

## **Tourism and Sustainable Development**

### **Sustainable Agriculture - Mandatory Approach for Regional and National Economic Development. Case Study: Tecuci Plain**

**Iulian Adrian Șorcaru<sup>1</sup>**

**Abstract:** Romania has a considerable agricultural potential, Tecuci Plain being one of the national agricultural regions with high potential, which can generate economic growth at regional and also national level. The study main objective is to analyze the dynamics of the main crops, livestock and crop production in the region, for each administrative unit, between 1970-2011 trying to determine the major trends and patterns, identifying the favorable and restriction factors and also the possibilities of the development of primary economic activities by practicing a sustainable agriculture. The research used the data obtained from the Bucharest National Institute of Statistics, but also from local institutions (Galati&Vaslui County Department of Statistics and Galati &Vaslui Department for Agriculture and Rural Development). We also used the cartographic method in order to highlight the dynamics of the agricultural activities which can be anytime analyzed by the local authorities directly responsible for the evolution of the region's agriculture in the last two decades. The results reflected significant agricultural disparities between the rural administrative units from the centre of the region (near Tecuci City) and the ones from north and south, disparities which we believe are closely related to the implementation of sustainable agriculture.

**Keywords:** sustainable development; sustainable agriculture; agricultural potential; agricultural production

**Jel Classification:** Q1; Q15

#### **1. Introduction**

The specific of the economy of Tecuci plain is determined by primary economic activities, agriculture having the largest share in the region. Besides agriculture, industry, transport and trade ensure economic links at national and international level and continuously contribute to maintain and improve the population living standards.

The most important factors which influenced the economic specific of the human settlements from our region are: the geographical position doubled by high

---

<sup>1</sup> Assistant Professor, PhD candidate, Faculty of Economics and Business Administration, "Dunarea de Jos" University of Galati, Romania, Address: 59-61 Nicolae Bălcescu Blvd, Galati, Romania, Tel: +40336130242, Fax: +40336 130 293, Corresponding author: iulian.sorcaru@ugal.ro.

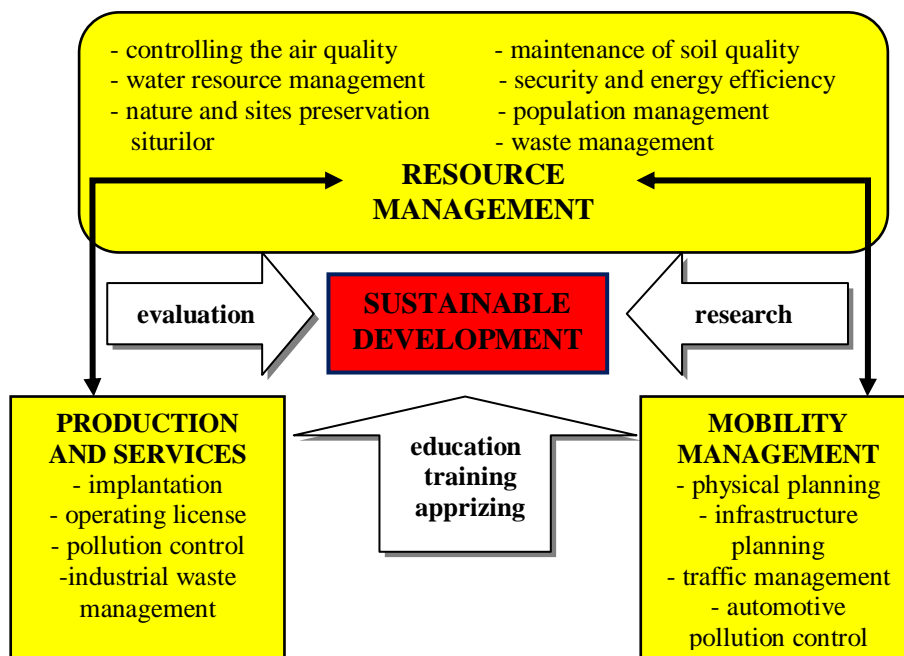
accessibility, water resources and agricultural potential. These factors significantly influenced the demographic growth of rural settlements, large and very large ones being currently predominant.

In the last four years, the global economic crisis led to a reduction in international migration in the region, massive after 1990, when most of the workforce was forced to seek work abroad (Italy, Spain). Now, along with rural migrants, many urban dwellers who have regained ownership of agricultural land after 1990, return to their villages, the labor force employed in the primary sector starting to increase after year 2000. In these circumstances the study aims to make a pertinent analysis of the dynamics of agriculture (main crops, livestock, crop production) between 1970-2011, proposing restructuring measures specific to sustainable agriculture.

## **2. Sustainable Development and Sustainable Agriculture-Theoretical Highlights**

The concept of “sustainable development” is currently a favorite theme in various specialized works being approached by numerous specialists. Although represents the basis of the development strategies and is currently analyzed at world summits and international conferences, this concept has been launched since 1987 by the Brundtland Report published by the UN World Commission on Environment and Development and institutionalized by the United Nations Conference on Environment and Development (1992 Rio Conference). During this period, studies which approach sustainable development, although sometimes can vary significantly, manage to establish some common issues:

- the content of sustainable development must ensure economic development, protecting the basic resources and the environment for further generations;
- overcoming poverty in order to satisfy the population basic needs (providing employment, housing, food, water, energy, health care);
- controlled population growth;
- reorientation of technology and risk oversight;
- decentralization of the forms of government;
- using analytical methods to evaluate some important aspects of sustainable development based on indicators included in the integrated system of human development;
- lack of synthetic methods of evaluation and an aggregate indicator of sustainable development similar to Human Development Index (HDI).



**Figure 1. Sustainable development**

*Source: (Erdeli, 1999)*

In conclusion, we can say that sustainable development has an aggregate objective targeting economic efficiency, social equity and at the same time caution to the environment.

