Measuring Sustainability in Tourism in the Balearic Islands

Measuring Sustainability in Tourism in the Balearic Islands

The CITTIB (Centre for Tourism Research and Technologies of the Balearic Islands) sponsors the Tourism Sustainability Watch (TSW)[1] , which conducts the task of scientifically defining the parameters of environmental diagnosis and the dissemination of results. This document is the summary of its main results, with a prior explanation of its technical framework that includes the concept of 'sustainability' and its precedents, the criteria for selecting and developing indicators and their link to the model of the geographic study of tourism booms established by Onofre Rullan (1998). The diagnosis of 12 of the 52 indicators that have been developed[2] are offered in the presentation of results. The 12 files presented constitute the Key Indicators of Sustainability (KIS) which in principle are considered of greater importance and significance.

1. The Concept of Sustainability

1.1. The Origins of the Concept

Since the classic definition of the term 'sustainable development' was established in events such as the Stockholm Conference (1972) and the report commonly known as the Brundtland Report, events have taken place which permit the concept of sustainability to be broadened and modified, in many cases.

Various agreements were approved in the **Rio Declaration (1992)**: the Convention on Climate Change (which the United States, responsible for most of the planet's CO_2, emissions, did not sign), the Biodiversity Convention and Programme 21. This last established the basis on which the principles of sustainability would be operative at the local level and thus achieve sustainability on a global scale, through Agendas 21.

After the Rio Summit, the concept of **sustainability** was included in many organisational and political programmes, although many very different definitions of the term are used (in fact, the misrepresentation and contradictory use of the concept is one of the most important issues presently under debate[3]). Nevertheless, the Rio Summit was a key milestone for adopting measures to face the ecological crisis that has been detected.

1.2. After the Rio Earth Summit (1992)

The application of the agreements endorsed at the Rio Summit in 1992 has been developed at the international level. Specifically, the most significant work carried out in the EU are:

- **"V Environmental Action Programme (EAP) 1993-2000"**: This programme was instituted as a response action to Agenda 21 and established the political framework to be transformed into legislation.
- **"VI Environmental Action Programme. Environment 2010**: The Future in our Hands", the objective of which is to define priorities in EU environmental policy until 2010,as well as outline in detail the measures to be taken to contribute to the application of EU strategy on sustainable development issues.
- **The Charter of European Cities and Towns towards Sustainability**, commonly known as the Aalborg Charter (1994).
- **The Hannover Declaration** of municipal leadership on the threshold of the 21st century (1996)[4].
- **The Johannesburg Summit (Rio + 10)**, held in summer 2002, which was a key event for attempting to revise the agreements endorsed in the Rio Earth Summit of 1992. The work carried

1 *The TSW team is made up of Macià Blázquez and Ivan Murray –Directors-, Jaume Mateu –Area Director- and Neus Andreu, Llorenç Mas, Felip Morell and Gloria Truyols –research grant interns.*

2 *The results of all the indicators are available in digital format and may be requested at jmateu@cittib.caib.es; or together with other partial files at http://www.finestraturistica.org.*

3 *NAREDO, JM & VALERO, A. (1999): "Desarrollo económico y deterioro ecológico." Argentaria Foundation, Madrid.*

4 *A large part of this information can be found in the CITIES FOR A MORE SUSTAINABLE FUTURE library of the Politechnic University of Madrid (http://habitat.aq.upm.es, consulted in January 2003).*

out by countries on sustainability issues was evaluated ten years afterwards. The focus of the Johannesburg Summit was different, more closely related to developing a new action agenda than to signing concrete agreements.

- **The Gauteng Declaration of 2002**, endorsed by representatives of 23 regional governments, describes the levels of government responsible for many of the policies, programmes and services that contribute to a more sustainable future for citizens from the territorial area, proximity and efficiency perspectives.

1.3. Beyond Sustainable Development: Sustainability

The concept of 'sustainable development' was almost exclusively limited to the academic world until the publication of the Brundtland Report, drafted in 1987 by Harlem Brundtland, Norway's Prime Minister at the time, upon the request of the United Nations, which provided a definition of sustainability development:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCDE, 1987).

This **concept**, according to Ekins and Max-Neef, refers to four structures: ecology, society, ethics and the economy, which are known as the tetrahedron of sustainability.

Figure 1. The Tetrahedron of Sustainability

The word 'sustainability' is derived from the Latin term "sustenere" which means "maintaining a situation in a stable manner over time". In any case, sustainability revolves around the concept of development, understood as a set of three spheres:

- Scale: the need for the economic system or human activity not to surpass the ecosphere system.
- Social Justice: the equitable distribution of resources among individuals both in the present generation as well as in future ones.
- Efficient consumption of resources: not wasting necessary resources.

