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THE HUMAN PRESSURE UPON THE ENVIRONMENT THROUGH AGRICULTURAL LAND USE IN THE DESNĂŢUI PLAIN

ELISABETA CIOCAN[1]

ABSTRACT - Through its activities, one way or another, Man leaves a mark upon the environment. The Desnăţui Plain is an important agricultural region, a feature also confirmed by the increased number of rural settlements and a high percentage of arable lands. Practicing agriculture, man exercises a pressure upon the environment through various types of land use: arable, vineyards, orchards, pastures and grasslands. In order to be able to analyse the interaction between the man and the environment, we used the following formulae P = S/N where P represents the human pressure (ha/inhabitant), S = surface of the analysed area (ha) and N = number of inhabitants from the analysed area. The data was collected from the Regional Department of Statistics of Dolj and from the County Department of Statistics of Mehedinţi, processed using mathematical formula and interpreted based on the resulted maps.

Keywords: human pressure, environment, arable, orchards, vineyards, pastures and grasslands

INTRODUCTION

Human activities have had an impact on the environment along the years. Agriculture is the main occupation of the inhabitants of the Desnăţui Plain, pursuant to the extended surfaces of agricultural land found in this subunit of the Oltenia Plain, a characteristic favoured by the natural geographical factors. By definition agriculture represents "the totality of works and land cultivation methods" and has the purpose "to obtain certain food products and raw materials" (DEXI, 2007, p. 40). As an important agricultural region, a feature confirmed by the increased number of rural settlements (97 villages grouped in 48 communes that represent about 94% of the total number of settlements in the Desnăţui Plain) and by the high percentage of arable lands (88.1% from the entire plain, in 2006), this economic branch is the main source of food and income for the inhabitants of the Desnăţui Plain.

The use of agricultural lands or other activities do not remain without marks upon the environment, which is an assembly of "physical and phenomenological factors, a result of the integration of the natural, artificial and social-economic environments which condition life" (Erdeli G. et al., 1999, p. 189). In the Illustrated Explanatory Dictionary of the Romanian Language (2007, p. 1121) the environment is defined as the "surrounding nature consisting in an assembly of factors and conditions (of relief, soil, climate, fauna, flora and civilization), which represents the background where beings and things exists". Ielenicz M. et al. define the environment as "the space where the human being, as part of it, studies and modifies it more or less according to the present or future interests, a space with special extension that provides conditions of live, work, spiritual needs" (2004, p. 258).

The human pressure upon the environment is determined by a series of factors such as the extension of agricultural lands as result of the transformation of some natural ecosystems in arable lands due to the embankment and draining works from the Danube alluvial plain, executed especially after 1970, the high request of agricultural products as result of the increase in the number of

[1] PhD student, University of Bucharest, Faculty of Geography, ''Simion Mehedinţi – Nature and Sustainable Development'' Doctoral School, 1 Nicolae Bălcescu Blvd., Bucharest, Romania.
E-mail:eli.ciocan@yahoo.com

inhabitants in the Desnăţui Plain (from 165,000 inhabitants in 1912 to over 270,000 inhabitants in 1966) and the request of products for export, for the supply of the urban markets in the conditions in which population was in constant numeric growth during the period 1970-1990.

Taking into account all these phenomena, an equilibrium of the environment in the Desnăţui Plain, threatened more and more by the human activity, is highly required by using lands in a way that it "will not cause the long term decline of these lands, maintaining their potential according to the needs and aspirations of present and future generations" (Rojanschi, V., 1997, p. 19).

DATA AND METHODS

Through agriculture, the man exercises a certain pressure upon the environment through different forms of land use: arable, vineyards, orchards, pastures and grasslands. In order to calculate this pressure for the Desnăţui Plain, the same formulae applied by FAO (The Organization for Food and Agriculture) was used:

$$P = S/N$$

P = human pressure (ha/inhabitant)
S = analysed surface (ha)
N = the number of inhabitants from the analysed surface

The data were collected from the Regional Department of Statistics of Dolj and from the County Department of Statistics of Mehedinţi and were processed using mathematical formula. For their interpretation a series of maps were made in order to outline the spatial dynamics and the trend regarding the modification of human pressure upon the environment through agricultural land use.