Like sustainable development, sustainable agriculture is a current concept being analyzed at national and especially European level.

*Sustainable agriculture* aims to achieve soil cultivation systems to meet the current needs of the population both in quantity and quality, proposing in the same time, as sustainable development, not to compromise the options of future generations and damage irreversibly the natural environment. This desideratum, which implies the transition to sustainable agriculture, can be achieved through a slow process of changes that enables the maintenance of the environmental quality on long-term. Therefore sustainable agriculture involves the use of economically viable technologies, providing on medium and long-term rich crops with lower costs.

The basic conditions which must be met by any agricultural system to be sustainable and viable are:

- maintaining and improving the environment and also the ability to withstand the external pressures;
- the ability to support the food demand;
- ensuring a level of social and economic welfare of farmers through constant financial support from the state, avoiding degradation and of agricultural areas and impoverishment of the producers;
- reducing pollution to a safety level and preserving the biodiversity;
- protecting the environment by adopting risk prevention strategies and distributing wealth fairly.

The purpose of practicing sustainable agriculture is to restore and support rural areas to achieve high performance ensuring increased quality of life. Therefore some specialists believe that sustainable agriculture must be based on the requirements, duties and aspirations of farmers themselves, but also on the restrictions they face both in agricultural and non-agricultural activities.

In conclusion, both sustainable development and sustainable agriculture aim at medium and long-term changes in the economic, administrative and technological domains and also at the mentality, education level and finally lifestyle of the population.

### **3. The Use of Farmland and the Agricultural Profile of the Settlements in Tecuci Plain**

Having complete data on the structure and land use for all administrative units of Tecuci Plain in the period 1960-2011 I could highlight the evolution of the agricultural area of the region, on the one hand, and its structure (*arable land, grassland, meadows, vineyards and vine nurseries, orchards and tree nurseries*) on the other. Analyzing the **agricultural area** by its ratio to the total area of each commune in the region, we can say that the plain didn't register major changes, the agricultural area ranging from 80.7% in 1960 to 82.9% in 2011. At territorial level, most of the communes have values between 80-90%, the highest values in 2011 exceeding 90% (Cudalbi-96%, 95% Grivița, Matca-93.8%). The lowest values were registered by Movileni (52.7%), Umbrărești (69.6%) and Nicorești (71.9%). Unfortunately the growth of about 2% is not real, as the plain agricultural area decreased from 138631 ha in 1990 to 130547 ha in 2011. This percentage decrease is attributed to the reduction of the areas of some communes due to administrative-territorial reorganization after year 2004.

Analyzing the structure of the agricultural area, we notice that the largest share, normally for a plain region, is occupied by the *arable land* which increased its share from 83% to 84.9% in the period 1960-2011. This increase is, as in the agricultural area, an artificial one, arable land registering a decrease, in absolute values, from 116180 ha in 1990 to 110919 ha in 2011. At commune level, with high levels of arable land, we notice the same administrative units which had the largest agricultural areas in 2011 (Cudalbi-93.9%, Matca-93.2%), Cosmești (93.5%) or Movileni (92.4%), most of them having shares between 75% and 85%. The lowest value was recorded by Nicorești, with an arable land of only 65.1% share of the agricultural area. This evolution of the arable land is caused, on the one hand, by the growth of the degraded areas specific to the communes with a downward trend (Tudor Vladimirescu, Nicorești, Munteni etc.) or the expansion of the arable areas inside the settlements (Tecuci, Barcea, Corod, Cerțești, etc.), where water resources are not an issue and crops can be watered, on the other hand. In some cases the increase of the arable land is due to some degraded areas-on the slopes of the valleys- which have been also used for cultivation certain crops.

*Meadows and grasslands* represent, by their nutritional value the forages for the livestock. The natural conditions of the region are responsible for the existence of two types of meadows: *floodplain meadows* more extended on Barlad, Berheci, Corozel and Geru floodplains and terraces and *steppe meadows* which occupy smaller areas of northern parts of the region. Unlike floodplain meadows, which have great power of nutrition (more than 20 sheep / ha) and a longer grazing period, the steppe ones have low nutritional power (15-16 sheep / ha) and a much shorter grazing period. The evolution of their surface during 1960-2011 was downward, although meadows recorded a slight increase of their share, due to agricultural land which decreased after 1990. Thus, the plain meadows decreased by about 295 ha, with a share of 8.21% in the last agricultural census. A similar situation was encountered by grasslands, where the reduction was about 120 ha in the period 1990-2011. At administrative level, the highest values were recorded in 2011 by the villages from north- Gohor (19.2%), Ghidigeni (15.5%) and Pochidia (15.1%).

*Vineyards and vine nurseries* have always enjoyed the suitability of the geographical position and the plain natural conditions, the slopes with southern, eastern and western exposure and also the terraces or interfluves with sandy substrate being occupied by the most important vineyards of the region. Thus, the largest vineyards are partially owned by Nicorești-Poiana vineyard and fully by Hanu Conachi- Ivești. Nicorești-Poiana vineyard, within Tecuci plain includes the wine centers like Dobrinești, Sârbi and Cosmești, known for producing red wines that exploit the local grape variety (Băbească Neagră). Vineyard Ivești-Hanu Conachi exploits the sandy soils from the southern part of the plain, the most important wine centers being Ivești, Liești, Umbrărești, Drăgănești, Barcea,

Movileni and also the most important wine-growing areas in the villages Negrileşti, Cudalbi, Valea Mărului and Corod.

The dynamics of vineyards and wine nurseries surface during 1960-2011 reflects a continuous decline for the entire plain, from 10744 ha in 1960 (7.8%) to 7602 ha (5.8%) in 2011. We can also notice this fall to the administrative units that partially or entirely overlap the two vineyards, Nicoreşti decreasing by 601 ha in the same period and Iveşti by 237 ha.

