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# ANALYSIS OF THE IMPACT OF COUPLED SUPPORT FOR SOYA ON SURFACES AND PRODUCTIONS

PETRE IONUȚ LAURENȚIU<sup>1</sup>

**Abstract:** *The present study proposes an analysis of how the changes and trends of soybean surfaces and produced crops have been influenced by the coupled support in the years 2015 and 2016. For this purpose qualitative and quantitative research methods will be used on the data obtained with the statistics, namely the National Institute of Statistics (NIS) and the Agricultural Accountancy Data Network (RICA), data on the total areas cultivated with soybeans and productions, respectively on the areas for which coupled support has been granted. With this data, we will determine the share of areas recorded in APIA in the total area, the dynamics of this indicator and the way in which the minimum compulsory production (for accessing the coupled support) influenced the average yield per hectare.*

**Keywords:** *soybean culture, coupled support, eligible area, production.*

**JEL Classification:** *Q15, Q18*

## INTRODUCTION

The soybean culture (*Glycine max*) has a high interest for both the producer and the consumer due to the wide range of uses used for animal feed in human food but also as inputs for certain manufacturing industries.

People's daily diet uses soybeans, but also non-starters to prepare some dishes. Also in soybean meal can be used in human food, up to 15% in certain limits, to get a high protein meal. At the same time, soybean meal can produce vegetable products such as milk, cheese, coffee, biscuits, chocolate.

For animal feed, it is mainly used soybean grains resulting from seed processing to produce oil, so these protein-rich grains are included in feed concentrations used in animal husbandry. Another use of soybean culture in this zoo technical sector may have the plant used as green fodder.

In order to industrialize the soybean culture presents certain opportunities such as obtaining: oil, margarine, lecithin, soap, and colors for painting.

Referring to agriculture, however, the main beneficial feature of this culture is the fact that it leaves behind a high amount of nitrogen in the soil and about 80-120 kg / ha.

As far as the chemical composition of soybeans is concerned, as is well known, protein ranging from 27 to 50 percent, followed by 17-25% fat, and 19-25% carbohydrates, and lecithin of soybeans rises to 2-4%. At the same time, mineral elements such as phosphorus, potassium and calcium magnesium, as well as vitamins, are found in the soybean structure.

All of these aspects mentioned above, which emphasize the importance of soybean culture, lead to a general aspect, namely the importance of continuing cultivation.

Referring to soybean surfaces and yields, they vary annually, either due to the crop rotation, for the first indicator, or according to the agricultural year concerned and the pedoclimatic conditions for the second indicator.

However, there may be some external factors that can influence these indicators (surface, total yield and average yield per hectare), one of these factors may be one of the financial support granted.

Thus, the present research seeks to determine whether such a link exists between soybean surfaces or soybean production and coupled support for this crop.

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## MATERIALS AND METHODS

The statistical data from the national databases will present the situation of the soybean surfaces and soybean production in Romania, as well as the average yields per hectare. In the second part of the research we will analyze the data on the coupled support granted and the areas eligible for this support taken from the Agricultural Accountancy Information Network (RICA).

Consequently, connections can be made using the correlation coefficient between the area and output dynamics and the dynamics or value of the coupled support granted during the reference period. These correlations can respond to the question of research, whether the coupled support or its value influences the soybean surface and production. The formula used in calculating the correlation coefficients will be:

$$r_{xy} = \frac{\sum(x_i - \bar{X})(y_i - \bar{Y})}{\sqrt{\sum(x_i - \bar{X})^2 \sum(y_i - \bar{Y})^2}}$$

## RESULTS AND DISCUSSIONS

In order to create an overall picture of the soybean crop sector, statistical data were analyzed with reference to the cultivated area, the total yield and implicitly the average yield per hectare on this crop.

Table 1. Dynamics of soybean surfaces and productions in Romania

| Specifications                | 2007   | 2008  | 2009  | 2010   | 2011   | 2012   | 2013   | 2014   | 2015   | 2016   |
|-------------------------------|--------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| Surface area (thousand ha)    | 133234 | 49857 | 48833 | 63948  | 72056  | 79793  | 67672  | 79910  | 128156 | 127266 |
| Total production (thousand t) | 136094 | 90579 | 84268 | 149940 | 142636 | 104330 | 149931 | 202892 | 262061 | 263380 |
| Average yield (kg / ha)       | 1021   | 1817  | 1726  | 2345   | 1980   | 1308   | 2216   | 2539   | 2045   | 2070   |

Source: National Institute of Statistics

As can be seen from Table 1, the largest area, cultivated with soy since Romania joined the European Union, was recorded in 2007 with 133.2 thousand hectares. It fell sharply in the coming years, more precisely throughout the programming period until 2014, the largest area was almost 80,000 hectares. Things have changed in the new reform, so from 2015, the cultivated area has seen an impressive rise, reaching 128,000 hectares and continuing almost at the same level the following year.