RESULTS AND DISCUSSIONS

Applying the mathematical formulae for the administrative territorial units in the Desnăţui Plain, we notice several aspects emphasized below.

Human pressure on the environment through agricultural land use

In 1970, the human pressure on the environment by agricultural land use does not registers values under 0.4 ha/inhabitant, the limit imposed by FAO to maintain the equilibrium of the environment. The values of this indicator vary between 0.4 and 2.0 ha/ inhabitant, the highest values characterizing the Dârvari, Giurgiţa and Măceşu de Jos settlements, for the last one being obtained the maximum value of 1.93 ha/ inhabitant (Figure 1).

In 1989, compared to 1970, the values for human pressure upon the environment through agricultural land use rose, exceeding 2.5 ha/inhabitant in Măceşu de Jos commune, in an interval of approximately 20 years, while the population of this commune decreased with 805 inhabitants and the agricultural surface with 425 ha. In the same time, we obtained values under 0.4 ha/inhabitant for Calafat town (0.24 ha/ inhabitant), the last administrative territorial unit where the human pressure upon the environment through agricultural land use decreases, the necessary values ranging between the limits of maintaining the equilibrium of the environment. We notice the increase of the index calculated for the central, eastern and south-eastern part of the plain, more emphasized for the administrative territorial units such as Radovan, Urzicuţa, Goicea and Gighera. These changes are influenced by a series of factors:

• the numerical growth of the population during the interval 1970-1989, as result of the increased natural growth or due to the migration of persons from the rural space into the urban area; for example, in Calafat town, in 1970, the total population was of 14,812 inhabitants, while in 1989, it reached 19,471 inhabitants, with 4,659 persons more, while the agricultural surface decreased with 3,777 ha.

• the extension of the agricultural surface due to the inclusion of the floodable areas from the Danube alluvial plain in the agricultural circuit by embankment and draining works, or the sandy lands by growing some adequate cultures like vines, tobacco, rye, watermelons, and vegetables. Thus, in the communes where the human pressure upon the environment was high, increases of the agricultural

surface were recorded: Goicea (+4,025 ha), Gighera (+2,879 ha), Radovan (+1,600 ha), Urzicuţa (+1,443 ha).

• the installation of the irrigation systems Calafat – Băileşti (during the period 1969-1971), Nedeia – Măceşu (in 1979), Cetate-Galicea, Izvoare – Cujmir (1982).

In 2006, we notice a continuous increase of the human pressure on the environment, at the level of the plain, as well as for the administrative territorial units, especially for those located in the central, northern, eastern and south-eastern part and less for those located in the western and south-western part of the plain, where, in settlements such as Cetate, Maglavit, Ciupercenii Noi, Desa, Poiana Mare, Piscu Vechi, the human pressure on the environment through agricultural land use kept values between 0.4 and 1.5 ha/inhabitant.

The lowest value continues to be recorded in Calafat town (0.48 ha/ inhabitant), and the highest one in Măceşu de Jos (3.17 ha/ inhabitant), exceeding almost 8 times the admissible limit.

