technology

The main economic indicators that characterize the wheat culture technology in SC Toma SRL, are presented in the table.1, as follows:

- The average production during the analysed period registered a minimum value in 2010, 2200 kg/ha, and reached a maximum during the last year analysed, 2013, of 6300 kg per ha. The average of productions is by 4067 kg/ha, with a standard deviation of 1363 kg/ha and a large supply of scattering of variation of 33.5%. The 90% probability interval is bounded below by 2881 kg/ha and higher by the limit 5252 kg/ha. The delivery price, is situated between the values 306 (2008) and 959 (2012), the average being of 604 Ron per ton, the coefficient of variation was over the threshold of 20 %,(37.9 %), which indicates a high degree of scattering of values around the average. Calculating the confidence limits, for the probability of 90%, it is indicated a range between 405 Ron/ton and 805 Ron /ton;

- The holding's revenues made from wheat culture, shows an average of 2425 Ron/ha, with a deviation of 1182 Ron/ha and a high coefficient of variation, 48.7%.

- The Gross margin is the indicator with the highest oscillations, recording in 2010, even a negative value,-344 Ron/ha, as well as a satisfying value in 2013 of 1341 Ron/ha. The average is of 339 Ron/ha, and the coefficient of variation demonstrate a very high degree of scattering, 164,7% .

Table 1. The main indicators evolution that characterize the wheat crop technology in SC Toma SRL, Modelu, Călărași County, for the period 2008-2013

| Specification | Wheat crop MU | Years | | | | | | Average | Stand. Deviation | c (%) | Mean square deviation (kg/ha) | Range for prob 90% (t = 2.13) | | | |
		2008	2009	2010	2011	2012	2013					min	max	Abs (+/-) towards average	%
Average yield	kg/ha	4200	4500	2200	3900	3300	6300	4067	1363	33,5	557	2881	5252	2371	*58,3*
Delivery price	RON/to	306	417	580	683	959	680	604	229	37,9	94	405	803	398	*65,9*
Revenue	RON/ha	1285	1877	1276	2664	3165	4284	2425	1182	48,7	482	1398	3452	2055	*84,7*
Gross margin	RON/ha	65,2	346,5	-344	253,7	368,7	1341	339	557	164,7	228	-146	823	677	*200,0*

Source: Own calculation after internal database of SC Toma SRL.[4]

2.The main indicators analysis that characterize the barley crop technology.

SC Toma SRL has the following indicators characteristics:

Table 2. The main indicators evolution that characterize the barley crop technology in SC Toma SRL, Modelu, Călărași County, for the period 2008-2013

| Specification | Barley crop Mu | Years | | | | | | Average | Stand. Deviation | c (%) | Mean square deviation (kg/ha) | Range for prob 90% (t = 2.13) | | | |
		2008	2009	2010	2011	2012	2013					min	max	Abs (+/-) average girl	%
Average yield	kg/ha	4400	4700	3900	4100	3700	7000	4633	1213	26,2	495	3579	5688	2109	45,5
Delivery price	RON/to	295	358	520	656	780	720	555	198	35,7	81	383	727	344	62,0
Revenue	RON/ha	1298	1683	2028	2690	2886	5040	2604	1335	51,3	545	1443	3765	2321	89,1
Gross margin	RON/ha	18	170,6	167	478,6	565	2597	666	968	145,4	395	-176	1508	1332	200,0

Source: Own calculation after internal database of SC Toma SRL.[4]

- The average production shows a stability until 2012, followed by an increase of almost 90% in 2013, reaching 7000 kg / ha.The average of the 6 years is 4633 kg / ha, with a large variation productions 35.7%, as shown by the coefficient of variation;
- The price of delivery has an upward trend, reaching to record in the last two years much higher values compared to the early years. On average for those 6 years, barley was sold with 555 Ron/ton, with a deviation of 198 Ron/ha, and the variation in prices of 35,7% around the average price. The confidence interval with 90% probability is lower bounded by 383 Ron/ha and higher by 727Ron/ha.
- In terms of revenue and gross margin we can affirm that 2013 was the year in which the company has registered considerable values with 5040 Ron/ha as revenue and a gross margin of 2597 Ron/ha. These values are due, of course, to the higher quantity of production.

3.The main indicators analysis that characterize the maize crop technology

Regarding the maize crop technology , its indicators are presented as follows:

Production/hectare has an averaged value over the years of 6750 kg/ha, the greatest production being obtained in the last year, 2013, 9000 kg/ha.

