

THE EVOLUTION OF THE AVERAGE YIELD PER HA IN THE MAIN CROPS DURING THE PERIOD OF PLANNED ECONOMY

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Abstract: *During the planned economy period (1950-1989), the Romanian agriculture benefited from the allocation of an important volume of resources, which, associated with the advantages of scale economy, led to a positive evolution of the main qualitative performance indicator – the average yield per surface unit.*

Regarding the evolution of the average yield, given the general ascending trend, the differences among crops or groups of crops remained the same until the end of the period. In others, among which maize, oleaginous plants, sugar beet or potatoes, the level of the average yields manifested an obvious decreasing trend over the last few years of planned economy.

In spite of the success obtained, compared to the market economy system, the negative differences remained significant. During the last years of planned economy, in Romania, compared to France, for example, the yield was by almost 30% lower in wheat, by 45% lower in maize, by less than 50% lower in soy or three times lower in sugar beet or potatoes, which were cultivated exclusively on irrigated fields.

Keywords: agriculture, average yield, planned economy.

1. The yield of cereals

The Romanian agriculture was, in its entire history, a cereal-based one. However, during the planned economy period, the share of the cereals cultivated on arable land reduced from 75 % to 61 %, with some variations from one period to another, the main breeds being wheat and maize, followed by barley (Table 1).

Compared to the previous period of the Second World War, the area planted with cereals reduced in those breeds grown for feeding draft animals (barley, oats, maize), their place being taken by non-food crops.

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Table 1. The evolution of the area cultivated with cereals, in Romania, during 1934-1938 and 1951-1990 -thousand ha-

Specification	1934-1938	1951-1955	1956-1960	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990
<i>Total cereals</i>	8186	6971	7312	6772	6509	6068	6353	6174	5785
<i>Arable share</i>	87,1	73,3	75,0	69,1	66,5	62,5	64,8	62,4	60,8
- wheat + rye	2742	2956	3069	3054	2826	2463	2297	2276	2403
-barley+two-row barley	839	472	290	237	278	363	662	791	725
- maize	3884	3057	3613	3308	3246	3110	3295	2992	2685
- oats	674	449	314	150	132	102	51	71	97
- rice	0,4	18	19	14	25	25	21	28	45
- sorghum+millet	46	19	6	9	3	4	17	15	9

Source: The Statistical Yearbook of Romania, CNS data.

Against the background provided by the absolute ponderal decrease in the cultivated land area, the cereal yield increased continuously, reaching a peak of almost 19 mil. tones in the five-year period, from 1976 to 1980, i.e. increasing by 2.3 times (Figure 1). The yield remained at a relatively high level in the next two five-year periods (i.e. 1981-1985 and 1986-1990), when, in Romania, over 18 mil.tones of cereals were produced annually.

Wheat. The evolution of the wheat yield generally followed the same trend as that of cereals, except the fact that the reduction of the cultivated area was slightly more pronounced. The greatest wheat yield was obtained in the five-year plan 1986-1990 (Figure 1).

Maize. It is the breed with the largest cultivated land area in Romania, rivaling that of wheat and barley together. In normal years, the yield is also more than half of that obtained from all the other cereals together. The area cultivated during the command economy was the highest in the 1956-1960 five-year plan (3,613 thousand ha). The annual average for the maize yield exceeded 10 million tones for the period 1976-1985; however, in the last years of the command economy, it decreased significantly (Figure 1).The territorial profile of the Romanian agriculture shows that the wheat and the maize have always strived for primacy, depending on the environmental favorability. On a descending scale of the environmental favorability on counties, the wheat may extend between 1,700 and 2,000 thousand ha, while the maize is restricted from maximum 3,400 thousand ha to 3,100 thousand ha minimum.

The evolution of the average yields, although positive, reflects a lag compared to most EU countries (Figure 2), the difference increasing from one period to another. In Romania, an extensive agriculture was practiced even during the command economy, when the statistics and the volume of the material costs showed

some intensity in the allocation of inputs (irrigation, fertilizers, advanced biological material).

