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## INVESTMENTS IN LAND IMPROVEMENT. METHODS OF MITIGATING THE CLIMATE'S EFFECTS ON THE ROMANIAN ECONOMY

### ABSTRACT

Agriculture was and is still considered a strategic sector of the Romanian economy; out of this reason a greater contribution is expected from agriculture to the gross value added at national level. However, the lack of new investments or rehabilitation of the existing ones in agriculture adversely impacts its capacity to produce gross value added and makes it vulnerable to the severe weather conditions from the recent years.

The statistical data for the past 7 years support, on the one hand, the correlation between productivity obtained in agriculture and the more or less favorable years in terms of weather conditions for Romania's agriculture; on the other hand, they highlight the need to further investments in land improvement as a factor ensuring food security for the population.

**Key words:** investments, land improvement, climate, desertification, agriculture.

**JEL Classification:** Q15, Q18.

### 1. INTRODUCTION

The severe weather conditions that have regularly and drastically reduced agricultural production, directly affect the export capacity of agriculture and its capacity to meet the population's needs in terms of food security. One of the most important means by which the adverse effects of climate change can be counteracted is represented by the investments in land improvement works. However, the land improvement sector continues to suffer from the lack of support, financial support in the first place; furthermore, the accession to the EU has imposed a drastic reduction of subsidies in this area, without taking into consideration the vital needs of the Romanian agriculture and the urgent need to counteract the effects of drought and flooding upon Romania's environment.

## 2. THE PLACE OF AGRICULTURE IN THE CURRENT ROMANIAN ECONOMIC CONTEXT

Agriculture was and is still considered a strategic sector of the Romanian economy, by the role it plays in the utilization of land and water resources as well as in their protection; it is also a strategic sector because of its share in GDP and in total population employed in the economy, as it is an important supply and also an outlet for the products and services of the industrial branches and mainly by the role it plays in Romania's food security<sup>1</sup>. The position of a certain branch in a country's economy is usually determined by the share of the respective branch in a panel of macroeconomic synthetic indicators<sup>2</sup>. In order to highlight the factors that led to the decreasing share of agriculture in our national economy, we shall compare several macroeconomic indicators with the gross added value reported by agriculture, forestry and fisheries (considered indicators: exports, imports and population's cash expenses).

The contribution of agriculture, forestry and fisheries to Romania's Gross Domestic Product (GDP) has declined in recent years, as shown in the Table 1.

*Table 1*  
Share of agriculture, forestry and fisheries in the national economy,  
by main synthetic macro-indicators in the period 2002–2008 (%)

	2002	2003	2004	2005	2006	2007	2008
<b>Active employed population</b>	36.2	34.8	32.0	31.9	29.7	28.3	29.9
<b>Fixed capital stock</b>	1.5	1.3	1.4	1.5	1.5	1.7	1.7
<b>Net investments</b>	11.7	5.9	5.5	3.9	5.3	3.4	4.5
<b>Export</b>	3.2	3.2	3.1	3.0	3.3	3.8	6.4
<b>Import</b>	6.6	7.3	6.5	6.2	6.0	6.5	7.6
<b>Population's cash expenses</b>	40.1	39.6	38.5	36.7	35.6	35.8	35.9
<b>Gross value added</b>	12.6	13.0	14.1	9.5	8.8	6.4	7.2

*Source:* own calculations based on data from Romania's Statistical Yearbook 2008, Romania in figures 2009, BSL Nr. 5/2009, NIS.

The share of agriculture in the gross value added in Romania continues to be significant (from 12.6% in 2002 to 7.2% in 2008), as compared to the EU-27 average of 1.9%. A similar situation is found in Bulgaria, Lithuania and Poland, which reveals, on the one hand, the importance of agriculture for Romania's economy and on the other hand the positive or, in recent years, negative effect that agriculture has on Romania's GDP. Agricultural products and foodstuffs have traditionally played an important role in Romania's foreign trade. These products

<sup>1</sup> Zahiu, L. (1999) *Agricultural Management*, Economica Publishing House, Bucharest.

