

Dogaru, D., (2007), "Population and economic activities in the Dobrogea Plateau and the Black Sea coastal hinterland", în Proceedings of the 4th Romanian-Turkish Geographic Seminar, Galati 2006: "Environment and Society Present-day Diversity and Dynamics", Ed. Universitară, București, ISBN 978-973-749-198-5, p.185-194;

Population and Economic Activities in the Dobrogea Plateau and the Black Sea Coastal Hinterland

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Abstract

Population dynamics and human activities are two integrative parts of the population-environment-oriented studies which are tackled either jointly by natural or/and social scientists. Population-environment investigations have an integrative character and are aimed at offering a better understanding of the physical and socioeconomic processes that govern peoples' livelihoods and activities.

This paper represents a broad overview of the existent potential of human impact on the environment in the Dobrogea Plateau and its coastal hinterland, eastern Romania, focusing on the economic profile and population dynamics of the area. These two elements are then connected and integrated within the natural resource-based profile of the Dobrogea Plateau and its coastal hinterland. Demographic hexagons were constructed for 1990 and 2002 in order to present the dynamics of the population in the study area. The workforce by economic sectors was also considered as data inputs for this analysis.

The results highlight the intraregional differences within the study area, in terms of different demographic and economic profiles which are clearly distinguished between the agrarian part of the Dobrogea Plateau and the more industrial and growing tertiary sector of the Black Sea coastal zone. Demographic and economic disparities, specifically between the two counties of the analyzed area, Constanța in the south and Tulcea in the north, are also obvious for the administrative levels.

Keywords: population dynamics, demographic hexagons, economic profile, intraregional disparities; eastern Romania.

1. Introduction

Population and economic activities are two elements of a territorial system that determine its dynamism and evolution trends, being key components in the spatial organization of the territorial unit they belong to. Moreover, the demographic factors and economic activities are inducing ever more changes in the natural environment, from local to global scale. These two factors have increased resource consumption significantly, evident in agriculture and food production, industrial development, international commerce, energy production and urbanization (IGBP Science, 2001).

Human-induced impacts are not easy to quantify and/or include in a cause-effect framework. In this respect, in the 1970s Ehrlich and Holdren devised a simple equation for measuring environmental impact. Its mathematical representation, the so-called 'IPAT equation', simply states that environmental impact (I) is the product of population (P), affluence (A), and technology (T): $I = P \times A \times T$ (Bălteanu and Șerban, 2005). Nonetheless, human-driven changes are superimposed on, and usually interact with natural patterns of variability in the Earth System. There is good evidence that human pressures override natural fluctuations and therefore it is significant to distinguish human impacts from natural variability in order to understand their relative importance as drivers of environmental change (IGBP Science, 2001).

The present paper is not looking precisely at the connections between human activities and environmental variability proper, it rather offers a broad overview of the potential human impact on the environment of the Dobrogea Plateau and its coastal hinterland. The results may constitute a base for further investigations in the field of human-environment interactions in this study area.

2. Study area

The study area is represented by two major relief units, the Dobrogea Plateau and its Black Sea coastal hinterland. It is delimited from the neighboring regions by water on three sides (the Danube River in the west and north and the Black Sea in the east). It corresponds largely to an orogen unit in the north (the Măcin Mountains and the Tulcea Hills) and a loess-covered plateau in the center and south, edging on the Black Sea Coast in the east (Fig. 1). The climatic conditions are imposed by the continental-temperate climate, with evident effects of aridity throughout the region, except for the coastal zone where the Pontic influences make the difference (*Geografia României*, vol. V., 2005). Such conditions favor the development of

seasonal tourism along the coast, while profitable agricultural production requires the use of irrigation systems.

From an administrative point of view, the study area includes 2 counties (Tulcea in the north and Constanta in the south) totaling a surface-area of 15 570 sqkm and numbering 971 643 inhabitants (2002 census data). The urban network in Constanța County (where most of the towns are concentrated in the coastal area) is better developed than in Tulcea County (12 vs. 5 towns). Constanța is the most important town of the study area, ranking 5 in the national urban hierarchy. The Danube Delta, which is part of the Tulcea County and presents a broad range of different aspects, from demographic and economic to cultural and environmental, was not considered in this analysis.



