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THE ANALYSE OF VALUE STRUCTURE OF AGRICULTURAL PRODUCTION FOR CONVENTIONAL AGRICULTURE

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Abstract

The value structure of agricultural production reflects the extensive character of Romanian agriculture and low economic efficiency of use of agricultural resources. Analytical research that formed the basis of this work has followed developments in agricultural production and structure of branches and vegetable crops. Were analyzed the correlations between volume indices of intermediate consumption and physical agricultural production indices, following the development trend of chronological series for years 2004-2014. Also, the dynamic costs to consumers was analyzed in correlation with price growth of agricultural production for vegetable crops representative Romanian agricultural sector.

***Key words*:** *agricultural production, price, consumption, correlation, regression*

INTRODUCTION

In order to calculate and interpret the many aspects of the relationship that forms objectively between efforts and results achieved in agricultural production was necessary to develop and use a system of technical indicators and economic with which to be able to address systemic activities specific agriculture.[9]
The use of indicators in economic analysis has a number of advantages such as:
-suggestively presents the evolution of a phenomenon (fixed base indices);
-presents annual growth of phenomena or factors (chain indices);
-can be done comparing indicators across time and space;
-provides some independence from value indicators, in terms of variation of prices;
-in the analysis they give an "alarm signal" showing the analyzed phenomenon's trend;
-can be used in both ways in retrospective analysis and in forward-looking analysis.[6]

MATERIALS AND METHODS

The economic function is the concrete - in the form of algebraic equations - correlations (technical, or economic power) is established between a dependent variable (eg production volume) and the factors that contribute to achieving its (independent variable).
In theory and statistical practice appears increasingly more often the question to use statistical data to determine the trend of development of phenomena in the subsequent step. In the social and economic phenomena generally acts the statistical laws, which manifests itself as a trend that can be traced only for a period of time. This means that the development trend of events in a limited probability can be known and thus be used in future calculations.[7]
To highlight the law which is manifested in the link between the phenomena it is necessary to express the law into the form of analytical function corresponding to the relationship between the factor and the resultant feature. This feature is known as regression function and its graphic

representation is through line (curve) regression. Choosing the right regression function that best expresses the connection between the two features is particularly important for determining the statistical value of the correlation indicators. [5]

Regression function expresses statistically the way that the resutaltive feature of y is changing due to the change of the factorial feature of the x factor when the variation of y is in correlation only with the variation of x. For this, it is necessary that the other characteristics to be considered non-essential and with constant action on all units on which is measured the ratio of interdependence and whose influence is summed up in a single value that has the character of average. If the polynom of approximation has the degree p = 2, the application of the criterion of least squares leads to the *quadratic regression* that has the form :

$$Y = a + bx + cx^2$$

where a, b and c are coefficients

* a is a constant

* when b<0, the variation of the resultative feature of y decreases due to the increase variation of x;

*when b>0, the resultative feature of y increases due to the increasing of x;

* when c <0, the variations of the resultative feature of y in response to variation x (time/year of production) are becoming smaller (if b> 0 characteristic outcome y will drop due to increased x if c> 0);

* when c> 0, the variations of the resultative feature of y as a result of variation of x are increasingly higher.[10]

RESULTS AND DISCUSSIONS

From the direct analysis of chronological data series for the years 2004-2014 it can be observed that the physical production in agriculture has stagnated in 2005-2007, and since 2008 the productions have increased.[4]

The volume indices of the intermediate consumptions (fertilizers etc.) were correlated with those of physical production in 2006-2007 (table 1), after which exceeded output growth in the coming years. Because of the unfavorable weather conditions (drought, floods), the effects of the growth of those consumptions were not found in the growth of the physical production.[2]

Table 1. Dynamics of the value of agricultural production, the specific consumption and fixed capital formation at current prices