<sup>2</sup> Toderoiu F. (2007) *Agri-food sector in the national economy - current status and prospective evaluation* in the Project: Agri-food sector in the national economy of Romania, in the post-accession period, Institute of Agricultural Economics, Bucharest.

have been particularly important in Romania's foreign trade at the beginning of the transition period and their importance increased again in recent years.

In Figure 1 we can notice that the share of agriculture in total exports increased, mainly in the last three years (from 3.2% in 2002 to 6.45 in 2008), although the share of agriculture, forestry and fisheries in total added value decreased.

The main food and agricultural products exported by Romania in the last 7 years were the following: livestock, oilseeds, vegetables, milk and dairy products, honey, fruit, wine, oil, canned fruits and vegetables, bread and cereal products; imports mainly consisted of grain, meat, tobacco, sugar, fruit, citrus and coffee. This structure of products reflects the inadequate international competitiveness of the Romanian agri-food sector, especially in the processing sector. The share of exported processed products slightly increased, but it is still below the levels achieved by the Candidate Countries.

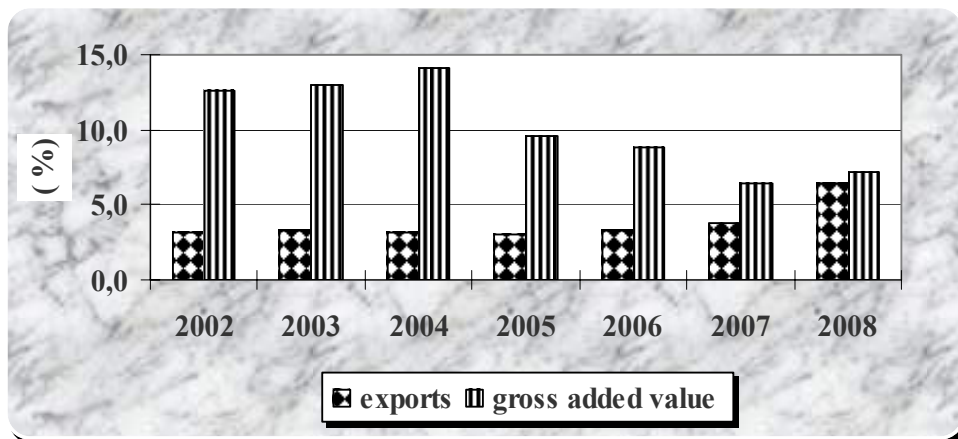


Figure 1. Share of exports in agriculture, forestry and fisheries compared to their gross added value.

The processing sector in Romania is less competitive<sup>3</sup>, significantly contributing to the fact that the trade balance in agricultural products and foodstuffs has remained consistently negative. Since 1990, Romania became a net importer of foodstuffs. Since 1997, the net imports followed an increasing trend, to reach a maximum of over 1.27 billion USD in 2002. After the accession moment, there was an increase in imports of agricultural products, especially from the EU Member States, due to the open access to the single market by the removal of customs duties and other trade barriers, but also on the basis of the population's increased propensity to import agricultural products, as seen in Figure 2.

<sup>3</sup> Zăhău, L. – coordinator, (2005) *Politici și piețe agricole – reformă și integrare europeană*, (Agricultural markets and policies – reform and European integration), Ceres Publishing House, Bucharest.

