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*ENVIRONMENTAL INDICATORS AS CONTEXTUAL INFORMATION FOR
TERRITORIAL ACTORS*

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Summary: In the last few decades, a great variety of indicators of sustainable development have been elaborated to feed models or assess strategies in form of macro-indexes or systems of indicators. But, Are the measures found in literature good references to be applied to lower territorial levels? This paper presents the results of CAENTI work in terms of the environmental dimension of sustainable development, since there are many other teams working in the social, institutional and economic dimensions. Therefore, it is just one of the pieces of the puzzle, which needs to be connected to other pieces.

Keywords: Sustainable Development, Environmental Indicators, Territory, Policy.



ENVIRONMENTAL INDICATORS AS CONTEXTUAL INFORMATION FOR TERRITORIAL ACTORS

1. SUSTAINABLE DEVELOPMENT AND RELATED CONCEPTS

Important progresses have been accomplished regarding to Sustainable Development (SD) in both, theory and praxis, but there is still a gap between theoretical modelling of SD and measurement initiatives implemented at the territorial level, that is, sustainable development indicators. Despite the fact that different perspectives of SD lead to different models, there are some agreements in its key factors: natural capital maintenance and equity with future and present generations. Both aim at ensuring human welfare through time. Economic literature has generally focused on how to include natural capital preservation within economic models to be passed on to future generations rather than studying intragenerational equity. In this sense, weak and strong sustainability models have been developed and they have been accompanied by measurements of sustainable development.

Thus, depending on the chosen model, sustainable development measures may vary. Measurements from the weak sustainability perspective are generally based on income models resulting in concepts as sustainable income, Green Net National Product (GNNP) or wealth-equivalent income (Pezzey y Toman, 2002). Measures developed from the strong sustainability position take into account tighter constraints, rules and principles to guarantee species preservation, minimum standards for impacts on environmental quality and sustainable use of renewable resources, including in their analysis physical measures. None of these measures consider intergenerational equity, which has a spatial dimension. It could be due to the fact that preservation of natural capital is easier to be accepted, modelled and measured than aspects related to equity, particularly intragenerational solidarity. Theoretical foundations have been based at this respect from the development process perspective.

Therefore, conceptualisation of sustainable development results on a specific model and moving to action means materialising it into a particular territory through sustainable policy. At this respect, it is very important to delimit a sustainability policy (as a unique policy or as the coordination of every policy implemented in a territory) rather than an environmental policy, establishing the requirements to fulfil not only environmental sustainability but also social sustainability and to be able to detect global constraints to be implemented at local levels. Good governance, both at the international and the territorial levels, could contribute to raise solutions in order to respect those global restrictions and develop actions to be implemented at local levels since institutional framework, principles and rules regulating relationship among territorial actors and their organisation play a critical role in implementing sustainability values within the territorial development path. In this context, we conceive “territory” as a complex, socially build and evolving concept (Leloup, Moyart y Pecqueur, 2004).

Besides the complexity of variables comprising the concept of sustainable development and its manifold interpretations, theoretical foundations have not always been accompanied by applied developments. Measurement not only entails to determine implications of the concept, but also establishes boundaries related to how it is going to be addressed in praxis. Evaluation has traditionally been the framework for measurements produced at territorial levels. Policies, plans, programs and projects —among others— are constantly assessed including sectoral, thematic, partnership or even global analysis. Those initiatives implemented at different territorial levels involving different actors are not always based on a common understanding of sustainable development and may not even seek common objectives. The field to which sustainable evaluations are performed is quite broad and experiences are not usually exchanged from different fields. In addition to this, interdisciplinarity is faced as a competition of approaches and methods rather than add value to the process (Martinuzzi, 2006).

2. MEASURES OF SUSTAINABLE DEVELOPMENT

In the last few decades, a great variety of indicators of sustainable development have been elaborated to feed models or assess strategies. They could be classified as macro-indexes and indicator systems. Complex or aggregated indicators are usually elaborated to give information about variables of a model or feed decision making in terms of policies or strategies while indicator systems also respond to a model of sustainability, but are usually designed to monitor the performance of territorial policies at different scales (Mínguez Moreno, 2007).



