

SUSTAINABILITY INDICATORS AS DISCURSIVE ELEMENTS

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0. Abstract

The objective of this paper is to analyse the role of sustainability indicators when considered as discursive elements of the sustainability discourse. Sustainability indicators have the particularity of having a scientific-objective appearance, and we argue that this allows their users to link sustainability utterances with the scientific discourse, which is one today's main sources of legitimacy. Thanks to this legitimisation capacity, sustainability indicators play a major role in sustainability discourse. In order to explain their role in our society we explore how they are related to political action, power and the sustainability discourse.

Keywords: sustainability, sustainability indicators, discourse, discourse analysis, Michel Foucault

1. Introduction

An increasing interest in using indicators to help in all kinds of political process has been observed around the world over the last few decades (Dhakal and Imura 2003). Usually their function is considered to be the incorporation of objective knowledge into the decision-making process. In relation to sustainability the Brundtland Report (WCED 1987) called for the development of new ways to measure and assess progress toward sustainable development and this call was echoed in point 4 of chapter 40 of Agenda 21 of the 1992 Earth Summit (United Nations 1992), where it was established:

Indicators of sustainable development need to be developed to provide solid bases for decision-making at all levels and to contribute to a self-regulating sustainability of integrated environment and development systems.

Since this formal recognition, academics, nations, cities, corporations, non-governmental organizations and international organizations, have developed their own local, national and global-level sustainability indicators (OECD 2002, Neumayer in press, Hardi et al. 1997, Gallopin 1997). Many human and capital resources have been used to define sustainability indicators' desirable characteristics (Hardi and Zdan 1997b), to develop new methods of selection and aggregation, to design new methods of presentation, etc. (United Nations 2001, Segnestam 2002, Bell and Morse 2001, Ekins 2003, Bossel 1999).

In parallel with this increasing popularity of sustainability indicators, some authors have cast doubt on their relevance and success in affecting decision-making (Briassoulis 2001, Bell and Morse 2001b, 2003, IISD 1999), and on the assumption that by using of such indicators we can obtain objective knowledge of the concept of sustainability. Should we continue developing sustainability indicators if their application is uncertain? Why are sustainability indicators increasingly popular, even if there is a reasonable doubt about their real capacity to fulfil their supposed functions?

In this paper I shall try to explain how their increasing importance can be understood if we consider them as discursive elements in the sustainability discourse, that have

the particularity of resembling objective tools. Under this approach, we shall see that the uses that justify their increasing popularity are different from that usually considered when we conceptualise sustainability indicators as objective measurement tools, within the decision-making process.

The structure of the paper is as follows. Section 2 defines what an indicator is and explains some characteristics of sustainability indicators. Section 3 justifies our proposed discursive approach to sustainability indicators. Section 4 explains how politics leads to the appearance of sustainability indicators and how power relations can explain their failure or success, depending on whether or not they are useful. In Section 5 there is an exposition of some of the uses that justify the increasing number of sustainability indicators. Finally, Section 6 draws some conclusions and suggests some future lines of research.

2. What is an indicator?

Before beginning our discursive approach to sustainability indicators, in order to clarify the subsequent discussion we shall begin by defining what is an indicator, and pointing out some specific characteristics of sustainability indicators.

The most common definition of indicators is that they are variables, operational representations of an attribute (quality, characteristic, property) of a system. They are our image of an attribute defined in terms of a specific measurement or observation procedure (Gallopín 1997).

We can see that this is a very broad definition, under which many different types of indicators could be considered. These can range from quantitative indicators (e.g. GDP) to qualitative indicators (e.g. richness perception), based on explicit criteria (measuring the living accommodation in square meters for example), or based on more implicit criteria (e.g. if we use self-reporting about health as an indicator of welfare, probably the appraisal is based on many causes and nobody will be really able to say how we came to that appraisal). A discussion of the main classifications of social indicators can be found in (Veenhoven 2002).

In reviewing the literature on sustainability indicators we see that almost all of them are quantitative indicators (Bell and Morse 2003) and are claimed to be useful because they are *objective measurement tools* (Bosch 2002, Natural Resources Canada 2001, Adnan et al. 2001, Global Leaders of Tomorrow Environmental Force 2002). Sustainability indicators such as the Environmental Sustainability Index (Global Leaders of Tomorrow Environmental Force 2002), the Ecological Footprint (Wackernagel et al. 2002), the ISEW (Daly and Cobb 1990), the Genuine Progress Indicator (Lawn 2003), etc., are examples of this type of indicator. For a complete discussion of the main sustainability indicators and some of their particularities consult (Modlan and Billharz 1997, Neumayer in press, Ekins 2003).

Before beginning our discursive discussion of sustainability indicators, it is useful to note that the relation between sustainability indicators and their capacity to be used as objective measurement tools is theoretically disputable. In this paper we shall not enter into a theoretical discussion of this point, because the general perception of them as “objective” is enough to support our conclusions. However, in our analysis we shall note some incoherencies of this perception.

3. Discourses and sustainability indicators

The next step in this presentation is briefly to explain what are discourses and discursive analysis, and the main characteristics of our approach.