All the axioms generated around sustainability are based on the need to respond to the **social and ecological crisis** present at the planetary level, as demonstrated by the various scientific studies that manifest imbalances in the environment (greenhouse effect and changes in climate) and society (unequal distribution of resources and inequalities between territories). The conceptual debate on the definition of the term sustainability is still a current issue and has produced various definitions of the concept which may even be contradictory.

1.4. Two Approaches to the Concept of Sustainability

There are two approaches to sustainability in economic terms:

- One approach to sustainability assumes that socio-environmental imbalances are 'external', i.e., undesired consequences of economic activities that can be palliated ('internalised') by incorporating them into monetary computations. This approach is known as ***weak sustainability*** and maintains that an economy is sustainable if total capital is constant. This approach contemplates the balance between the following forces: manufactured, human and natural capital. These three types of capital are measured in monetary terms and can be substituted for each other.
- On the other hand, ***strong sustainability*** considers that an economy is sustainable if its natural patrimony does not decrease. It considers the three types of capital (manufactured, natural and human) as complementary, not substitutable. Its proposition is based on biophysical measures to avoid the inconveniences involved in monetary measurements.

WEAK SUSTAINABILITY	STRONG SUSTAINABILITY
Natural capital is substitutable by manufactured capital and everything can be reduced to monetary measures, including so-called 'non-market goods' (such as the atmosphere, water).	Natural capital is not substitutable by manufactured capital. There is a critical natural capital which must be preserved for future generations.

As set forth in the publication *'Indicators of Sustainability in Tourism, 1989 – 1999'* (Blázquez, Murray and Garau, 2002), the concept of sustainability stems from ecology and thermodynamics. Notions related to the cyclical behaviour of nature (as demonstrated in ecosystems and the complex and systemic behaviour of the biosphere) are basically extracted from **ecology**. The concepts of conserving material and energy and their transformation, depletion and entropy (disorder) are borrowed from **thermodynamics**. Several economic theories that attempt to define the concept of sustainability have been developed from these concepts.

In short, sustainability is conceived as a proposal for balance and improvement in qualitative rather than quantitative terms. Thus, sustainability is associated with political and social improvements or advances in a group of people. The very fact that the interests of each individual or social group must be taken into account turns sustainability into a debate (in the finest sense of the word) and therefore into **democratic solutions**: each one of the possible options presented by social groups must be evaluated in an attempt to find lines of consensus. Basically, conflict is unleashed by the need to co-ordinate economic, social, ecological and ethical aspects and therefore the problem of development must be broached from multi-criteria evaluation and based on **participation**.

2. Why Indicators of Sustainability?

The problem posed by sustainability is multidimensional in nature. Therefore, criteria must be defined that allows territorial evolution to be understood as well as whether this evolution falls within the parameters of sustainability or not. Taking into account the complexity of the term, very different proposals have been put forward on measurement systems to diagnose a territory's situation in relation to the optimum situation defined by 'sustainability'. These measurement systems are grouped together under the generic term 'Indicators of Sustainability' and arose as a counterpoint to the measurement systems established in classic economics. One example is the so-called System of National Accounts (SNA) of the United Nations, an instrument of macro-economic information which explains in quantitative terms an economy's structure and variation from which its GDP is calculated. The values for calculating each country's GDP is extracted from the SNA and fluctuations in these values indicate to what degree a country can be considered developed.

Nevertheless, many authors have criticised this system,as the GDP masks many variables which have an impact on people's welfare and does not include the depletion or exhaustion of natural resources in its calculations.

As Falconi[5], notes, attempts to correct national accountancy are not new:

- Nordhaus and Tobin were the first to do so when in 1973 they created the ***MEW (Measure of Economic Welfare)***, which took other aspects into consideration, such as leisure activities or other forms of non-market production (such as domestic work, for example).
- Robert Repetto, of the World Resources Institute proposed the so-called ***Method of Depreciation*** that included the exploitation of natural resources in the GDP.
- In their book 'For the Common Good', Daly and Cobb (1998) proposed an indicator called the ISEW - ***Indicator of Sustainable Economic Welfare*** – which attempted to establish a system for measuring welfare that included other aspects in addition to economic growth. This indicator took into account natural capital (renewable and non-renewable resources), pollution, the distribution of income, the social costs of urban concentration...