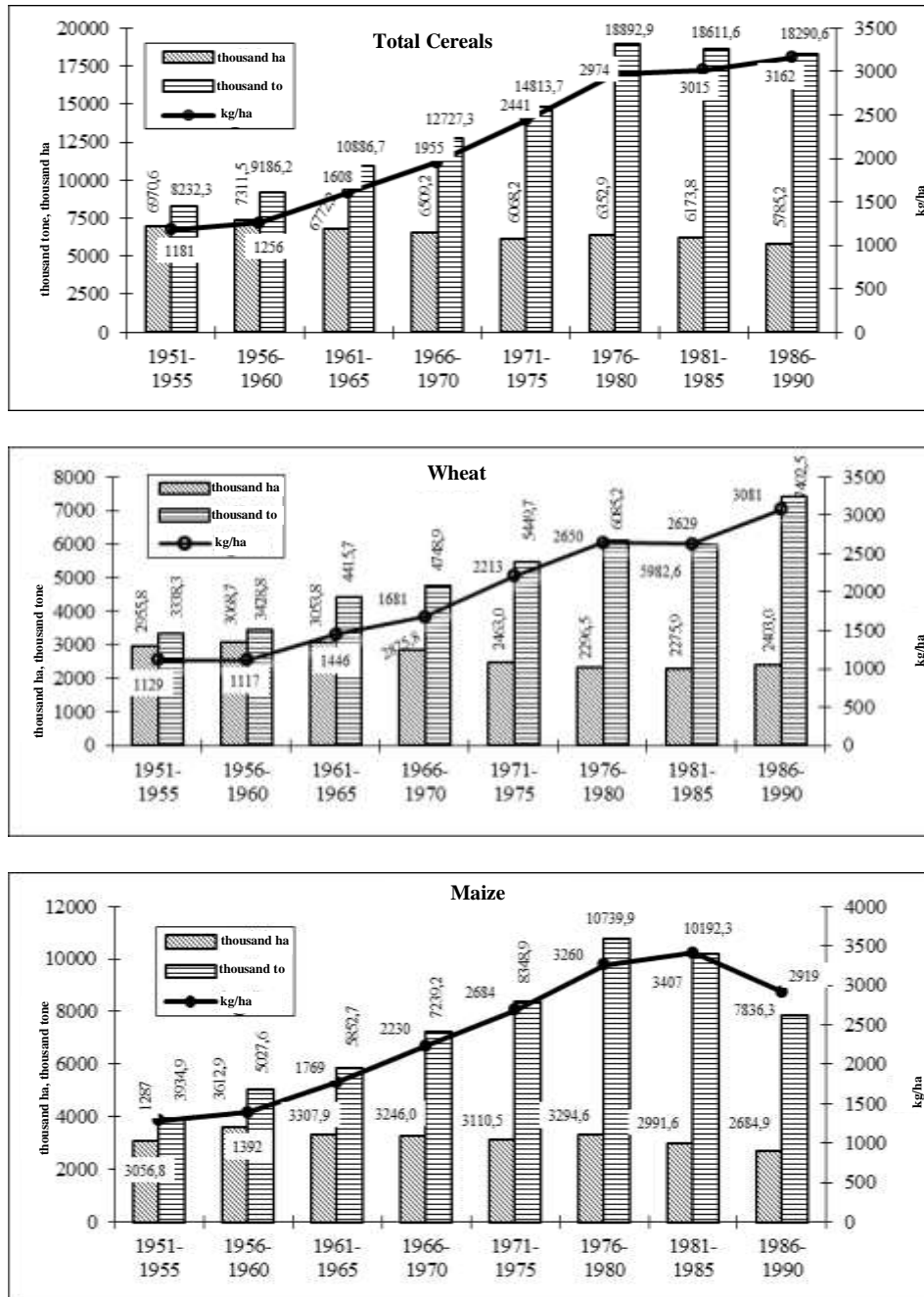


Fig. 1. The evolution of areas, for the total and average yield in cereals, wheat and maize, in Romania, during 1951-1990