Fig. 1. The Dobrogea Plateau and the Black Sea coastal hinterland

The two distinct relief units contribute basically to the creation of specific territorial functions and shape the evolution patterns of the area's economy as a whole. The spatial continuity of these relief units creates regional coherence that favors the internal flows of goods

and services among settlements. Moreover, the geographical position, at the Black Sea, renders the region a convergence function in terms of economic flows and external relations, particularly through Constanța city, which is the main port of Romania. Also, tourists almost double the population along the coast during the summer months, increasing connex activities (especially commerce and transport), at the same time intensifying pressure on the environment (the area concentrates more than 40% of Romania's tourism structures, *National Institute of Statistics*, 2004). Thus, the economic significance of Constanța is not only regional, but extends also at national and international level.

3. Population dynamics and territorial distribution

The dynamics of the population in the Dobrogea Plateau and its coastal hinterland follows the national trend, which up to 1992 was generally associated with an increase of urban inhabitants and a decrease of the rural population. Subsequently, the demographic trend was marked by a population decline in both urban and rural areas (Fig. 2.). Explicitly, as from 1948, the population dynamics in the study area registered a sharp rise in the number of urban inhabitants especially beginning with mid-1960s up to the early 1990s. The increase was due mainly to the afflux of rural inhabitants to the town in the wake of the communist regime's economic and demographic policies (industrialization and pro-natality drive).

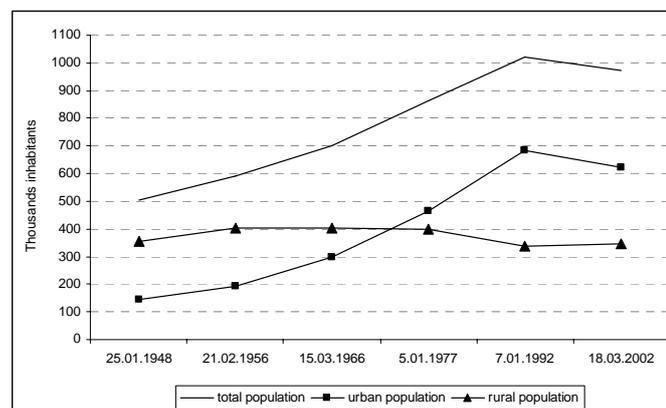


Fig. 2. Population dynamics in the Dobrogea Plateau and the Black Sea coastal hinterland (censuses data)

For example, the Constanța city population increased from 27 201 in 1912 to more than 300 000 at present. Unlike the urban population, the dynamics of the rural inhabitants had been moderate up to mid-1970s. Afterwards, it registered a negative trend due mostly to intense rural-to-urban migratory fluxes, as a consequence of the industrialization of towns. From the early 1990s, when Romania passed from a totalitarian regime to a free-market system, the total population, regardless of its place of origin, registered a decline compared with the previous

period. A complete representation of population dynamics between 1990 and 2002 is offered by the demographic hexagons of the rural and urban inhabitants in the Dobrogea Plateau and its coastal hinterland (Fig. 3 a,b,c,d). The demographic hexagon is a synthetic image of the main demographic processes, basically of the natural and migration balances. It considers population as a closed system, where the input is given by live-births and in-migrants, while the output is specified by mortality and out-migrants (Vert, 2000).

