

## THE RAPE CROP PRODUCTION IN ROMANIA, ENERGY RESOURCES AND THE IMPLICATIONS IN THE ECOLOGIC AND ECONOMIC SYSTEM

MARIAN Constantin<sup>1</sup>, Raluca NECULA<sup>2</sup>, Manea DRĂGHICI<sup>2</sup>

**Abstract:** *In order to ensure a source energy, the rape culture is of particular importance and its unprecedented spread in the world and in our country, in this the work being highlighted the extension of this culture. In the annual dynamics 2007-2013 are rendered the indicators that reveal the production capacities levels, resources and use, finally completed by the trade image. All questions submitted to the national level pursue knowledge/evaluation of the potentialities development of the rape culture, at which were analyzed the economic effects from which it can be defined the extending trends and the restrictive sides in the current stage of the agriculture development.*

**Keywords:** efficiency indicators, industrial processing, production capacity, supply balance, trade

### 1. Introduction

The territorial area is increasingly wider for the use of biodiesel in Europe and the USA included also Romania, and which resulted in extending the potential of agriculture by encouraging alternative crops of technical crops, in order to ensure the energy production, includes also the rape culture.

Its importance and unprecedented spread in the world and in our country, highlights this crop area expansion. It can be highlighted the many companies in Western Europe that have embarked on an offensive in the Romanian market. They sought the surfaces expansion on which to cultivate rape, production that later to be transformed into oil and, as a result of additivation to turn into biodiesel.

Through this work in the succession of the annual growth rate 2007-2013 are played indicators that reveals the levels of production capacities, resources and uses, finally completed with the trade.

All questions submitted at national level are aiming at knowledge/evaluation of potentialities for the development of the cultivation of rape crop, at which were

---

<sup>1</sup> Prof. Ph.D. Academy of Romanian Scientists

<sup>2</sup> Ph.D. USAMV Bucharest

analyzed the economic effects, from which it can be delineated the expansion trends and the sides of the current restrictive stage of agriculture development.

## 2. Materials and Methods

The evaluation of the possibilities for development carried out on the basis of the data processing, requires the means of identification of the factors of action involved. This is because it is permanent required the indication of trends generating the future development.

By appropriate analytical methodology, in this paper have been used processing forms whose database had the production of rapeseed in the existent dynamics for the period 2007-2013. The database of completed productions at the national level have been taken from the Yearbook of Romania, INS (2014), which was used also for the purchase prices.

The processes were carried out in accordance with the annual growth rate and the data were structured in a tridimensional form which has followed production capacities, resources/uses and trade.

Data processing was carried out in a suitable form showing representative levels which were playable through percentage comparisons against year 2008, the succession of years past, but also towards the average annual dynamics.

Regarding the expenses, they were estimated cumulative for hectare (classified under the fixed and variable expenses) with playable levels in specialist works [1]. The variation in the amount of production expenses played in this work were set out as follows: the fixed costs due to the equivalence of the level of these expenditures (1,850 lei/ha); variable costs evaluation was made in proportion to the level of the yields achieved annually (183.82 lei/tonne).

The supply balance also through indicators, highlighting the annual variations fluctuations of uses and resources. For Export/import indicators were conducted analysis quantitative and value, also existing the possibility of the total values interpretation of the indicators, the comparison to the year 2007, as well as knowledge of the changes from the previous year.

A deepening of the study was based on extrapolation of imports and exports which has been carried out on the basis of the equation of quadratic trend type of the following form:

$$Y(UM) = a_1x_1^2 + b_1x_1 + c_1$$

Where,  $X_1$  represents the production achieved. For confidence limits corresponding to a given risk [2] has been used formula,  $Y_{ajust} (+/-\delta y \cdot tp)$ , in which:

$Y$  = imports /exports adjusted;  $\delta y$  = standard deviation;  $TP$  = tabular value for probability of transgression (risk).

As such, extrapolating the trend dynamics for import/export for rape, we have the formula:  $Y_{adjusted} (+/-) \delta x \cdot TP$ , in which it is defined the upper limit ( $Y_{adjusted} + \delta x \cdot tp$ ) and the lower limit ( $Y_{adjusted} - tp \delta x$ ).

The amplitude of oscillation of the confidence limits [3] is:  $(+ tp Y_{aj} \delta y)$  and  $(\delta y Y_{aj} - tp)$

The result was that for all import/export: upper limit =  $Y + 1.86 \cdot 6 x$ ; adjusted lower limit  $Y = -1.86 \cdot 6 x$

The results have pursued the extrapolated production for the year 2015, which was calculated as the average of the last 5 years for the period 2010-2014.

The evaluation of the possibilities for development carried out on the basis of the data processing, requires the means of identification of the factors of action involved. This is because it is permanent required the indication of trends generating the future development.