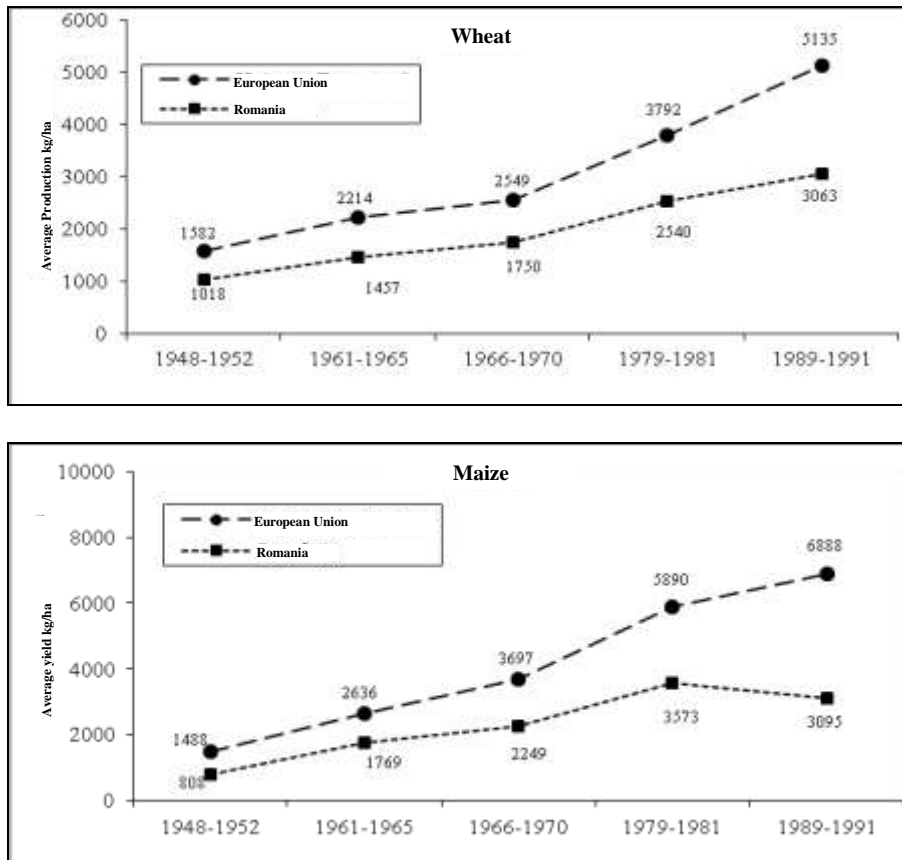


Fig. 2. The evolution of the average yield per ha in wheat and maize, in EU-15 and in Romania, during 1948-1991

Serious technological impediments in the quality of work, the failure to comply with the optimal periods for the execution of works, failure to comply with the irrigation regime, the waste and the poor plant protection largely tithed the yield capacity of Romanian breeds and hybrids.

2. The oilseed plants

They belong to the most comprehensive group of non-food crops. From a botanical perspective, the oilseeds belong to very different families, their aggregation criterion being the one represented by their final product, i.e. the oil. Of these, the most important ones, which are grown in *pure culture*, are the sunflower, the soybean, the rapeseed, followed by the flax, the castor oil plant and by other plants cultivated on much smaller areas. The entire group of oilseeds was cultivated on increasingly larger areas, from 447.1 thousand ha, during 1951-1955, peaking, in 1986-1990 five-year plan, to 910.5 thousand ha, and to an average yield of 1,165 kg/ha (Figure 3).