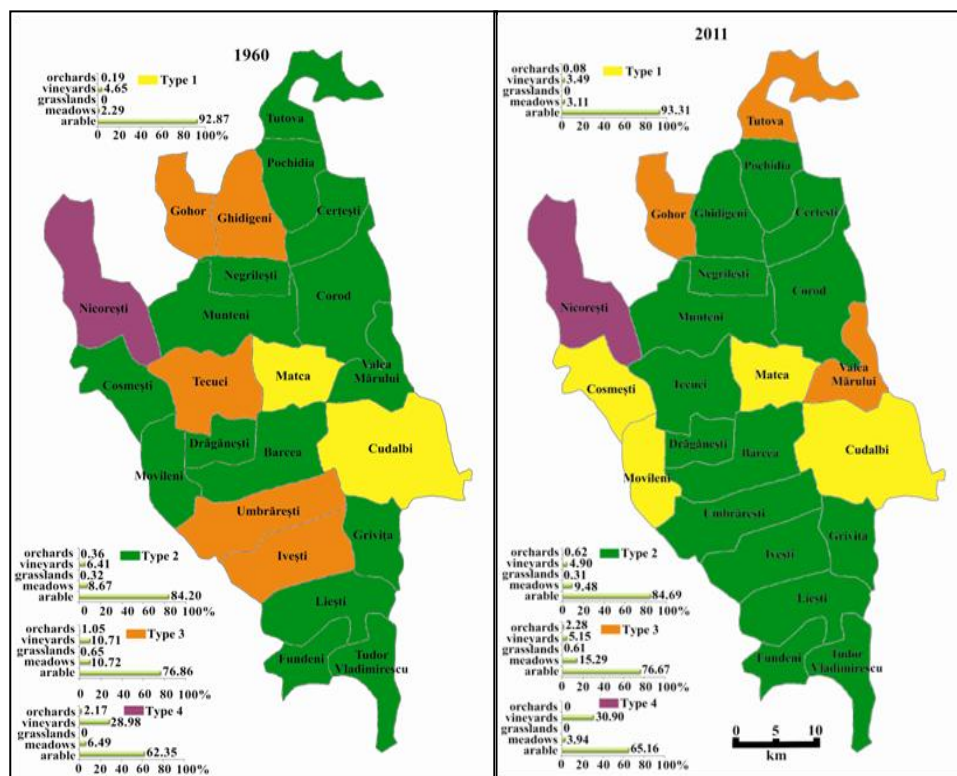
**Orchards and tree nurseries** are currently occupying, along with grasslands, less than 1% of the agricultural area of the region (0.77% in 2011), decreasing by 496 ha in the period 1990-2011. Basically, orchards and tree nurseries in Tecuci plain currently have an area and a share in the agricultural land almost identical to the year 1960 (1004 ha- 0.74%). The geographical distribution of orchards in the region shows that the largest areas are owned in 2011 by Tecuci city (221 ha), Iveşti (208 ha) Valea Mărului (202 ha), Munteni (126 ha), Drăgăneşti (45 ha), Lieşti (40 ha), Matca (24 ha). Unfortunately, the only administrative units which registered a growth of orchards surface during 1990-2011 were Drăgăneşti (42 ha +0.78%) and Matca (24 ha +0.3%). Most of them registered considerable decreases, in some communes the reduction being of 100%, due to their shifting to arable land. Establishing patterns of the agricultural land use in 1960 and 2011 in Tecuci plain is a delicate approach, because all administrative units of the region always had high shares of arable land, crop production being the main agricultural activity of the region. However, a detailed analysis of the structure of the agricultural land in the two years allowed us to identify four specific functional profiles of administrative units of the region whose share has recorded small changes in the years 1960 and 2011.

Thus, **the first agricultural profile** includes in year 1960, 2 communes (Cudalbi and Matca) plus two more in 2011 (Cosmeşti and Movileni). In this profile arable land exceeds 90%, with an average of 92.8% in 1960 and 93.3% in 2011. Unlike arable areas, the other agricultural areas are negligible (meadows-2.2% in 1960 and 3.1% in 2011, vineyards- 4.6% in 1960 and 3.4% in 2011, orchards-0.1% in 1960 and 0.08% in 2011).

**The second functional profile** comprises 15 administrative units in both years (Tecuci, Barcea, Cerleşti, Corod, Drăgăneşti, Fundeni, Ghidigeni, Griviţa, Iveşti, Lieşti, Munteni, Negrileşti, Tudor Vladimirescu, Umbrăreşti, Pochidia in 2011) being characterized by an average arable area of 84.2% in 1960 and 84.6% in 2011, while meadows and vineyards are about 9% and 5% of the agricultural area. In this profile meadows and orchards also occupy extremely low surfaces, less than 1%, reflecting the agricultural cereal profile of the most settlements from the region.

**The third agricultural profile** includes 5 administrative units in 1960 (Tecuci, Ghidigeni, Gohor, Iveşti, Umbrăreşti) and only 3 in 2011 (Gohor, Valea Mărului,

Tutova). This profile has an arable area of about 77%, followed by meadows with a share that increased from 10.7% in 1960 to 15.2% in 2011.



**Figure 2. Agricultural profile of administrative units by the use of agricultural land in 1960 and 2011**

*Source: DJS Galați&Vaslui; Direcția pentru Agricultură și Dezvoltare Rurală Galați&Vaslui /Galati&Vaslui County Department Of Statistics; Galati&Vaslui Department For Agriculture And Rural Development*

This increase of meadows area occurred to the detriment of vineyards which decreased by about 5%. In this profile meadows had tiny percentages too, less than 1%, while orchards increased by 1.2%, the profile average being 2.2% in 2011.

**The last agricultural profile** includes only commune Nicorești, who has the lowest arable area (62.3% in 1960 and 65.1% in 2011) but also the highest vineyards area (28.9% in 1960 and 30.9% in 2011), percentages justifying the location of more than half of the commune territory in the Poiana Nicorești Piedmont.

