

## **Designing a framework of indicators to assess regional sustainability and form spatial planning priorities**

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Sustainable development is the “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (Brundtland, 1987). Its main priorities are to enhance economic development, advance social equity and ensure environmental protection (Leiserowitz et al., 2006) by linking what should be sustained (e.g., resources) with what should be developed (e.g., infrastructure) and the emphasis has often differed from extremes of “sustain only” to “develop mostly” to various forms of “and/or” (Kates et al., 2005). Many studies acknowledged the role of spatial planning in this process (Brackhahn B., & Kärkkäinen 2001; Adams et al., 2012; Nadin & Stead, 2008).

Indicators provide the possibility to find economic, social and environmental impediments and are also useful tools to communicate ideas, thoughts and values (Kaptagaeva, 2013). Therefore, they are the most appropriate means to measure the level of sustainability of an area and to promote relevant policies (UN, 1992). It is profound though that using indicators to evaluate the level of sustainability requires constant feedback information and data spatially and timely focused (Vagiona et al., 2010).

This study aims to assess the fulfillment of sustainable priorities in a member state of European Union (EU) and to outline the principles spatial planning should follow to achieve sustainable development's goals. The proposed methodology is based on using indicators to measure sustainability. However, identifying the appropriate indicators to assess economic progress, social and environmental priorities is a challenging venture. Many approaches to choose the optimal indicators

are recorded in the literature (Bell & Morse, 1999). In this study, the criteria used for the selection of indicators are: i.to be compatible with the European Strategy for Sustainable Development, ii.to consider indicators proposed by International Organizations (e.g., UNEP), iii.to find indicators provided by EUROSTAT. The selected indicators are grouped into categories according to the aspects of sustainable development (economy, society, environment and governance). In this way, it is ensured that the most significant aspects of sustainable development are analyzed adequately. The selected indicators are further categorized into relevant issues. The environmental indicators are related to energy, waste, biodiversity and built environment. The social indicators are related to demographic dynamics, education and health. The economic indicators are related to unemployment, GDP, wealth, and tourism. Finally, certain institutional indicators are analyzed. The analysis is performed at the regional level because, during the last decades, the role of regions is continuously upgrading in the EU's regional policies. The stepwise approach to the indicator application process is as follows: i.data for each indicator are gathered ii.data is attributed to one of seven appropriate classes and transformed into class values from 0 to 10 based on predefined ranges and iii.the class values are averaged for each issue and summed to receive a total score for each aspect of sustainability as well as the overall score of sustainability in each region. Furthermore, Geographic Information Systems are used to facilitate comparing spatially the results produced. The case study of this research effort is Greece.

The results reveal major differences among the regions of Greece. The level of sustainability regarding economic and social issues is far from satisfying. The same conclusion is valid for the environmental issues although the policies implemented by the EU during the last decades have minimized various pressures. The primary cause of this situation is the economic crisis, a phenomenon that was significantly maximized by the diachronic deficiencies of the Greek spatial planning system. Spatial planning system in Greece belongs to the so-called "urbanism" planning tradition (CEC, 1997) and until recently was dominated by issues of physical planning. It is characterized by many and often contradicting laws, regulatory framework, lack of efficient control mechanisms, inefficient adaptation to the constantly changing economies, lack of

coherence among the levels of government, etc. Consequently, the effects of the ongoing crisis on sustainability issues are difficult to be minimized unless Greek spatial planning solves all the above long prevailing problems and transforms into a flexible process adapted to each region's needs, requirements and characteristics.

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