

BIOECONOMIC SIGNIFICANCE TO DIVERSIFY THE PRODUCTION IN ROMANIAN AGRICULTURE

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Abstract

Agricultural diversification is an important mechanism for economic growth. With the globalization of markets, diversification of agriculture has as result the increasing crop productivity in terms of quality, quantity and monetary value.

The purpose of this paper is to give an overview of Romanian agriculture in terms of diversifying production. Based on the National Statistics Institute, it analyzes the dynamics of vegetable and animal sector in terms of cultivated areas, livestock, the total and average production obtained.

Romanian agriculture is at a disadvantage due to excessive fragmentation of ownership, low use of agricultural land through cultivation or weak endowment with agricultural machinery and lack of organization.

We conclude that agriculture as a whole, had not a positive development. Fluctuations in the main indicators of production are the consequences of the long transition period and of the incoherent policies on agriculture in general and to each sector, in particular.

Keywords: agriculture, diversification of production, indicators, productivity

1. INTRODUCTION

Agricultural diversification is an important mechanism for economic growth. This can be facilitated by the introduction of new technologies, changes in consumer demand, government policies, infrastructure development and or may be hindered by the risks of practices in crop management, the prices on international markets and natural resource degradation.

Diversification of agriculture refers to the shift from the regional dominance of a certain culture, the regional production of a number of crops in order to satisfy the growing demand for grains, legumes, vegetables, fruits, oilseeds, fiber, forage, fuel, and so on in order to improve soil health and creating a dynamic equilibrium in the agro-ecosystem. With the globalization of markets, diversification in agriculture has as result increased crop productivity in terms of quality, quantity and monetary value. [2]

There are two approaches to diversification of agricultural systems. First it is horizontal diversification, which is the primary approach to diversification of production in crops. Here, diversification occurs by enhancing crop by adding new crops of high value to existing culture systems, as a way to improve the overall productivity of a farm or agricultural economy of the region. The second way is the vertical approach of diversification, when farmers add value through processing the products. [3]

Generally, farmers tend to perform activities that increase their income, reduce their physical exertion, financial risk and need of work. There are various ways in which diverse agricultural systems can help farmers to maximize profit, including their roles in alleviating various types of risks. Farmers face several risks, including *price risk* (ie the risk that the price they receive

for yields to be lower than the average in a given year), the *risk of yield obtained* (eg risk as pest infestation and drought cause lower yields than average), the *risk of entry* (ie the risk of a shortage of labor in a critical point in the production process) and other risks (eg risk a family member is sick or defective tractor). [4]

Many of these types of risk (price risk, the risk of yield) directly contributes to the risk of profit, which ultimately, is the most important for the producer. Farmers and their families may respond to the risks in many ways, respectively, before the event, precautionary measures, or after the event through measures that consider minimizing losses. [5]

Another economic incentive for farmers to adopt diversified agricultural systems is the market potential, the capacity of products to attract a growing number of consumers and the impact of these products on their health and the environment. [11]

Finally, agricultural policies through regulations, taxes and subsidies, may impact on the development and profitability of farming systems by influencing farmers' decisions on the types of crops and land area cultivated or facilitating trade in certain agricultural products. [7]

Just as there are economic reasons for a farmer to choose for diversifying the production, in response to the constraints of risk, biophysical or capital market conditions, there are many other reasons for a farmer to specialize in the production of a specific crop. Modernization of agriculture has led to more specialization and by the introduction of fertilizers and synthetic chemicals there is no need for additional animal waste as an input in agricultural production. On the other hand, harvesting and processing of agricultural products also contributed to this trend toward specialization and mechanization. Mechanization has brought additional earnings for farmers due to lower operating costs. [8]

The desire of consumers to have a range of cheap products available all seasons, improvement of infrastructure (which decreased cost of long-distance transport) were also important implications for regional specialization. In addition to these economic factors that led to the specialization of agricultural production, various worldwide programs supported specialization of production in some regions for certain agricultural products such as corn, rice and wheat. [9]

2. MATERIAL AND METHOD

This study aims to analyze the evolution of Romanian agriculture during 1990-2014, from the perspective of diversification of agricultural production.