In our society many discourses are present simultaneously: security discourse, immigration discourse, sustainability discourse, risk discourse, development discourse, etc., are some examples. While it seems easy to recognize them at a first glance, what are we really talking about when we are considering, for example, the sustainability discourse? We all know that many different approaches and conceptualisations could be considered in a sustainability discourse (McManus 1996). From the perspective of the free market environmentalist, to the eco-feminism or eco-marxist, etc., all have their own opinion of what sustainability is and many times are almost in contradiction. In this paper, when we use the term “sustainability discourse”, we are not considering just one of the different options; rather, the sustainability discourse is precisely constituted by all of the different perspectives and theoretical frameworks on the sustainability concept. This perspective of the “discourse”, which allows one to introduce within the same discourse different frameworks, which may even be in contradiction, follows the approach of Michel Foucault, whose main technical characteristics will be explained in next section.

If many understandings of a discourse coexist, it is not strange also to find many different understandings of what is a discourse analysis. On the one hand, some authors consider discourse analysis as an analytical method based on the regularities and variations in what is being said or written, and this is used to understand the social backgrounds and the social effects of specific modes of talking. On the other hand, other approaches to discourse analysis aim primarily to understand why a particular understanding at some point gains dominance and is seen as authoritative, while other understandings are discredited (Hajer 1995). Both of these approaches have been used to understand the sustainability discourse (Dobson 1996, Jacobs 1999, McManus 1996, Lele 1991).

In our analysis we shall use a specific approach to discourses and discourse analysis, following the work of Michel Foucault (Foucault 1991:21-45). While originally the author developed his theory of discourses in relation to health, security and sexuality, recently it has been also used to study environmental discourses and different elements of ecological modernization (Hajer 1995, Forsyth 2003:77-102, Luke 1999).

3.1. Sustainability indicators in the sustainability discourse

Michel Foucault conceived of a discourse as “an identifiable collections of utterances governed by rules of construction and evaluation which determine within some thematic area what may be said, by whom, in what context, and with what effect” (Gordon 2000:i-xli). In this paper we shall assume that sustainability could be considered as a discourse in the above sense, and we shall focus our attention on the function of sustainability indicators in the sustainability discourse.

Why is it interesting to take Michel Foucault’s discursive approach to studying sustainability indicators? There are mainly two reasons.

The first reason is that one of the main characteristics of this discursive approach is that it considers that, at each period of time, many discourses (e.g. risk discourse, scientific discourse, security discourse, etc.) cohabit and interact. As we shall try to exemplify below, sustainability indicators play a key role in these interactions,

especially because they establish a link between sustainability discourse and today's probably main source of legitimacy in decision-making and knowledge-making, the scientific discourse

In our analysis we shall consider that each expression inside a sustainability discourse (e.g. "the United States is an unsustainable country ") may be considered important not only depending on its support for the other elements of the sustainability discourse, but also on the other discourses present in the society. As an example, we can see that changing slightly the previous sentence to "the United States is an unsustainable country because its ecological footprint per capita in 1999 was 5.27 while a sustainable footprint should have been lower than 1.9 ha per capita (data obtained from the Living Planet Report 2002, (WWF 2002))" increases the credibility of the utterance, by using the credibility of an indicator which is considered to be an objective measurement tool.

The second reason to study sustainability indicators under Foucault's discursive approach is because, in this view, discourses are in constant interaction with two other basic elements of the creation and use of knowledge: political action and power. In particular, this relation as we shall see, will help us to understand why sustainability indicators appear and why they are successful or fail.

We shall begin our discursive study by considering how political action and power relations with the sustainability discourse conditioned the appearance and success of sustainability indicators, and we shall continue by studying some of the uses of sustainability indicators.

4. Political practice, power and knowledge

Sustainability indicators are used by all kind of institutions and appear in many political statements and argumentations. They are not elements closed in the "ivory tower" of scientific community but they are affected by the general political practices that are taking place, and especially by the political practices in relation with sustainability discourse. At the same time they are also influenced by the establish power relations on the society, which limits or expand their success. The understanding of the relation between sustainability indicators and political practice and power is then a key element to understand today's sustainability indicators.

4.1. Political practice and sustainability indicators

In Foucault's approach, political practice does not transform the meaning or form of discourses, but the affects the conditions of its emergence, insertion and functioning (Foucault 1991:53-72). As a consequence of its interaction with the sustainability discourse, politics, without directly creating sustainability indicators, forces their appearance and development. While a complete study is still needed to understand all of the operations that link politics with the creation and evolution of sustainability indicators, we shall explore here only some of the main aspects.

The first mechanism used by political action that leads to an increased number of sustainability indicators is the ability to establish criteria to designate those who have, by law or other explicit administrative schemes, the right to hold a sustainable discourse. For example, in Europe no municipality could in practice claim to be applying a sustainability policy if its town is not involved in a Local Agenda 21 process, which is linked to the creation and development of sustainability indicators; the same applies to countries and their National Sustainability Strategies. In the main

economic sectors such as transport, tourism, energy, etc., specific sustainability labels and strategies have been created and they are linked to the use of sectoral sustainability indicators (Transport and Environment Reporting Mechanism for example (Gudmundsson, 2003)). Finally, in relation to business there is the impulse of EMAS or ISO 14000 schemes, both of them submitted to auditing processes based on the definition of sustainability indicators and the achievement of some sustainability goals.