By appropriate analytical methodology, in this paper have been used processing forms whose database had the production of rapeseed in the existent dynamics for the period 2007-2013. The database of completed productions at the national level have been taken from the Yearbook of Romania, INS (2014), which was used also for the purchase prices.

The processes were carried out in accordance with the annual growth rate and the data were structured in a tridimensional form which has followed production capacities, resources/uses and trade.

Data processing was carried out in a suitable form showing representative levels which were playable through percentage comparisons against year 2008, the succession of years past, but also towards the average annual dynamics.

Regarding the expenses, they were estimated cumulative for hectare (classified under the fixed and variable expenses) with playable levels in specialist works [1]. The variation in the amount of production expenses played in this work was set out as follows: the fixed costs due to the equivalence of the level of these expenditures (1,850 lei/ha); variable costs evaluation was made in proportion to the level of the yields achieved annually (183.82 lei/tonne).

The supply balance also through indicators, highlighting the annual variations fluctuations of uses and resources. For Export/import indicators were conducted analysis quantitative and value, also existing the possibility of the total values interpretation of the indicators, the comparison to the year 2007, as well as knowledge of the changes from the previous year.

A deepening of the study was based on extrapolation of imports and exports which has been carried out on the basis of the equation of quadratic trend type of the following form:

$$Y(UM) = a_1x^2 + b_1x + c_1$$

Where,  $X_1$  represents the production achieved. For confidence limits corresponding to a given risk [6] has been used formula,  $Y_{ajust} (+/- \delta y \cdot tp)$ , in which:

$Y$  = imports / exports adjusted;  $\delta y$  = standard deviation;  $TP$  = tabular value for probability of transgression (risk).

As such, extrapolating the trend dynamics for import/export for rape, we have the formula:  $Y_{adjusted} (+/-) \delta x \cdot TP$ , in which it is defined the upper limit ( $Y_{adjusted} + \delta x \cdot tp$ ) and the lower limit ( $Y_{adjusted} - tp \delta x$ ).

The amplitude of oscillation of the confidence limits [4] is:  $(+ tp Y_{aj} \delta y)$  and  $(\delta y Y_{aj} - tp)$

The result was that for all import/export: upper limit =  $Y + 1.86 \cdot \delta x$ ; adjusted lower limit  $Y - 1.86 \cdot \delta x$

The results have pursued the extrapolated production for the year 2015, which was calculated as the average of the last 5 years for the period 2010-2014.

### 3. Results and discussions

The analysis carried out at national level was based on a structure in which it is possible to deduce interpretative in the successive stage of the evolution of production capabilities, resources and elements of production and trade.

#### I-PRODUCTION CAPACITY

Through the cultivation systems of rape culture has been tracked continuously ways and methods to increase yields and the quality of their environmental and within the limits of economic efficiency. At the national level we analyzed the production capacities for the rape culture, with reference to the areas and yields obtained and were recorded along the analyzed period large fluctuations. In *table 1* through the dynamics of the 2008-2013 are played levels and areas of productions, which were made through comparisons carried out can be deducted the follows:

- area cultivated with rape can ascertain significant annual variations, but which can be analyzed in the dynamic for two periods: the period 2008-2010 where it finds an increase in cultivated areas and the period 2011-2013 is characterized by a setback (for 2008 represents a maximum of areas cultivated, and 2012 a minimum of - 21.73 % in comparison with 2008);

**Table 1.** -Surface and yields for the rape culture in Romania

Specification	UM	2008		2009		2010		2011		2012		2013	
		Total	private	Total	private	Total	private	Total	private	Total	private	Total	private
Cultivated surface	thousand hectares	365.0	360.5	419.9	415.3	537.3	528.9	392.7	388.5	105.3	103.2	276.6	274.5
	% compared to 2008	100	98.76	115.04	113.78	147.20	144.90	107.58	106.43	28.84	28.27	75.78	75.20
	% compared to previous year	-	98.76	116.47	98.90	129.37	98.43	74.24	98.93	27.10	98.00	268.02	99.24
Total production	thousand tons	673.0	663.6	569.6	563.2	943.0	925.9	739.0	730.8	157.5	154.0	666.1	661.1
	% compared to 2008	100	98.60	84.63	83.68	140.11	137.57	109.80	108.58	23.40	22.88	98.97	98.23
	% compared to previous year	-	98.60	85.83	98.87	167.43	98.18	79.81	98.89	21.55	97.77	432.53	99.24
Production per hectare	kg/ha	1,844	1,840	1,357	1,356	1,755	1,750	1,882	1,881	1,496	1,492	2,408	2,408
	% compared to 2008	100	99.78	73.59	73.53	95.17	94.90	102.06	102.00	81.12	80.91	130.58	130.58
	% compared to previous year	-	99.78	73.75	99.92	129.42	99.71	107.54	99.94	79.53	99.73	161.39	100