The methodology used was to analyze and to synthesize. For the introduction of this paper there were consulted numerous bibliographic sources which provided valuable information regarding the factors leading to diversification or specialization of agricultural production.

In continuing the work, based on statistics provided by the National Statistics Institute was analyzed the evolution of the main indicators of plant and animal production in order to identify ways to exploit the existing potential to diversify agricultural production.

3. RESULTS AND DISCUSSIONS

The evolution of socio-economic conditions of our country led the Romanian agriculture to a series of

structural imbalances, which related to availability of existing technical and material disponibilities, had less beneficial consequences. Returning to private ownership led to excessive fragmentation of agricultural property, to a large number of subsistence and semi-subsistence farms, plus a large share of farmers from the total employment and the number of older farmers who have a modest material basis, lacking any financial support. At the same time, the lack of specialized units in service (as were former SMAs) and anti-cooperative education, created great difficulties for these modest exploitations preventing technical progress and therefore their efficiency.

Romania's arable land (64% of farming land) is used for cereal crops (56.8%), oilseeds (13.6%), potatoes (2.7%), vegetables 2.9%), green fodder (8.9%), legumes and other crops (14.5%). Of the total number of farms (RGA 2010), 99.2% are unincorporated farms using 56% of the UAA (average 1.95 ha / holding). Analyzing farms, depending on the scope of activity, we find a great diversity, most of the farms are mixed, focusing on crop and animal production, negative element consisting of a small number of farms specialized in livestock production.

If we look from the perspective of the vegetable cultivated areas, the average production and the total achieved productions in the period 1990-2014, we see low yields per unit area and instability of production levels from one year to another (Tables nos. 1,2, 3).

Table 1: Evolution of areas planted with cereals in the period 1990-2014 (thousand ha)

Specification	1990	1995	2000	2005	2010	2011	2012	2013	2014
Wheat	2253,2	2480,8	1940,2	2476,0	2162,4	1947,0	1997,6	2104,0	2112,9
Barley	650,1	391,7	214,6	221,1	258,7	196,5	207,0	269,6	304,0
Oat	144,3	238,9	232,3	214,8	181,4	185,3	194,5	182,3	179,7
Corn	2466,7	3109,2	3049,4	2628,5	2098,4	2589,7	2730,2	2518,3	2512,8
Sun flower	394,7	714,5	876,8	970,9	790,8	995,0	1067,0	1074,6	1001,0
Soybeans	190,2	73,4	117,0	143,1	64,0	72,1	79,8	67,7	79,9
Sugar beet	162,7	133,2	48,4	25,2	22,03	18,8	27,3	28,1	31,3

Source: INS

Table 2: Evolution of average production for the main crops in the period 1990-2014 (kg / ha)

Specification	1990	1995	2000	2005	2010	2011	2012	2013	2014
Wheat	3235	3090	2286	2965	2688	3663	2652	3468	3590
Barley	3709	3505	2612	2621	3003	3628	2613	3451	3571
Oat	1622	1693	1050	1757	1679	2028	1743	2051	2124
Corn	2756	3184	1603	3952	4309	4525	2180	4488	4770
Sun flower	1409	1304	821	1381	1597	1798	1310	1993	2187
Soybeans	742	1470	594	2186	2345	1980	1308	2216	2539
Sugar beet	20149	19928	13787	28932	38036	35103	26363	36569	44711

Source: INS

Table. 3: Evolution of total output produced in the plant sector in the period 1990-2014 (thousand tons)

Specification	1990	1995	2000	2005	2010	2011	2012	2013	2014
Wheat	7289,3	7666,5	4434,4	7340,7	5811,8	7131,6	5297,7	7296,4	7584,8
Barley	2411,2	1372,9	560,6	579,6	777,1	712,8	540,9	930,5	1085,6
Oat	234,0	404,4	243,8	377,5	304,5	375,8	339,0	373,8	381,6
Corn	6809,6	9923,1	4897,6	10388,5	9042,0	11717,6	5953,4	11305,1	11988,6
Sun flower	556,2	932,9	720,8	1340,9	1262,9	1789,3	1398,2	2142,1	2189,4
Soybeans	141,2	107,8	69,5	312,8	149,9	142,6	104,3	145,0	202,9
Sugar beet	3277,7	2654,6	666,8	729,7	837,9	660,5	719,8	1029,2	1398,6

Source: INS

Crop corn acreage was reduced below 3mil. ha, primarily because of lower domestic demand for corn due to reduced livestock. The average yields of corn per unit area fluctuate widely from year to year (4438 kg / ha in 2004, 1526 kg/ha in 2007) and is not even 50% of that achieved France and total production exceeding rarely the 10 million tons (5 years of 20) while Romania could easily make 16-20 million tons corn.