A second mechanism by which political action forces the appearance of sustainability indicators is that under political action there is also a new delineation of the sustainability object, and this helps to create new sustainability indicators. While at the beginning the sustainability discourse was mainly related to global problems (United Nations 1972, Meadows et al. 1972), which match a well established ecosystem boundary, now many other scales are superimposed on the first without erasing it, so that now sustainability is applied also at the regional, national or local scales. This change of scale evolves from the different political schemes used in relation to sustainability (national sustainability strategy, regional sustainability strategy, local sustainability strategy) and is linked to the different administrative boundaries (state, region, city). A key element that allows sustainability planning in this holistic approach is the creation of sustainability indicators, since they are useful as connectors between the different scales on which the sustainability discourse acts (Brugmann 1997).

Finally, political action has led to a new mode of preserving, accumulating, diffusing and teaching sustainability principles, which is increasingly performed inside of sustainability research centres and in specific research fields and disciplines, such as ecological economics, environmental politics, etc. Concerning these educational establishments, and the creation of environmental departments in such organizations, one observes the introduction of eco-managerial practices (Luke 1999: 103-20) which, in line with other traditional managerial practices (Total Quality Management, Excellence practices, remuneration depending on objectives, etc.), which need indicators to be applied. In this case, this also leads to the creation of sustainability indicators.

4.2. Power, knowledge and sustainability indicators

Once we have seen that political action can lead to an increase in the number of sustainability indicators, in this next section we study how power and knowledge relations affect sustainability indicators.

As a starting point for the discussion on how power conditions sustainability indicators, we can consider Foucault's own words:

I have been trying to make visible the constant articulation I think there is of power on knowledge and of knowledge on power. We should not be content to say that power has a need for a certain discovery, a certain form of knowledge, but we should add that the exercise of power creates and causes to emerge new objects of knowledge and accumulates new bodies of information ... The exercise of power perpetually creates knowledge and, conversely, knowledge constantly induces effects of power (Gordon 2000: i-xli).

A clear interrelation between power and knowledge is then established. As sustainability indicators are part of the knowledge in relation to sustainability, a close linkage between sustainability indicators and power is forged in our approach. This linkage between power and sustainability indicators, which has been supported by

other studies of sustainability indicators, such as the PASTILLE project, is clearly in opposition to some views that defend sustainability indicators as exogenous factors, introduced into the policy process (Pastille 2002) with the capacity to incorporate “objective information by measurement” in the classical policy cycle (Colebatch 2000, Smith and May 1993:197-212). In our view, sustainability indicators, as part of sustainability ‘knowledge’, cannot be conceived of as exogenous elements, separate from the political process and other power relations.

But not only we can see that an exogenous view is open to criticism. As we shall see below, the relationship between power and knowledge gives us guidance to understanding the success or failure of sustainability indicators.

Foucault’s relation between knowledge and power suggests that knowledge should be considered under the perspective of being useful and necessary to the exercise of power, because it is of practical use, not because it is true or false (Gordon 2000: i-xli). Considering this notion in relation to sustainability indicators, objectivity and scientificity of sustainability indicators are no longer key elements to explain their success or failure; rather, but they are rhetorical items to be utilised if they are useful to the exercise of power¹. Under this approach, the emergence and success or failure of sustainability indicators, as tools linked to knowledge, is related to the exercise of power, very far from the “enlightenment view” of their being “objective indicators”.

Since the exercise of power could give us guidance to the understanding of the success or failure of sustainability indicators, we can say that sustainability indicators will be successful if they are practically useful to the exercise of power. The increasing popularity of sustainability indicators suggests that they are, indeed, useful. In the next section we shall explore some of their uses in our society that justify their increasing popularity.

5. Uses of sustainability indicators as discursive elements

Usually, when analysing sustainability indicators’ success, attention is paid mainly to their capacity to influence the decision making process relating to policies.

In our approach, sustainability indicators as discursive elements are used for many other purposes that are not usually considered. Their use in the creation and evolution of the sustainability discourse, in the connection between the sustainability discourse and political discourses, in the fight for political power between institutions, in the decision making process, and in the learning process of communities, are some examples of their possibilities as discursive elements, that we shall discuss in the next sections. The successful use of all these applications allows us to understand why they are more and more important in the sustainability discourse.

5.1. Sustainability indicators in the creation and evolution of the sustainability discourse

Sustainability indicators can be used as rhetorical elements, giving ammunition to the different approaches to sustainability that cohabit within the sustainability discourse.

