Implication of demographic dimension in local sustainable development Case study: Cuejdiu hydrographic basin

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IMPLICATION OF DEMOGRAPHIC DIMENSION IN LOCAL SUSTAINABLE DEVELOPMENT
CASE STUDY: CUEJDIU HYDROGRAPHIC BASIN

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Abstract. Analysis of demographic indicators show a high importance to highlight the economic aspects of the area, being a point of support for the process of sustainable development. The deterioration of population demography in the past 20 years is based on a multitude of complex causes, and is the result of the entire political, economic and social situations of transition. The human development index, calculated for the years 1992, 2002 and 2010, has a gradual evolution, highlighting an improvement in the demographic situation in analyzed area ,of the human capital tends to a stable equilibrium. Problems identified are focused on decreasing birthrate and incrising mortality rate, issues highlighted at both regional and national level, which should be resolved through the development of effective demographic policies, to support people in dealing with existing demographic decline. The new strategies proposed by specialized institutions will contribute to both demographic increase and standard of living (health care quality and access to medical services).

Introduction
The concept of sustainable development is focused on systemic approaches of different ecological, social and economic processes and it is represented of complex strategies that improve the living conditions of the inhabitants by respecting natural resources and enhancement of cultural traditions from each geographical area (Cristea, 1997). Population is a social subsystem and its analyzed highlights that the demographic size is an indicator of development, a continuous process in time and space, being also an action and consumer factor (Man, 2007). The rural space is threatened by the depopulation phenomenon, through migration to other areas in order to increase living standards and by aging population growth which leads to a very high mortality rates.

Material and method
Area analyzed in this research is the Cuejdiu Basin which has about 100 km^2 and it is located in the center of Neamţ County. The zone that will be analyzed in detail overlaps only on rural space, because its development terms provide a demographics diagnostic analysis. This research aims to analyze the demographic indicator in rural area, which provides

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important informations about the area development trend. Data from Neamţ County Statistics Department analyzes a period of 20 years (1990-2011), the date before 1990 was purchased from Gârcina commune monograph of 2009 and provides population issues since 1772. Based on these data we made representative graphs for each demographic indicator.

The methodology used to interpret the evolution in time of demographic dimension, initiated by Sergio Sepulveda (Inter-American Institute for Cooperation on Agriculture in Costa Rica) aims to assess sustainable development progress by calculating an index based on the selected variables as representative as possible for quantification: D1 - the index of areality, D2 – population number, D3 – the masculinity ratio, D4 - birth rate, D5 –marriage rate, D6 - infant mortality rate, D7 - mortality rate, D8 - net migration. The periods of time chosen for estimating the index overlap population census, excluding 2010, due to lack of data from the 2011 census. By using Excel, where we introduced the values for each variable, we set the influence on process of sustainable development: increasing value show positive effects and is noted with (1) and if this value has adversely effect on system is noted with (0). Further, the relativization function aims to bring these values to a common scale, and calculating the Human Development Index (Sepulveda, 2008). The indicatores calculated for each variable have values between 0 and 1, their average being specific for each time interval analyzed, namely 1992, 2002 and 2011. Depending on the values we get, the system can be viewed as different levels of development: collapse (0 - 0.2), critical (0.2 - 0.4), unstable (0.4 - 0.6), stable (0.6 to 0.8), optimum (0.8 - 1).

Results and discussions

The Gârcina commune consists of three villages (Gârcina, Cuiejdi and Almaş), with a total area of 26.83 km^2. The first statistical data on local population are available from the 1972 census, which has only information about the number of inhabitants (Bârjoveanu, 2009). The density of population, calculated only for the last 20 years, has increased from 172.19 inhabitants/km^2 in 1990, to 178.79 inhabitants/km^2 in 2010.
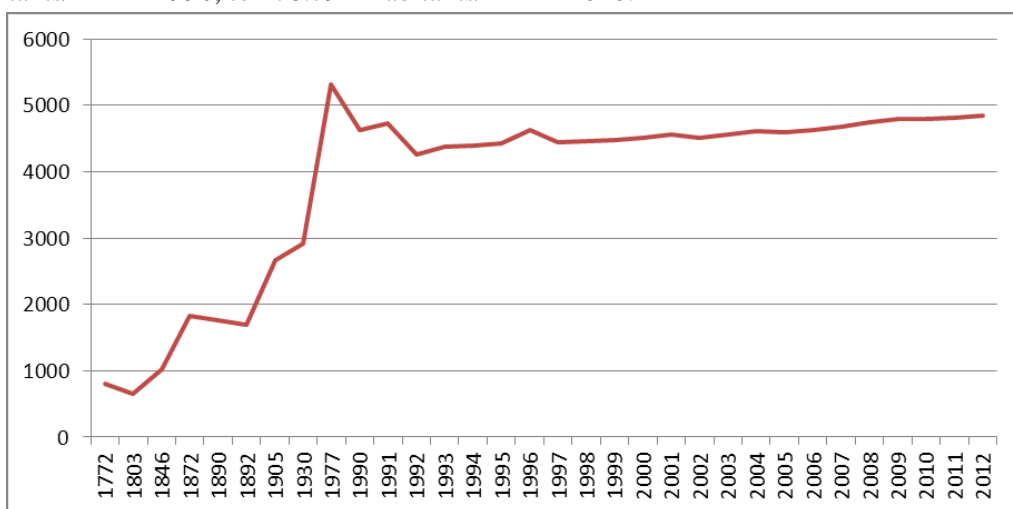