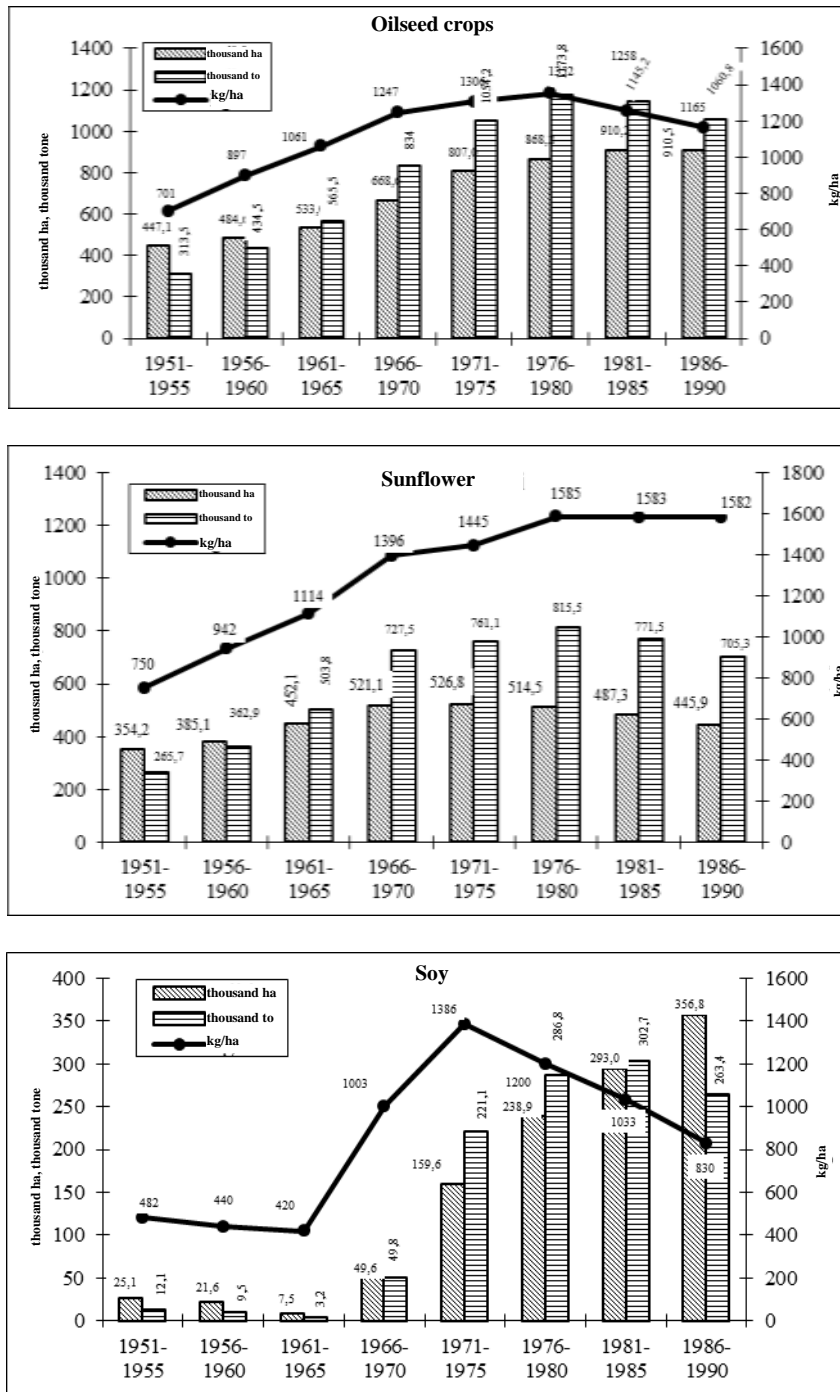


Fig. 3. The evolution of the cultivated land areas and of the yields of oilseed crops, sunflower and soy in Romania (1951-1990)

Sunflower. In the period before the war, the statistics reported, for the years 1925-1929, a cultivated land area of 128 thousand ha and a yield of 740 kg/ha. In the early years after the war (1945-1947), the cultivated land area increased to about 400 thousand ha but the average yield reduced to just 390 kg/ha (Figure 3). During the socialist agriculture, the sunflower was grown on areas increasingly larger, from 354.2 thousand ha and an average yield of 750 kg/ha, during 1951-1955, and reaching a maximum of 487.3 thousand ha and 1,583 kg/ha in the five year plan 1981-1985 (Figure 3).

Soybean. It was cultivated on small areas, with modest yields until the early 70's, when the first large irrigation systems were brought into service. In the years 1971-1975, the soybean was cultivated on almost 160 thousand ha, and the highest average yield, i.e. 1,386 kg/ha, was obtained. The cultivated land area was further expanded to over 350 thousands ha. However, because of the inadequate technology, the average yield reduced to less than 900 kg/ha (Figure 3).

3. Sugar beet and potatoes

Sugar beet. It was grown on areas between 100-200 thousand ha, until the early 70's, in the traditional areas of Transylvania, Maramures, northern Moldavia. Afterwards, it was extended in the areas equipped for irrigation from the south and the east of the country, reaching, in last years, to over 300 thousand ha (Figure 4). The territorial self-sufficiency program launched in the last years of the regime included the establishment of over 30 sugar mills, which had to be supplied with raw material. The sugar beet was grown exclusively by agricultural cooperatives until the last year, i.e. 1989, when it was also imposed to state agricultural enterprises, because of yields per ha, which were some of the lowest in Europe, even after it had been located in the southern and south-eastern parts of the country, on exclusively irrigated land. On average, for the years 1977-1978, Romania achieved 23,352 kg/ha, Bulgaria 25,641 kg/ha, German Democratic Republic 29,122 kg/ha, Hungary 35,246 kg/ha, France 44,050 kg/ha and the Federal Republic of Germany 47,512 kg/ha (Parpală, 1980). Even in the last years of planned economy, the average yields were wholly unsatisfactory, given the many technological deficiencies, the faulty irrigation and the mechanized harvesting losses being the most important. On average, for the period 1986-1989, only 21,800 kg/ha roots were obtained, while, during the same period, France obtained 65,593 kg/ha, more than three times (FAO Yearbooks - Yield).

Potatoes. Although basic components of the food system, the human consumption did not exceed 2,000 tones during the whole period. The industrial needs and the use in animal feeding led to a continuous increase in the potato yield, which was mostly satisfied by expanding the cultivated land areas from 247.5 thousand ha, in the period 1951-1955, to almost 332 thousand ha, in the period 1986-1990 (Figure 4).