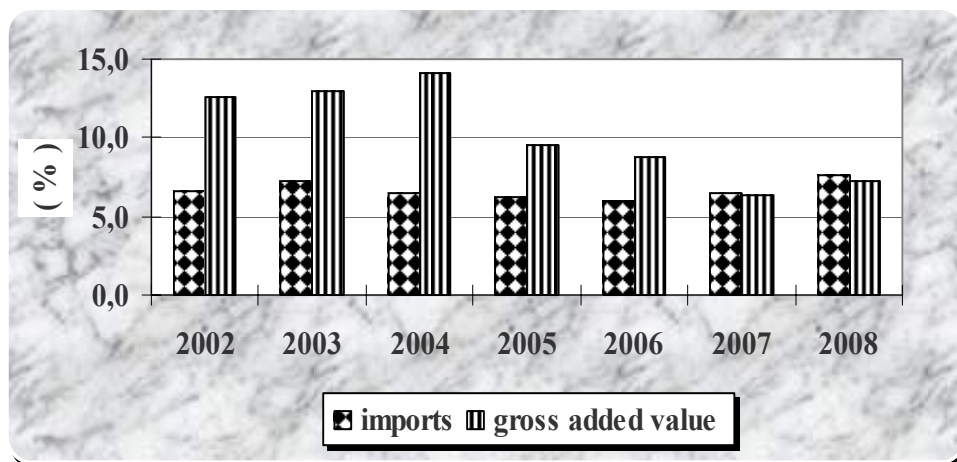


Figure 2. Share of imports of agriculture, forestry and fisheries compared to the gross value added in agriculture, forestry and fisheries

The one percent increase from 6.6% in 2002 to 7.6% in 2008 of the share of agriculture in imports shows that Romania, although considered a country with great potential in agriculture, is increasingly dependent on agricultural imports; at the same time, “opening the economy to the outside world on the basis of imports led to an enlarged gap between Romania and the EU Member States, and thus a longer period of time is required in order to improve the competitiveness parameters”<sup>4</sup>.

Most of the population’s cash expenses in Romania are used to cover the food needs for daily consumption (40.8% in the first quarter of 2009), which reveals the impact of agricultural products prices on the population’s welfare and the need to increase agricultural productivity. The share of agriculture in the population’s cash expenses continuously decreased, from 40.1% in 2002 to 35.9% in 2008, mainly due to the increase in the share of expenses for services.

In Figure 3 we can notice a very large difference between the share of agriculture in the population’s total cash expenses and the share in total gross value added, which reveals the poor performance of the agricultural sector that fails to keep up with the increasing food demand, determined by the general economic growth, and unable to face foreign competition, mainly from the other EU Member States.

<sup>4</sup> Toderoiu F. (2007) *Sectorul agroalimentar în economia națională – stare actuală și evaluări prospective*, (Agri-food sector in the national economy – current status and prospective evaluation) in the Project: *Agri-food sector in the national economy of Romania, in the post-accession period*, Institute of Agricultural Economics, Bucharest.

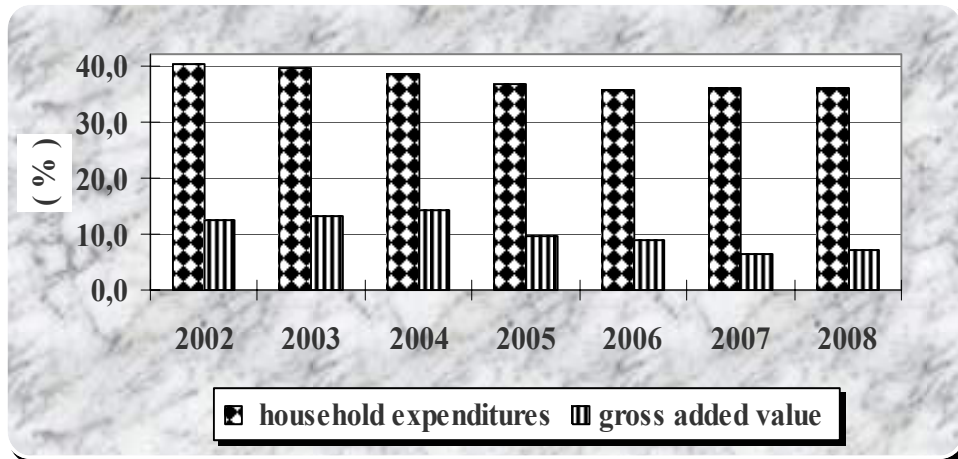


Figure 3. Share of agriculture, forestry and fisheries in the population's cash incomes, compared to the share of agriculture, forestry and fisheries in GVA.