In conclusion, the high percentage of the arable land, clearly shows the region predisposition for crop production, especially grains, the important agricultural

potential of the region being severely affected nowadays by the lack of agricultural facilities and land improvements.

#### 4. The Dynamics of Crops and Vegetal Production

The first of the two major branches of agriculture, *plant cultivation* was and still is representative for the plain economy, being supported by favourable natural conditions of the region. Human factor also occurred, the most important achievements for the plain agriculture being the planning of the irrigation systems from Cosmești interfluvial area, the location of the main communication paths along the embankments, the anthropic terraces on Barlad, Corozel and Călmățui river basins, the impoundment of Barlad river, the hydrotechnical development from Cosmești -Movileni area.

Unfortunately, especially after 1990, these measures didn't continue, most agricultural production remaining at the "mercy of the nature" encountering fluctuations from one year to another.

To analyze the dynamics of crops and vegetal production we chose the period 1990-2011 because 1990 marks the end of the communist period and therefore the effect of planned agricultural economy whose productions were often questionable, the high values recorded during 1980 - 1989 being often only "on paper".

After 1990 we notice a real evolution, most peasants cultivating their land after their needs on the open market. The increase or decrease of the prices for certain crops, depending on production costs, the improvement of the cultivated varieties quality, or excessive fragmentation of ownership are just a few factors that have influenced the overall dynamics of plain main crops in postcommunist period. Here we can also add the maintenance of a diet in which cereals are still perceived as basic plants.

Unfortunately, after Romania joined the European Union, the extensive farming practiced on grinded areas with rudimentary means of production was preserved, the weak attraction of the European funds and the lack of state subsidies for farmers generating high costs for agricultural products.

European requirements (appearance, packaging) generated in the end a reorientation of many farmers that could not keep up with imported products distributed in hypermarkets which were often more competitive than the local ones.

*The analysis of the major crops (wheat and rye, corn, sunflower, potatoes, vegetables, fruits, grapes)* shows that corn culture occupies the first place both in 1990 and in 2011. The causes are many and lie in great adaptability and natural conditions favorable to this culture and of course its large share in human food and animal nutrition. Thus, the area cultivated with *corn* increased by 31.2% in the



plain, from 36972 ha in 1990 to 48512 ha in 2011. At territorial level, a significant increase in the period 1990-2011 was recorded by Tecuci city (716.1%), and its neighboring communes Barcea (94.3%), Cosmești (94.9%), Corod (35%), Matca (20.4%). However a few communes recorded a significant decrease, among which we can mention Fundeni (-53.9%), Tudor Vladimirescu (-32%) and Nicorești (-30.2%).

At the village level, *the largest areas occupied by corn cultures* which registered shares above 75% of arable land are in Ivești and Cârломănești estates, Tecuci City having a share between 60-75%. Unlike these, Valea Mărului, Matca and Drăgănești estates recorded shares between 15-30%, although the administrative units which include them recorded a growth in 2011.

The growth of the cultivated area, generated also an increase of the *absolute corn production* in the plain, by 126.2% from 69701 tons in 1990 to 157691 tons in 2011. The most spectacular production increases were recorded by Tecuci City (+820.8%), Drăgănești (+605.4%), Cosmești (234.9%), Corod (+115.4%). The production per hectare also increased from 1.88 t/ha in 1990 to 3.25 t/ha in 2011, in territorial the best productions being obtained in 2011 by communes Drăgănești (4.77t/ha), Tudor Vladimirescu (4.69 t/ha) and Cosmești (4.51 t/ha).

The area cultivated with *wheat and rye* occupies the second place in Tecuci plain during 1990-2011, despite its significant decrease (-39.8%) from 30134 ha in 1990 to 18111 ha in 2011. The restriction of the areas cultivated with wheat and rye was made in favor of other crops, more profitable (sunflower), being influenced by droughts in the recent years which have discouraged farmers or by the fluctuating demand recorded in the bakery industry. This decrease can also be explained by the fact that wheat involves a series of mechanized farming activities plus the need for herbiciding the culture which can be performed on large areas.

Significant decreases were registered by Cosmești (-84.6%), Valea Mărului (-76.2%), Barcea (-64.6%) while only three communes registered increases (Drăgănești+59.8% -, Cerțești+ 39.7%, Cudalbi - +12.8%).

Unfortunately *the absolute production* followed the same trend, the plain production decreasing by 30.3% from 66380 tons in 1990 to 46264 tons in 2011. The largest decreases were registered by Cosmești (-95.3%), Gohor (-85%) and Valea Mărului (-77.5%). Increases in production of wheat and rye have been registered by only 4 communes: Drăgănești (+985.1%), Fundeni (+83.4%), Cerțești (+22.4%), Cudalbi (+5.1%).

*The production per hectare* increased slightly in the plain, from 2.2 t/ha in 1990 to 2.5 t/ha in 2011, due to incredible productions obtained by some communes which recorded increases of the cultivated areas too. Thus, Drăgănești recorded a production of 9.6 t/ha in 2011, followed by Barcea (3.7 t/ha) and Corod (3.2 t/ha).

**The area cultivated with sunflower** recorded, along with corn, an increase, being nowadays, one of the highly profitable crops. The extraction of oil from sunflower seeds and their use in food after refining, food industry (margarine, canned), pharmaceutical (lecithin), and so on, increased the area cultivated at national level, peaking in 1999 and 2004 when were cultivated over 1 million hectares.