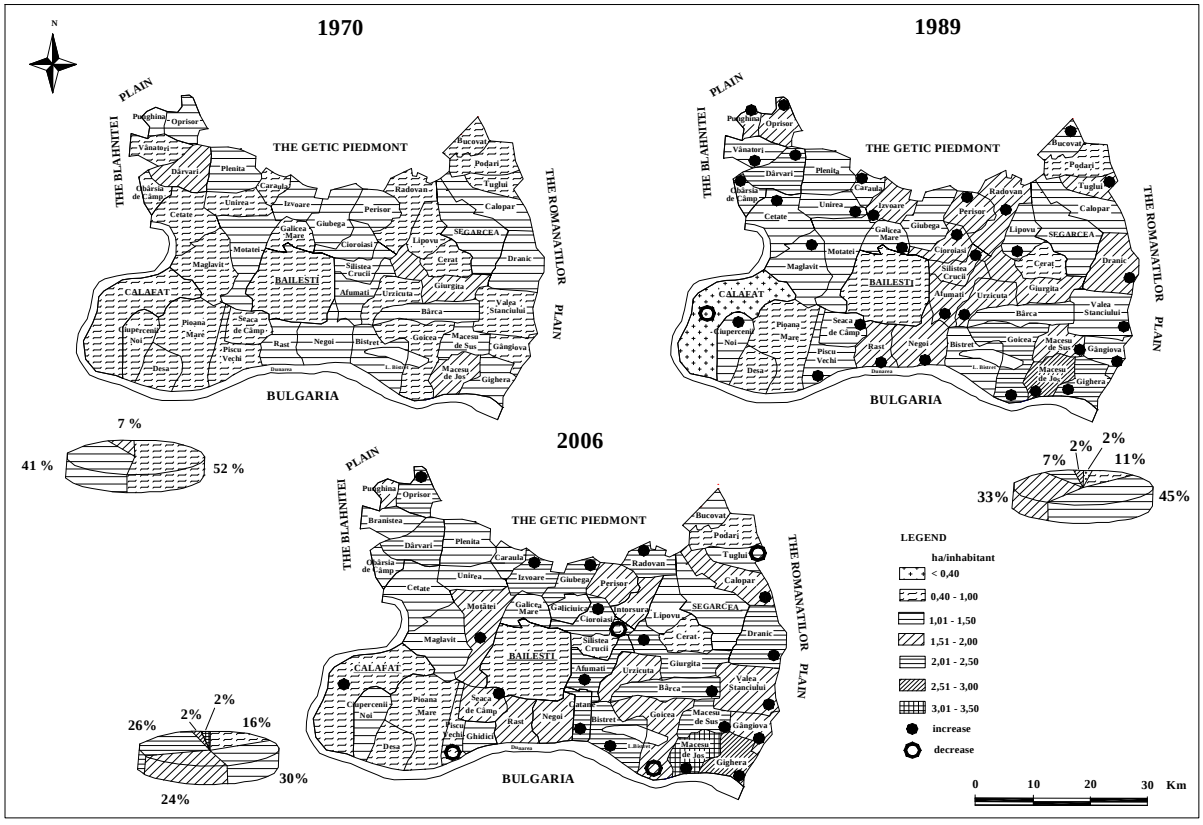

Figure 1. *The Desnăţui Plain – Human pressure upon the environment through agricultural land use*

a) The human pressure upon the environment through arable land use

The human pressure upon the environment through arable land use follows the same trend as the human pressure upon the environment through agricultural land use, with small exceptions.

In 1970, increased values of this indicator were registered in Dârvari commune (Mehedinţi county), and in Giurgiţa commune (Dolj county), namely 1.52 ha/inhabitant and 1.60 ha/inhabitant. The lowest value was characteristic for Calafat (0.48 ha/inhabitant).

In 1989, the indicator had increased values, compared to 1970, for the administrative territorial units located in eastern and south-eastern part of the plain, namely in Ţuglui, Drănic, Bistreţ, Goicea, Gighera, with a maximum value of 2.14 ha/inhabitant in Măceşu de Jos commune. In all these settlements, the arable surface registered an increase during the period 1970-1989, from 1,023 ha in Bistreţ to 2,857 ha in Gighera commune. Decreased values were registered only in Calafat town, as

result of the reduction of the arable surface with 3,977 ha. This low value was also maintained within the admissible limits to maintain the equilibrium of the environment, in 2006 reaching 0.36 ha/inhabitant during an interval of 17 years,.