Figure 1: The evolution of population during 1772-2012 in Gârcina commune

The index of areality (a) is calculated by dividing the living space to the actual number of population and is registered an increase since 1992, when the value was 11.59 inhabitants/km2, reaching to 13.9 inhabitants / km2 in 2010. Optimal conditions for the standard of living have led to a continues growing of population, plotted from 1772 to 2011, the latest year has a temporary value because of the unfinished census from 2011, that highlights a decline number of population (Figure 1).

Regarding the evolution of the rural population, data are available from 1992 and 2002 censuses for the villeges: Gârcina village has the largest number of people, due to surface that it occupies, but also due to the nearness to town (Figure 2).
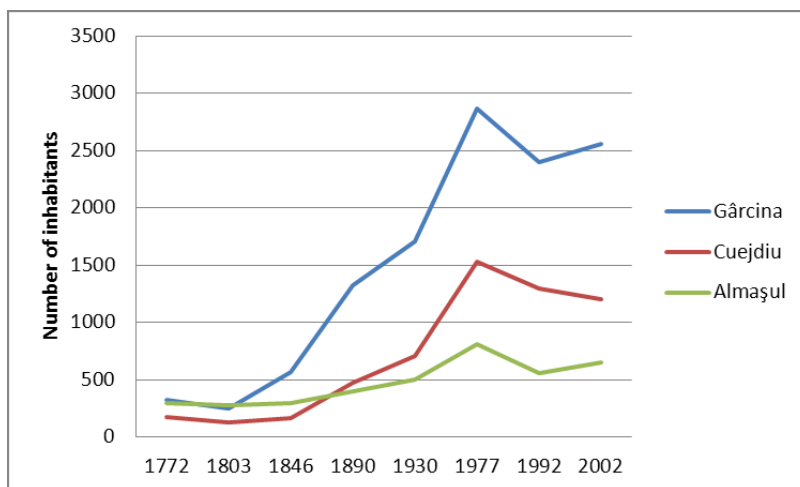

Figure 2: The evolution of population in Gârcina commune village

The structure on sexes of population evolution shows that the share of female is majority from 1990 to 2005, and from 2006 it falls in favor of the males (Figure 3 and 4) .
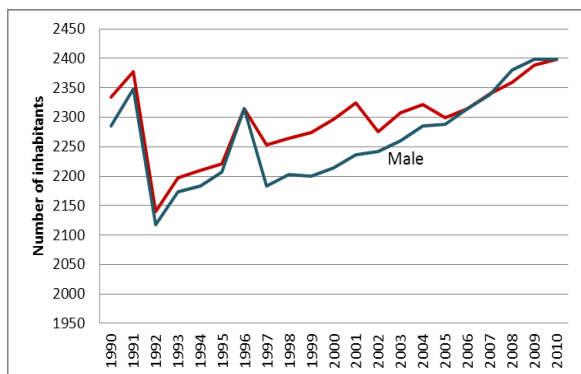