Referring to the average yield per hectare and implicitly to the total yield, they vary from year to year, so even if in the first year the cultivated area was the highest, the yield per hectare was the lowest, so these two indicators, have contracted, resulting in a relatively small total production in relation to the cultivated area of only 136.1 thousand tons of grain soybeans. However, fortunately, yields increased in the next period, reaching double production levels on a single hectare, which implicitly led to an increase in total production. The highest yield was 2045 kg / ha in 2014, but the highest yields were recorded in the last years when the cultivated areas were among the most extensive and the good yield, over 2000 kg / ha, was ensures a total production of over 260 thousand tons of soybeans.

Thus, with the above, we can highlight the increases in the area and implicitly of the soybean production in the last period, which coincides with the current CAP reform. Thus, these statistical data strengthen the fact that certain factors, whether internal or external, have significantly and beneficially influenced soybean culture. For this study attention will be paid to the influence of coupled support.

Since 2015, with the implementation of the new CAP reform 2014-2020, Romania has benefited from a number of additional measures as compared to the previous programming period, ie the granting of new direct aids to Pillar I, including "support coupled".

As foreseen in the EU Regulation, coupled support can be given to sectors considered important for economic, social and environmental reasons and affected by certain difficulties. This is given to farmers, both in the vegetable and livestock sectors. Among the crops that are included in the vegetable sector are soybeans.

In order to benefit from this support, producers have to meet a number of general conditions but also some particular ones depending on the crop. For soybeans, the specific conditions aim at: achieving a minimum yield per hectare of at least 1300 kilograms of grain; making use of this minimum production on a contractual basis; and the exclusive use of certified seed.

It was further considered that this coupled support to soybean culture had a positive effect on production as financial incentives encouraged more and more producers to apply for this support by cultivating a larger area and implicitly obtaining total direct production proportional.

In order to be able to better analyze how this support influences producers in their decision to cultivate soybeans and to comply with the specific conditions of support (1300 kg of grain per hectare), Table 2 will present the situation with regard to this support from 2015 by 2017, respectively the total budget granted, the number of hectares of the beneficiaries and, implicitly, the average value of the support.

Table 2. Dynamics of coupled quantum rates

| Specification                                 | 2015          | 2016          | 2017          |
|---|---------------|---------------|---------------|
| Total coupled support value (euro)            | 28,996,567.44 | 29,891,290.95 | 31,602,000.00 |
| Total eligible hectares (ha)                  | 107,769.89    | 117,391.50    | 164,718.17    |
| Amount of Support Coupled Support (euro / ha) | 269.06        | 254.63        | 191.855       |

Source: Agricultural Accounting Information Network (RICA), Agricultural Payments and Intervention Agency (APIA)

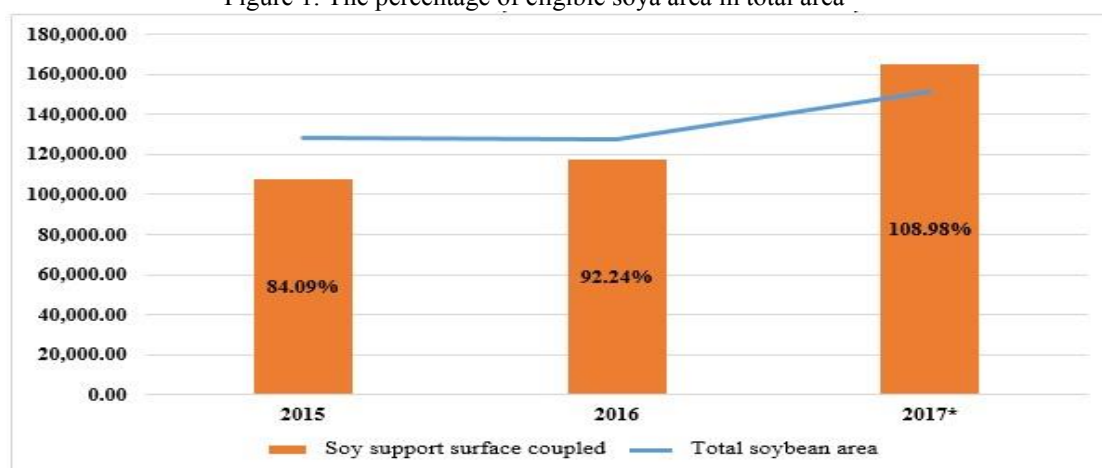
As can be seen in Table 1, the demand for support coupled with soybean culture has been on the rise. The total amount of the allocated budget has been increasing over the whole period under review, starting at around EUR 29 million in 2015, rising by 3.1% in 2016 to around EUR 29.9 million, thereafter (2017) to increase by another 5.7% to 31.6 million euros.

