Lecture Notes in Networks and Systems 482

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New Metropolitan Perspectives

Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages Perspectives

Springer

Lecture Notes in Networks and Systems

Volume 482

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Geographic Information and Socio-Economic Indicators: A Reading of Recent Territorial Processes in the Test Area of Basilicata Region

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Abstract. This work proposes the development of a methodology directed to analyze the potential of the territory in terms of local development and the evolution that this has undergone in the historical period between 2017 and 2021. Taking into account the social and environmental realities present, the study also developed an in-depth analysis of the evolution of the urban and rural fabric and socio-economic characteristics, paying particular attention to the multifunctional role played within the territory.

Analyses of urban and rural environments typically focus on the application of methodologies that assess quality objectives at the environmental and urban levels. Research has shown that a system of indicators can be useful in developing qualitative and quantitative descriptors of the area, investigating urban and inland areas. The first step was to formulate a methodology to measure the quality of life in these areas based on lists of objective indicators, aggregated to develop a framework to assess the level of quality and spatial development of the areas investigated. The second step was to apply this methodology to evaluate the settlements of tested area of Basilicata Region, characterized by a multiplicity of different environments that make possible the coexistence of a great variety of environmental and territorial phenomena. The main results of this research concern the opportunity to measure numerically the objective aspects that influence the development of the territory in urban and rural areas. In this way, the most critical areas to be upgraded have been highlighted in order to prepare policies congruent with the local context.

Keywords: Geographic information · Urban and Rural environment · Territorial processes

F. Calabrò et al. (Eds.): NMP 2022, LNNS 482, pp. 2104–2111, 2022.
https://doi.org/10.1007/978-3-031-06825-6_202

1 Introduction

Define a territorial model represents a constant challenge to the systematization of data and spatial information able to understand the mechanisms that, at the local scale, determine the organization of the demand and, consequently, of the offer of services and equipment's [1–4].

This consists in an interpretative approach to the dynamics of settlement, territorial, infra-structural endowments and organizational models that condition, for example, territorial accessibility and that lead citizens to self-determine the residence and systematic movements according to criteria of optimization of the modalities of use of space and territory. The research for rules and criteria that define the settlement pattern finds utility in the planning of sustainable forms of territorial development. The search for rules and criteria that contribute to the definition of the settlement model is useful in the planning of sustainable forms of territorial development. This is particularly critical in the management of territories with low settlement density in which the rules and standards defined for the organization of large metropolitan aggregates lose effectiveness. Basilicata represents this criticality in the management of territories, being one of the regions with the lowest settlement density, conditioned by a delay in development, which derives from a secular infrastructural deficit. The search for rules and criteria that contribute to the definition of the settlement model is useful in the planning of sustainable forms of territorial development. The region still bases its strategic line of territorial development on the use of autochthonous resources linked to the system of diffused naturalness, to the quality of the productions of the agricultural sector, to the uniqueness of the values - historical and cultural.

The purpose of this work was to analyze the trend of territorial development in terms of public and private services present between 2017 and 2021.

The article presents a methodology to investigate the relationships between socio-economic phenomena present in the territory and its spatial distribution, developed in a Geographic Information System (GIS) environment using a free and open-source data and software (FoSS). The integration of different integrated datasets in a GIS environment, combined with the application of new territorial analysis models, represent a fundamental tool for studying and monitoring the evolution and development of the territory. The interoperability of the various territorial data and analysis models represent an important tool for the planner and the territorial government bodies, and contribute to improving the definition of plans and strategies consistent with the real needs and territorial problems [5–10].

2 Materials and Methods

2.1 Study Area

The territorial area studied includes thirty-one municipalities of Basilicata Region (Fig. 1) that, according to the SNAI classification [11, 12], all fall within inland areas. The study area is characterized by a multiplicity of different natural environments, characterized by wooded and mountainous areas, hilly areas and plains with the presence of agricultural areas, badlands and barren areas [13, 14]. This variety of environment

makes possible the coexistence of a great variety of plant and animal species. The urban and rural settlements are mainly located in the hills and mountains, some are also located in the flat coastal area of the Metapontum plain. The study area can be divided into three macro areas: a Tyrrhenian mountainous area bordering the Campania region, an internal hilly area and finally an Ionian area falling partly in the Metapontum plain and partly in the territory of the Matera mountains (Fig. 1). The climate is Mediterranean, with a marked two-season regime characterized by hot and dry summers and wet and cold winters. From a geological and geomorphological point of view, the whole of Basilicata is among the regions with a high seismic and geomorphological risk, it is in fact affected by the presence of innumerable landslides [14–17].