On the one hand, Green GDP, Genuine Savings or ISEW (Index of Sustainable Economic Welfare or GPI, Genuine Progress Indicator as an updated version) are examples of macroeconomic measures adjusted by environmental and social information. Based on National Accounting, there are also some attempts to measure wellbeing. The most well-known composite quality of life indicator is the Human Development Index and its associated ones, the Human Poverty Index and the Gender Related Development Index. There are also attempts of sustainable indicators more focused on the environmental sphere than the economic or the social ones, for instance, Ecological Footprint; Environmental Sustainability Index (or its two associates: Environmental Performance Index and Environmental Vulnerability Index); or energy indicators such as National Energy Surplus; Available Energy Surplus; Total Exosomatic Production, Endosomatic Energy Consumption; or dematerialisation indicators such as Factor X.

On the other hand, systems of sustainable development indicators have also been generated and greatly improved since the Río Conference. Instead of aggregating separate components into a single index, one way of addressing the multiplicity of factors and dimensions of sustainable development is to generate a system. At an international level, United Nations has made an outstanding effort to reach consensus on the implementation of an indicator system to measure national progress towards sustainable development. World Bank and OECD have also developed systems and gather data related to indicators of sustainable development. The European Union, apart from its Structural Indicators, has accomplished a system of sustainable development indicators to measure progress in terms of political priorities. The work of the European Environmental Agency regarding to environmental indicators systems based on DPSIR Framework is a very rigorous reference.

3. THE CONTRIBUTION OF CAENTI TO THE ENVIRONMENTAL DIMENSION OF SUSTAINABLE DEVELOPMENT.

But, Are these examples good references to be applied to lower territorial levels? How are the processes of modelling and measuring SD at the local level? What elements need to be considered to guarantee sustainability in a territory? What kind of information do different territorial actors need? Where could they find it?

These questions should be answered from different viewpoints: theory and praxis.

From a theoretical perspective and focusing on a specific territory, we should study ecosystems, not only those located in the municipal territory, but also the ones located in surrounding areas in order to find out what is the natural capital to be preserved at the local level. Besides this, policies with impact on territory should be studied and the model guiding local development determined. Reality becomes complex when numerous administrations have different competences managing sustainability principles. Moreover, actors (enterprises, associations, scientific community, etc.) not always operating in the same territory are also involved in their implementation. Institutional dimension plays a key role in territorial management. Equity application as second sustainability key factor is a twofold dimension. Intergenerational equity is raised by preserving natural capital, among others, as a bequest to future generations. Intragenerational equity is suggested from universalism, focusing on people's ability to generate opportunities to "live worthy lives". At a global scale, consumption decisions and development aid influence global consequences of local decisions, from the social sustainability point of view. At a local scale, attention must be put on satisfactors. Culture by values, environmental and sustainability education and transparency in information; induce responsibility in consumption and production patterns; which could be fostered by administration.

In summary and based on a theoretical perspective, policy coordination and introducing sustainability as a transversal factor in every policy implemented in the territory are the key elements to connect natural capital and equity in the local area. At this respect, a territorial information system should be the common framework to include information regarding to the progress made by a territory in terms of sustainability (for more information, please see the contribution of WP3 and WP6 of CAENTI).

But, what about applications of all that? What has been the contribution of CAENTI to praxis? The questions related to processes of modelling and measuring SD at the local level or the elements to assure sustainability in a territory could be answered better from a theoretical perspective. But questions related to the information needed by territorial actors or where could they find it should be faced from praxis. In order to answer these questions according to the work done by other teams and workpackages inside CAENTI, we have centred on European territories where CAENTI partners operate.



This paper presents the results of CAENTI work in terms of the environmental dimension of sustainable development, since there are many other teams working in the social, institutional and economic dimensions. Therefore, it is just one of the pieces of the puzzle, which needs to be connected to other pieces.

First of all, we have focused on finding out what should be studied or measured according to the theory of sustainable development. At this respect, theory focuses on natural capital and equity; that is, one of the basic things to do is to study ecosystems sustaining those particular human settlements or communities to focus on. But unfortunately, CAENTI's objective is not to study ecosystems of the territories where its partners are located, for the time being. As one of CAENTI products has been to define territory, one of the future steps will be to include the natural delimitation of the territories in which CAENTI partners are operating in order to see the natural boundaries that should be respected in each particular territory.