In 2006, the human pressure upon the environment through arable is present in some administrative territorial units from the northern part of the analysed territory (Oprişor, Izvoare, Giubega, Perişor, Radovan), located at the contact with the Getic Piedmont, in the central part (Cioroiaşi), south and south-eastern part of the Desnăţui Plain (Rast, Bistreţ, Măceşu de Sus, Măceşu de Jos, Gighera, Gângiova, Valea Stanciului, Bârca). Reduced values are maintained in the settlements from the south-western part of the plain (Ciupercenii Noi, Desa, Poiana Mare, Piscu Vechi) and insular in the central part (Băileşti, Lipovu, Cerăt) and north-eastern part (Bucovăţ and Podari). Only two administrative territorial units register reductions for this index: Siliştea Crucii and Ţuglui, due to the numerical growth of population, Siliştea Crucii (+ 1,349 inhabitants) or due to the reduction of the arable surface, Ţuglui (– 2,605 ha).

b. The human pressure upon the environment through the cultivation of vine

In 1970, the values of human pressure upon the environment through vine culture were generally low, below 0.05 ha/inhabitant. Higher values of 0.06 – 0.1 ha/inhabitant were registered in the administrative territorial units located at the contact with the Getic Piedmont (Oprişor, Pleniţa, Caraula, Izvoare, Perişor), where altitudes are higher, Segarcea being a settlement with tradition in vine culture, and Lipovu, located in its vicinity. A similar situation was in some settlements in the south-west of the Desnăţui Plain (Piscu Vechi, Desa, Ciupercenii Noi), where vine is cultivated only to stabilise the sandy lands in the Danube alluvial plain.

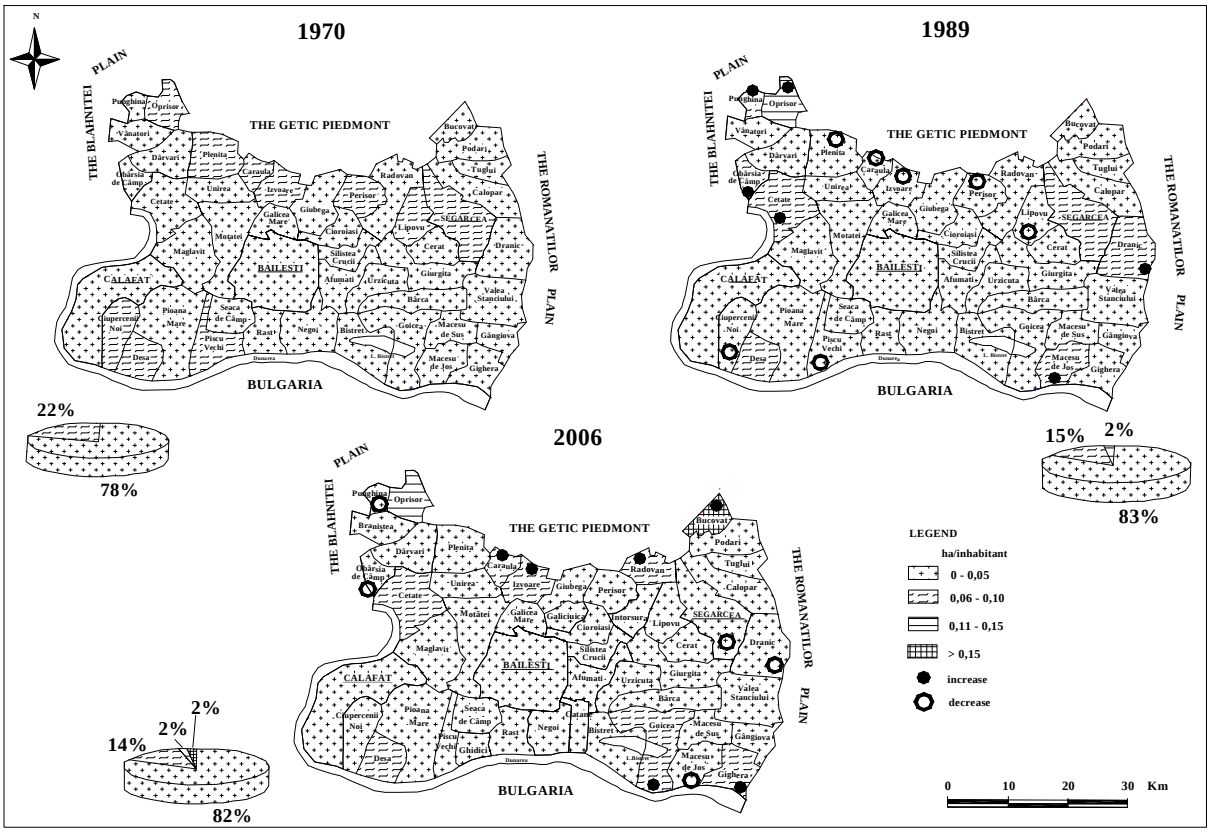

Figure 2. *The Desnăţui Plain – human pressure upon the environment through vine culture*