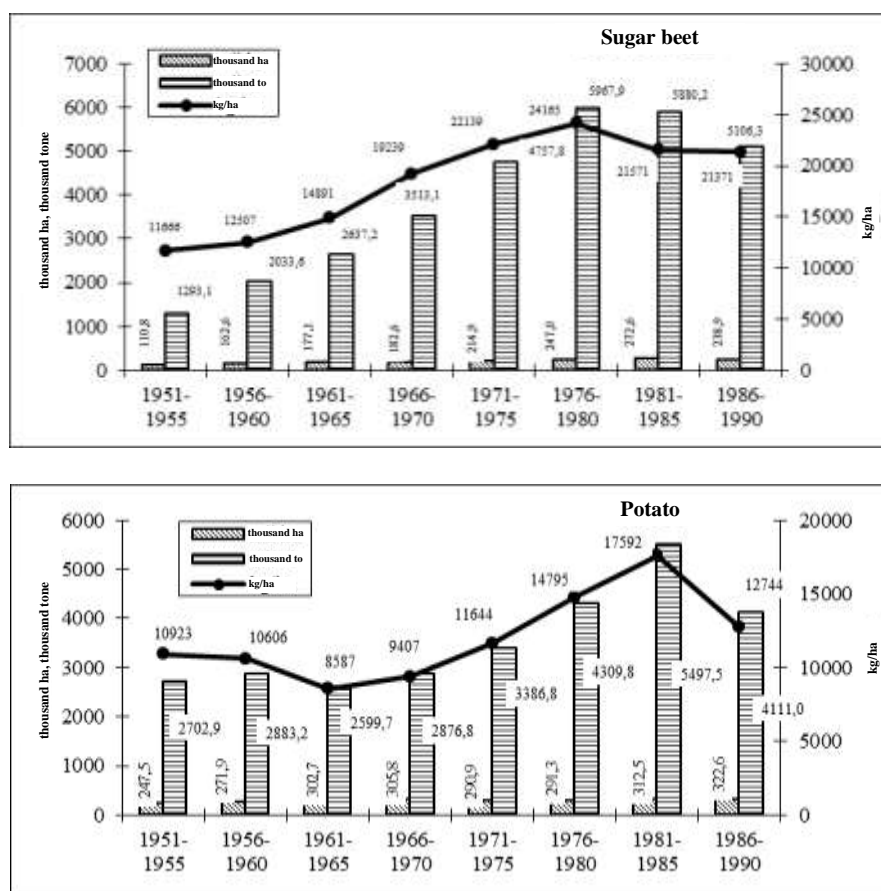


Fig. 4. The evolution of the cultivated land areas and of the yields obtained in sugar beet and potato, in Romania, during 1951-1990

The increase in the potato cultivated land area was necessary because of the low yields per ha, i.e. nearly 11 t/ha during 1951-1955, and 12.7 t/ha in the last years of the regime. In 1978-1980, when Romania obtained 14.4 t/ha, Poland obtained 20.5 t/ha, and the Federal Republic of Germany 29.7 t/ha (Parpală, 1980). On average, for the period 1986-1990, Romania obtained 10.5 t/ha and France 29.8 t/ha, i.e. more than 2.8 times (FAO Yearbooks - Yield).

4. The evolution of the long-term average yield for the main crops, during 1963-1989

By comparing the yield level obtained in the last years of planned agriculture with the one from the beginning of the collectivization and nationalization process of agriculture from 1951-1955, it appears that the latter period appears favorable and it is normal to be so. The war years, the catastrophic drought of 1945-1946, the nationalization process, the relentless struggle against the kulaks, i.e. precisely

against the most performant farmers of that time, decisively affected the yields per ha. On a long term, the yield per ha recorded the highest increases in cereals, i.e. wheat, maize and barley, and, as far as the non-food crops are concerned, in sunflower (tab.2)

Table 2. The yields for the main crops during 1951-1955, compared to 1986-1989 q/ha

Period	Wheat	Maize	Barley	Rice	Beans	Peas	Hemp bundle	Sunflower	Potatoes	Sugar beet	Tobacco	Hemp	Cabbage
1951-1955	11,2	12,7	10,5	25,5	5,2	8,6	24,3	7,4	98	117	6,45	84	174
1986-1989	30,6	29,4	38,8	25,6	6,7	10,6	33,4	16,2	137	216	9,3	107	211
$\frac{1986-1989}{1951-1955}$ %	272	232	369	100	131	123	137	218	140	18/5	145	127	121

Source: Processing based on the Romanian Statistical Yearbooks.