The increase in demand for this support can actually be seen by the number of hectares for which coupled support was requested. Thus, for the year 2015, 107.77 thousand hectares eligible for coupled support were registered at the Agricultural Payments and Intervention Agency. Thus, by reporting the two indicators (the amount of the allocated budget and the number of eligible hectares), the support coupled per hectare was determined, namely 269.06 euro.

In 2016, more hectares were registered, ie 117.4 thousand hectares, representing an increase of 8.9% compared to the previous year. By reporting the total value to the number of hectares, an amount of coupled support for soybean cultivation resulted in 254.63 euro / ha, a decrease of 5.36%. This decrease was recorded as the number of applications increased, as mentioned above.

In the last year the increase in demand for coupled support was even more significant, so the total number of eligible hectares increased to 164.7 thousand, 40.3%, as compared to the previous year. Although the value of the allocated budget has increased, this increase in demand exceeded the first, so when the two indicators were reported, the value of the amount decreased by 24.65%, reaching 191.85 euro per hectare.

Figure 1. The percentage of eligible soya area in total area



Source: own data processing Agricultural Accountancy Data Network (AGIC), Agricultural Payments and Intervention Agency (APIA), INS, Eurostat

In Figure 1, the share of the soybean-cultivated area for which coupled support according to RICA was calculated and the total area taken from the statistical data provided by the National Institute of Statistics. The exception is the year 2017, for which the data were partial, ie the area for which coupled support will be granted has been taken through the interview given by the director of APIA and the total area cultivated with soy was taken from the Euro-state site, this is why it can be seen that in that year the share of the area for which coupled support will be granted exceeds by 8.98% that of the total soybean surface, which can only be scriptic, but not in reality.

However, referring to the years 2015 and 2016, one can observe the following: the soybean area for which coupled support was granted was 84.09% of the total soybean area in Romania in 2015. In 2016, the area for which coupled support increased by 8.15 percentage points over the previous year, so its weight in the total soybean area was 92.24%.

In 2017, even if the data are partial, we can see that the growth trend continues, even increasing, by doubling the difference between the shares of the surface for the coupled support from the total, thus the increase is of 16.74 percentage points.

This growing tendency for the coupled support has definitely influenced the total production of soybeans, these two indicators being in a proportionate relationship.

The influence of coupled support on the average yield per hectare will also be determined by means of the correlation coefficient.

In Table 3, we calculate the correlation coefficients between the amount of direct payments per hectare of soybeans, plus the amounts of coupled support in recent years and the three indicators previously analyzed.

Table 3. Relationship between the amount of subsidies and the area, production and yield

| Specifications                   | Cultivated area | Total production | Average yield per hectare |
|----------------------------------|-----------------|------------------|---------------------------|
| Direct payment + coupled support | 0.6566          | 0.8210           | 0.4311                    |

Source: own calculations

## CONCLUSIONS

In this paper it was desired to determine the influence of coupled support to soybean culture on indicators such as cultivated area, total yield and average yield per hectare. Thus, by analyzing the current situation of these indicators, there was a concomitant increase with the increase of the coupled support value.

However, in order to clarify this issue, the coefficients of correlation between these variables were calculated, as can be seen in the last table, the situation of soybean culture in

Romania is as follows: Between the amount of direct payments per hectare, cumulated with the value of coupled support and the area cultivated during the period 2007-2017 has a close relationship due to the coefficient of correlation of 0.6566, so when the increased support value increased and the soybean surface. Moving to the second indicator or total output, it can be seen that between this and the value of the support granted is a strong relationship with a coefficient of correlation of 0.821, representing a directly proportional relationship, when the values of the increased support increased and the production total. Last but not least, the average yield per hectare is not influenced by the support given to this crop, given the coefficient below 0.5 and 0.4311, respectively.

In conclusion, in Romania, the area cultivated with soybeans and the total production harvested on this surface are influenced by the values of the financial support granted by the European Union through the first pillar of the Common Agricultural Policy.

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