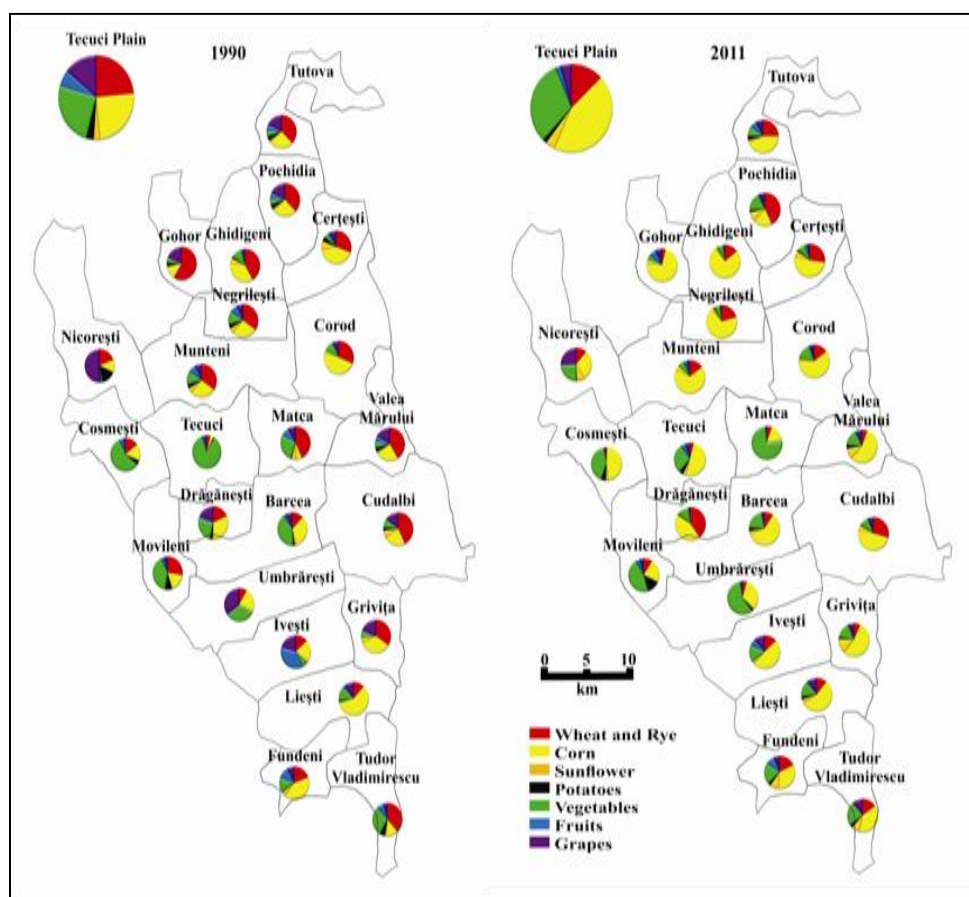
In Tecuci plain whose natural conditions are extremely favorable for sunflower crops, the cultivated area increased by 31.8% from 6941 ha in 1990 to 9149 ha in 2011. In territorial, spectacular increases were recorded by Gohor (2246%, from 15 ha in 1990 to 352 ha in 2011), Cosmești (532%), and Tecuci city (+452.7%).

**Total production and the average production per hectare** registered an increase at the plain level by 82.6% (from 7623 ha in 1990 to 13925 ha in 2011) and 50% (from 1000 kg/ha in 1990 to 1500 kg/ha in 2011), significant increases, sometimes incredible, being recorded by Tecuci city (2657%, from 26 tons in 1990 to 717 tons in 2011- **total production**, +391.6% from 0.24 t/ha in 1990 to 1.18 t/ha in 2011- **average production per hectare**) and Tudor Vladimirescu commune (1023%, from 78 tons in 1990 to 876 tons in 2011- **total production**, +196.6% from 0.6 t / ha in 1990 to 1.78 t / ha in 2011- **average production per hectare**).

**The vegetable crops**, although recorded a slight decrease (-8.2%, from 5041 ha in 1990 to 4627 ha in 2011), occupy large areas of Tecuci city extravillan (581 ha in 2011) but also of the villages estates located in its vicinity (Matca-1200 ha in 2011, 25.9% of the total area of the region; Cosmești-379 ha in 2011, Draganesti-159 ha in 2011, Barcea-138 ha in 2011). Important areas were also cultivated in the same year in villages from central and southern parts of the plain: Umbrărești-470 ha, Fundeni-190 ha, Liești-187 ha, Cudalbi -180 ha, Ivești-175 ha. Cultivating vegetables on large surfaces, for fresh consumption and also for canning, is favored by the natural conditions of the plain (the large extension of river terraces and floodplains, optimal climate, fertile soils, high irrigation potential). Among the vegetable crops, the largest crop areas are occupied by tomatoes, which have expanded considerably after building the canning factory in Tecuci City.

The highest productions are obtained for the vegetables (tomatoes, cucumbers) cultivated in greenhouses and solariums, their dynamics from 1990 to 2011 being remarkable for some communes. Thus, if **the plain total production** increase was +59.9% from 70542 tons in 1990 to 112798 tons in 2011, in territorial the largest increase was recorded in Matca (1895% from 2812 tons in 1990 to 56100 tons in 2011) famous at national level and being one of the most important vegetable basins of Romania. From the 1200 hectares cultivated with vegetables in 2011, about 600 hectares were cultivated in greenhouses owned by the inhabitants of the commune, the **average production per hectare** increasing from 6.9 t / ha in 1990 to 46.7 t / ha in 2011. Higher average production per hectare were also obtained by Cosmești (18.9 t/ha in 1990 and 18.7 t/ha in 2011), Umbrărești (12.1 t/ha in 1990

and 27 t/ha in 2011), Barcea (17.4 t/ha in 1990 and 18.9 t/ha in 2011) and Tecuci city (22.5 t/ha in 1990 and 10.6 t/ha in 2011), while the plain average production per hectare increased from 13.9 t/ha in 1990 to 24.3 t/ha in 2011. The surface cultivated with *potatoes* decreased (-43.2%) from 1990 to 2011 and also *the absolute production* (-40.1%).