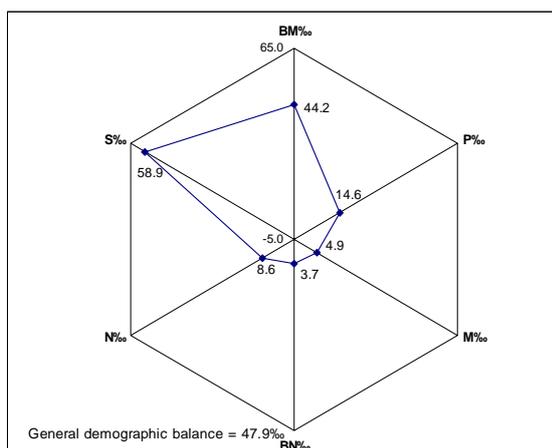


Fig.3.a. The urban demographic hexagon in 1990

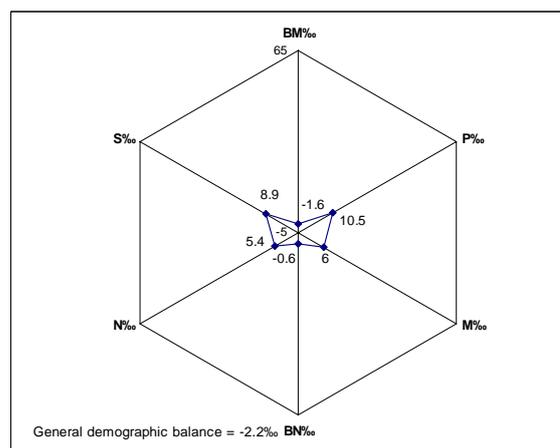


Fig.3.b. The urban demographic hexagon in 2002

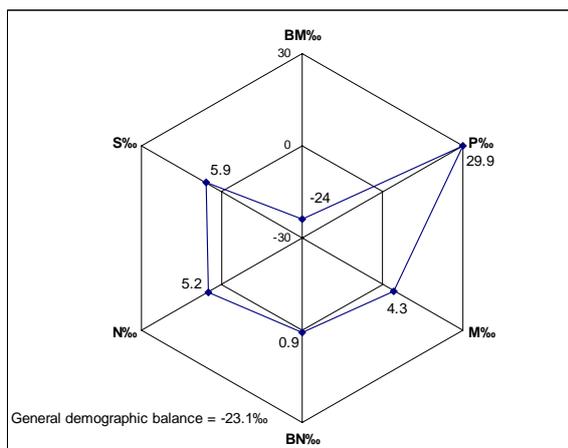


Fig.3.c. The rural demographic hexagon in 1990

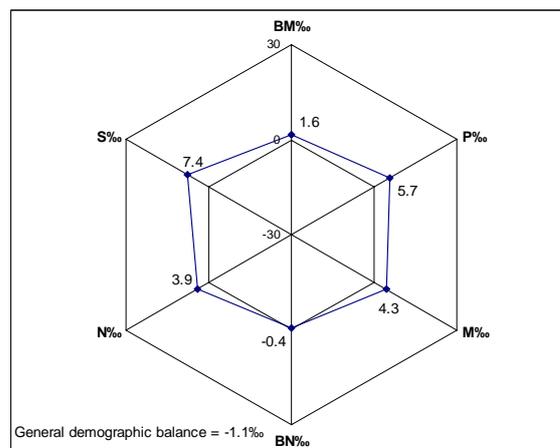


Fig.3.d. The rural demographic hexagon in 2002

Fig.3. The demographic hexagon for the urban and rural space of the Dobrogea Plateau and the Black Sea coastal hinterland in 1990 and 2002; N,S,P,M stand for the number of newborns, in-migrants, out-migrants, deceased / 1 000 inhabitants; Bm and Bn are migration and natural balances.

Analyzing these graphical representations it emerges that the urban population dynamics in 1990 was higher than in 2002, particularly in terms of migration balance. The prominent direction of the hexagon for the 1990 urban population is of in-migrants, emphasizing the importance of this indicator in shaping the demographic dimension of the urban area. The abrogation of restrictions on people's settling in large cities after the downfall of the totalitarian system led to an increase in the number of in-migrants there. This aspect is significant for Constanța and Mangalia, the major towns on the Black Sea coast, which registered the highest

migration balance values in 1990, 44.3‰ and 1.9‰, respectively, by attracting newcomers and investors through their capacity to diversify and multiply the economic functions and better assimilate the economic changes. Also the geographical position of the two towns, on the coast is an important asset in this respect.

The urban population migration balance in 2002 turned negative due to external migration fluxes and possibly to the urban-to-rural fluxes a situation caused by the socio-economic changes of the transition period. Thus, the economic restructuring and the closure of large industrial and unproductive units determined many people to leave town for their former countryside, or even to go abroad.

The natural urban balance was positive for 1990 (3.7‰) and negative for 2002 (-0.6‰), due to the constant decrease of newborns during the period of transition to a free-market economy.