Source: Statistical Yearbook of Romania, INS, 2014 [2]

- the total production offers significant variation in annual levels, and are between 157.5 tons to 943.0 tons, the achievements what are related to 2012 and 2010 respectively. Analyzed comparatively, it may find that compared to base year 2008, these variations are significant while in the same year, the levels are between 22.88 % and 137.57 %;

- yields per hectare, reflect lower levels for oscillation which are between 1,357 kg/ha (2009) and 2,408 kg/ha (2013). It can be observed a rising trend, with interpretative elements over the significant decrease in production in 2009, followed by an increase from 2013.

All of these issues have been pursued through a quantitative analysis, which is why it was necessary to an investigation by knowing the economic efficiency of rape culture. In this context the following is presented the interpretive situation of price levels of production, value of production, costs and gross profit. In *table 2* by absolute values (lei/kg and lei/ha) and relative (percentage comparisons) placed in the dynamics of the period 2008-2013, are rendered the levels within which these indicators as follows:

**Table 2.** Indicators of efficiency to rape culture in Romania

Specification	UM	2008	2009	2010	2011	2012	2013
<b>Purchase price</b>	lei/kg	1.20	0.97	1.25	1.62	1.83	1.57
compared to 2008	%	100	80.83	104.16	135	152.5	130.83
compared to previous year	%	-	80.83	128.86	129.6	112.96	85.79
<b>The value of production acquisition cost</b>	lei/ha	2,766	1,316.29	2,193.75	3,048.84	2,737.68	3,780.56
compared to 2008	%	100	47.58	79.31	110.22	98.97	136.67
compared to previous year	%	-	47.58	166.66	138.97	89.79	138.09
<b>Estimated production costs</b> *(ch. de Prod. 1850 fixed lei/ha + ch. 0.183 lei/kg variables)	lei/ha	2,188.96	2,099.44	2,172.60	2,195.94	2,124.99	2,292.63
<b>Gross profit</b>	lei/ha	577.04	-783.15	21.15	852.9	612.69	1487.93
compared to 2008	%	100	-135.71	3.66	147.80	106.17	257.85
compared to previous year	%	-	-135.71	270, 06	4,032.62	71.83	242.95

Source: Statistical Yearbook of Romania, INS, 2014; \*) Estimated by processing Levels playable after: Pirmă, I., etc., the cultivation of rape, 2011, INMA Bucharest-P2; Top 5 most profitable crops, <http://m.business24.ro/macroconomie/top-5-cele-mai-profitabile-culturi-agricole-1526826>. [1, 2, 7]

- the purchase price registered with oscillators levels which has a rise trend, at which in the percentage comparisons compared with 2008 has a maximum increase of + 52.5 %;

- the production value at purchase price, expressed in the unit of surface, indicates annual increases at which, indicator correlated with yields at ha, reflects increases compared to base year 2008, the growth is of + 36.7 %;

- the production costs estimated at production unit [4] (1,850 lei/ha fixed + variable 0.183 lei/kg), outlines the variations that can be considered insignificant;

- as synthetic indicator, the profit for most years indicates favorable values, with a level of annual variations. It may be noted in 2009 a loss is reported (-783.15 lei/ha) and in 2013 with the highest level (lei/ha 2,292.63). The comparisons of percentage for this indicator in the dynamics reflects variations with a peak in 2013 (+257.85 % compared to 2008).

From the structural analysis of economic indicators, it emerges an interaction production -expenses- prices which shows: on the one hand a variation level, and on the other hand the existence of a threshold of profitability in production (referring to 2009, the results of which are entirely unfavorable, and the following year 2010 can be considered to be a limit, i.e. with 21.15 lei/ha, which represents the lowest level of profit).

All of these problems involve the Knowledge of the rape growing capacity of agricultural holdings in Romania. It was considered that these holdings can be analyzed according to the class size of utilized agricultural surface. At the national level for 2007 and 2008 in *table 3* summarizes this structure where you can embrace aspects that can be can be delineated: quantitative and qualitative

**Table 3.** - The structure of agricultural holdings growing rapeseed in Romania  
(on class size of utilized agricultural surface)