As in the case of maize and wheat crop, there are fluctuations from one year to the next, on the area under cultivation, the total production and yield per hectare obtained. Wheat cultivated area was over 2 millions hectares, the average production is rather small (in most years is below 3000 kg / ha) compared with the average yields obtained in EU countries. On the other hand, the total production being dependent of yields and acreage have large variations from year to year (2.4791 million t in 2003, 7.8124 million t in 2004, 3.0444 million tons in 2007).

For sunflower crop, cultivated areas have recorded an upward trend, from 394 700 ha in 1990 to 1 001 000 ha in 2014 (the last three years, the area has stabilized around 1000 thousand ha). As with other crops, yield per unit area is low (1/2 of that in France) and vary greatly from year to year (876 kg / ha in 2000, 1595 kg / ha in 2004, 654 kg / ha in 2007, 2187 kg / ha in 2014) and the same are met in terms of total output produced (1.557 million t in 2003, 546 900 t in 2007, 1.2629 million t in 2010 respectively in 2189, 3 000 t in 2014).

Soybean crop currently occupy small areas although there are favorable conditions for this crop. Throughout the period analyzed cultivated area was reduced from 190 200 ha in 1990 to 79900 ha in 2014, to the reduction of cultivated areas contributing the interdiction for cultivation of genetically modified soybean varieties with the accession of Romania to the European Union. The average yields per hectare varies a lot (594 kg/ha in 2000, 2462 kg/ha in 2004, 1308 kg/ha in 2012, 2539 kg/ha in 2014), the amplitude of variations of productions highlighting that the soybean plant is sensitive to growing conditions and applied technology. Total yields obtained ranged between 69 500 tonnes in 2000 and 344 900 tonnes in 2006 respectively 202 900 tonnes in 2014, while the domestic demand amounts to 500 thousand tons annually, just soy grits required for animal feeding.

For sugar beet crop, the area was drastically reduced from 201 600 ha in 1991 to only 31 300 ha in 2014, due to readjustment programs in the field of sugar production with the entry in the EU. Although the average yield of sugar beet per hectare has increased, the area under cultivation has decreased (20 t / ha in 1991 to 2003, over 32 t / ha in 2004 to 2010 and 44 100 t / ha in 2014) yield remains low compared with that obtained by large cultivators countries who obtain on average 45-60 t / ha. Total production of sugar beet roots performed in the period 2007-2010 (during Romania's EU integration) allows us to get a sugar production close to allocated quota for Romania (approx. 106 thousand tons of white sugar).

The livestock sector has an important role in the conversion of crop production in animal production. In the last 20 years between these two sectors of agriculture was created a disparity, crop production has accounted for 67% of total agricultural production while livestock production only 33%.

After 1990, in livestock production of Romania there were some changes in the structure of land ownership and livestock, the destruction of big units with intensive type of production and organization in very small livestock holdings, new relationships to acquire production factors, in providing services and in processing and marketing of livestock products, which led to a reduction in livestock in all species (table no. 4). While reducing livestock was recorded a steady decline in total production of meat obtained (table no. 5).

Between 1990-2014, the number of cattle for milk production decrease by over 40% while those for meat production by over 60%. However, there is a positive thing, ie increasing average milk production per cow from approx. 2063 l / head in 1990-3385 l / head in 2013 (the highest value of the average output was 3807 l/head in 2009).

Between 1995-2009, total milk production was maintained above 50 million hl milk annually but in 2010 it fell sharply to 42.824 million hl, remaining around this value in the next period. Although the average weight at slaughter of cattle increased by more than 50% of total beef production achieved in 2014 is almost half of what was achieved in 1990.