The 1990 demographic evolution of the rural space was marked by the large number of out-migrants (29.9‰) and implicitly has a negative migration balance (-24.0‰), and also by an approximately null natural balance (0.9‰). By contrast, in 2002, the number of in-migrants was slightly higher than that of out-migrants, while the natural balance was similar to that before the 2002 census (-0.4‰). A slight rural population increase was noted in several large and medium-sized communes (>5000 inh. and 2000-5000 inh., respectively) situated near the coastal urban centers, Constanța and Mangalia (Agigea, Valu lui Traian, Topraisar, Limanu, Cumpăna, Albești and Pecineaga). Their position, close to the largest centers in the region and at the same time to the proximity of the Black Sea coastal zone contributed to increasing arrivals in these localities. Possibly, the new land law, 18/1991 (revised by laws 1/2000 and 102/2001), stipulating retrocession of land to the former owners, had its role in the slight repopulation of the countryside. Nevertheless, the effect of the land law in attracting in-migrants to the rural localities situated in the Dobrogea Plateau and discharging typical agricultural functions was not that obvious as expected. Very few rural settlements situated in the continental part of the region registered an increase of inhabitants between 1990 and 2002 (e.g. Castelu, Siliștea, Mircea Vodă in Constanța County, or Luncavița and Nalbant in Tulcea County). Moreover, the ageing process specific to the countryside, even might have been accelerated by the land law, as retired or elderly town residents tended to move to the village, being attracted by the restitution of their land (Soare, 2004).

The average density (inh./sqkm) is one of the most relevant indicators of the territorial distribution of population. The population density is conditioned both by physical-geographical and economic factors, a region recording distinctive densities on its territory.

A characteristic of the study area are the high densities of towns and rural settlements located around urban centers, with low densities in rural areas which stand far from the main roads or railways (Fig. 4).