In 1989, the value of human pressure upon the environment through vine culture was sensibly reduced for these settlements because of the extension imposed by the arable lands in the detriment of vineyards: Pleniţa (-407 ha vine, +572 ha arable land), Caraula (–254 ha vine), Izvoare (–211 ha vine, +140 ha arable land), Perişor (-180 ha vine), Ciupercenii Noi (–151 ha vine, +2,472 ha arable land), Lipovu (-112 ha vine), Piscu Vechi (-109 ha vine, +404 arable land). The highest value was registered in Segarcea (0.09 ha/inhabitant), where there is a vine centre known all over the country. The smallest value was in Cioroiaşi commune (0.0004 ha/inhabitant).

For 2006 we noticed an increase for the localities Caraula, Izvoare, Radovan, Bucovăţ (0.40ha/inhabitant), Goicea, Gighera (Figure 2), as result of the measures taken to renew the vines cleared during the previous period. Thus, in Bucovăţ the vine surface increased with 1,564 ha.

c. The human pressure upon the environment through orchards

It is insignificant taking into account the fact that fruit farming is not characteristic for the agriculture practiced in the Desnăţui Plain, being a occupation predominant in the piedmont and Sub-Carpathian regions.

If in 1970 we noticed a certain homogeneity at the level of the entire plain, the values of the human pressure upon the environment through orchards were below 0.05 ha/inhabitant. In 1989, settlements such as Podari (+313 ha orchards), Măceşu de Jos (+183 ha) and Goicea (+1,126 ha) stood out, so that, in the case of Goicea, the value of the index was 0.21 ha/inhabitant. They are located in the northern part of the plain, at the contact with the Getic Piedmont, as well as on the sandy soils in the south (Figure 3).