The delivery price has varied values throught the period considered, the year 2012 representing the year with a very good capitalization , 1047 Ron/tonne of maize.

Although , the most quantitative production was done in the year 2013, taking into account the value of the delivery price and the achieved production, the highest incomes were completed in the year 2011, 5736 Ron/ha, with 516 Ron more compared to the year 2013.

The Gross margin shows a large variation, with a coefficient of 69%, a deviation of 1282 Ron/ha and an average of 1856 Ron/ha.

Table 3. The main indicators evolution that characterize the maize crop technology in SC Toma SRL, Modelu, Călărași County, for the period 2008-2013

| Specification | Maize culture UM | Years | | | | | | Average | Stand. Deviation | c (%) | Mean square deviation (kg/ha) | Range for prob 90% (t = 2.13) | | | |
		2008	2009	2010	2011	2012	2013					min	max	Abs (+/-) average girl	%
Average yield	kg/ha	5100	5400	7800	8000	5200	9000	6750	1713	25,4	699	5260	8240	2979	44.1
Delivery price	RON/to	354	408	652	717	1047	580	626	249	39,7	102	410	843	433	69.1
Revenue	RON/ha	1805	2203	5086	5736	5444	5220	4249	1757	41,4	717	2721	5777	3056	71,9
Gross margin	RON/ha	221,4	365,2	2740,6	3327	2433,4	2051	1856	1282	69,0	523	742	2971	2229	120.1

Source: Own calculation after internal database of SC Toma SRL.[4]

4.The main indicators analysis that characterize the rape crop technology.

The average production at the rape culture, as values between 1800 kg/ha and 3300 kg/ha, with an average /years of 2094 kg/ha. In 2012, the agricultural holding has not cultivated the rape. The delivery price is around 1638 Ron per ton, with a deviation of 379 Ron/ton, and a values variation around the mean of 23.1%.

The gross margin and the incomes have the lowest values in 2008 of 2016 lei/ha and respectively 61 Ron/ha and a significant

values in the last year 2013, of 5445 Ron/ha
and 3068 Ron/ha.

Table 4. The main indicators evolution that characterize the rape crop technology in SC Toma SRL, Modelu, Călărași County, for the period 2008-2013

Specification	Rape culture	Years						Average	Stand. Deviation	c (%)	Mean square deviation (kg/ha)	Range for prob 90% (t = 2.13)			
	UM	2008	2009	2010	2011	2012	2013					min	max	Abs (+/-)-average girl	%
Average yield	kg/ha	1800	2100	2800	2565	-	3300	2094	1153	55,1	471	1092	3097	2005	95,7
Delivery price	RON/to	1120	1650	1350	1860	2200	1650	1638	379	23,1	155	1309	1968	658	40,2
Revenue	RON/ha	2016	3465	3780	4771	-	5445	3246	1977	60,9	807	1527	4965	3438	105,9
Gross margin	RON/ha	61	1563	1773	2551,9	-	3068	1503	1262	84,0	515	405	2600	2195	146,1

Source: Own calculation after internal database of SC Toma SRL.[4]

5.The main indicators analysis that characterize the sunflower crop technology

In the crop technology of sunflower , we see the following developments:

- The average production per hectare has throughout the period considered, a positive evolution, reaching in the year 2013 to record with 1900 kg/ha more than in 2008. The productions average is of 2485 kg/ha, with a deviation of 637 kg/ha and a high degree of scattering given by the coefficient of variation 25.3%;

Table 5. The main indicators evolution that characterize the sunflower crop technology in SC Toma SRL, Modelu, Călărași County, for the period 2008-2013

Specification	Sunflower crop	Years						Average	Stand. Deviation	c (%)	Mean square deviation (kg/ha)	Range for prob 90% (t = 2.13)			
	UM	2008	2009	2010	2011	2012	2013					min	max	Abs (+/-)-average girl	%
Average yield	kg/ha	1700	2300	2400	2800	2300	3600	2517	637	25,3	260	1963	3071	1108	44,0
Delivery price	RON/to	659	712	1337	1397	2035	1050	1198	511	42,7	209	754	1643	890	74,2
Revenue	RON/ha	1120	1638	3209	3912	4681	3780	3056	1391	45,5	568	1847	4266	2420	79,2
Gross margin	RON/ha	75,3	330,6	1553,8	1994,6	2611,5	1602	1361	977	71,8	399	512	2211	1700	124,9

Source: Own calculation after internal database of SC Toma SRL.[4]

- Regarding the delivery price, its value was the highest in 2012, 2226 Ron per ton, while in 2008 was the lowest, 659 Ron/ton. The average value is of 1198 Ron/ton, with a standard deviation of 511 Ron/ton.

