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ScienceDirect

Energy Procedia 122 (2017) 44–49

Energy Procedia

www.elsevier.com/locate/procedia

CISBAT 2017 International Conference – Future Buildings & Districts – Energy Efficiency from Nano to Urban Scale, CISBAT 2017 6-8 September 2017, Lausanne, Switzerland

Urban sustainability assessment of neighborhoods in Lombardy

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Abstract

The paper presents a contextualized system useful in the decision-making of Public Administrators for analysis and actions concerning urban sustainability and for monitoring neighborhood transformation processes. The system is developed with an approach made up by Inputs (available data from standards and laws and state-of-the-art), Controls (i.e. technical skills of Public Administrators) and Mechanisms (know-how and software used) which implement Outputs, the main elements of the system: Sustainability indicators, Benchmarks and Scores. The set of indicators chosen allows to consider many aspects of environmental sustainability as Resource Consumption (Energy, Materials, Water, Soil) and Environmental Impacts (Pollutant Emissions, Wastes and Vulnerability). The objective parameters of the indicators are based on a benchmarking activity in relation to the Lombardy context and in order to provide reachable target performance. Finally, a baseline of weighted scores of indicators is proposed to allow to reach a final overall score of sustainability of the neighborhood.

Peer-review under responsibility of the scientific committee of the CISBAT 2017 International Conference – Future Buildings & Districts – Energy Efficiency from Nano to Urban Scale

Keywords: urban sustainability assessment; indicators; sustainable neighborhoods; urban governance.

1. Introduction

Public Administrations and urban designers were compelled to modify the territory following industrial and technological development in order both to meet the inhabitants needs and to preserve the peculiar features of the territory itself. In Italy, starting from the second part of XX century, the fast technological development and the

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1876-6102
Peer-review under responsibility of the scientific committee of the CISBAT 2017 International Conference – Future Buildings & Districts – Energy Efficiency from Nano to Urban Scale
10.1016/j.egypro.2017.07.310

ongoing population growth and migration from the countryside to the cities [1] has led to significant urban transformation processes; many laws concerning city planning were passed in order to control this phenomenon. Despite the laws, in some cases, urban development remained unchecked causing a progressive loss of urban sustainability and resilience. To face this problem a very broad know-how is required and Public Administrations often do not have it.

Urban sustainability can be achieved when a city has an homogenous development concerning environmental, economic and social issues; in this way the city can recover from significant multi-hazard threats with minimum damage to public safety and health, economy and security. Nowadays, thanks to the broad possibility to collect data concerning many specific issues over the time, a wide range of databases, indexes and documents are available for achieving a better knowledge of the cities [2]: this is crucial to guarantee urban sustainability and resilience.

This paper proposes a new system of indicators for assessing sustainability of urban areas that could support Public Administrations in the development of strategies, policies and regulations concerning urban sustainability. The framework can be applied at two levels (i) a full version that includes environmental, social and economic profiles of sustainability; (ii) a small version, based on indicators related to the environmental and urban structure issues only, which can be applied to an urban sub-area (i.e. neighbourhood or district). This paper describes the second version, the Urban Decision Support System for Neighbourhood (UDSSN).

The development of the tool is based on a multidisciplinary approach to implement outputs represented by the set of sustainability indicators, benchmarks and the score system.

2. Methodology

The logical approach used to develop the system tries to address all the critical points according to the following IDEF0 diagram [3] (Fig.1).

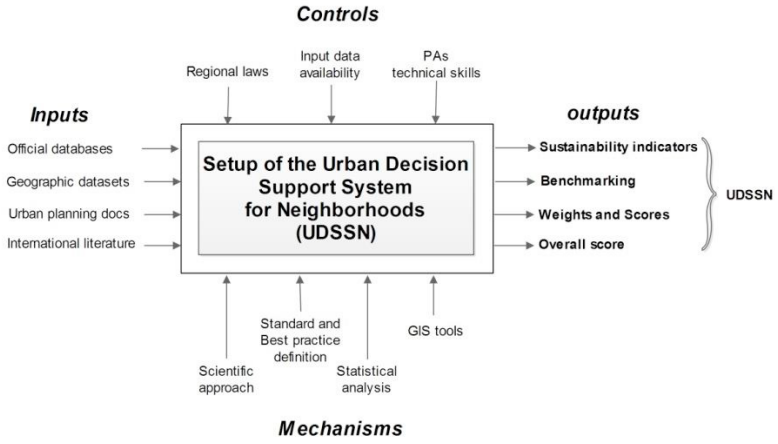

Fig. 1: Methodological approach scheme

The process is divided into four parts: (i) Inputs, which represent all data included in the process; (ii) Controls, which coincide with all factors that place constraints on the process development orienting it towards a specific direction, (iii) Mechanisms, that consider all of the tools (also human resources) used to produce outputs, (iv) Outputs, that represent the final expected results of the process.

In this system, Inputs are represented by data sources (stats, maps and other kinds of documents used to develop indicators and benchmark scales), Controls are the boundaries considered due both to the needs of Public Administrations and to the regional context in which the system is applied (Lombardy Region), Mechanisms are provided both by algorithms and scientific know-how and, finally, Outputs which refer to the elements of the overall