Usually, the main approaches to sustainability considered are the so-called weak and strong sustainability approaches, sometimes called optimistic and pessimistic approaches (Jöst 1996) (for a complete discussion of both approaches, see Munda

(1997)). Both approaches need arguments and rhetorical elements to support their views (Lucks 1998) and sustainability indicators are one of the rhetorical elements used. Corrections of the GDP, such as the ISEW (Daly and Cobb 1990) and GPI (Lawn 2003) or the Genuine Saving (or Adjusted Saving) indicator (World Bank 2002) mainly proposed by the World Bank, are examples of indicators coherent with and supportive of the weak sustainability discourse. On the other hand, physical indicators, such as the Ecological footprint (Wackernagel et al. 2002), Material Flows (Hinterberger et al. 1997), Human Appropriation of Net Primary Productivity (HANPP) (Vitousek et al. 1986) or the Environmental Space (Spangenberg 2002), are usually considered to be in the spirit of the strong sustainability discourse.

These indicators usually reach vastly differing conclusions concerning the sustainability of the studied object; for example the “Genuine Saving Indicator” shows that the most developed countries (all of the OECD) have no problem with sustainability (World Bank 2002), while the Ecological Footprint shows exactly the opposite (WWF 2002). Following the example of Section 3.1, and considering a weak sustainability indicator (the Genuine Saving Indicator) instead of the ecological footprint previously used, we can say that the “United States is a sustainable country because in 1996 the Genuine Saving Rate was 8.6 % of the GDP (data obtained from Hamilton and Clemens (1998))” which is exactly the opposite of what we have concluded previously.

All sustainability indicators could easily be criticized by the researchers who work with an approach different from that for which they have been created (Neumayer in press). However, the all the researchers involved in their creation agree that sustainability is a contested concept (Kasemir et al. 1999). So why do these different researchers define their indicators so differently? Perhaps it is because the participants in the debate around sustainability use sustainability indicators to provide arguments to support their definition of the sustainability concept and their associated goals (Kasemir et al. 1999).

5.2. Sustainability indicators in the interaction between the sustainability discourse and political discourses

Sustainability indicators could be used as rhetorical elements giving ammunition to support a pre-determined political position; it is about *persuading* others to a particular view of the problem and of ways to solve it. Under this point of view we can study the creation and evolution of eco-efficiency indicators.

For example, the World Business Council for Sustainable Development (WBCSD, a coalition of 130 international companies that claims to be “*united by a shared commitment to sustainable development*”) introduced in 1992 the concept of ‘eco-efficiency’. The WBCSD’s fundamental principle is that *Zero Growth is not an option* and therefore they define Sustainable Development as *the way to balance further economic growth and social progress while protecting the environment from further damage by using the earth’s resources sensibly* (World Business Council for Sustainable Development 1996).

Once this position was established, the concept of eco-efficiency was launched and successfully introduced into society: “*Eco-efficiency is reached by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the earth’s estimated carrying capacity*”. Indicators of eco-efficiency were developed in parallel with this definition, and their general form is (Verfaille and Robin 2000):

Product or service value / Environmental influence

Some examples could be: Net Sales/Greenhouse Gas Emissions, Net sales/ energy consumption, etc.

Introducing these ratio indicators, the WBCSD seeks to shift attention away from the total amount of resources or energy used in the business production, or the total produced waste in their production and consumption (which was one of the main topics at the beginning of the 90s and has more to do with the ecological limits of the earth). Instead, the focus is moved to a mixed ecological-monetary approach to the problem, with no direct relation to the ecological effects of the production. Introducing a new rhetoric, supported by new indicators, the view of the problem changes.

5.3. Sustainability indicators in the interaction of institutions with discourses and power

Sustainability indicators can be used as rhetorical elements in the struggle between institutions for power and political influence. An example could be the definition and use of sustainability indicators by the World Economic Forum and by Redefining Progress.

The World Economic Forum is an independent organization funded by the 1000 foremost global companies. Its foundation documents state that it is committed to improving the state of the world. The aim to influence the political arena is explicitly stated in its strategic vision: *“be a leader in identifying strategic issues and to provide a platform for decision-makers to effect constructive change”*

Under this mandate, the *Global Leaders of Tomorrow Environment Task Force*, in the year 2001 developed the Environmental Sustainability Index (ESI), which is needed, in the words of their Project Director, Daniel Esty, because:

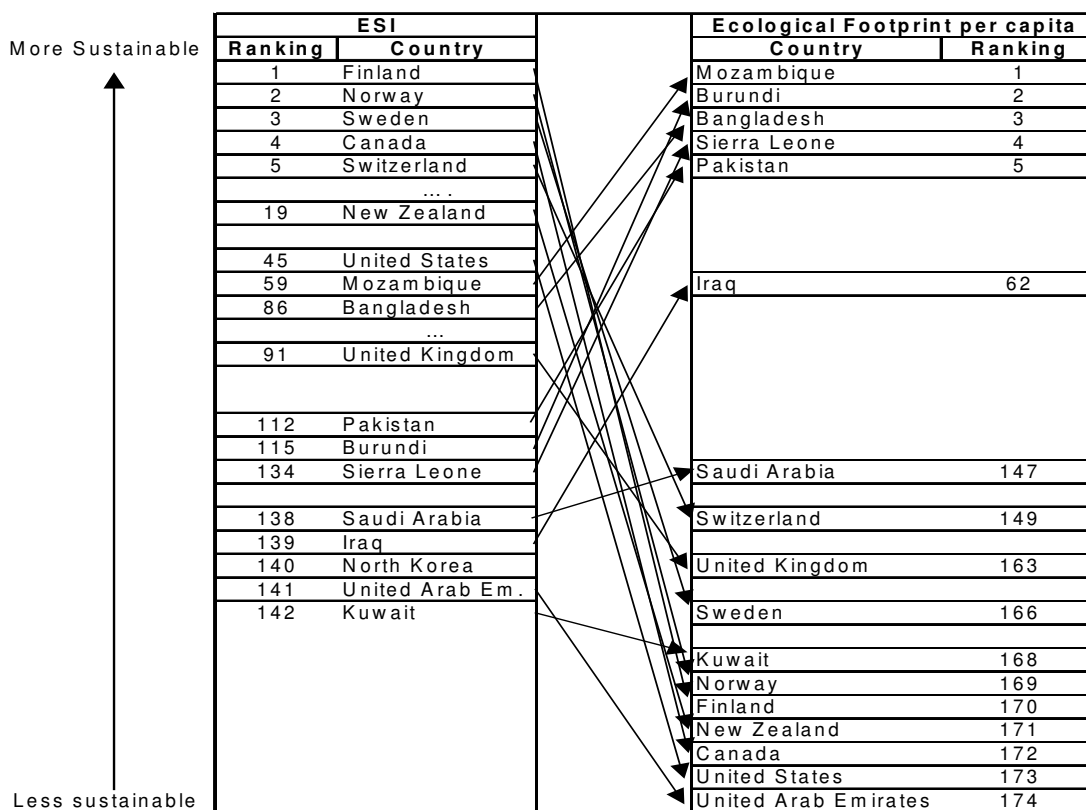
Environmental decision making has long been plagued by uncertainties and a lack of critical information. As a result, choices are made on the basis of generalized observations and best guesses, or worse yet, rhetoric or emotion. The ESI moves us toward a more analytically rigorous and data driven approach to environmental decision making (emphasis added) (Devitt and DeFusco 2002).

Thus the ESI permits a cross-national environmental comparison, establishing a ranking of countries by its Sustainable behaviour (Global Leaders of Tomorrow Environmental Force 2002).

On the other hand Redefining Progress is a non-profit organization that works to *“shift the economy and public policy towards sustainability”* (Redefining Progress 2003). In order to do this, one of its three lines of work is to *“measure the real state of our economy, our environment, and social justice with tools like the Genuine Progress Indicator and the Ecological Footprint”* (emphasis added). In the year 2002 they published, with the World Wide Fund for Nature and the UNEP World Conservation Monitoring Centre, the *“Living Planet Report”* where two main indicators are used: the *Living Planet Index* and the *Ecological Footprint* (WWF 2002). The use of these indicators is coherent with their definition of Sustainable Development as *“improving the quality of human life while living within the carrying capacity of supporting ecosystems”*, focusing more on the ecological limits more than does the Brundtland Report definition of sustainable development. Although in the report there is a recognition that these two indicators are not enough to achieve

sustainability, they are considered as a precondition. The *Ecological Footprint per person* was calculated by country, and a country ranking was then established. A country is more “sustainable” the smaller is the ecological footprint of its inhabitants.

We can see that both organizations share the aim of achieving political influence, and both claim to use “objective measures” to achieve sustainability. If we observe the obtained rankings (Table 1) we can see that these indicators are completely different, which one must assume would lead to different political reactions. The differences do not come from the “scientific quality of indicators” (both of them have been supported and criticised in the sustainability literature (Neumayer in press)), but from the different sustainability discourses that are being used to influence the decision-makers. The “objective measurement” comes already inserted into the institutional discourse and it is used as a rhetorical tool to increase the institution’s power and to achieve the organization’s political aims.



5.4. Sustainability indicators in the decision-making process

The usual justification of the creation of sustainability indicators is their use as tools to introduce objective information into the decision-making process, so decision-making can be improved. In spite of this aim, there is little empirical evidence of this use. As an example, in a New Environment Foundation survey (NEF) , which used information from more than 60 English Local Authorities (Higginson et al. 2003), only a little more than 10% of the local authorities said that indicators had been used in the decision-making process. Similarly, other studies of the use of sustainability indicators, such as the PASTILLE European project, stated that “*sustainability*

indicators do not currently have much impact on decision making at the municipal level” (PASTILLE 2002).

Another usual justification of the creation of sustainability indicators is their use as communicative elements for the decision-makers to the general public. They usually are considered as good tools to raise public awareness, helping to persuade the majority of the society that the problems identified by the decision-makers are real and important (Jesinghaus 1999, Dhakal and Imura 2003, German Government 2003) (sometimes this “enlightment capacity” is used by the political advisers towards the decision-makers, also). These communicative sustainability indicators are usually highly aggregated (e.g. GPI (Lawn 2003), ESI (Global Leaders of Tomorrow Environmental Force 2002) or Ecological Footprint (Wackernagel et al. 2002)). To date, their success has been very limited, as many subjective choices are made in the aggregation procedure needed for the creation of these aggregated indicators. As a consequence, they are not perceived as “objective” and their capacity to be a link between the scientific discourse and the sustainability discourse is lost. We can see, therefore, that the “perception of objectivity” is a key element in the use of sustainability indicators.