- In light of the above data, we can determine the value of the revenues, and we see that the revenue has had an uptrend in the past three years gathering the highest incomes.

- The Gross margin thas he same uptrend, in the year 2012, being around 2611,5 Ron/ha. The average is 1361 Ron/ha and the value of deviation is very elevated of 977 Ron /ha, demonstrating the very large variation between data.
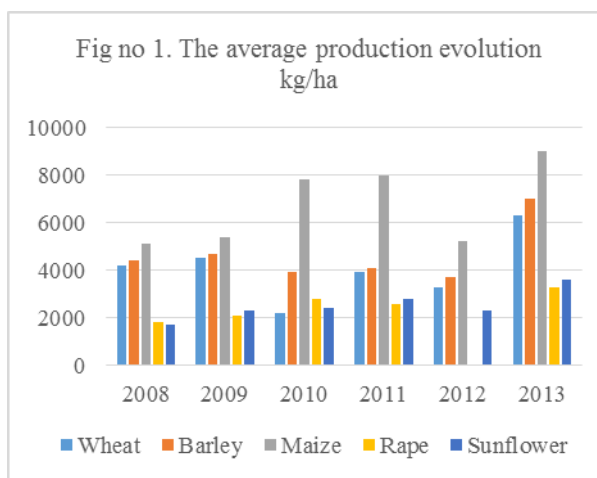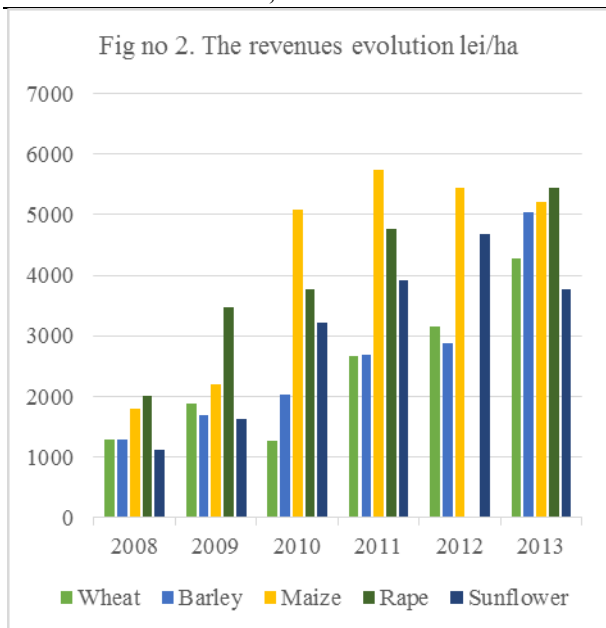

Fig.1.The average production (kg/ha)

Fig.2.The revenues (lei/ha)

CONCLUSIONS

As a result of the analysis carried out in the agricultural society SC Taiga LLC, we conclude the following:

1.The year 2013 was the year in which the productions from all cultures have reached a maximum for the period studied, while the previous year has registered the smallest productions in most cultures.

2.A spectacularly evolution, in terms production performance has the corn crop, which in the last 3 years register values almost double compared to the first year.

3.These production increases are due primarily to the technological evolution of society, followed by good climate conditions from the year 2013.

4.In terms of financial indicators, corn is the culture that manages to bring to the holding's the largest revenue, followed by rape and sunflower crops.

5.In the last year studied, for most crops were recorded high incomes compared to previous years, except the maize, that had a peak in 2010 and the sunflower in 2012; but the homogeneity of revenues from the year 2013 is not common throughout the period studied.

REFERENCES

[1]Build Free Website of your own on, Tripod, http://statisticasociala.tripod.com/tabele.htm
[2]Demographic growth, http://www.dictsociologie.netfirms.com/_IndDem/IndReproducere.htm
[3]Calarasi County Council, http://www.calarasi.ro
[4]SC Toma SRL, Internal database
[5]Buhociu, L., Buhociu, C.-A., Water and agriculture in human development perspective, http://www.anif.ro/cnrid/contributii/20100322-APA% 20and% 20AGRICULTURA.pdf
[6]Ceapoiu, N., 1968, Applied statistical methods in agricultural experiments and statistical Ed.Agro-Silvica, Bucharest 1968
[7]Draghici, M., Mara, F., 2010, Statistical indicators characterizing meat animal production at the country level and the Teleorman county during 2000-2008, ICEADR Session 2010