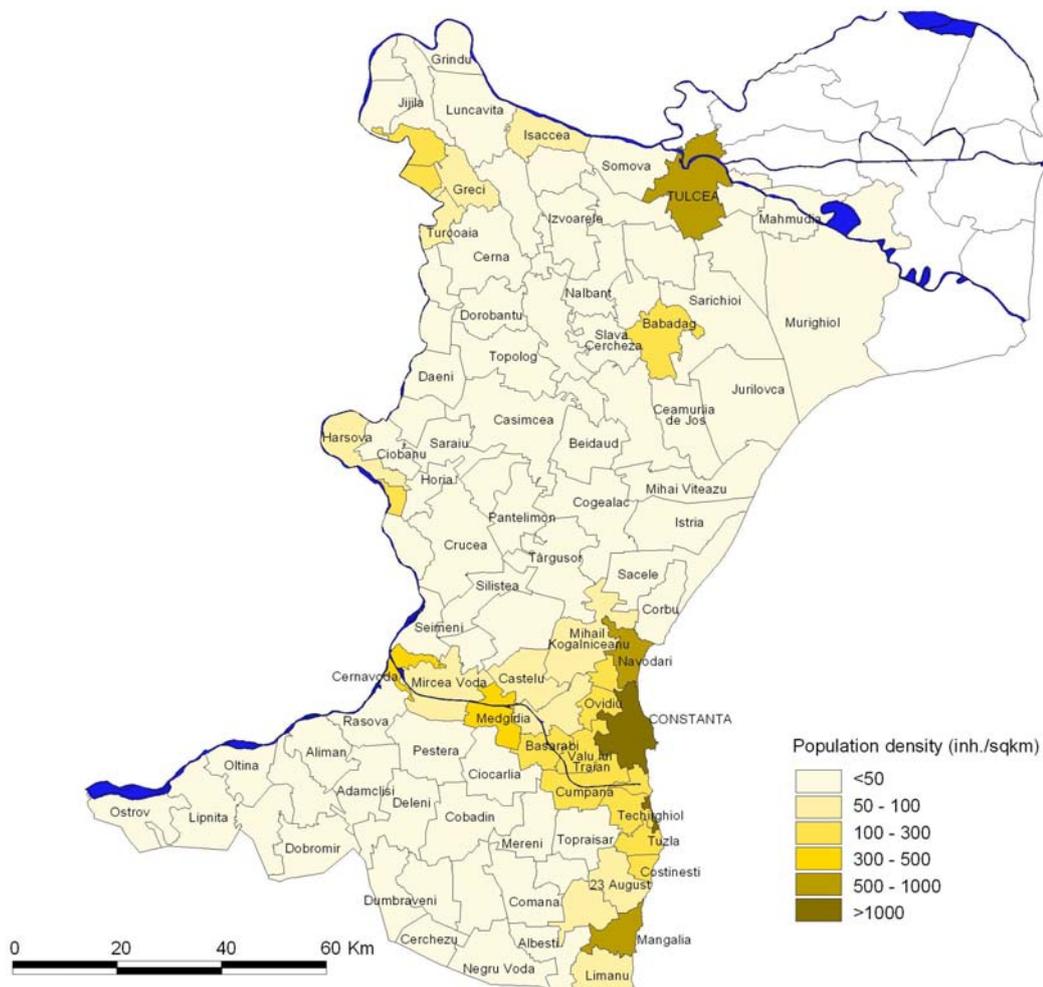


Fig. 4. Population density in the Dobrogea Plateau and the Black Sea coastal hinterland

The highest population density values (over 1 000 inh/sqkm) are attributed to Constanța city (2 498 inh/sqkm) and Eforie town (1 248 inh/sqkm), a particularity of polarizing centers, in the first case, and of small towns with a well-defined tourism function in the second. The other urban centers register over 100 inh/sqkm, except for the small agrarian towns (Negru Voda, 66 inh/sqkm, Isaccea 52 inh/sqkm). The highest rural densities (>100 inh/sqkm) are found in the settlements situated near coastal urban centers (Cumpăna, Valu lui Traian, Costinești, Tuzla and Agigea). High values, between 50 and 100inh/sqkm, are typical for large localities engaged in tourism, or wine and fruit growth, primarily for those lying alongside the Danube-Black Sea Canal (Mircea Vodă, Castelul, Poarta Albă). The other settlements have no more than 50-10 inh/sqkm, and are associated with deeply rural areas (e.g. Vulturul, Săcele, Saraiu and Deleni in

Constanța County; Hamcearca, Beidaud, Dorobanțu and Grindu in Tulcea County, below 15 inh/sqkm).

In the light of these results we may conclude that the settlements situated alongside the coastal zone and in its proximity have high concentrations of population in both the urban and the rural areas, hence a considerable human impact on this geographical environment.

4. Economic profile

The economic dimension of the Dobrogea Plateau and its coastal hinterland is determined mostly by the region's polarizing centers which establish various types of relations within the area itself and with the neighboring regions, as well. The most important one is Constanța, which is Romania's main port at the Black Sea, followed by Tulcea, Mangalia, Cernavodă and Medgidia. They play an important role in the industrial profile of the region and represent convergence points of workforce, production and transport fluxes. The main types of relations developed among the polarizing centers and between them and their zone of influence are of production, trade and services, communication and mobility (Benedek, 2004).

The production units are concentrated primarily in the urban centers of the region and, as a particularity, many of them are found in the centers situated along the coastal zone. There is also high spatial density of consumers (population, firms, public institutions, etc.) of these urban centers.

The large industrial units, with more than 1 000 employees, shape the region's industrial framework. The most important units are grouped around Constanța and Tulcea, which are county-seats as well, but also in Mangalia, Năvodari and Cernavodă. Their profiles include: oil extraction and processing (Petromar and Petromidia SA in Constanța and Năvodari), production of aluminum and iron compounds (SC Alum SA and SC Feral SRL in Tulcea), power plants (CET in Constanta and Nuclear Power Plant at Cernavoda), cement plant (SC Lafarge Romcim SA in Medgidia), ship-yards (construction and repair) in the ports of Constanta, Tulcea and Mangalia. Besides heavy industry, the light industrial sector (food and textile) is well represented in the area, having substantial financial capital and a good job offer. Tourism services are specific to the centers located on the Black Sea coast and in the town of Tulcea – a gateway to the Danube Delta. Many small enterprises (under 10 employees) situated in the Constanta area are meant to satisfy summer tourism demands (small food units, brewery, handicraft units, etc), also contributing to the economic dynamism of the coastal zone. Moreover, in terms of the number of trading companies registered in 2004 (49 187 economic agents), Constanța County

ranks 4 in the national hierarchy, which is suggestive of the steady development of the tertiary sector.

In terms of location, the main industries are high concentrated along the coastal zone and the Danube River, due on the one hand to Romania's industrialization during the communist period, and to the facilities offered by the fluvial-maritime transport, on the other (Ghenovici, 1985; Popovici et al., 1984).