Specification	2004*		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Absolute values	(%)										
Agriculture production	52,527	0	-17.1	-11.2	-16.2	18.3	3.6	13	35.6	11.4	36.8	27.2
Intermediate consumption, by:	26,178	0	-7.8	-1	2.7	38.3	25.4	40.1	60.9	39.7	70.5	66.5
-energy and lubricants	2,692	0	14.1	24.7	18.5	90.5	71.3	127.9	187.8	151.3	216.1	234.6
-chemical fertilizers	1,574	0	-3	-17.9	-33.6	57.5	24.7	60.4	103.9	83.7	112.3	113
-maintenance of equipment	2,203	0	-15.8	-8.7	-18.7	16.2	11	4.7	33.6	4.9	21.1	30.4
-maintenance of buildings	296	0	16.2	73.6	14.2	9.8	6.8	-15.2	50.3	41.9	50	48.6
-agriculture services	392	0	0.8	20.9	74.7	82.7	91.6	42.1	39	36.5	89.8	137.5
-consumption of fixed capital	5,254	0	7.2	36.9	43.4	40.9	55.5	86.5	121.7	121.9	153.8	134.4

Source*:* Calculations based on data series TEMPO-ONLINE, years 2004-2014, INS * 2004 = 100 (absolute values – mil. lei)

The dynamics of intermediate consumption prices continues to outpace the dynamics of agricultural production prices and as a result, farmers' incomes are declining.[1]

The intermediate consumptions have superior values than the production value since 2007, largely due to increasing energy prices and material maintenance of machinery and buildings. Intermediate consumption during 2007-2014 grew up without showing a production value corresponding to this growth, which contributed to increased costs and as a result of the reduced capitalization prices, the gross added value decreased. Consumption of fixed capital expressed at current prices, presents the annual variations due to price changes in equipment and does not correlate with the value of production whose dynamic is inferior.[8]

Increased consumption of fixed capital

exceeds the increase in value of production during the period 2004-2014 and thereby decreases net added value in agriculture.

Table 2. The structure of agricultural output at basic prices

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Agriculture production*	52,527.3	43,570.3	46,635.9	43,998.9	62,153.3	54,420.0	59,359.8	71,211.4	58,508.6	71,855.6	66,815.5
Vegetal production (%)	72.5	64.2	67.2	65.3	73.6	65.7	73.3	76.1	68.7	74.9	72.7
Animal production (%)	26.7	34.9	31.8	33.2	25.3	33.0	25.8	23.2	30.4	24.0	25.9
Agriculture services (%)	0.7	0.9	1.0	1.6	1.2	1.4	0.9	0.8	0.9	1.0	1,4

Source*:* Calculations based on data series TEMPO-ONLINE, years 2004-2014, INS * 2004 = 100 (absolute values – mil. lei, current prices)

The value of crop production has a relevant share in the structure of agricultural production value, ranging from 64.2% (due to floods) in 2005 to 74.9% in 2013 (due to higher yields obtained).

Table 3. The dynamics of crop production value of intermediate consumption and specific, current prices

Specification	2004*		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Absolute values	(%)										
Vegetal production	38,097.2	0	-26.6	-17.8	-24.6	20.1	-6.2	14.2	42.2	5.4	41.3	27.6
Intermediate consumption:	26,178.3	0	-7.8	-1	2.7	38.3	25.4	40.1	60.9	39.7	70.5	66.5
- seeds	2,114.6	0	-18.6	15.2	13.9	61.6	23.1	65.6	92.4	47.4	105.9	91.3
- energy and lubricants	2,692.1	0	14.1	24.7	18.5	90.5	71.3	127.9	187.8	151.3	216.1	234.6
- chemical fertilizers	1,574.0	0	-3.1	-17.9	-33.6	57.5	24.7	60.4	103.9	83.7	112.3	113
- pesticides	737.1	0	-2.9	-23.5	-28.4	22.8	1.3	44.5	74.2	47.7	93.7	111.5

Source*:* Calculations based on data series TEMPO-ONLINE, years 2004-2014, INS * 2004 = 100

The volume indices of intermediate consumptions (seeds, energy, fertilizers, pesticides) are correlated with those of crop production in 2005-2007, after which exceeded the dynamics of crop production in the coming years. The effects of this growth of consumption were not found in physical production growth due to increasing input prices.