The structure of the size classes	2007			2008		
	number	% compared to total	percent compared to the average size of classes (12 classes)	number	% compared to total	percent compared to the average size of classes (12 classes)
Total	8,016	100	100% = 668 ha	10,550	100	100% = 879.1667 ha
of which:						
below 0.1	-	0	-	16	0.15	1.78
0.1-0.3	92	1.15	13.77	90	0.85	10.031
0.3-0.5	-	0	-	81	0.77	9.02
0.5-1	101	1.26	15.11	205	1.94	22.84
1-2	217	2.71	32.48	447	4.24	49.82
2-5	1,438	17.93	215.26	1,409	13.36	157.05
5-10	1,494	18.64	223.65	1,120	10.62	124.83
10-20	730	9.11	109.28	876	8.3	97.64
20-30	258	3.22	38.62	451	4.27	50.26
30-50	698	8.71	104.49	599	5.68	66.76
50-100	411	5.12	61.52	940	8.91	104.77
over 100	2,577	32.15	385.77	4,316	40.91	481.07

Source: Statistical Yearbook of Romania, INS, 2014 [2]

- on the quantitative side you can see that the number of agricultural holdings growing rapeseed is growing, along with the growing average size of holdings which tends to expand the size classes with bigger surfaces (situation reported for both years). 2008 compared with 2007 highlights an amplification for both situations with + 31.61 %;

- the structure of the size classes of holdings considered in qualitative aspect highlights the two-way aspect: is found for holdings with rape culture areas over 2

hectares (these occupying in 2007 more than 95 % of the total surface area); majority of farms are growing for the dimensions of the surfaces of sizes 2-20 ha and 50 - 100 hectares.

From all this it follows that the limits potential yields achieved is offering levels of efficiency. From the analysis of the number of the rape growing farms we see a growing trend, and the size structure of the areas held by the culture of rape is classified at the medium and maximum limits towards.

## II.-RESOURCES AND USES

The continuity of such an analysis is given by the knowledge structure of resources and uses of the products of rape culture. The national level within a balance of indicators is presented in the continuation through percentage comparisons within the dynamics of 2007/2009-2012/2013.

The resources in the supply balance sheet for the production of rapeseeds, is played at the national level in *table 4*, where it can be highlighted the following aspects:

**Table 4.** - Resources in the supply balance sheet for rape crop in Romania.

Specification	UM	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
A.-Resources	<b>thousand tons</b>	367.2	760.2	615.8	972.3	762.2	206.5
	% compared to 2007/2008	100	207.02	167.70	264.78	207.57	56.23
	% compared to previous year	-	207.02	81.00	157.89	78.39	27.09
1.-usable Production	<b>thousand tons</b>	361.5	673.0	569.6	943.0	739.0	157.5
	% compared to 2007/2008	100	186.16	157.56	260.85	204.42	43.56
	% compared to previous year	-	186.16	84.63	165.55	78.36	21.31
2.-Imports	<b>thousand tons</b>	5.7	87.2	46.2	29.3	23.2	49.0
	% compared with total exports	1.90	13.03	1.90	6.87	5.79	337.93
	% compared to 2007/2008	100	1,529.82	810.52	514.03	407.01	859.64
	% compared to previous year	-	1,529.82	52.98	63.41	79.18	211.20

Source: supply balance sheets for the main agri-food products, 2013, 2014, INS reference period: 1 (previous year) to 30 VI (current year) [3]

- the annual level of resources is very variable, observing an upward trend, finding a maximum in 2010/2011 (being of 972.3 thousand tons), after which the final year 2012/2013 is registered a sharp decrease (206.5 thousand tons). For the



same annual percentage comparisons highlight these variations in both the base year 2007/2008, and compared to previous year;

- the usable production volume is majority-against total resources, levels also showing annual variations;

- the imports constitute a complement of resources and with a very small share compared with the total resources. Annual exports compared to imports, means for most years a small share (between 1.9 % and 6.87 %), but a very high proportion of year 2012/2013, usable production (internal) decreased to very low levels.

The existence of all these recent variational levels in sourcing resources involves knowledge of uses structure which in the same period, the growth rate for the national level, appear in *table 5*. The comparisons made by level indicators show the following:

**Table 5.** – Uses in the total supply balance for rape in Romania.

Specification	UM	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
B.-USES	<b>thousand tons</b>	367.2	760.2	615.8	972.3	762.2	206.5
	% compared to 2007/2008	100	207.02	167.70	264.78	207.57	56.23
	% compared to previous year	-	207.02	81.00	157.89	78.39	27.09
3.-Exports	<b>thousand tons</b>	299.3	669.0	2,423.3	426.1	400.6	14.5
	% compared with total imports	5,250.87	767.20	5,245.23	1,454.26	1,726.72	29.59
	% compared to 2007/2008	100	223.52	809.65	142.36	133.84	4.84
	% compared to previous year	-	223.52	362.22	17.58	94.01	3.61
4.-variation of stocks	<b>thousand tons</b>	-	-	-	214.5	-1,364	123.8
	% compared to 2007/2008	-	-	-	100	-635.89	57.71
	% compared to previous year	-	-	-	-	-635.89	-9.07
5.-Internal Use	<b>thousand tons</b>	67.9	91.2	372.5	331.7	498.0	68.2
	% compared to 2007/2008	100	134.31	548.60	488.51	733.43	100.44
	% compared to previous year	-	134.31	408.44	89.04	150.13	13.69
-seeds	<b>thousand tons</b>	2.4	2.9	3.4	4.3	3.1	0.8
	% compared to 2007/2008	100	120.83	141.66	179.16	129.16	33.33
	% compared to previous year	-	120.83	117.24	126.47	72.09	25.80