Another possible use of sustainability indicators, in relation to decision-making, is their so-called direct use. This direct use consists of linking the value of the indicator to a legislative action. This way of using indicators is quite popular for some particular topics usually related with sustainability. For example, is possible to find in much national or local legislation, laws allowing a certain degree of gas emissions or waste emissions, but punishing them or taking automatic decisions if they exceed a maximum level of the considered indicator. The author has not evidence of any Direct Use of a sustainability indicator, when the used sustainability indicator tries to consider more than one of the dimensions of this concept, some other authors have not found evidences too (see Gudmundsson 2003). This could be because of the contested response to sustainability indicators, or simply a consequence of the very recent implementation of these indicators. Some times more than a decade is needed between the creation of an indicator and its direct use (Innes 1998).

Sustainability indicators could also be conceived of as rhetorical elements in the decision-making process, used either as a delaying tactic or as a substitute for action, while still arguing to support the sustainability discourse. In other words, indicators are used as a sign or symbol of some other reality. The fact that, for example, more than 150 local authorities in England and Wales are currently developing sustainability indicators (Higginson et al. 2003) while, as we have seen above, there is little evidence of their use in real decision-making, seems to argue that they are really being used as symbolic elements. Probably, the process of gathering indicators gives a ritualistic assurance that those who make the decisions hold appropriate attitudes towards decision-making in relation to sustainability.

5.5. Sustainability indicators as discursive elements in the learning process of local communities

Indicators could also be used as part of the learning process of local communities (Bell and Morse 2003). Community sustainability indicators are mainly devices to help increase the understanding of the community and to raise questions such as: what is sustainability, what does the community want in relation with sustainability and what are their limits to action? In this sense, sustainability indicators are rhetorical tools, that are used to facilitate the elaboration of these questions (Higginson et al. 2003). In the NEF, survey 57 % of the participants said that indicators help them to raise awareness and understanding about sustainability. At

the same time, they consider that indicators help to encourage partnership working inside the different departments of the administration (52% support this aspect) and between the administration and other organisations from the voluntary sector, private sector, or other government agencies (49% support).

The use of local sustainability indicators as learning tool is quite popular in the United States (IISD 2003), where it was first developed as part of the famous Seattle experience (Sustainable Seattle 2003), and it is becoming more important in cities around Europe (MacGillivray et al. 1998, Bell and Morse 2003). But this increasing popularity has not avoided criticism on this approach, the main of which is that this learning process has not led to changes in the population's behaviour or to political action (Brugmann 1997); this can lead to the disillusionment of the participants involved in the creation and development of sustainability indicators (Bell and Morse 2003) and a lack of confidence in their value.

6. Conclusions

The point of departure of this paper was that sustainability indicators are becoming more and more important in the sustainability discourse, but there is a need to explain this success, especially as this increasing importance is accompanied by increasing doubts concerning their relevance, the assumption that by using such indicators we can obtain objective knowledge of the concept of sustainability, and their success in affecting decision-making.

Adopting a discursive approach, and considering as important only the common belief of sustainability indicators as "objective tools", we have seen that we can understand why sustainability indicators are becoming so popular, through their function in the sustainability discourse and their relationships to political action and power.

Political action has required the creation and dissemination of sustainability indicators through a variety of mechanisms:

- establishing new criteria to designate those who receive the right to hold a sustainable discourse;
- by introducing sustainability strategies into different administrative schemes;
- by establishing new modes of preserving, accumulating, diffusing and teaching sustainability;
- by introducing eco-managerial practices, etc.

But political action is not enough to explain the disappearance or survival of these newly created sustainability indicators. The existing power relations in society can explain the success or failure of some sustainability indicators, if we acknowledge that this is linked to their capacity to be useful for the wielding of power and not with their capacity to be "objective" or "true".

As a consequence of this approach, the increase in the number of indicators can be explained. They fulfil a number of uses:

- to support the different perspectives in the sustainability discourse;
- to increase the power of the organizations that creates them
- in many different ways in the decision-making process;
- and finally they play a role as discursive elements in the learning process of communities in relation with sustainability.

A complete study and understanding of the uses of sustainability indicators is a key element to understanding their function in the sustainability discourse.

The discursive approach to sustainability indicators is still in its early stages, but further studies in this direction could help to understand better the implementation of sustainability policies and the relations between power, politics and knowledge in the sustainability arena.

FOOTNOTES

¹ Sadly, we cannot know the direct opinions of Foucault in relation to sustainability, as he died in 1984, before the Brudtland Report was published and the sustainability concept became popular.

