
4 and 5. Definition and enumeration of principles, criteria and indicators of the sustainability of current urban growth. Design and development of a geo-indicators system of sustainability, and their cartography

The concept of sustainability allows us to articulate an alternative vision of how to manage our environment. The evaluation of the sustainability of the model of urban development and its effect on the natural medium is more complex than merely listing indicators. Sustainability must be taken to mean the maintenance of a series of principles or criteria over time.

If we apply the concept of sustainability to urban development and to current models of urban expansion and metropolitan organisation, our research must concentrate on how it affects change in land use and the functions of cities' surroundings as sources of resources and dumps for contamination and waste. The principles must be associated to each of the criteria, the latter being evaluated by means of the indicators developed.

In order to determine territorial sustainability, it will be enough to corroborate the degree of compliance with the principles and criteria of sustainability set out above. The most efficient way to evaluate them is with the aid of Sustainability Geo-indicator System. This method will permit the monitoring of changes in resource quality and the efficient use of materials or resources, as well as the analysis of each sustainability indicator in relation to a broader matrix which includes them so that they can be analysed.

We have defined the principles and criteria shown in the following table. We have also started to give cartographic form to the system of geo-indicators emerging from those principles with a view to proceeding further with the calculation and cartography of Total Territorial Value (task 11). At the moment an important cartographic and alphabetical-numerical data base is available for devising the geo-indicators (information from the urban property register, topographical information, satellite images, etc.).

Principles	Criteria	
ECOLOGICAL DIMENSION. Living within environmental limits. Ensure environmental protection and that human activities do not exceed the carrying capacity.	E. 1	Preserve, protect and enhance the territorial elements without compromising its quality or restore the quality in those places as may be required. The elements considered are landscape, biodiversity and ecosystem functioning.
	E. 2	Ensure productive use of renewable natural resources efficiently and at a rate not exceeding the rate of renewal. Natural resources are considered: water resources quality, ensuring the supply to the population, agricultural resources, forestry resources, renewable energy resources (wind, solar, biomass, etc.) ensuring the supply to the population.
	E. 3	Ensure the consumption of nonrenewable resources (fossil fuels, minerals, etc..) so as to allow its gradual replacement by other renewable resources.
	E. 4	Reduce, reuse and recycle waste, and pollution reduction to an amount that ecosystems are able to assimilate.
ECONOMIC, SOCIAL, CULTURAL DIMENSION. Moving towards a prosperous, healthy and fair.	SE. 1	Ensure well-being, personal fulfillment, social cohesion and equal opportunities (Individual and Collective).
	SE. 2	For adequate network (quantity, quality and distribution) of public facilities and services. The services and facilities considered are: Health, Education, Culture and Leisure, Justice and Security.
	SE. 3	Preserve, protect and social resources (cultural heritage, historical and recreational).
	SE. 4	Promote and provide a adequate distribution (quantity, quality and distribution) of economic activity (production and consumption).
	SE. 5	For adequate network (quantity, quality and distribution) infrastructure. These are: road infrastructure (roads and railways), public transport and airports, hydraulic infrastructures (water supply and sanitation), energy infrastructure.

Table 4. Sustainability principles and criteria