-animal feed	<b>thousand tons</b>	-	-	0.8	0.8	0.1	-
	% compared to 2007/2008	-	-	100	100	12.5	-
	% compared to previous year	-	-	-	100	12.5	-
-loss	<b>thousand tons</b>	0.5	0.9	1.4	1.1	1.1	0.1
	% compared to 2007/2008	100	180	280	220	220	20
	% compared to previous year	-	180	155.55	78.57	100	9.09
-industrial processing	<b>thousand tons</b>	65.0	87.4	366.9	325.5	493.7	67.3
	% compared to 2007/2008	100	134.46	564.46	500.76	759.53	103.53
	% compared to previous year	-	134.46	419.79	88.71	151.67	13.63

Source: supply balance sheets for the main agri-food products, 2013, 2014, INS reference period: 1 (previous year) to 30 VI (current year) [3]

- in the supply balance is found that total annual uses highlights corresponding variations with resources (are the same annual variational levels);

- the exports analyzed by both comparisons against total imports, but also compared to the base year 2007/2008 highlights higher levels (except for the year 2012/2013 at which the very usable production recorded very low values);

- the internal usage highlights a growing annual level, to which in the structural analysis an important role lies with industrial processing.

Or all of these presentations of resources and uses highlights, in one side the existence of a preponderance of internal productions, and on the other hand the high level of exports with an industrial processing at the national level.

### III.-TRADE

Permanently, the trade knowledge, constitutes an aspect that fills the whole system of circuit capitalization efficiency. The bivalent import/export issues were based on the analysis of the dynamic structure of indicators relating to the quantity and value of production. The comparative presentations that appear in *table 6* seeks to highlight the main aspects of trade, which can be highlighted:

- imports are at a much lower level than the exports side, recorded quite high. Quantitatively by comparison with the base year 2007 growth of imports are significant (analysed quantitatively amplitudes vary between 24.8 and 6.1 times). Similarly, the value analysis showed that imports are much lower than exports (as compared by amplitudes compared to 2007 annual variation is observed between 3.5 and 11.4 times);

- exports analyzed by the same group of indicators are found both quantitatively and in value, a level much higher than the imports. The comparison compared to 2007 found a variation in the level of these exports, but also a growing trend for 2010, followed by a decrease (in 2011 and 2012, in which is found a setback both quantitative as well as in value).

It follows that in the international trade of rape seed and for Romania as it establishes the existence of favorable opportunities especially for export activities, to which the quantities marketed is still reported a variation level. Within this framework the dynamic oscillatory form 2007-2014 has been pursued through the upper limits, adjusted results and lower limits for the extrapolation of imports/exports. It was pursued the value determination by using a function for a variable value located outside the range of known values. These were analyzed quantitatively (thousand tons) and value (million euros) and played in a two-dimensional form: for the year 2015; year 2015 towards the period 2007-2014.

**Table 6.** - The situation of trade in intra and extra-EU in the period 2007-2012 in Romania

UM		2007	2008	2009	2010	2011	2012
<b>IMPORTS</b>							
Quantity	tons	9,703.6	76,360.6	70,466.9	241,043.8	70,682.6	59,466.3
	% compared with total exports	3.47	13.53	9.00	22.90	12.24	87.13
	% compared to 2007	100	786.93	726.19	2,484.06	728.41	612.82
	% compared to previous year	-	786.93	92.28	342.06	29.32	84.13
Value	thousand euros	7,902.7	35,816.5	28,158.2	88,108.8	50,203.6	42,826.5
	% compared with total exports	10.16	14.55	12.58	26.37	18.37	102.40
	% compared to 2007	100	453.21	356.31	1,114.92	635.27	541.92
	% compared to previous year	-	453.21	78.61	312.90	56.97	85.30
<b>EXPORTS</b>							
Quantity	tons	279,125.5	564,028.6	782,186.4	1052,366.2	577,206.6	68,246.0
	% compared with total imports	2,876.51	738.63	1,110.00	436.58	816.61	114.76
	% compared to 2007	100	202.06	280.22	377.02	206.79	24.44
	% compared to previous year	-	202.06	138.67	134.54	54.84	11.82
Value	thousand euros	77,720.9	246,035.6	223,703.0	334,038.5	273,270.4	41,819.0
	% compared with total imports	983.47	686.93	794.45	379.12	544.32	97.64
	% compared to 2007	100	316.56	287.82	429.79	351.60	53.80
	% compared to previous year	-	316.56	90.92	149.32	81.80	15.30