**Figure 3. Vegetal Production (tons) in 1990 and 2011 in Tecuci Plain**

Source: INS București; Direcția pentru Agricultură și Dezvoltare Rurală Galați & Vaslui/ National Institute of Statistics, Bucharest; Galați & Vaslui Department For Agriculture And Rural Development

In territorial, the highest decreases for the cultivated areas were registered by Munteni (-97.1%), Tudor Vladimirescu (-85%), Nicorești (-76.4%) and for the *absolute production* by Nicorești (-98.1%), Munteni (-95.8%) and Gohor (-81.1%).

However, despite the downward trend registered in the plain, 9 administrative units (Tecuci, Barcea, Corod, Cosmești, Cudalbi, Fundeni, Ivești, Liești, Umbrărești) recorded significant increases both in cultivated areas and absolute production.

The decreases of the cultivated areas and productions after 1990 were caused by the reduction in number of the agricultural machinery which are extremely useful in potato cultivation, knowing that this culture requires a lot of physical work. Also many pests that affect this crop (Colorado beetle, wire worms, etc.) significantly reduce absolute and average production, requiring meticulous spraying operations.

**Fruit production** also registered a decrease (-58.2%), from 18029 tons in 1990 to 7524 tons in 2011, in territorial, the highest productions being recorded both in 1990 and in 2011 by Tecuci city and Ivești commune which have the largest orchards in the region as we mentioned in the previous chapter. Analyzing the production by species, we can mention the significant variation from one year to another, in 2011 the hierarchy being as follows: apples-53.1%, plums-20%, cherries and sour cherries -9.2%.

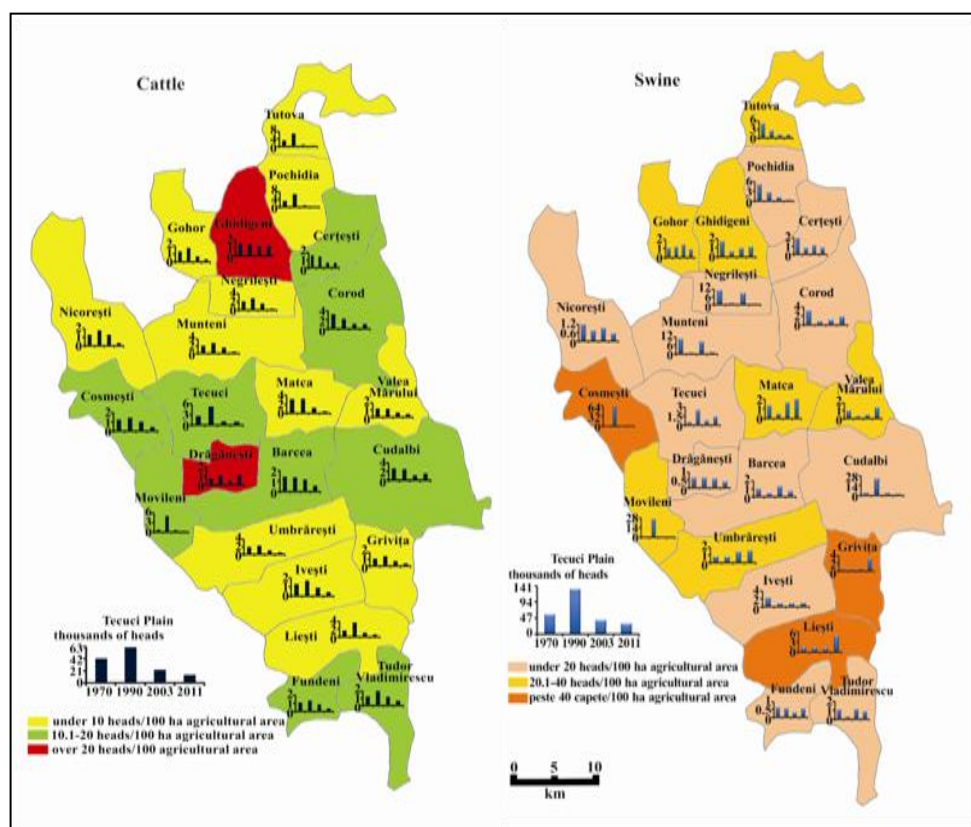
**Grape production** decreased by 60.9% in the period 1990-2011, the major causes being excessive fragmentation of ownership, lack of the modern systems of culture (intensive and supaintensive), adverse climatic conditions occurred in the last years and the reduction of the cultivated areas. Thus, most administrative units in the region decreased their production in 2011, the most significant being recorded by Umbrărești (-95.4%) and Nicorești (-78.5%).

## 5. The Livestock

Livestock remains the second core activity in agriculture, contributing significantly to the welfare of the population from rural regions. The lack of large areas covered with natural meadows and grasslands in the region (less than 9% of the agricultural area) was supplemented over time by forage crops plus large quantities of corn and potatoes which completed the required quantity of forages for the livestock. However, the analysis of the dynamics of livestock and its density shows that the livestock sector has occupied a secondary place, the agricultural profile of region settlements, as we mentioned in the previous chapter, being mostly a vegetal one (cereals, vegetables, vineyards).

**Cattle farming** is the most important branch in the livestock sector, milk and beef being two basic agricultural products in the diet of the population of any region. In Tecuci plain, the cattle number increased during 1970-1990, followed by a significant decrease in postcommunist period. Thus, in 1990 the plain recorded the highest number of cattle (61724 heads) which decreased considerably in 2011 reaching only 13464 heads (-78.1%).