We can draw the conclusion that while performance in agriculture has remained still low in recent years, the share of agriculture in gross value added continues to be quite significant, which reveals the importance of agriculture in national economy and its effect on the GDP in Romania. Although Romania is considered a country with great potential in agriculture, our country is increasingly dependent on agricultural imports, as it does not keep up with the increasing food demand and cannot face foreign competition.

### 3. THE EFFECT OF ENVIRONMENTAL CONDITIONS ON LABOR PRODUCTIVITY IN ROMANIA'S AGRICULTURE

Labor productivity in agriculture is negatively affected by the excessively large number of people employed in agriculture on one hand, and by the low value of the fixed capital stock in agriculture, on the other hand. As regards the agricultural labour in Romania, although this continues to be one of the most numerous in Europe, the dynamics of the share of the population working in agriculture features a gradual downward trend, from 36.2% in 2002 to 29.9% in 2008, as seen in Figure 4.

By comparing the share of the active population employed in agriculture in total employed population in Romania with the share of agriculture, forestry and fisheries in total gross value added, we can notice the very great difference in favour of the agricultural labour, which reveals the low labour productivity in agriculture. At the same time, the figure also reveals the effect of the environmental conditions upon labor productivity in agriculture:

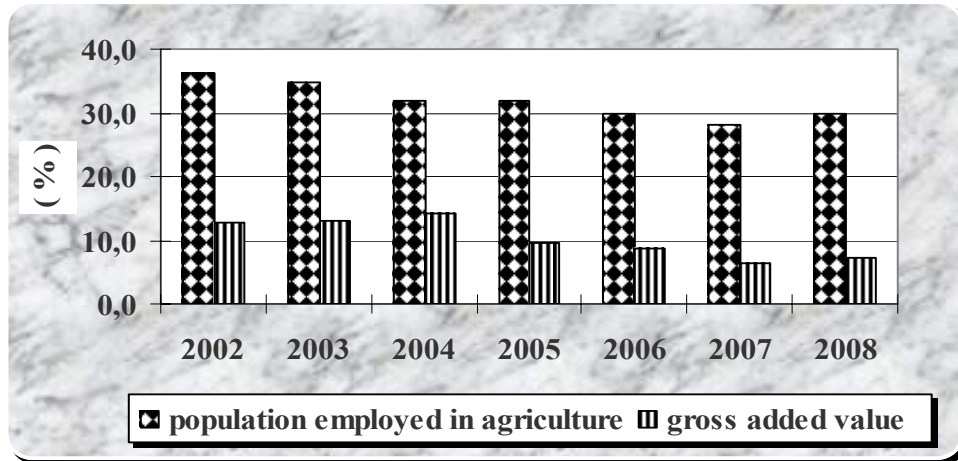


Figure 4. Share of the population employed in agriculture, forestry and fisheries, compared to the gross added value in agriculture, forestry and fisheries

By comparing the share of the active population employed in agriculture in total employed population in Romania with the share of agriculture, forestry and fisheries in total gross value added, we can notice the very great difference in favour of the agricultural labour, which reveals the low labour productivity in agriculture. At the same time, the figure also reveals the effect of the environmental conditions upon labor productivity in agriculture:

- taking as reference the year 2004 (considered a good year in terms of environmental conditions for agriculture) and the year 2007 (considered a bad year mainly due to drought and floods), we can clearly notice two peaks in the share of agriculture, forestry and fisheries in total value added: 2004 as a high peak and 2007 as a low peak.

- in the year 2004 (considered a good year for agriculture in terms of environmental conditions), the share of employment in agriculture, forestry and fisheries in total employment decreased, while the share of agriculture, forestry and fisheries in total gross value added increased.

A similar gap can be noticed between the share in the fixed capital stock and the share of agriculture in GVA. As shown in Figure 5, the years 2002, 2003 and 2004 in particular (characterized by a more significant contribution of agriculture to total gross value added), do not represent years with a significant increase in the fixed capital stock in agriculture, which, in fact, remained almost constant throughout the investigated period.