5 *Falconí, F (2002): "¿Qué tipo de humo arroja la industria sin chimeneas? La pertinencia de un indicador de sustentabilidad débil en las Islas Baleares.". Sustainability Forum of the Balearic Islands, 2002 (http://www.caib.es/medi_ambient/DG_residusier/forum/forum.htm, consulted in January 2003).*

Therefore, the search for alternative measurements other than GDP to evaluate a territory's evolution has been one of the most widely debated proposals since weak sustainability. The problem as yet unsolved is that one sole valid measurement to evaluate whether an economy falls within the terms of sustainability or not has still not been found. Creating a system or set of indicators which include measures from each one of the areas that define sustainability (economic, environmental,social) has been resorted to in this area. In any case, aggregating these diverse concepts implies their commensurability, i.e., the possible establishment of a common measure which allows all these factors to be compared, a concept which is questionable in principle. The above reasons justify the creation of Indicators of Sustainability.

Indicators of sustainability are defined as 'clear, useful and objective analytical tools for communicating comparable results (between different spaces and over time) capable of including the relationships between different variables. The methodology for developing these indicators is based on the environmental,social and economic variables conceived as the basis of sustainability that are not included in traditional economic analysis' (Blázquez et. al.2002).

Figure 2. The Process of Creating Indicators of Sustainability

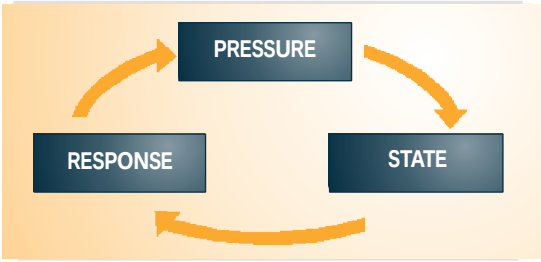
At present, the use of indicators has been extended to areas related to **environmental management** and **strategic planning**. The European Environmental Agency (EEA)[6] has established a system of indicators which show the state of the environment and provide relevant information for orienting policies and decision making. At the same time, these indicators[7] constitute an informative tool for different social agents; citizens, NGOs, businesses.... The publication of periodic EEA reports is one of the referents to be taken into account when defining indicators of sustainability.

Other notable examples are **Local Agenda 21 Action Plans** that generally contain indicator systems as tools for communication and participation.

One of the most widely accepted systems for working with indicators is the **PSR Model** (Pressure – State – Response) proposed by the Organisation for Economic Co-operation and Development (OECD). This model establishes indicators to evaluate:

- **Pressures** exerted on the environment (increase in residual waste production, increase in population, water consumption...)
- **State** of the environment (available resources) which fluctuates in function of the pressures exerted.
- **Responses** or reactions from governments and social or economic agents to change the state of the environment.

Figure 3.P-S-R Model



At the same time, it is generally accepted that if good indicators are to be meaningful they should reflect concrete realities objectively and include different temporal and spatial scales to enable comparisons. In fact, source reliability and the availability of information is the main problem when defining a series of indicators. As from Moffat (1996), Hanley (1999) and Van der Bergh and

6 JIMÉNEZ-BELTRÁN, D. (2001): *Making sustainability accountable: the role and feasibility of indicators. From Gothenburg to Barcelona and beyond via Laeken (a road map), European Environment Agency.*

7 *European Environment Agency (2001): Environmental Signals 2001. European Environment Agency regular indicator report, European Environmental Agency.*

Verbruggen (1999) on, **criteria** has been established on the elements which make up good **indicators** (see figure 4):

Figure 4. Criteria which Constitute Good Indicators

- **Objective and scientific calculation procedures**
- **Related to political objectives and in the public interest.**
- **Useful on different levels: political decisions, research,the public in general.**
- **Clear and easily understood by non-specialists**
- **Comprehensible in all their complexity.**
- **Comparable with indicators in other places.**
- **Comparable over time.**

Source: Moffat (1996), Hanley (1999) and Van der Bergh & Verbruggen (1999)

Other classifications of indicators are related to the spheres in which they operate (economic, social and environmental). In any case, the debate on the convenience of one type of indicator or other – to which the debate on simple or aggregate indicators is added – makes it clear that the optimum solution is the use of a set of indicators chosen in function of uses or objectives established.

2.1. Sustainability of Tourism Activities

The debate on the **sustainability of tourism activities** is still fully relevant in mature tourism destinations such as the Balearic Islands. Tourism, on the surface and in contrast to economic activities such as heavy industry, is an activity which respects the environment as it uses natural resources as services and not as products.

There are two aspects of the above: aspects which concern **habitability at the local level and at the global level**.

- Firstly, **local habitability** concerns the receptor territory, which constitutes the fundamental object of tourism products and is transformed into an image which justifies trips to the destination and into inducements for selling tourism packages. Nevertheless, this does not mean that the impact of this activity goes unnoticed. The evolution of tourism destinations with a long tradition, such as the Balearic Islands, indicates that tourism is an activity which may provoke social, environmental and economic imbalances.