Source: ANV and the INS, quoted in the paper Rapeseed Oil, <http://www.madr.ro/ro/culturi-de-camp/plante-tehnice/rapita-pentru-ulei.html> [5]

The rape imports extrapolation (by expressing in thousands tons and mil euros) based on production (thousands tons) in Romania in *table 7* outlines differentiated aspects that can be rendered as follows:

- analysed quantitatively based on extrapolation of imports in accordance with the function of production adjustment ( $Y_{aj} \text{ (thou to)} = 0.000053 \cdot x^2 + 0.03 \cdot x + 26.97$ ), indicates that the dynamic years differentiations can be considered significant. With reference to annual periods may indicate: a maximum of imports for 2010 and 2014; for the remaining years a decrease to these imports; for year 2015 an average level of imports;

- the analysis of the imports value frames the results of the adjusted function ( $Y \text{ (Mil. euro)} = 0.00005 \cdot x^2 - 0.030 \cdot x - 32.777$ ) which for the levels of the upper/lower limits has annual amplitudes much lower. The very year 2015 levels are set at the lower limit values.

**Table 7** – The rape imports extrapolation (thousands to/mil euro) based on production (thousands to) in Romania (year 2015 towards 2007-2014)

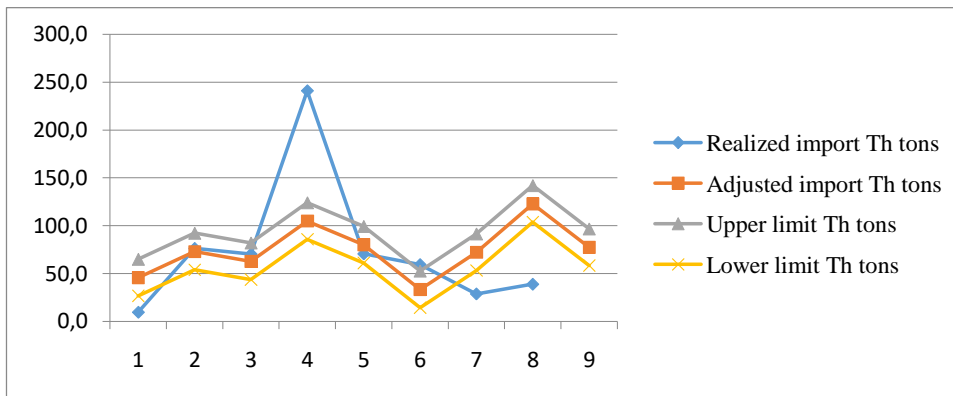
The years	Quantity (thousand tonnes) $\sigma x = 6.4; tp = 1.86$ $Y_{aj} \text{ (thou to)}^2 = 0.000053 \cdot x^2 + 0.03 \cdot x + 26.97$			Value (million euro) $\sigma x = 3,64; tp = 1.86$ $Y \text{ (Mill. euro)}^2 = 0.00005 \cdot x^2 - 0.030 \cdot x - 32.777$		
	Limit upper	Adjusted import	Limit lower	Limit upper	Nota t adjusted	Limit lower
2007	65	28.5	16.5	35.2	17.6	13.4
2008	92.2	73.1	33.5	26.0	35.1	17.6
2009	82.1	62.9	43.	38.6	19.8	25
2010	124.1	104.9	53.3	34.5	48.8	26.2
2011	99.3	80.1	61	27.7	23.5	31
2012	52.6	20.8	14.3	36	18.2	14.0
2013	91.5	72.3	53.2	25.8	21.7	17.5
2014	142	122.9	103.7	40.2	58	31.8
<b>2015</b>	96.7	77.6	58.4	27.1	22.9	30

The attached graphs highlight the year 2010 with the highest import, and in the year 2007 the lowest of imports, but by the adjustment highlights an uniform trend of quantities/values played through the respective curves.