The next step theory has shown as important is to consider policies implemented in each territory and analyze their connections. As sustainable development embraces a great variety of aspects and links, which usually differ in each territory; and this is a first attempt to include the environmental dimension into CAENTI work; we have decided to focus on the policy boosted at an European level: the European Strategy of Sustainable Development (ESSD).

The ESSD has focused on ten main themes to measure its progress to sustainability. Those are: i) socio-economic development, ii) climate change and energy; iii) sustainable transport; iv) sustainable consumption and production; v) natural resources; vi) public health; vii) social inclusion; viii) demographic changes; ix) global partnership; and x) good governance.

The next step has a twofold dimension. On the one hand it is necessary to detect the information needs of territorial actors in environmental aspects and to what extent are they fulfilled by the work of other teams of CAENTI. On the other hand, it is essential to examine the availability of the information gathered for measuring the progresses of the European Strategy of Sustainable Development; the methodology, protocols, and levels to which information is computed.

As a result of this, and as themes related to socio-economic development, social inclusion, demographic changes and public health, are widely covered by the socioeconomic indicators developed by WP4 and WP6, we have decided to focus on sustainable consumption and production, climate change and energy and natural resources; choosing five indicators from the wide battery provided by the European Union (EUROSTAT). Those are:

- ✓ Municipal waste generated.
- ✓ Electricity consumption by households.
- ✓ Greenhouse gas emissions.
- ✓ Modal split of passenger transport.
- ✓ Built up areas.

Those indicators are calculated for the member states of the European Union, at a NUTS 1 level and are made comparable from one to other territories. But, what happens if we try to deep on lower levels to the national one? We usually find out that the information behind the equally called indicator in one or other territory is not gathered in the same way. For instance, the indicator “municipal waste generated” is computed by EUROSTAT through the EUROSTAT-OECD Joint Questionnaire for the NUTS 1 level, while the Spanish Statistics Institute applies a survey on collected and treated urban waste for the NUTS 1 and NUTS 2 levels; or the Statistical Office of the Republic of Slovenia, using a different methodology, gathers information related to urban waste for the NUTS 3 level.

But it still becomes more difficult if one goes deep into the local level. In one country —let's choose Spain as an example— although every municipality should have information related to waste generated within the territory, this information is not gathered the same way and by the same institutions or organisms. For instance, in Huelva province (NUTS 3), there are two different administrations dealing with waste, both using different methodologies. For this specific case, the Local Employment Observatory has gathered all the information and it is available at <http://www.ole.uhu.es/> for LAU 2 level. It is likely that those municipalities with Local Agenda 21 may have collected some information related to waste.

For the other four indicators chosen, the situation is very similar.

4. CONCLUSIONS



We have started from analyzing the several theories elaborated for the concept of sustainable development. After that we have deepened on the various measurements of sustainable development built on and calculated through specific literature. Having realized this wide scanning, some questions arise: Are the measures found in literature good references to be applied to lower territorial levels? How are the processes of modelling and measuring SD at the local level? What elements need to be considered to guarantee sustainability in a territory? What kind of information do different territorial actors need? Where could they find it?

Some restrictions arose in our way of answering these questions. For instance, theory recommends focusing on natural capital; therefore ecosystems sustaining those particular human settlements in which CAENTI partner operates should be delimited and investigated in order to see the natural boundaries that should be respected in each particular territory to assure physical limits of sustainable development. Unfortunately, this is still not an objective for CAENTI's work.

After considering the European Strategy of Sustainable Development and the main themes in which it is focused, we approach to the environmental dimension of sustainable development from a twofold dimension: needs of territorial actors regarding to environmental aspects and the availability of environmental information from the European to the local level. At this respect, restrictions related to information availability are still really hard.

Finally, as a first step in CAENTI's work related to the environmental dimension, five indicators are chosen for the national level: municipal waste generated, electricity consumption by households, greenhouse gas emissions, modal split of passenger transport, built up areas.



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