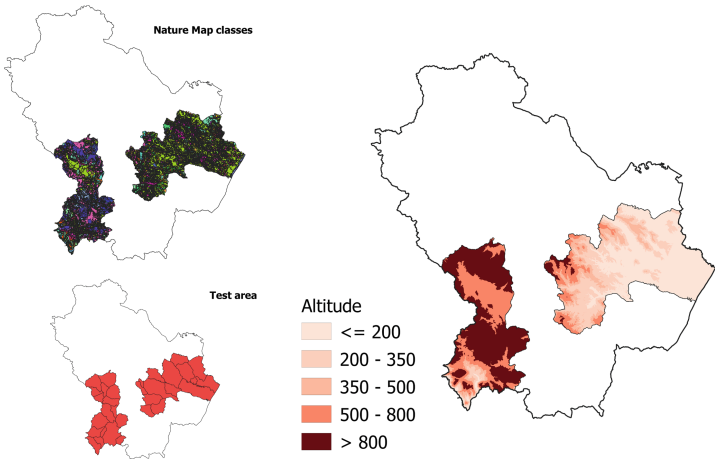

Fig. 1. Territorial framework of study area.

The main road system is represented by a few arteries that cross the whole region and from which develops a system of secondary roads that have the function of connecting the individual centers to roads of higher level, allowing access to suburban roads and agricultural land. From the demographic point of view, by the steady reduction of the regional resident population since the 50's; currently, there are about 545 thousand inhabitants. The structure of the economic system of the study area shows a prevalence of agricultural enterprises, followed by the commercial sector and the tertiary sector. The prevalence of the agricultural sector does not correspond to an occupational structure composed in terms of employees and collaborators of the companies. This denotes a system linked to individual and family businesses with a low level of industrialization of production processes.

2.2 Methodology

In this paper we consider two main informative data for the territorial framework of some regional centers chosen as test areas: the demographic structure of the resident population and the endowment of services and equipment. The framing of the demographic structure

refers to ISTAT data [18], while the equipment of services and equipment derives from a work of reconnaissance and detailed mapping of the offer of public and private services, which together determine the different types of territorial equipment.

The criteria for evaluating the evolution of the development of the 31 municipalities in the period studied are analyzed through the development of indicators in a GIS environment. Numerical assessments and maps were extracted to allow an objective and quantifiable comparative analysis of their transformation between 2017 and 2021.

The first methodological approach was to reconstruct the stock of services (public and private) and equipment (economic activities, associations, etc.) in the years 2017 and 2021, with the use of open data [16, 18–22] processed in the QGIS software [23], it was possible to define a map of local services relating to the entire test area. A large part of Italian small urban centers, despite having potential for development linked to cultural tourism, suffer from serious economic and above all social hardship, above all due to the processes of depopulation. The processes of abandonment have significant effects on the landscape heritage which deteriorates more rapidly due to the absence of any maintenance practice. In order to frame a preliminary summary view of the main socio-economic variables of the area read with respect to the trends that emerge from the ISTAT census data [18], the demographic trend in the periods considered, was subsequently analyzed. A significant elaboration to describe the seriousness of the aging process of the population is the construction of indicators that frame the resident population in percentage terms, divided into three classes: Youth population (aged between 14 and 35 years), adult population (over 55 years) and aged population (over 80 years).

The purpose is to create a territorial framework that will be used for spatial processing, with the aim of integrating traditional methodologies and geostatistical approaches in the definition of the territorial socio-economic framework, that represent the basis of future development planning.

3 Results and Discussion

In this preliminary work, two main information layers were compared from the point of view of regional territorial development: the demographic structure of the settled population and the provision of services and equipment. The purpose of this preliminary work was to first create a dataset of data useful for the calculation of various socio-economic indicators, in order to frame the demographic evolution and the evolution of the stocks of public and private services.