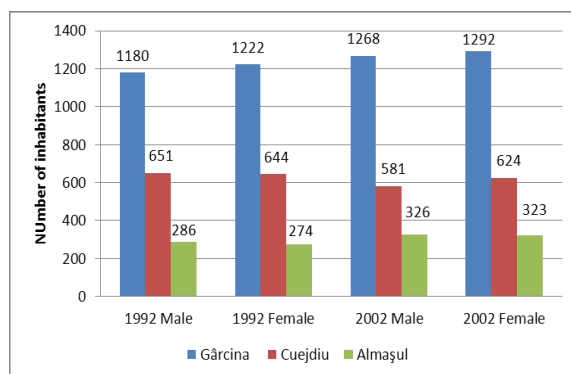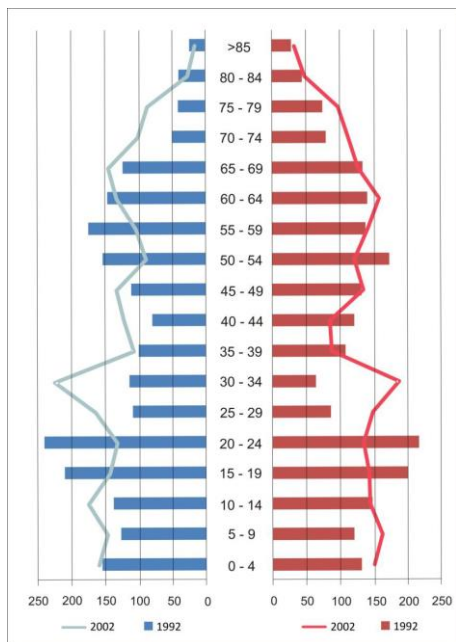*Figure 3: The evoltion of male and female in Gârcina commune population*

Figure 4: The evoltion of male and female population in Gârcina commune villages

The structure on ages is represented by the pyramid population, indicating a difference between 0-14 and 15-25 ages, the last having values higher in 1992 and 2002. Due to the young people departure, mature people share is reduced, the pyramid is very poorly represented by low values of the population aging. The increasing of population from 1992 to 2002 reflects the higher values for the 25-45 ages (Figure 5).

Figure 5: Age and sex distribuition for the year 1992 and 2002

The masculinity ratio is the ratio between the number of male persons assigned to 100 female persons and has a value close to 100% for the years 1992 and 2002, but in 2010 exceeded 100%, which means that the share of population is male is majority. Demographic aging index, calculated by reference to population older than 70 years and young population of less than 25 years, has increased from 22.63‰ in 1992 to 35.06‰ in 2002, which demonstrates an advanced level aging of the population in the area studied. Taking into account the continuous decline of the birth rate (12,33‰ in 1992 and 8.13‰ in 2002) and the increasing index of aging, we conclude a demographic decline, fact demonstrated also by the provisional data of the census 2011, which forecast a lower number of population (4263 people).

Birth rate, in the past 20 years, has a downward trend compared to the mortality rate, which recorded a significant increase after 1999, natural increase being negative (Figure 6). This trend has a negative effect on the development of the studied area, and authorities must take initiatives to promote the birth rate. Rate mortality increasing leads to a decreased life expectancy at birth. Infant mortality rate in Neamț County has higher values in rural areas as compared to urban areas, but in Gârcina commune this rate is decreasing from 1992 (87.71%) to 2011 (25.64%) (Figure 7).

Net migration is represented by the difference between the number of arrivals and departures with residence, having negative values until 1992, due to the massive departures abroad, particularly in Western Europe, in looking for a job, after that, by 2011, the departures has small values, fact evidenced in the increasing trend of the number of population, but also because of the unfortunate situation in European countries. Marriage rate is an important element in demographic analysis of population within a zone, being represented by the total number of marriages in related to the average number of population, expressed in promilles.

In Gârcina commune, in the last 20 years, this rate has a decreasing trend, with the lowest value of 0.86‰ in 1996, and as the highest value of 12.06‰ in 1991.
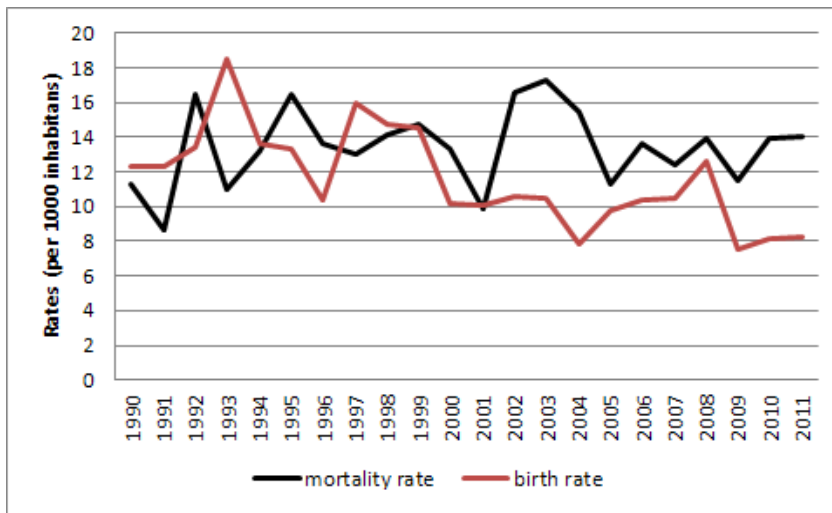