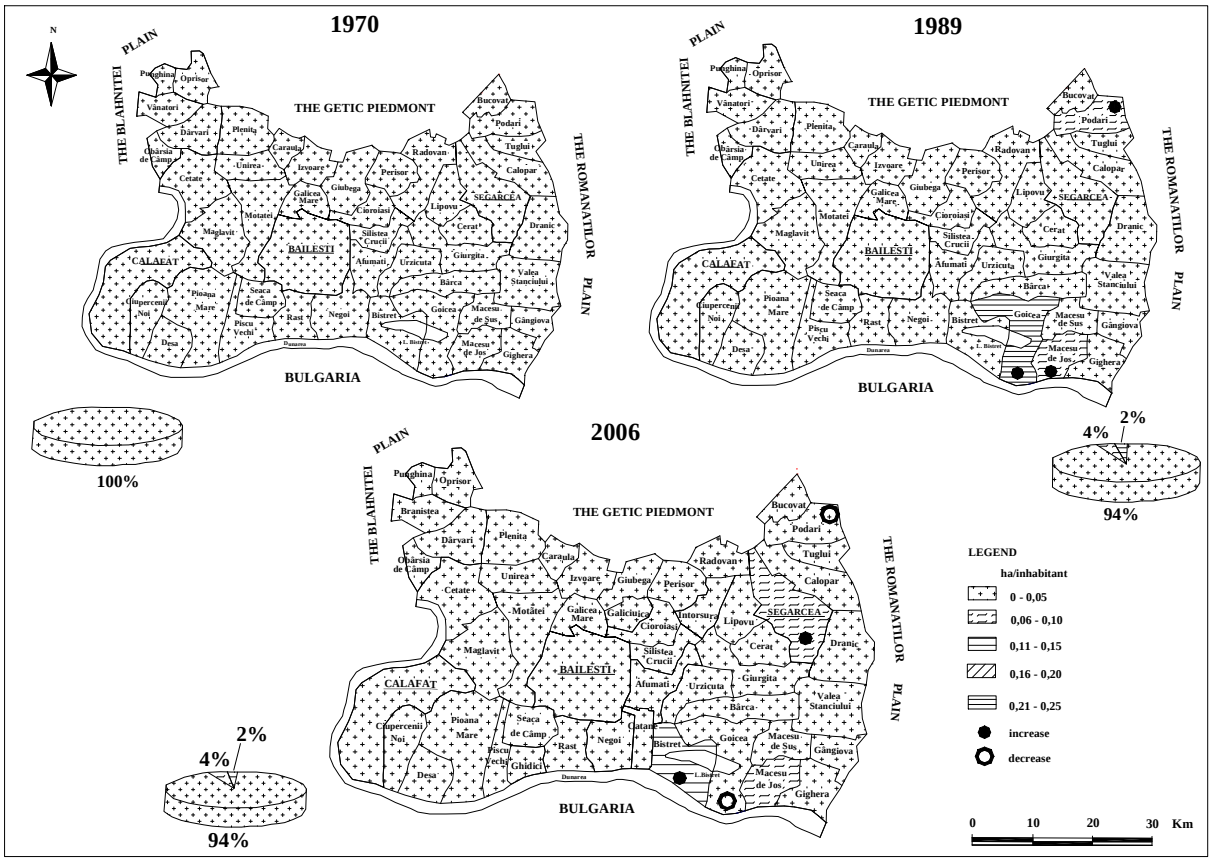

Figure 3. *The Desnăţui Plain – human pressure upon the environment through orchards*

In 2006, increased values were recorded in Bistreţ (+446 ha) and Segarcea (+789 ha). The modification of the land property, the maintenance difficulties, the production costs and the difficulty met in selling the products favoured the maintenance of a low human pressure upon the environment through orchards for most of the administrative territorial units in the Desnăţui Plain.

d. The human pressure upon the environment through pastures and grasslands

In 1970, higher values for human pressure upon the environment through pastures and grasslands were recorded in the southern and north-eastern part of the Desnăţui Plain, namely in the settlements located in the Danube alluvial plain (Ciupercenii Noi, Desa, Poiana Mare, Piscu Vechi, Gighera, Bistreţ, where the maximum value of 0.32 ha/inhabitant was recorded), in the Desnăţui alluvial plain (Giurgiţa, Goicea) and in the Jiu alluvial plain (Bucovăţ, Ţuglui, Podari, Calopăr).

In most of these settlements, the human pressure upon the environment through pastures and grasslands continued to increase until 1989 due to the extension of the surfaces covered by pastures and grasslands, as in the case of Goicea (+1,184 ha) and Ciupercenii Noi (+768 ha). The extended surfaces covered with pastures and grasslands are the result of the livestock farming development. In Băileşti, a complex for breading and fattening pigs was built in 1965 and a complex for breading young cows was founded in 1975. In 1989, the highest values were recorded in Goicea (0.33ha/inhabitant) and Desa (0.34 ha/inhabitant) communes.