At territorial level, the largest numbers were owned in 1990 by the administrative units of central and northern parts of the plain (Tecuci city-5193 heads, Tutova-6840 heads, Movileni-5111 heads). In 2011, the largest numbers still belonged to the central and northern communes, but rarely exceeded 1000 heads (Cudalbi-1518 heads, Ghidigeni-1245 heads, Draganesti-1122 heads, Corod-1034). Basically in the postcommunist period most of the administrative units of the region recorded decreases over 50%, some even exceeding the percentage of 80-85% (Tutova). The major cause that determined this evolution was the shift from socialist agriculture to market agriculture which decimated most of the state-subsidized livestock farms, which operated mainly in rural areas before 1990.



**Figure 4. The Dynamics of Cattle and Swine (1970-2011) And Their Density (2011) in Tecuci Plain**

*Source: DJS Galați&Vaslui; INS București; Direcția pentru Agricultură și Dezvoltare Rurală Galați&Vaslui/ Galați&Vaslui County Department Of Statistics; National Institute of Statistics, Bucharest; Galați&Vaslui Department For Agriculture And Rural Development*

With the entry into the European Union, European directives regarding the production of milk increased considerably the production and processing costs, farmers not being supported by state protectionist policies. Thus, production costs have exceeded those for sale, many of the animals being slaughtered for meat.

**Swine farming** represents the second important branch in the region, after cattle, recording the same evolution: upward during 1970-1990 with an increase of 130.6% (from 57365 heads in 1970 to 132307 heads in 1990) and downward following the year 1990, in 2011 the number being only 30416 heads. The increase during the period 1970-1990 was caused by the opening of breeding and fattening swine farms, at Cosmești and Movileni, which in 1990 had 62093 heads (46.9% from the plain) and 26246 heads (19.8% from the plains). They were also completed by Cudalbi commune with 24041 heads (18.1% from the plain).

The decrease after 1990 was caused by the same political and economic changes that occurred in 1990 that ended state-owned swine units from Tecuci plain. They have not been backed up against imports of subsidized agricultural products from the neighboring countries (Hungary) or other EU (Germany, Netherlands, Spain, Belgium, Denmark, Austria) and therefore they were shut down. Other factors that caused the reduction of swine number, which are now raised only for own consumption, were the forages which became more expensive and the high costs for opening breeding farms after Romania joined the EU.

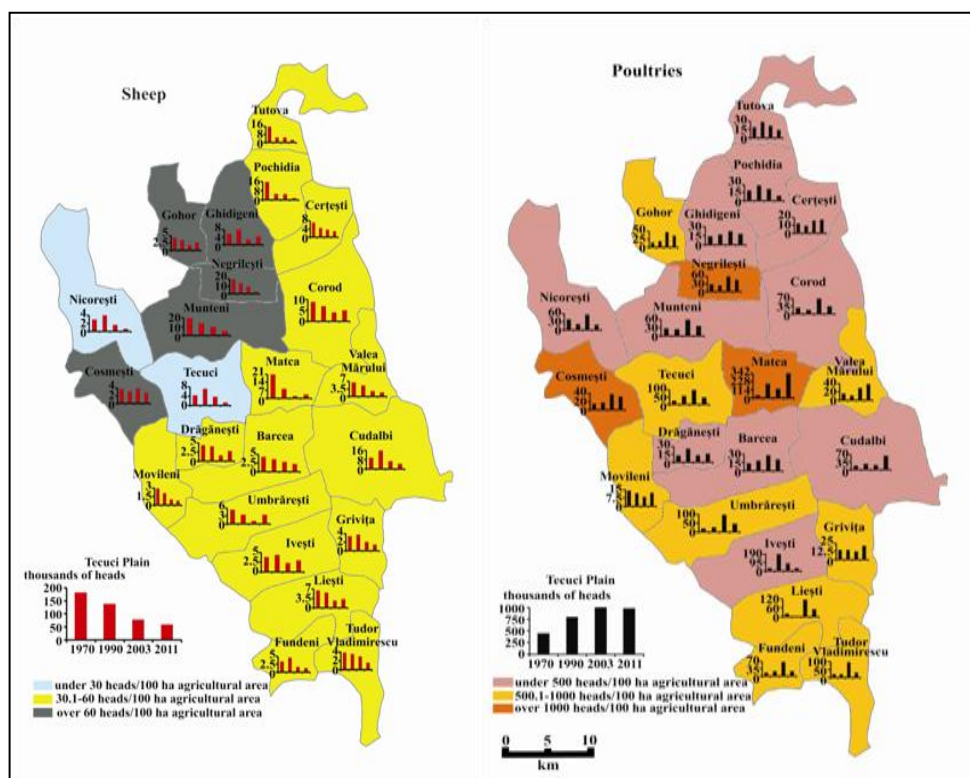
Thus, if we follow the evolution of the three communes mentioned above, we notice that in 2011 Cosmești had only 1325 heads, Movileni only 598 heads and Cudalbi only 2804. Most administrative units had in 2011 below 2000 heads, the highest number being owned by Liești with 4809 heads.

**Sheep farming** also recorded a downward trend throughout the period 1970-2011, although the 2010 General Agricultural Census reflected an increase at the national level by 16.2% since 2002. Thus, the region recorded a - 67.9% decrease from a number of 181453 heads in 1970 to 58068 heads in 2011. The largest flocks were owned both in 1970 and in 2011 by rural communities from Matca (20839 heads in 1970, 3006 heads in 2011), Munteni (20008 heads in 1970 and 5280 heads in 2011), Cudalbi (9438 heads in 1970 and 4305 heads in 2011) and Corod (8738 heads in 1970 and 4837 heads in 2011). This decrease is based on the factors mentioned also at the cattle and swine farming (forages price increases, lack of subsidies for farmers, low consumption of meat and milk plus the small area of meadows).

**Poultry farming** is an agricultural sector which is practiced mainly in the households of the population from the rural settlements of the plain.