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Table 4: Evolution of livestock during the period 1990-2014 (thousand head)

Specification	1990	1995	2000	2005	2010	2011	2012	2013	2014
Cattle	5380,8	3496,3	2870,4	2861,7	2001,1	1988,9	2009,1	2022,4	2068,9
Swine	12003,4	7959,5	4797,4	6622,3	5428,3	5363,8	5234,3	5180,2	5041, 8
Sheep	14061,8	10380,9	7656,8	7610,9	8417,4	8533,4	8833,8	9135,7	9518,2
Goats	1004,8	705,3	538,0	686,8	1240,8	1236,1	1265,7	1312,9	1417,2
Birds	121378,5	80524,1	70075,6	86552,2	80844,9	79841,7	80135,7	79440,3	75446,8

Source: INS

Table 5: Evolution of animal production in the period 1990-2014

Specification	U.M.	1990	1995	2000	2005	2010	2011	2012	2013	2014
Meat cattle	<i>thousand tons</i>	633	392	330	383	264	205	289,3	198,5	232,6
Pig meat	<i>thousand tons</i>	1010	882	670	605	585	553	595	555	582
Sheep and goat meat	<i>thousand tons</i>	203	152	116	114	104	100	150,0	107	171
Poultry meat	<i>thousand tons</i>	552	355	324	401	489	446	468	470	485
Milk cow	<i>thousand tons</i>	33057	44759	41719	48572	45457	38494	44172	44786	46615
Eggs	<i>million pieces</i>	8077	5567	5711	7310	6211	6199	6398	6388	6636

Source: INS

In the pig sector, downsizing of over 50% of the total number of pigs was mainly due to the disappearance or restricted activities of large pig farms, which financially unsustainable were decapitalized, leading to bankruptcy. This situation was due, on the one hand by the liberalization of upstream prices (energy, fuels, etc.) and the freezing of prices of main livestock products until 1996, on the other hand, by the absence of credits adapted to agriculture and animal husbandry where production cycles are much longer than in the commercial sector. In the period under review, total meat production was halved (1.069 thousands t in 1991-534,7 thousands tons in 2014) average weight at slaughter remained at 100 kg/head.

Sheep and goat sector is the only sector of Romanian livestock which increased the total number of animals, on the one hand because of the forms of support given to farmers, on the other hand by growing demands of domestic and foreign markets for sheep and goats meat. Within this sector the total number of sheep in 2014 it is 35% smaller than existing in 1990, instead of the total number of goats outperforms 1990 (+ 30.65% in 2014 compared to 1990). Raising goats has become a business partly encouraged by the export of products, especially by the trend about the therapeutic qualities of milk and goat milk derivatives.

In the poultry sector, due to the restructuring program (ASAL II) which led to the liquidation of poultry complexes, the total poultry flocks decreased drastically by 2002. The total number of year 2014 are more than 20% lower than those of 1991.

Production of poultry meat of the last 3-4 years slightly exceeds meat production in 1991 (about 470 thousand tons per year) as a result of increasing average weight at slaughter (2.0-2.1 kg / head in 2013 compared to 1.1-1.2 kg/head in 1991) and egg production remained high due to the growth of productivity recorded in the past decade.

4. CONCLUSIONS

Romanian agriculture is at a disadvantage due to excessive fragmentation of ownership, low use of agricultural land through cultivation or weak endowment with agricultural machinery and lack of organization.

Agriculture as a whole, had not a positive development. Fluctuations in the main indicators of production, are the consequences of the long transition period and also of the incoherent policies on agriculture in general and to each sector, in particular.

The main directions for revaluation of the existing agricultural potential should consider on the one hand the modernization of agricultural production through the use of advanced technologies and on the other hand modernization of agricultural management.

Romania, both as a tradition, but especially as potential is clearly favored, only it have to make the effort to evolve on the two directions of development, because currently its output is far below the existing potential. The two directions are closely linked because modern technologies and modern equipment can not be applied in rudimentary holdings, with organization and management outdated as concepts.

On the other hand it requires a change of perspective on management strategies that should have as main directions to be followed:

- ✓ developing a sustainable agriculture through innovation and technology transfer;
- ✓ farms and production specialization;
- ✓ association;
- ✓ vertical integration and production diversification.

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