This discrepancy highlights the difference between the prices of agricultural and industrial (scisors priceing) with a reduction in farmers' income and the possibility of purchasing inputs.[3] In table 4 it is shown the changes made by vegetable crops studied compared to the base year 2004 in terms of production value obtained.

Table 4. Evolution of crop production value (culture) and current prices

Specification	2004*		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Absolute values (%)											
GRAIN	14,579.4	0	-52.3	-60.5	-62.7	-3.5	-40.6	-26.1	35.4	-14.1	36.4	19.3
Wheat	4,060.9	0	-37.8	-55.6	-54.9	16	-41.6	-19.6	50.5	16	47	40.1
Barley	781.1	0	-49.9	-62.4	-56.3	21.6	-16.7	-4.2	52.7	25.7	101.7	107.5
Maize	9,457,2	0	-59.5	-63.1	-68.5	-16.6	-43.7	-32.4	24.7	-34.2	23.3	0.3
Rice	5.1	0	60.7	-90.4	536	868.4	893.7	914.1	1,428.1	1,192.5	1,241.8	818.5
Oleaginous	1,531.1	0	-14.2	-4.5	-43.4	50	5.1	91.6	183.8	102.9	224.8	192.9
Rapeseed	66.0	0	33.9	95.9	307.3	1,122.9	736.7	1,683.8	1,712.2	336.1	1,641.5	X
Sunflower	1,192.1	0	-14.6	-6.6	-59.8	16.7	-19	29.2	146	120.2	196.3	X
Soybeans	235.2	0	-12.3	-7.7	-50.2	-62.8	-65.7	-21.8	-20.7	-24.7	17.1	X
Tobacco	29.0	0	-60.1	-82.2	-89.2	-70.6	-83.7	-59.2	-56.6	-72.9	-75.2	-77.2
Sugar beet	56.8	0	-11.1	80.9	19.2	35.7	85.4	75.3	96.2	114.2	206.4	311.9
Textile plants	0.8	0	41	47	-75.9	-85.5	-99.9	-97.6	-98.8	-97.6	-94	X
Hop	0.5	0	365.3	987.8	1,014.3	902	700	900	538.8	1,018.4	906.1	X
Potatoes	4,419.1	0	-29.7	13.1	4.7	-6.2	8.2	-1.4	49.3	-31.5	28.8	14.4

Source*:* Calculations based on data series TEMPO-ONLINE, years 2004-2014, INS * 2004 = 100

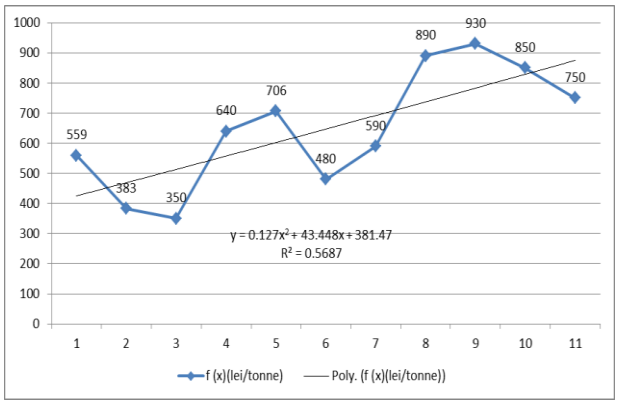

Fig. 1. The dynamic of basic price at wheat (lei/tonne)
Source: Own calculation.