Preliminary phase of the study was to identify the stock of services (public and private) and equipment, the data collection phase allowed the identification of approximately 3600 in 2017 and 5600 in 2021 activities and services in all the municipalities studied (Table1). Globally there is a general increase in 2021 in all classes of services and equipment surveyed.

Table 1. Service and equipment classes in 2017 and 2021.

Services and equipment	2017	2021
Education	222	246
Commerce	768	1395
Culture, art, publishing	279	495
Health	370	508
Services	843	1342
Public services	113	135
Financial services	161	212
Safety	96	95
Sport and Free time	395	560
Tourism	388	577

Analyzing the supply of services and equipment in a territory is a parameter against which to evaluate the quality of life in a specific territory, also through comparison with reference realities. On the other hand, it can be understood as a deficit assessment, or the absence of minimum requirements for the offer of services and equipment in reference to the urban functions exercised by each territorial unit.

The demographic structure of the municipalities analyzed reflects the regional trend towards depopulation, in fact the resident population has gone from 131.425 (2017) to 125.202 (2021) inhabitants. The results of the calculation of the indicators divided by age groups for the year 2021 are very significant. The indicators measure, as a percentage, the population in the three age groups considered (youth (age 14–35), age over 55 and age over 80) out of the total resident population (Fig. 2). These values were compared to the values of the national average. The indicators have been constructed and classified into 5 value classes, with reference to the national average of southern Italy. As regards the indicator relating to the percentage of the resident population in the age group 14 - 35, the class with the value 5 represents a resident youth population rate greater than 27% until it decreases to the value 1, which represents the percentage of resident youth population less than 18%. What emerges from this first analysis is that the resident population for this age group in the areas considered is of the order of 21% - 18% class 3 and 2. With regard to the adult population over 55, the indicator measures, also in this case, the resident population in percentage terms compared to the average of southern Italy. Class 5 is attributed with a percentage of the population over 55 residents of less than 30% while class 1 represents a resident population over 55 years of greater than 40%. From the analyzes it emerges that the population residing in the test area, in the over 55 age group is greater than 40%. Similar argument was made for the resident population in the age group over 80, where in class 5 a resident population of less than 3% is represented while in class 1 a resident elderly population value greater than 10%. In this case it emerges that the percentage of the population residing in this age group in the area is between 7% and 10%.

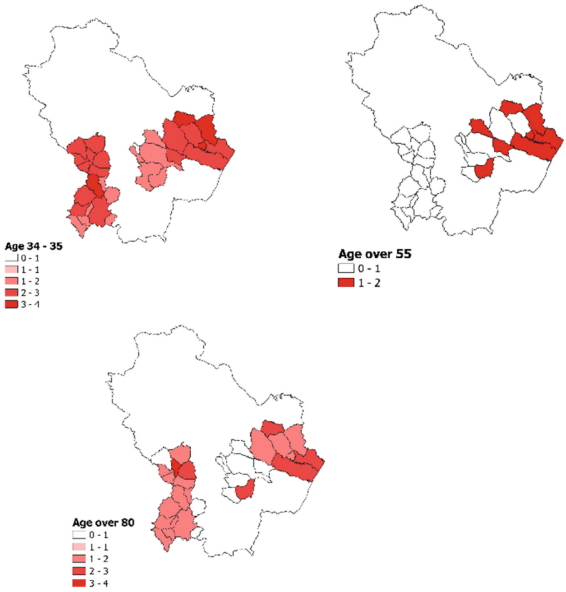

Fig. 2. Indicators of the distribution of the resident population by age group.

4 Conclusion

The situation of the studied area, and in general the entire Basilicata region, raises the need for a new multi-year regional strategic planning that allows the region to implement the public policies necessary to trigger balanced development. The results of demographic trends highlight the structural territorial weaknesses linked above all to depopulation and abandonment of smaller towns. This work represents the main elements of a first experimentation, at the municipal level, of the methodology described which achieves preliminary results. Further studies and analyzes are needed to provide a socio-economic geographical picture of the area considered. Future developments concern the implementation of new indicators regarding the accessibility of these areas to the nearest school complexes and also to medical health centers. A further object of analysis will be to study the degree of infrastructure of the road and railway network and assess its exposure to hydrogeological risk.

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