The major differences between the two periods are explained primarily by the outstanding level of the average yield in the first period, i.e. 11.2 q/ha for wheat, 12.7 q/ha for maize or 10.5 q/ha for barley. Compared to this level, in the last years of planned economy, the average yields were more than 2.7 times higher for wheat, about 2.3 times higher for maize and nearly 3.7 times higher for barley.

Significantly higher yields were obtained from sunflower, as it was less dependent on irrigation; however, in this respect, a significant contribution was brought by the shift from breeds to more productive hybrids, as in the case of maize. Small yield increases have been achieved in grain legumes and textile plants, breeds which had been neglected during most of the planned economy.

A special case is represented by high intensity crops, such as the sugar beet or the potato, which, in the last years, were cultivated solely on areas equipped for irrigation but not irrigated, which, along with other technological malfunctions, explain the unsatisfactory results obtained.

5. The evolution of the average yield in some crops in the socialist agricultural system

In the spring of 1962, the agricultural cooperativization process ended, so that, starting with the next year, the agriculture developed and performed exclusively under the socialist system, represented by the two kinds of agricultural holdings: state agricultural enterprises (known as IAS in Romanian) and agricultural cooperatives (known as CAP in Romanian).

During this period, the Romanian agriculture underwent an intense modernization process, the number of tractors increasing from 57,500 units to 151,7 thousand units, i.e. over 2.6 times. The amount of fertilizer delivered to agriculture increased from 101.8 thousand tons to 1,158.8 thousand tons, i.e. over 11 times, and the area equipped for irrigation increased from about 200 thousand ha to more than three million ha, i.e. 15 times. The biological material was greatly improved, as well as the technological system as a whole, and it also generally benefited from specialized management. The evolution of the series adjusted to the socialist agriculture period 1963-1989 is shown in fig. 5-10.

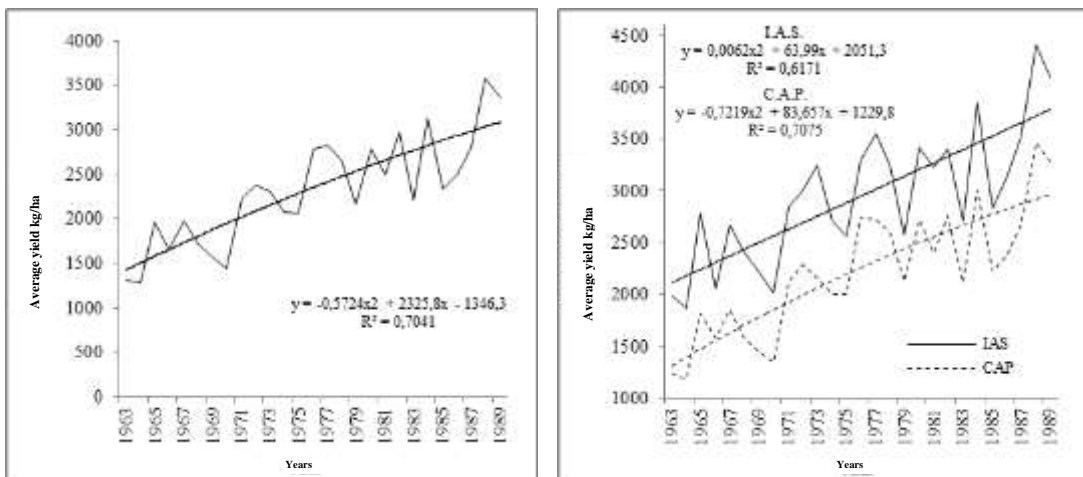


Fig. 5. The evolution of the average yields in wheat, in Romania, per total agriculture, in IAS and CAP (1963-1989)

Except for wheat, where the developments of the average yields per ha increased until the end of the period, in the other crops, i.e. maize, sunflower, soybean, sugar beet and potato, there is recorded a yield peak placed somewhere (depending on the crop) between 1975-1985; however, in last years, the yields decreased significantly.