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REFERENCES

- Adnan, A.H. and Hasan, M.N. 2001, 'Sustainable Development Indicators (SDIs): linkage to policy processes and Effective use'. in: National Central University (ed.) *Workshop on Sustainable Development Indicators*. Chung-Li. Taiwan: National Central University.
- Bell, S. and Morse, S. 2001. *Sustainability Indicators. Measuring the immensurable*. London: Earthscan.
- Bell, S. and Morse, S. 2001b. 'Breaking through the Glass Ceiling: who really cares about sustainability indicators?', *Local Environment* **6**: 291-309.
- Bell, S. and Morse, S. 2003. *Measuring sustainability. Learning from doing*. London: Earthscan.
- Bosch, P. 2002. 'The European Environment Agency focuses on EU-policy in its approach to sustainable development indicators', *Statistical Journal of the United Nations*, **19**: 5-18.
- Bossel, H. 1999. *Indicators for sustainable development: theory, methods, applications. A Report to the Balaton Group*. Canada: IISD.
- Briassoulis, H. 2001. 'Sustainable Development and its Indicators: Through a (Planner's) Glass Darkly', *Journal of Environmental Planning and Management*, **44**: 409-27.
- Brugmann, J. 1997. 'Is there a method in our measurement? The use of indicators in local sustainable development planning', *Local Environment*, **2**: 59-72.
- Colebatch, H.K. 2000. *Policy*. Buckingham, U.K.: Open University Press.
- Daly, H. and Cobb, J. Jr. 1990. *For the Common Good. Redirecting the Economy toward Community, the Environment, and a Sustainable Future*. London: Green Print.
- Devitt, J. and DeFusco, D. 2002. 'Finlands Ranks Highest in Environmental Index; U.S. Lags', Press Release of the Environmental Sustainability Index project. Source ESI web page http://www.ciesin.columbia.edu/indicators/ESI/press_rel.html
- Dhakal, S. and Imura, H. 2003. 'Policy-based Indicator Systems: emerging debates and lessons', *Local Environment*, **8**: 113-9.
- Dobson, A. 1996. 'Environment Sustainabilities: An Analysis and a Typology', *Environmental Politics*, **5**: 401-28.
- Ekins, P. 2003. 'Sustainable Development' in Proops, J. and Page, A. (eds.), *Environmental Thought*. Cheltenham: Edward Elgar.
- Forsyth, T. 2003. 'Social framings of environmental science', in *Critical political ecology* (London, New York: Routledge), pp 77-102.

Foucault, M. 1991. 'Politics and the study of discourse', in Graham Burchell, Colin Gordon, Peter Miller (eds.), *The Foucault effect. Studies in governmentality*. (Harvester Wheatsheaf, The University of Chicago Press), pp 53-72.

Gallopín, G. C. 1997. 'Indicators and their use: Information for Decision-making', in Moldan, Beldrich and Billharz, Suzane (eds.), *Sustainability Indicators. Report of the project of indicators of Sustainable Development*, New York:Wiley.

German government. 2003. *Perspectives for Germany. Our Strategy for Sustainable Development*. In German Council for Sustainable Development web page http://www.nachhaltigkeitsrat.de/service/links_e/05.html

Global Leaders of Tomorrow Environmental Force. 2002. *Environmental Sustainability Index*. Dabos: World Economic Forum.

Gordon, C. 2000. 'Introduction', in: Paul Rabinow (ed.), *Michel Foucault Power. Essential Works of Foucault 1954-1984. volume 3*, (New York: The New Press). pp i-xli.

Gudmundsson, H. 2003. 'Indicator - Policy linkages in Environmental Integration – Exemplified by transport and environmental reporting'. In the *6th Nordic Conference on Environmental Social Sciences (NESS) proceedings*.

Hajer, M. A. 1995. *The politics of environmental discourse: ecological modernization and the policy process*. Oxford: Oxford Clarendon Press.

Hamilton, K. and Clemens, M. 1998. *Genuine Savings Rates in Developing Countries*. World Bank Publications. Available in web page <http://lnweb18.worldbank.org/ESSD/envext.nsf/44ByDocName/Publications>

Hardi, P. ; Barg, S. ; Hodge, T. and Pinter, L. 1997. *Measuring Sustainable Development: review of current practices*. Canada: Occasional Paper 17. Industry Canada.

Hardi, P. and Zdan, T. 1997b. *Assessing sustainable development. Principles in practice*. Canada:IISD.

Higginson, S. ; Sommer, F. and Terry, A. 2003. *Making indicators count. Using quality of life indicators in local governance. Identifying the Missing Link*. Report by the New Economics Foundation and University of West of England. London: New Economic Foundation.

Hinterberger, F. ; Lucks, F. and Schmidt-Bleek, F. 1997. 'Material Flows vs. Natural Capital - What Makes an Economy Sustainable?' *Ecological Economics*, **23**: 1-14.

IISD. 1999. *Beyond delusion: a science and policy dialogue on designing effective indicators for sustainable development*. Canada: IISD.

IISD. 2003. International Institute for sustainable development web page <http://www.iisd.org/measure/>

Innes, J. E. 1998. 'Information in Communicative Planning'. *Journal of the American Planning Association*, **64**: 52-63

Jacobs, M. 1999. 'Sustainable Development: A contested Concept', in Oxford University Press (ed.) *Fairness and Futurity. Essays on environmental sustainability and social justice*. Oxford: Oxford University Press.

Jesinghaus, J. *Indicators for Decision-Making*. 1999. European Commission. Brussels.