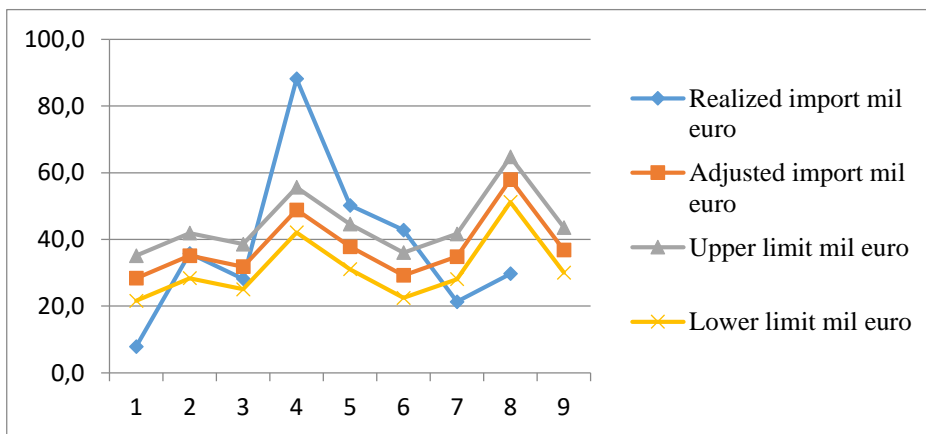
In the export activity the quantities and value extrapolation of the production from rapeseed (by expressing in thousands tons and mil euros) based on production (thousands tons) in Romania is illustrated in *table 8* where are similarly highlighted the following aspects:

- the knowledge of the quantitative variations (based on the regression function

$Y (\text{thou to}) = 0.000053 \cdot x^2 + 0.03 \cdot x + 26.97$ ), played by upper/lower limits, has annual variations. For mentioning is that years 2010 and 2014 is reported the maximum of exports, the limits were expressed through the dynamic 2007-2015 through a values correlation, but the year 2012 is represented by a negative value;



**Fig no 1.** The rape imports extrapolation (thousands to) based on production (thousands to) in Romania (year 2015 towards 2007-2014)

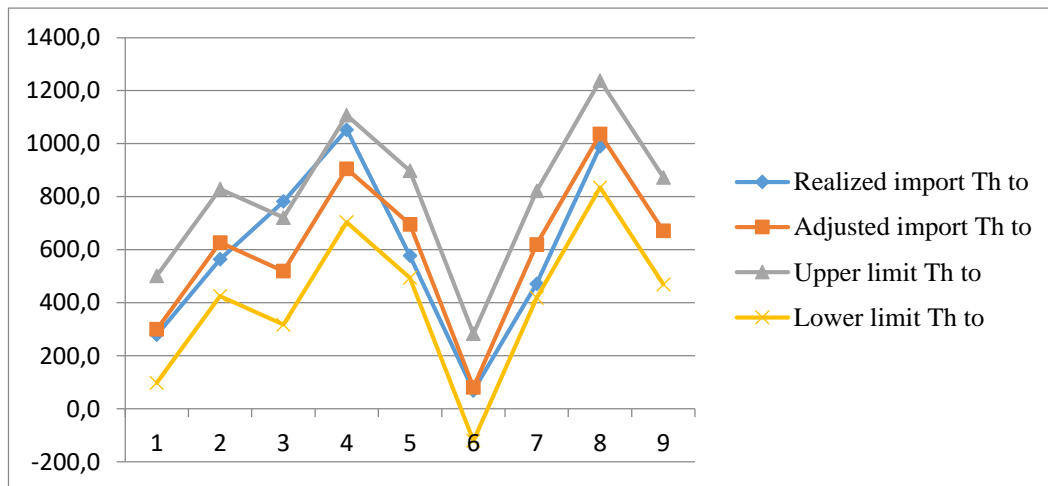


**Fig no 2.** The rape imports extrapolation (mil Euro) based on production (thousands to) in Romania (year 2015 towards 2007-2014)

**Table 8** – The rape exports eextrapolation (thousands to/ mil euro) based on production (thousands to) in Romania (2015 period 2007-2014)

The years	Quantity (thousand tons) $Y (\text{thou to}) = 0.000053 \cdot x^2 + 0.03 \cdot x + 26.97$			Value (million euro) $Y (\text{Mill. euro}) = 0.00005 \cdot x^2 - 0.030 \cdot x - 32.777$		
	Limit upper	Adjusted import	Limit lower	Limit upper	Import adjusted	Limit lower
2007	501.5	299.6	97.7	184.4	114.8	28.1
2008	828.9	627	425.1	302.9	233.3	163.7
2009	721.1	519.2	317.3	266	196.4	126.9
2010	1,107.2	905.3	703.4	387.8	318.2	248.7
2011	897.4	695.5	493.7	325.2	255.6	186
2012	283.2	81.3	-120.6	94.8	15.7	-27.6
2013	821.6	619.7	417.9	300.5	230.9	161.3
2014	1,238.4	1,036.5	834.6	422.6	353	283.5
<b>2015</b>	873	671.1	469.3	317.3	\$ 247.8	178.2

- the value analysis by the extrapolation function ( $Y (\text{Mil. EUR}) = 0.00005 \cdot x^2 - 0.030 \cdot x - 32.777$ ) reflect similar correlative variations. It is worth mentioning the same year highs (2010 and 2014), the lower limit of the year 2012.