Agricultural activities are specific to, and at the same time traditional, inside the, continental part of the region. The uniformity of the Dobrogea Plateau, particularly in the center and the southern part, the mild slopes and the large floodplains, as well as the specific climatic conditions, account for complex land uses (*Geografia Romaniei*, vol. V., 2005). Cereals and technical plants, wine-and-fruit growth are characteristic crops in the Dobrogea Plateau. The settlements, with over 50% of the total workforce occupied in agriculture, are situated at a considerable distance from the polarizing centers and lack subsoil resources (e.g. Dorobanțu, Hamcearca, Nalbant, Ceamurlia de Jos, Valea Nucarilor, Peceneaga, Aliman, Saraiu, Deleni, Dobromir, etc.).

Table 1 presents a synthetic view of the workforce in the Dobrogea Plateau and its coastal hinterland in terms of occupied population by economic branches. Statistics show a net difference between the two counties in regard of the agricultural population, fact that demonstrates that the services and industrial sectors are better represented in Constanța County than in Tulcea County, and that the former has a higher development potential.

Table 1. Economic structure by number of occupied workforce in 2002

Economic branch	Constanta County			Tulcea County		
	Urban (% of the urban workforce)	Rural (% of the rural workforce)	Total (% of the total workforce)	Urban (% of the urban workforce)	Rural (% of the rural workforce)	Total (% of the total workforce)
agriculture, forest and fishing	3.09	47.82	13.93	5.05	56.64	26.31
extractive industry	1.1	0.71	1	0.88	3.28	1.87
manufacturing industry	18.98	11.09	17.06	33.46	8.95	23.36
electricity, thermal energy and natural gas production and distribution	2.88	0.95	2.41	1.49	0.45	1.07
constructions	8.7	6.92	8.27	6.41	4.76	5.73
trade	15.71	7.66	13.76	13.35	6.71	10.62
hotels and restaurants	3.92	1.79	3.4	1.19	0.4	0.87
transport	14.2	6.26	12.28	6.71	2.62	5.02
communications	1.37	0.85	1.25	1.64	1.21	1.46
financial transactions	2.04	0.29	1.62	1.75	0.27	1.14
research and development	0.58	0.2	0.49	0.58	0.14	0.4
education, health and public services	24.09	13.75	21.58	24.77	12.76	19.82
other services	3.35	1.71	2.96	2.72	1.8	2.34

5. Conclusions

The physical environment and the natural resources of the Dobrogea Plateau and its coastal hinterland account for the demographic and economic evolution of this space. The study region corresponds to an orogen in the north (the Măcin Mountains and the Tulcea Hills) and a plateau in the center and the south, the Black Sea Coast edging on the east.

Inside the continental part, except for the largest urban centers here (Tulcea, Medgidia and Cernavodă), agriculture is the dominant activity while the coastal zone and the continental shelf offer various conditions to tap underground deposits (oil, natural gas), to turn to advantage aquatic resources and seashore tourism.

Industrial development, diversification and location had cascading effects, bringing about changes in the other economic sectors, in social life and the environment. Thus, the agricultural sector evolved simultaneously with the industrialization process, benefiting by the automation of agricultural works and production, and the creation of a large irrigation system.

Urbanization was boosted not only by the higher concentration of people and activities in sea-towns, but also by the expansion and diversification of the urban landscape. As a result, the agricultural area shrank, infrastructure developed (e.g. transport networks - the construction of the Danube-Black Sea Canal (1984), dykes were built at different angles against the cliff with negative impact on the accumulation of sea sediment and on the transport and circulation of water currents, etc.). Also in this case there are clear-cut differences in the degree of urbanization (72.9 % vs. 51%) and economic development between Constanta County in the south and Tulcea County in the north.

Although industrial development brought about economic progress for the whole region, and particularly for the coastal zone, the environmental effects of locating and conducting economic activities were little considered.

Nowadays, as Romania has assumed a capitalist market economy, spatial structure dynamics are governed by new shifts and changes. Although the demographic statistics between the last two censuses show a general trend of population decrease, the coastal zone remains a densely populated zone (e.g. Constanța city has 2 498 inh/sqkm), putting a great stress on the area. The process of industrial restructuring, as well as greater awareness concerning environmental problems has led to changes in production mechanisms and outputs, in the structure and number of the workforce, and in the diversification and increase of consumption. It has also deepened the economic disparities between the two counties of the studied region.

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