At the same time, it is noticed that although the share of agriculture in total fixed capital stock is very low and did not experience growth that is worth being highlighted in the investigated period, this fixed agricultural capital has a much better contribution to labor productivity in agriculture than the population employed in

agriculture. This proves that labor productivity in agriculture is negatively affected by the excessive number of people employed in agriculture, on the one hand, and by the low value of fixed capital stock in agriculture, on the other hand.

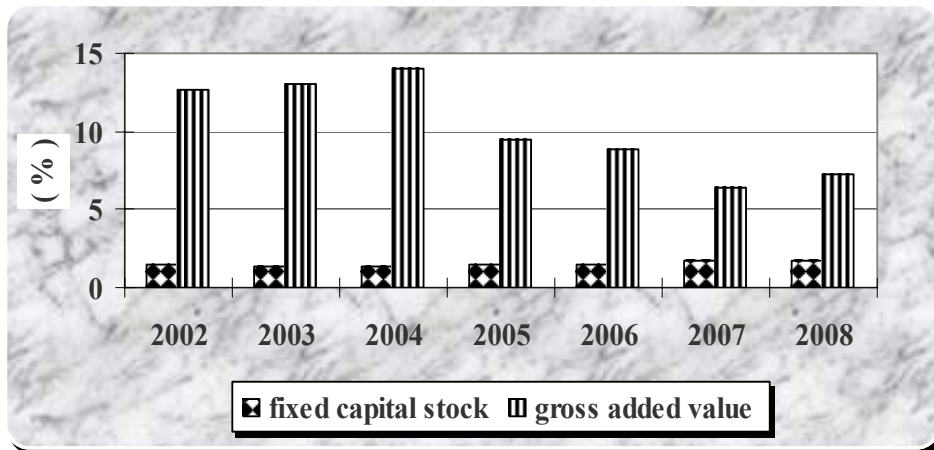


Figure 5. Share of fixed capital stock in agriculture, forestry and fisheries, compared to the gross value added in agriculture, forestry and fisheries.

The highly fragmented structure of the agricultural area is an obstacle to attracting new investments, while at the same time it affects labor productivity.

From Figure 6 we can see that the net investments in agriculture did not entail their directly proportional participation to producing gross value added.

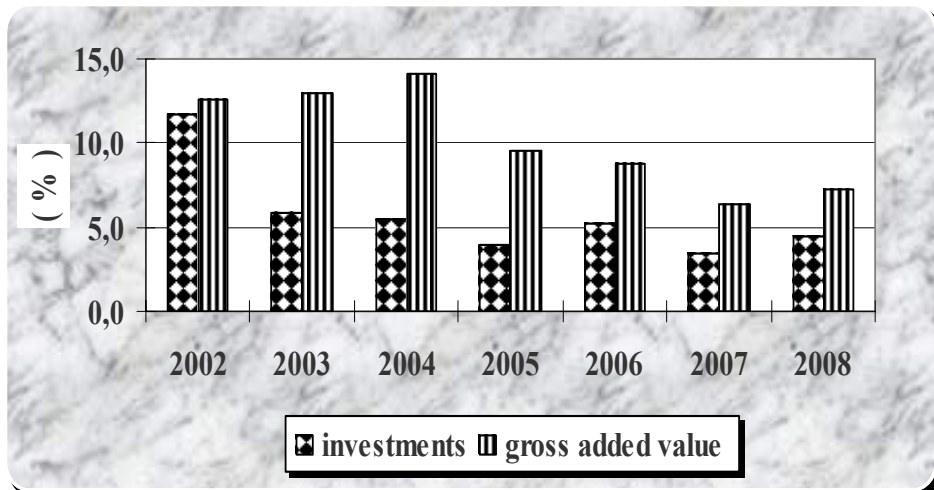


Figure 6. Share of net investments in agriculture, forestry and fisheries, as compared to the gross value added value in agriculture, forestry and fisheries.

Although the net investments are intended to increase the real technical capital, the years with the highest values of net investments in agriculture (2002, 2003, 2004) do not equally show high fixed capital values (see picture above), which proves that in these years, although investments in fixed capital were made, a large part of the old fixed capital in agriculture was scrapped. This proves the imperious need for new fixed capital investments in Romania's agriculture and the slow investment rate in the fixed capital.