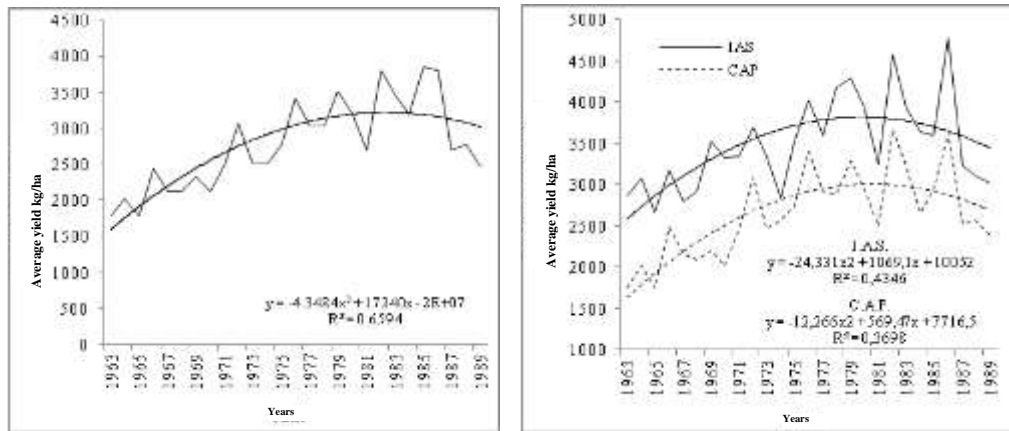


Fig. 6. The evolution of the average yields in maize, in Romania, per total agriculture, in IAS and CAP (1963-1989)

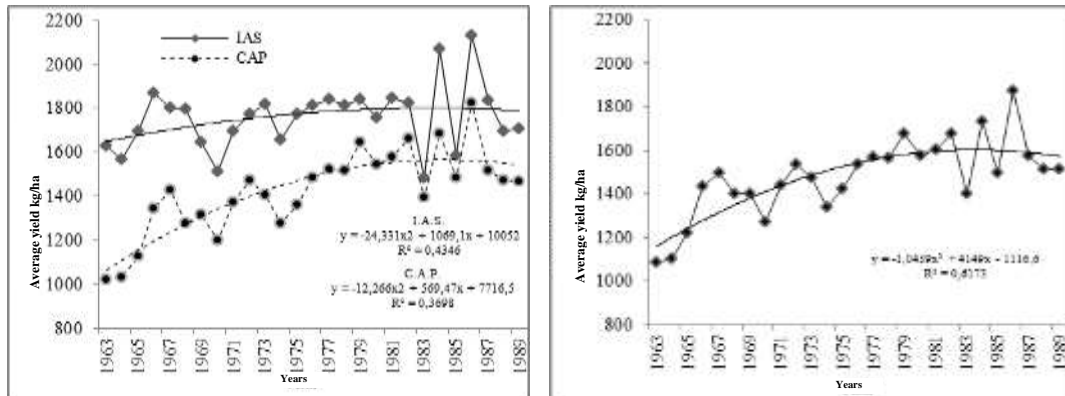


Fig. 7. The evolution of the average yields in sunflower, in Romania, per total agriculture, in IAS and CAP (1963-1989)

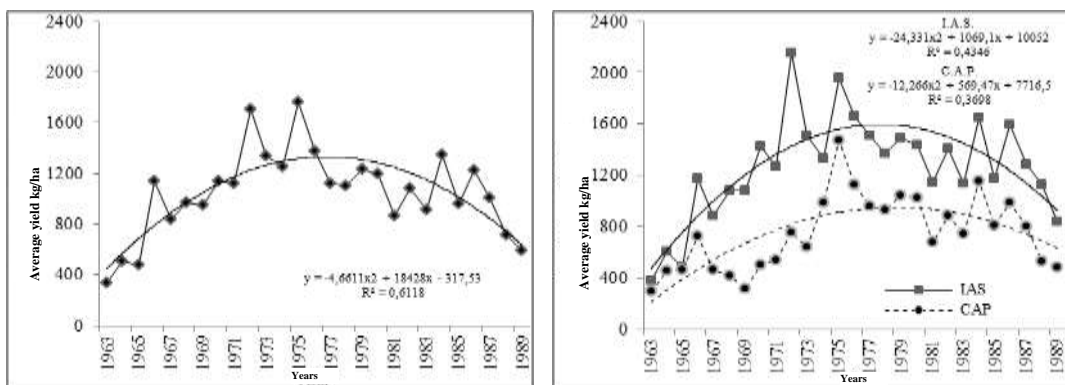


Fig. 8. The evolution of the average yields in soybean, in Romania, per total agriculture, in IAS and CAP (1963-1989)

