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 Călărași 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

Călărași 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\cite{3}. Modelu Village is situated in the southern part of Călărași 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 : \textsuperscript{[2]} \textsuperscript{[6]}

For the arithmetic mean:\[ \bar{X} = \frac{\sum \text{Xi}}{n} ; \]
\text{where:}
\text{Xi} = The average production values for a number of years (i);
\text{n} = number of years taken into account

The annual average growth rate \textsuperscript{[5]} = 
\[ r_{2008-2013} = \sqrt[5]{\prod_{i=0}^{1}(p1/p0)} - 1 ; \]
\text{where:}

r2008-2013 = average annual growth rate; 
\( \frac{p1}{p0} = \text{entangled growth indicators} \)

For the standard deviation =
\[
\sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}} \quad \text{where:}
\]
- \( \sigma \) = standard deviation; \( x \) = the average values for a number of years
- \( n \) = number of years taken into account

For mean square deviation =
\[
\bar{x} = \sqrt{\frac{\sum(x - \bar{x})^2}{n(n-1)}} \quad \text{where:}
\]
- \( \bar{x} \) = mean square deviation; \( xi \) = the average values for a number of years
- \( n \) = number of years taken into account

For mean square deviation =
\[
\bar{x} = \sqrt{\frac{\sum(x - \bar{x})^2}{n(n-1)}} \quad \text{where:}
\]
- \( \bar{x} \) = mean square deviation; \( xi \) = the average values for a number of years
- \( n \) = number of years taken into account

The confidence limits corresponding to a given risk X = +/−\( \delta \bar{x} * tp \), 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] =
\[
= ((X + \delta \bar{x} * tp)-(X-\delta \bar{x} * tp)/(X)) * 100
\]

Coefficient of variation =
\[
C = \frac{\bar{x}}{\bar{X}} * 100
\]

where:
- \( C \) = coefficient of variation (expressed as a percentage)
- \( \bar{x} \) = mean square deviation; \( X \) = the arithmetic average; average square deviation

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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Wheat crop</th>
<th>Years</th>
<th>Average</th>
<th>Stand. Deviation</th>
<th>( C) (%)</th>
<th>Mean square deviation (kg/ha)</th>
<th>Range for prob 90% (t = 2.13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MU</td>
<td>2008</td>
<td>4200</td>
<td>2009</td>
<td>4500</td>
<td>2200</td>
<td>2010</td>
</tr>
<tr>
<td>Average yield</td>
<td>kg/ha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery price</td>
<td>RON/to</td>
<td>306</td>
<td>417</td>
<td>580</td>
<td>683</td>
<td>959</td>
<td>680</td>
</tr>
<tr>
<td>Revenue</td>
<td>RON/ha</td>
<td>1285</td>
<td>1877</td>
<td>1276</td>
<td>2664</td>
<td>3165</td>
<td>4284</td>
</tr>
<tr>
<td>Gross margin</td>
<td>RON/ha</td>
<td>65,2</td>
<td>346,5</td>
<td>-344</td>
<td>253,7</td>
<td>368,7</td>
<td>1341</td>
</tr>
</tbody>
</table>

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:
- 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 average for those 6 years of 6750 kg/ha, the greatest production being obtained in the last year, 2013, 9000 kg/ha.

The delivery price has varied values throughout 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.

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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Rape culture</th>
<th>Years</th>
<th>Average</th>
<th>Stand. Deviation</th>
<th>c (%)</th>
<th>Mean square deviation (kg/ha)</th>
<th>Range for prob 90% (t = 2.13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UM</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Average yield</td>
<td>kg/ha</td>
<td>2063</td>
<td>2100</td>
<td>2800</td>
<td>2656</td>
<td>4300</td>
<td>2094</td>
</tr>
<tr>
<td>Delivery price</td>
<td>RON/ton</td>
<td>1124</td>
<td>1650</td>
<td>1350</td>
<td>1860</td>
<td>2200</td>
<td>1650</td>
</tr>
<tr>
<td>Revenue</td>
<td>RON/ha</td>
<td>4016</td>
<td>3466</td>
<td>3780</td>
<td>4771</td>
<td>5445</td>
<td>3246</td>
</tr>
<tr>
<td>Gross margin</td>
<td>RON/ha</td>
<td>61</td>
<td>156</td>
<td>177</td>
<td>2551</td>
<td>9</td>
<td>1503</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Sunflower crop</th>
<th>Years</th>
<th>Average</th>
<th>Stand. Deviation</th>
<th>c (%)</th>
<th>Mean square deviation (kg/ha)</th>
<th>Range for prob 90% (t = 2.13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UM</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Average yield</td>
<td>kg/ha</td>
<td>1700</td>
<td>2300</td>
<td>2400</td>
<td>2800</td>
<td>2300</td>
<td>3600</td>
</tr>
<tr>
<td>Delivery price</td>
<td>RON/ton</td>
<td>659</td>
<td>712</td>
<td>1337</td>
<td>1397</td>
<td>2035</td>
<td>1050</td>
</tr>
<tr>
<td>Revenue</td>
<td>RON/ha</td>
<td>1120</td>
<td>1638</td>
<td>3209</td>
<td>3912</td>
<td>4684</td>
<td>3780</td>
</tr>
<tr>
<td>Gross margin</td>
<td>RON/ha</td>
<td>75,3</td>
<td>330,6</td>
<td>1553,8</td>
<td>1994,6</td>
<td>2611,5</td>
<td>1602</td>
</tr>
</tbody>
</table>

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 has the 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 evolution kg/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