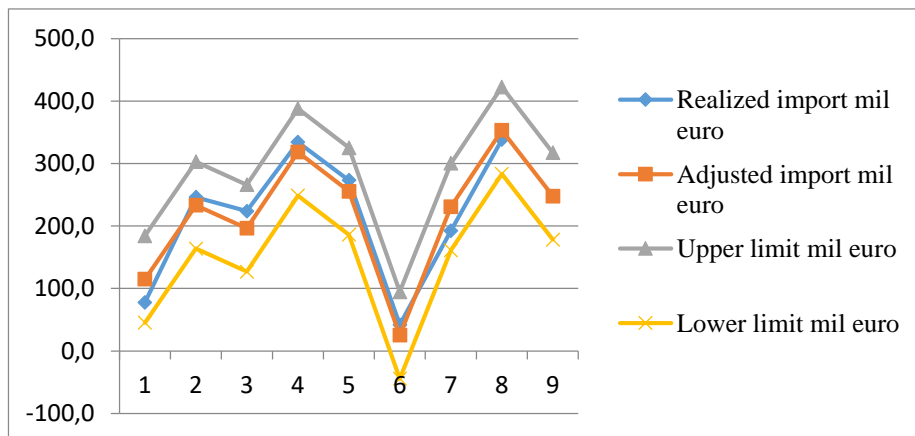
**Fig no 3.** The rape exports extrapolation (thousands to) based on production (thousands to) in Romania (year 2015 towards 2007-2014)

The graphics rendered complements the interpretive appearance finding an uniformity of combination of trend curves on the level of production and for the adjusted forms.

Synthetically, through the interpretation of the confidence interval resulting from the extrapolation of the regression functions it may be deduced the annual level of productions/ values that can be made in import and export activities.

## CONCLUSIONS

The analysis has sought to underscore the actual aspects of rapeseed production potentialities from Romania, aiming the trends of capitalization through the trade of current market events.



**Fig no 4.** The rape exports extrapolation (mil euro) based on production (thousands to) in Romania (year 2015 towards 2007-2014)

Conclusion (1). The problems investigation of the rape culture production involved a knowledge of economic efficiency from which it emerged that production potentialities are related to the interaction production expenses-prices, nationwide means an annual variability. We find the existence of a threshold limit of profitability, respectively representing the lowest level of profits (in the analysis being approx. 2000 kg/ha).

Conclusion (2) The number of farms growing rapeseed is growing, and the structure surfaces for this culture is framed towards medium and maximum limits (an area for holdings of over 2 hectares, these occupying over 95 % of the total surface area, and the majority of farms are growing to sizes 2 to 20 hectares and 50-100 ha).

Conclusion (3). The knowledge of the resources and uses structure of the rape culture products emphasizes annual variation with a trend of growth. Through comparisons carried out shows that the import levels constitute a very small contribution to resources. The structure depicted of the supply balance sheet we have corresponding variations with very resources, also the same annual variation levels. Exports, analyzed through comparisons against total imports which are

prevailing (in comparison to 2007 is found a variation in the level of these exports, based on a rising trend until 2010, after which follows a decrease). At the same time, it can be highlighted also the industrial processing at which the annual level, although low, in the annual dynamic means a growth.

Conclusion (4) Through the presumptive analysis of import/export was traced the interpretative knowledge of these activities, the confidence limits of these activities, with the levels of annual variation.

### References

- [1]. Pirnă, I., Voicu, E., Vlăduț V., 2011, Tehnologia de cultivare a rapiței, INMA București - P2, <http://multilingual.bionetsyst.com/images/docs/6400677781335502327.pdf>
- [2]. Statistical Yearbook of Romania, INS, 2014
- [3]. Supply balance sheets for the main agri-food products, year 2013, INS, 2014
- [4]. Drăghici, M., Mara Fl., 2012, Indicatori statistici ce caracterizează producția animală de carne la nivelul țării și a județului Teleorman pe perioada 2000-2008, Sesiune ICEADR, București
- [5]. The rape crop for oil, MADR, <http://www.madr.ro/culturi-de-camp/plante-tehnice/rapita-pentru-ulei.html>
- [6]. Build Free Website of your own, Tripod, <http://statisticasociala.tripod.com/tabele.htm>
- [7]. Cauea, Cristina, Top 5 most profitable crops, <http://m.business24.ro/macroconomie/top-5-cele-mai-profitabile-culturi-agricole-1526826>,