Unlike cattle, swine and sheep, poultries number has increased significantly in the period 1970-2003 (+168.9%, from 436,894 heads in 1970 to 1175168 heads in 2003), recording a slight decrease from 2003 to 2011 (-16.8%, 977284 heads in

2011). As sheep farming, we can notice, when we analyze the dynamics of poultries, at territorial level, a close correlation between their number and the demographic size of human settlements in the plain. Thus, the highest values were and still are owned by Matca (6.6% from the plain number in 1970, 10.1% from the plain number in 2003 and 34.8% from the plain number in 2011), Liești (4.3% from the plain number in 1970, 9.6% from the plain number in 2003 and 5% from the plain number in 2011), Cudalbi (3.6% from the plain number in 1970, 1.5% from the plain number in 2003 and 6.3% from the plain number in 2011) and Tecuci city (5.3% from the plain number in 1970, 8.1% from the plain number in 2003, 4.6% from the plain number in 2011). One of the factors that increased the poultries number during 1970-2003 is demographic aging, farmers growing much harder swine, cattle or sheep unlike poultries which are much easier to raise. In the last years, low incomes, expensive forages and grains due to low productions have caused also the decrease of the poultries number.



**Figure 5. The Dynamics of Sheep and Poultries (1970-2011) and their Density (2011) In Tecuci Plain**

*Source: DJS Galați&Vaslui; INS București; Direcția pentru Agricultură și Dezvoltare Rurală Galați&Vaslui/ Galați&Vaslui County Department Of Statistics; National Institute of Statistics, Bucharest; Galați&Vaslui Department For Agriculture And Rural Development*

## 6. Measures for Sustainable Agricultural Development in Tecuci Plain

Restructuring traditional agricultural practiced in Tecuci Plain and developing sustainable agriculture is an approach that includes a series of complex measures, the most important being:

- ***changing the population mentality*** - quite delicate goal now that the people in rural areas are poorly informed, are very reluctant to change. This situation is compounded by the fact that very few farmers are aware of the long term effect of the current agricultural practice, still practicing subsistence agriculture;
- ***maximizing production while minimizing costs*** - aims to increase production in order to ensure the food needs of the population of the region, useful raw material for industries and also the organization of a modern agriculture. These developments depend heavily on mechanization and chemical treatment, and on the introduction of advanced agronomic methods resulting from applied research.
- ***preservation and environmental protection*** - intended to protect its main components: the atmosphere, hydrosphere and pedosphere. In Tecuci plain, they are affected in some regions from the practice of the improper agriculture requiring a series of preventive measures. Livestock farming is a cause of pedosphere degradation by grazing, compaction and erosion; the hydrosphere by animal waste and atmosphere by carbon dioxide emissions from manure used as fertilizer plus the vegetable sector which sometimes affect the environment by improper chemicalization (contamination of water sources with heavy metals, nitrates, etc., species extinction or natural predators).
- ***investments in human resources*** to provide support for young farmers and training facilities;
- ***development of agricultural holdings*** by delimiting the areas of new owners, creation of associations, defining the road network and linking the properties boundaries with the hydrotechnics scheme of the land improvement;
- ***developing a sustainable agriculture on ecological principles to produce organic agricultural products that are not affected by pollution;***
- ***providing regular financial support for farmers*** (state subsidies) and organizing tutorials for the preparation of projects in order to attract European funds.



## 7. Conclusions

Unfortunately, extensive agriculture practiced in Tecuci plain, has not been replaced, as it happened in most agricultural regions in Western Europe, with an intensive one, benefiting from modern technologies of production and land improvements, agricultural situation being currently extremely difficult.

Political and economic changes in 1990 did not produce significant changes in the agriculture, factors that widened the difficult situation in the present being:

- the lack of investment in modern agricultural production technologies to support privatization of agriculture conducted by the 1991 Land Law (Law no. 18/1991) completed by “Lupu Law” from 2000 (Law No.1/2000). The lack of subsidies or their reduced value made it impossible for farmers to access modern production technologies to support a real private agriculture. Here we can add the damages or theft of the irrigation facilities, which led to a drastic reduction in crop productions.
- the dissolution of the collective and state farms established during the communist period represented the end of state agriculture, considered by many specialists a viable alternative to the private one, which currently uses more and more intermediaries who increase considerably the final price of agricultural products;
- excessive fragmentation of the property also affected the chances of practicing a modern agriculture, usually covering large areas such as farms or associations.

In the end we can affirm again that restructuring the current agriculture and developing the sustainable agriculture, using the proposed measures, is urgently needed on medium and long term to fully exploit the considerable agricultural potential of Tecuci plain.

## 8. References

Cândea, M.; Bran F. & Cimpoeru I. (2006). *Organizarea, amenajarea și dezvoltarea durabilă a spațiului geografic/Organizing, Planning and Sustainable Development of Geographical Space*. Bucharest: Editura Universitară.

Erdeli, G.; Cândea, M.; Braghină, C.; Costache S. & Zamfir D. (1999). *Dicționar de geografie umană/Dictionary of Human Geography*. Bucharest: Corint.

Ianoș, I. (2000). *Sisteme teritoriale/Territorial Systems*. Bucharest: Editura Tehnică.

Puşcaşu, V. (2008). *Dezvoltare și planificare urbană/Development and Urban Planning*. Galati: Europlus.

Puşcaşu, V.; Chiriță, V.; Şorcaru, I.; Balcu, F. & Oprea, R. (2008). *Strategia de dezvoltare locală: comuna Cudalbi-potențial și perspective/Local Development Strategy: Cudalbi Commune-Potential and Perspectives*. Galati: Europlus.

\*\*\*Tempo-Online Database-Series of Time, INS. Bucharest.

\*\*\*(1975). *Statistical Yearbooks of the Administrative-Units in Galati and Vaslui Counties*, Galati&Vaslui County Department of Statistics

\*\*\*(2012). *Annual Reports of the Administrative-Units in Galati and Vaslui Counties*, Galati &Vaslui Department for Agriculture and Rural Development.