We consider that there is still an imperious need for investments in new fixed capital or in the rehabilitation of the existing one in Romania's agriculture, as the low investment rate has increased the vulnerability of Romania's agriculture to the environmental factors.

#### **4. LAND IMPROVEMENT – A CONSTANT NEED FOR ROMANIA'S ECONOMY**

The soil ability to regenerate and improve its fertility is the greatest opportunity provided by nature for the population's food security and for the continuous practice of modern agriculture.

The fertility regeneration and improvement of this limited resource (the quality aspect of the land resource), together with the rational use of agricultural land areas (the quantity aspect) presuppose the continuous increase in the volume of investments in land. As a result, soil fertility cannot be merely a "gift of nature" because man can no longer rely only on its natural fertility. The soil becomes the product of labor and the economic fertility turns it into an important element of the capital in agriculture. As a modern fixed capital item, it is subject to physical wear and tear with all its consequences.

Soil degradation due to the effects of natural hazards and as a result of human action results in economic risk and uncertainty in all the human activities, in agriculture in particular.

All the land improvement works contribute to restore natural fertility to soil and determine the production capacity increase and the growth of the raw material basis in one of the most vital economic areas – agriculture<sup>5</sup>.

We believe that the economic role of the land improvement works in the agricultural activities is to create the most favourable conditions for production, similar to those provided by nature.

As a result of land improvement works not only is the natural fertility restored to the soil (by irrigations for example – the most important works that directly affect agricultural production), but significant harvest increases are also obtained, the yields are stabilized, which enable the practice of a modern and effective livestock production.

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<sup>5</sup> Lup, A. (1997) *Irrigation in Romanian Agriculture*, Agris Publishing House, Bucharest.



Briefly, the beneficial economic effects in agriculture had in view by the land improvement works are the following:

A. Higher and stable average yields;

B. Protection of the existing agricultural area and even its increase by bringing back to the agricultural use of new land areas with improved fertility.

It is necessary to point out that the land improvement activity has had a long and rich tradition in Romania, due to recognized importance of this sector for our country. We should mention here that the first irrigation plan, for example, was developed by the Italian engineer Gioia in the period 1865–1872, who proposed a deviation of the Danube River course at Turnu Severin and water transportation into the irrigation channels to Galati.

In addition to the requirements imposed by the natural conditions, by the intensification of the effects of environment pollution, by the weather extremes (drought and other weather and relief related issues) that have a significant impact on the stability of agricultural production and food security for the population, there are also other reasons for the restructuring and development of the land improvement sector by new investments in Romania, among which the following are worth mentioning:

- significant land areas, in almost all counties, which already have a developed land improvement infrastructure;
- experience gained in the design, execution and operation of land improvement facilities, which was the basis for setting up medium and high professional education in this field;
- the land improvement works have generated a significant number of jobs in agriculture and the rural areas throughout the years;
- last but not least, we should mention that the long lasting land improvement activity has created conditions for the existence of domestic manufacturers of specific machinery and equipment, as well as conditions for stimulating the demand of agricultural machinery, once a reliable source of supply was in place.

## 5. CONCLUSIONS

Taking the best year in terms of environmental conditions for agriculture and the year considered unfavorable for agriculture (drought and/or flood) as reference years of the investigated period, we clearly see how these correspond to the two extremes of the share of agriculture, forestry and fisheries in total added value (the high extreme in the year the most favourable to agriculture and the low extreme in the less favourable year).

One of the most important factors that led to the increased vulnerability of Romanian agriculture to the environmental factors and to the competition from the part of imported food products is the low volume of new investments.

We consider that the purpose of national land improvement strategies is to prevent and eliminate the negative effects of drought and other adverse weather and relief issues affecting the domestic production stability and the population's food security.

Out of the above-mentioned reasons, we consider it extremely necessary for this important branch of the Romanian economy to consolidate the land improvement sector through new investments or through fixed capital rehabilitation, as well as through the increase of the efficiency of the existing land improvement works.

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