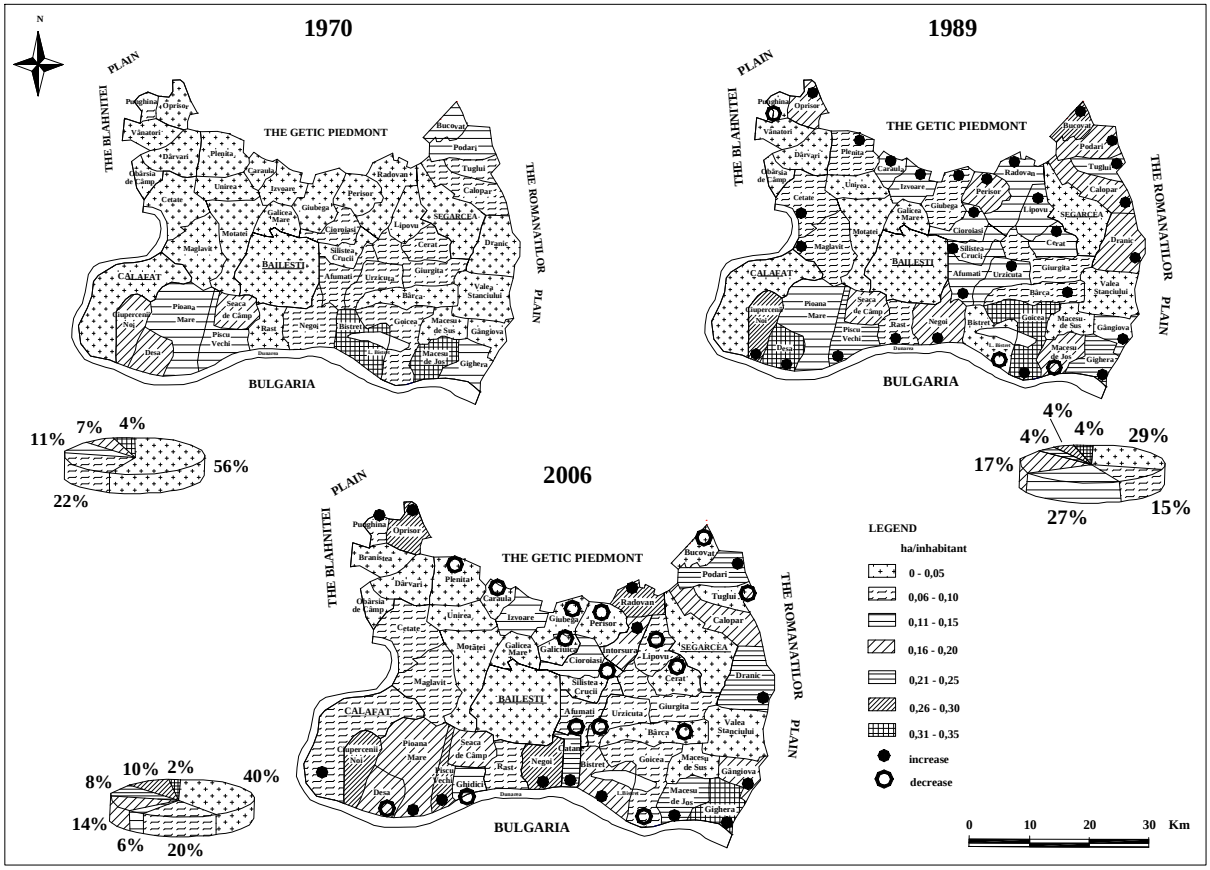

Figure 4. *The Desnăţui Plain – human pressure upon the environment through pastures and grasslands*

In many administrative territorial units where the values were high in 1989, they dropped in 2006 (Figure 4). It is remarkable that high values are maintained in the settlements located in the Danube alluvial plain, the maximum value of 0.35 ha/inhabitant being reached in Gighera commune,

where the surface covered with pastures and grasslands increased with 207 ha. Smaller values were registered in the western part of the plain. The decrease of the human pressure upon the environment in the settlements located in the northern and central part of the plain after 1989 was influenced by the disestablishment of farms. The pastures and grasslands passed into another category of use as result of the change in the political system and land property and due to the subventions granted in agriculture to support the agricultural producers to buy tractors, agricultural machines, equipments, installations, fertilizers and to encourage them to increase the vegetable production both quantitatively and qualitatively.

CONCLUSIONS

The study outlines the dynamics of the human pressure upon the environment through agricultural land use, emphasizing the phenomena connected to the population dynamics and the main category of agricultural land use, namely arable, pastures and grasslands, vineyards and orchards, for an interval of 25 years.

According to the analysis, there are high values for the human pressure upon the environment through arable land. Thus, in 80% of the surface of the Desnăţui plain values exceed the limit imposed by FAO, emphasizing perturbation phenomena in the components of the environment.

Therefore, we consider that it is highly required that people and stakeholders should know about this phenomenon in order to take the necessary measures for a sustainable agriculture.

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*** Data from the County Department of Statistics of Mehedinţi.