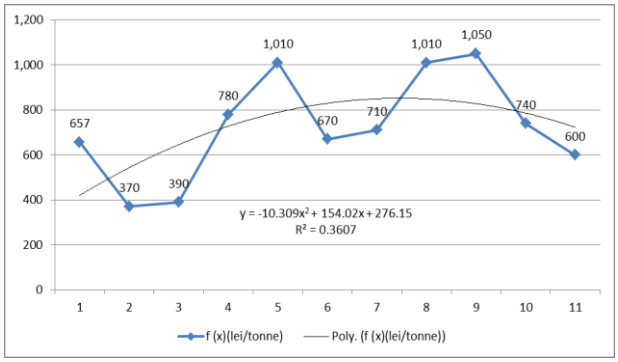

Fig. 2. The dynamic of basic price at maize (lei/tonne)
Source: Own calculation.

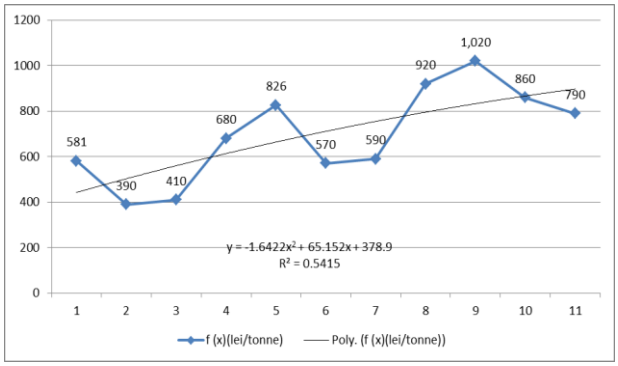

Fig. 3. The dynamic of basic price at barley (lei/tonne)
Source: Own calculation.

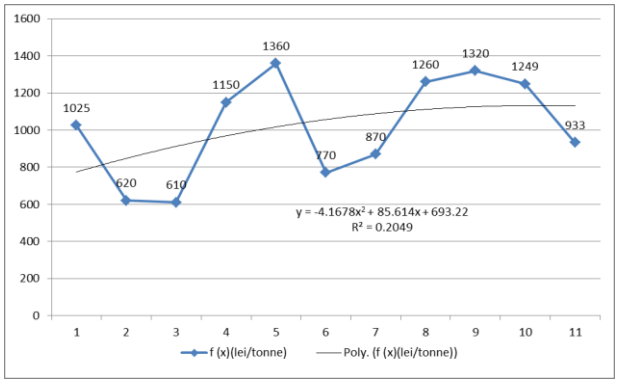

Fig. 4. The dynamic of basic price at rice (lei/tonne)
Source: Own calculation.

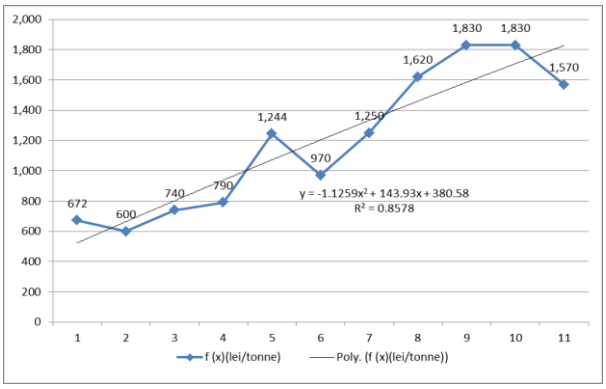

Fig. 5. The dynamic of basic price at rapeseed (lei/tonne)
Source: Own calculation.

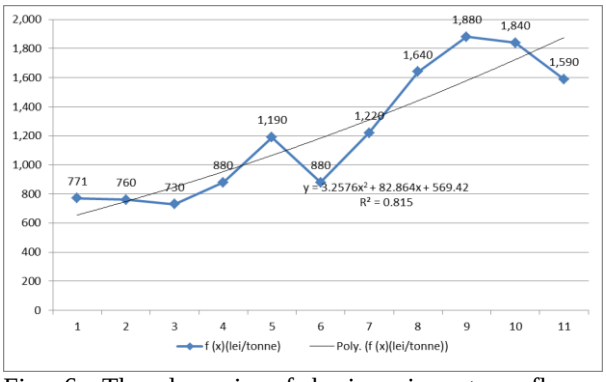

Fig. 6. The dynamic of basic price at sunflower (lei/tonne)
Source: Own calculation.