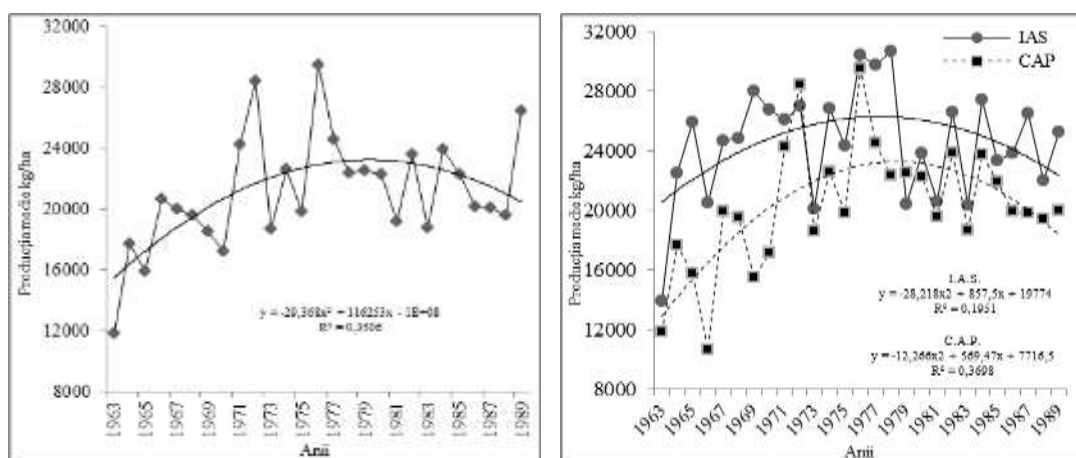


Fig. 9. The evolution of the average yields in sugar beet, in Romania, per total agriculture, in IAS and CAP (1963-1989)

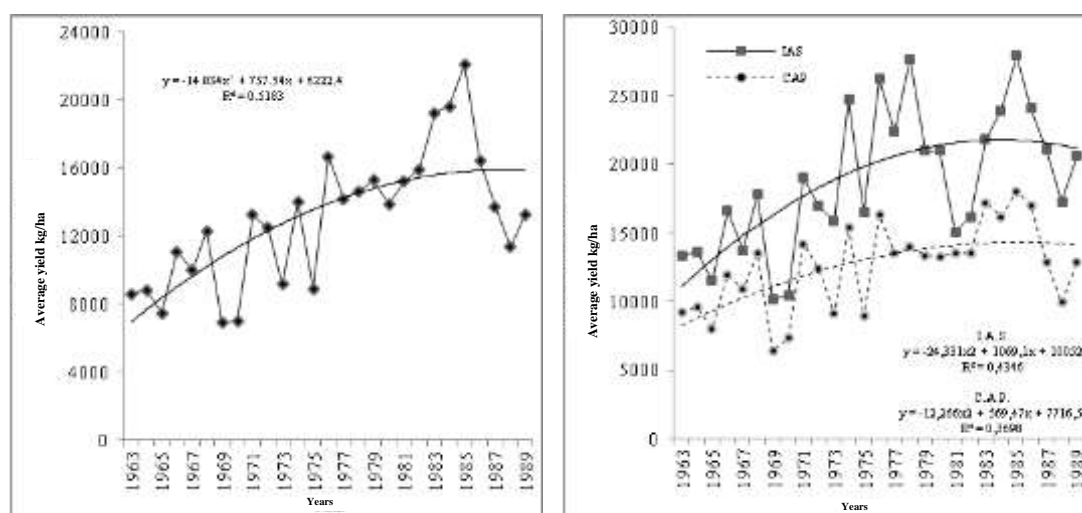


Fig. 10. The evolution of the average yields in potatoes, in Romania, per total agriculture, in IAS and CAP (1963-1989)

The technological degradation in all its aspects - including the irrigation regime - are responsible for this development. There is also a significant difference between the state agricultural enterprises - state agricultural holdings - and the agricultural cooperatives, the latter's average yield level being significantly lower.

CONCLUSIONS

1. The period after the Second World War meant, for the Romanian agriculture, the transition from an ancestral and primitive technological system to a modern

agriculture, in many ways comparable to that of the developed economies from Western Europe and North America.

2. The agricultural technological revolution was triggered by the political regime established in 1945, which aimed, among others, at the economic and agricultural modernization and at the increase of its technical and economic competitiveness.
3. It has been invested heavily in both capitalization, i.e. tractors and working equipment, ample land reclamation works, and in increasing the provision of inputs: fertilizers, performant biologic material, pesticides, water.
4. The result of this technological revolution and management translated into significant increases of yields per unit area, at the main crops. Lately, however, the state economy did not succeed in maintaining a technologically advanced system so that the average yield was in decline.
5. Despite all its recorded performances, the socialist agricultural system remained considerably behind the market economy states.

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