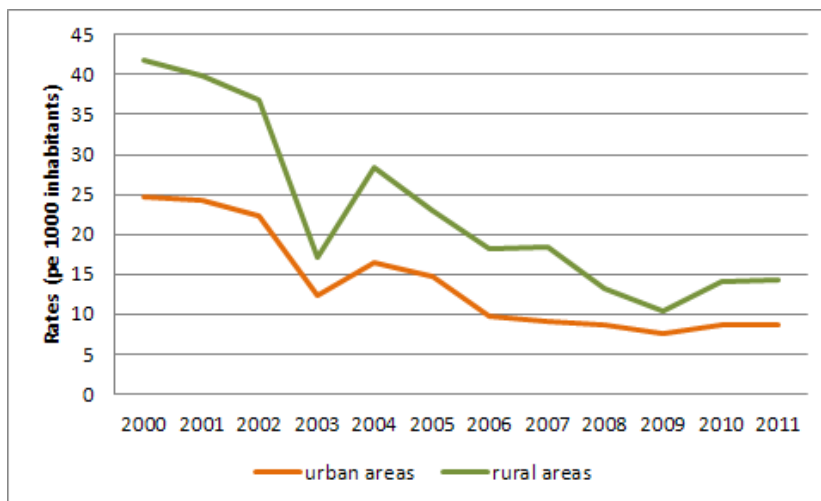*Figure 6: Natural increase, birth and death rates*

Figure 7: Infant moratality rate

The method of calculating the human development index has been used to highlight an evolution over time and to analyze the situation in the field. As shown in figure 8, demographic index calculated for the year 1992 has the lowest value (0.29) and according to the criteria established by the methodology fits into the critical situation. For the year 2002 and 2011, the values of this index began to grow from 0,43 to 0.66, inducing an unstable system, followed by a stable situation. The demographic processes presented in this paper lead to the idea that the analyzed area has conducive situations for a sustainable development of the demographic dimension, idea supported also by the relationship between rural and urban.

Figure 8: Development trend of demographic dimension

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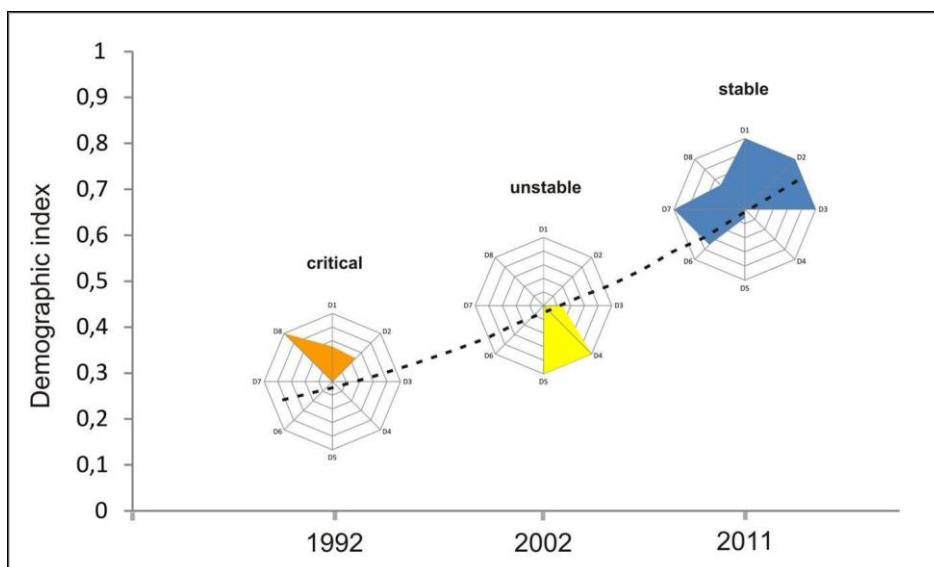
Conclusion

Analysis of demographic indicators show a high importance to highlight the economic aspects of the area, being a point of support for the process of sustainable development.   The deterioration of population demography in the past 20 years is based on a multitude of complex causes, and is the result of the entire political, economic and social situations of transition.

The human development index, calculated for the years 1992, 2002 and 2010, has a gradual evolution, highlighting an improvement in the demographic situation in analyzed area ,of the human capital tends to a stable equilibrium.

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***1992, 2002, 2011 census