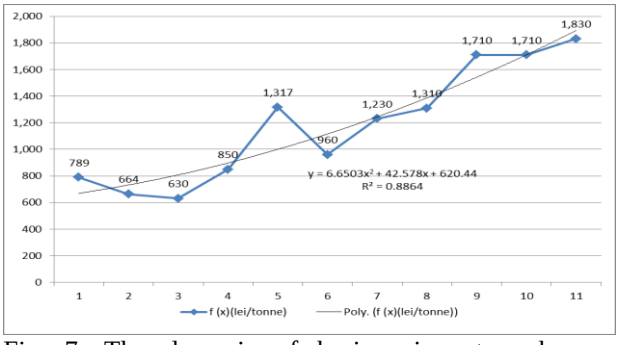

Fig. 7. The dynamic of basic price at soybeans (lei/tonne)
Source: Own calculation.

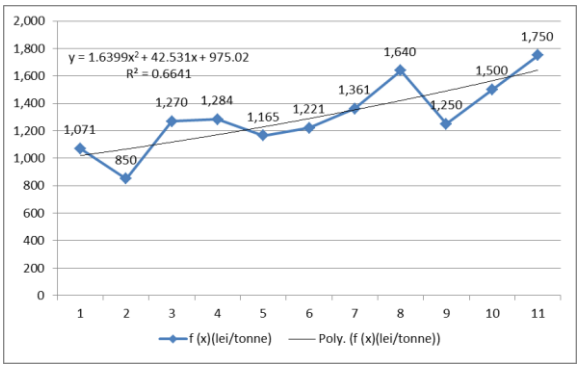

Fig. 8. The dynamic of basic price at potatoes (lei/tonne)
Source: Own calculation.

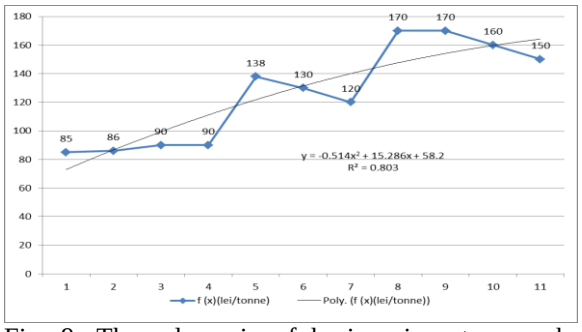

Fig. 9. The dynamic of basic price at sugar beet (lei/tonne)
Source: Own calculation.

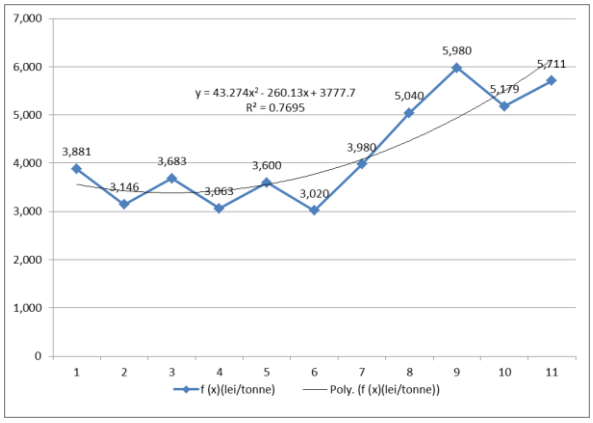

Fig. 10. The dynamic of basic price at tobacco (lei/tonne)
Source: Own calculation.