Jöst, F. 2002. 'Sustainable Development: The Roles of Science and Ethics' in Faber, Malte; Manstetten, Reiner and Proops, John *Ecological Economics. Concepts and methods*, (Cheltenham: Edward Elgar), pp 75-92.

Kasemir, B. ; B.A.van Asselt, M. ; Durrenberger, G. and Jaeger, C. C. 1999. 'Integrated assessment of sustainable development: multiple perspectives in interaction', *International Journal of Environment and Pollution*, **11**: 407-425.

Lawn, P. 2003. 'A theoretical foundation to support the Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), and other related indexes', *Ecological Economics*, **44**: 105-118.

Lele, S. 1991. 'Sustainable Development: A critical review', *World Development*, **19**: 607-621.

Lucks, F. 1998. 'The rhetorics of ecological economics', *Ecological Economics*, **26**: 139-149.

Luke, T. 1999. 'Eco-Managerialism: Environmental Studies as a Power/Knowledge Formation', in *Living with nature. Environmental politics as cultural discourse*, (Oxford: Oxford University Press), pp 103-120.

MacGillivray, A. ; Weston, C. ; Unsworth, C. 1998. *Communities Count!: a step-by-step guide to community sustainability indicators*. London: New Economics Foundation.

McManus, P. 1996. 'Contested terrains: Politics, Stories and Discourses of Sustainability', *Environmental Politics*, **5**: 48-73.

Meadows, D. ; Meadows, D. ; Randers, J. and W. Behrens III, W. 1972. *The limits of growth. Club of Rome*. New York, Universe of Books.

Moldan, B. and Billharz, S. (eds.).1997. *Sustainability Indicators. Report of the project of indicators of Sustainable Development*. New York:Wiley.

Munda, G. 1997. 'Environmental Economics, Ecological Economics, and the concept of Sustainable Development', *Environmental Values*, **6**: 213-233.

Natural Resources Canada (NRC). 2001. *Information for Decision Making in Sustainable Development*. Monograph 16. Ottawa, Canada.

Neumayer, E. (in press 2004). 'Indicators of Sustainability', in Tom Tietenberg and Henk Folmer (eds.), *International Yearbook of Environmental and Resource Economics*. Cheltenham: Edward Elgar.

OECD. 2002. *Working Together Towards Sustainable Development. The OECD experience*. OECD publishers.

PASTILLE. 2002. *Indicators into action. Local Sustainability Indicators sets in their context.* Deliverable 19. Available in web page <http://www.lse.ac.uk/Depts/geography/Pastille/research.htm>

Redefining Progress 2003. Presentation. Redefining progress web page <http://www.rprogress.org/>

Segnestam, L. 2002. *Indicators of Environment and Sustainable Development. Theories and practical experience.* World Bank report num 89.

Smith, G. and May, D. 1993. 'The artificial debate between rationalist and incrementalist models of decision making', in Michael Hill (ed), *The policy process: a reader* (Hertfordshire: Harvester-Wheatsheaf), pp 197-212.

Spangenberg, J. 2002. 'Environmental space and the prism of sustainability: frameworks for indicators measuring sustainable development', *Ecological Indicators* 2: 295-309.

Sustainable Seattle. 2003. Sustainable Seattle web page <http://www.sustainableseattle.org/>

United Nations. 1972. *United Nations conference on the human environment. Action Plan for the Human Environment.* Available in United Nations web page <http://www.unep.org/Documents/Default.asp?DocumentID=97>

United Nations. 1992. *Local Agenda 21.* <http://www.un.org/esa/sustdev/documents/agenda21/> . Web page visited in 2003.

United Nations. 2001. *Indicators of Sustainable Development: Guidelines and methodologies.* New York: United Nations.

Veenhoven, R. 2002. 'Why social policy needs subjective indicators', *Social Indicator Research*, **58**: 33-45.

Verfaillie, H. A. and Bidwell, R. 2000. *Measuring eco-efficiency. A guide to reporting company performance.* World Business Council for Sustainable Development Publications. ISBN:2940240140

Vitousek, P.M.; Ehrlich, P.R., Ehrlich, A.H. and Mason, P.A. 1986 'Human Appropriation of the Products of Photosynthesis', *BioScience*, **36**: 368-373.

Wackernagel, M.; Schulz, N.B.; Deumling, D.; Callejas Linares, A.; Jenkins, M.; Kapos, V.; Monfreda, Ch.; Loh, J.; Myers, N.; Norgaard, R. and Randers, J. 2002. 'Tracking the ecological overshoot of the human economy', *Proceedings of the National Academy of Sciences*, **99**: 9266-71.

WCED. 1987. *Our Common Future (The Brundtland Report).* Oxford/New York: Oxford University Press.

World Bank 2002. *Manual for Calculating Adjusted Net Savings.* World Bank report.

World Business Council for Sustainable Development 1996. *Eco-efficient leadership for improved economic and environmental performance.* World Business Council for Sustainable Development Publications.

WWF (World Wide Fund for Nature) 2002. *Living planet report 2002*. Jonathan Loh (ed.), Gland, Switzerland: World Wide Fund for Nature.