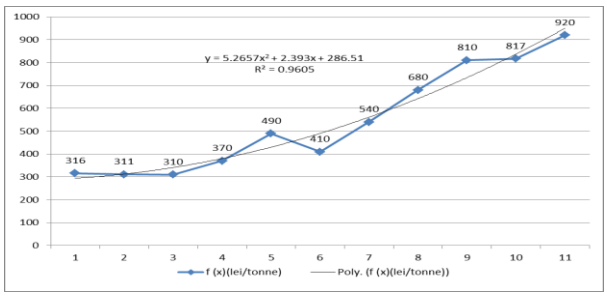

Fig. 11. The dynamic of basic price at textile plants (lei/tonne)
Source: Own calculation.

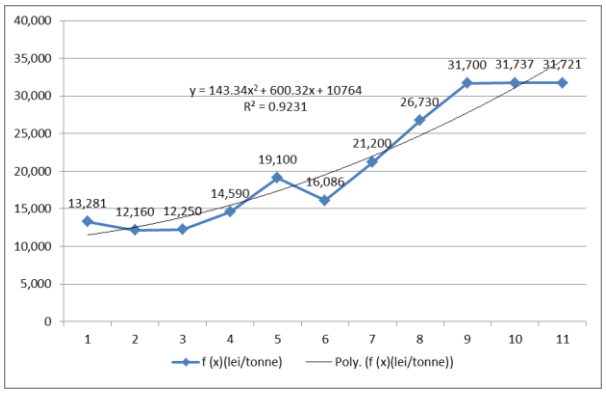

Fig. 12. The dynamic of basic price at hop (lei/tonne)
Source: Own calculation.

Next it is presented the dynamic of the evolution at basic prices of the chronological series 2004-2014, through graphs that highlight both the average annual values of prices, and correlation indicators by the line (curve) of regression for every crop that we have analised (figures1-12).

In the period 2004-2014 the main conclusions drawn by analyzing the value of the agricultural production are [11]:

- Across entire agriculture there were no essential changes in the structure of production value. Predominant remains the crop production (72.7% in 2014), animal production stays low (25.9% in 2014) and services hold an insignificant share; noticeable changes took place in branches and cultures between years 2004-20014, main crop production value structure recorded significant changes due to lowering of the corn wheat and barley acreage, and the fall in prices; average yields in 2014 compared to same period in previous years, registered increases, as follows: 35.9 q/ha wheat, 47.7 q/ha for maize, 21.8 q/ha sunflower, 25.4 q/ha soybeans, 26.1 q/ha rapeseed, 447 q/ha for sugar beet 175 q/ha for potatoes, 59.13 q/ha to hemp, 16.4 q/ha tobacco and 11.3 q/ha to hop);
- The proportion of technical plants in production value maintains as a result of increased areas cultivated with rapeseed and sunflower and sunflower average yields (the oleaginous plants held 9.2% of the value of agricultural production in 2014);
- Textile plants (hemp) is still cultivated on small areas (318 ha (0.005%) in 2014) and yields tend to rise (59.13 q ha) and the prices are low;
- The sugar beet increased share of production value (0.48% in 2014) due to rising prices and subsidies;
- The area planted with tobacco was reduced from about 5,892 hectares in 2004 to 1,681 ha in 2011 and to 855 ha in 2014, and as a result the production of cigarettes is based on imports;
- Potatoes are maintained with a high share in the structure of agricultural production value (11.6 in 2014) due to the large areas planted, average yields (17 tons in 2014) and prices tend to rise, etc.

CONCLUSIONS

Agricultural production evolution and its structure of branches and cultures does not reflect an efficient use of human and natural resources of agriculture. Dominant are the cereals, oilseeds and potato plants, and some products are produced in insufficient quantities (eg sugar beet, etc.) and therefore they are imported. The composition of agricultural production reflects the extensive character of Romanian agriculture and the low economic efficiency of using the agricultural resources. The comparative advantages offered by soil conditions have not yet turned into competitive advantages due to lack of adequate technical infrastructure and mismanagement of production and the environment. In Romania it's maintained a simplified production structure, into holdings which fail to respond to the consumption needs of the population and therefore results an imports increase (eg sugar, tobacco, hop, etc.)

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