- Secondly, the sustainability of tourism on a **global level** needs to be evaluated. The development of tourism in a region such as the Balearic Islands is the result of economic development and other much more contaminating economic activities in Central Europe, which have spread all over the world owing to de-localisation in the 1980's and 1990's. Therefore, tourism benefits from the system which sustains it, from the moment in which the functional specialisation of territories is designed to permit them to be small oasis as a class privilege of developed countries. Thus, both residents as well as tourists must assume their share of responsibility in the world-wide imbalance caused by the current global economic system, through mechanisms which correct tourism's global consequences.

2.2. Indicators of Sustainability in Tourism in the Balearic Islands

In order to understand the role of indicators in the sustainability of tourism in the Balearic Islands, a retrospective analysis of the history of tourism in the Islands must be carried out. According to work by Rullán (1998) tourism can be distributed over three major periods known as Booms.

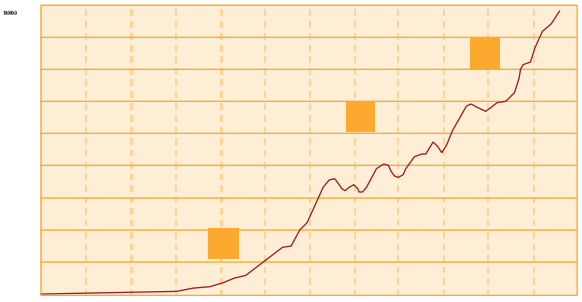
- **The first Boom** encompasses the beginning of mass tourism (early 1960's) up to the international economic crisis of 1973-1975. This period led to the construction of hotel infrastructures on the coast and was when the first tourist areas in the Bay of Palma and Calvià were defined.

- **The second Boom** encompasses the period between the post-1975 recovery and the Gulf War crisis which decelerated the economy between 1990 and 1993. In this case, economic evolution permitted the Islands' tourism system to become stable, consolidated the tourist areas which had

arisen in the previous period and led to appearance of new areas (Bay of Alcudia, eastern coast...), with more extensive urban characteristics.

- **The third Boom** encompasses the period between the post Gulf War crisis and the present. The evolution of this third Boom displays a more highly accentuated progression than previous periods. In fact, the Islands' response to the Gulf War crisis was to promote new tourist attractions of an environmental or traditional character, as demonstrated by the Natural Spaces Act of 1991, and new tourist products far removed from the classic model of 'sand and sun'. The sensation of saturation produced by this third Boom is one more symptom of what indicators of sustainability attempt to evaluate.

Number of passengers Using the Palma Airport



At the CITTIB Tourism Sustainability Watch we are working on defining Indicators of Sustainability in Tourism as key referents for analysing the evolution of tourism and its repercussions on the Balearic archipelago. In this sense, we propose a total of 50 indicators grouped in different analytical areas which reflect the economic, social and environmental realities of the Balearic Islands. These indicators are predominantly based on official data, although new sources of information and other tools of data gathering has been resorted to: work in the field, systems of geographic information and statistical information,among others.

The analytical scales with which we are working at present concern the Islands – in all cases – and municipalities, when data sources permit. As far as time scales are concerned, in the first phase data was gathered from the 1989-2000 period, coinciding with the period of the third Boom, and updated with data from 2001 and 2002 in a second phase. A list of the indicators analysed is shown in the table below.

3. Analysing Sustainability in the Balearic Islands through the Use of 12 Indicators

As we have seen, the **first period of tourism** was characterised by the construction of large hotel buildings on the coastal areas, while the **second** was characterised by the appearance of tourist apartments as a new offer and the consolidation of pressure on the coastline. Lastly, the third period, known as the **third Boom**, featured the expansion of 'direct' tourism (i.e., tourism entailing regulated and non-regulated accommodation) not only in coastal areas, but also all throughout the Islands territory.

Beginning with the first period, all territory became tourist territory as demonstrated by the clear trend of the active population towards jobs in the service sector from the 1970's onwards. Nevertheless, in real terms, tourist areas and non-tourist areas were clearly defined and the accommodation offer was concentrated in coastal areas from which visitors practically did not leave. Thus, interaction in interior areas was very limited (especially in Mallorca and Minorca).

The pressure exerted by the increase in tourism during the **third Boom** has had multiple repercussions in the Balearic archipelago. **Pressure exerted on the eco-system resources** which constitute the islands has increased considerably and in many cases has led to the need for importing resources from the exterior to maintain the Islands' economic system. This situation involves social inequalities as resources from other areas have been appropriated and these areas have been impoverished as a result.

Next we shall present a brief analysis of the repercussions resulting from this last period of tourism, classified according to their demographic, socio-economic and environmental nature.

3.1. Demographic Indicators

Human pressure is the indicator which determines the impact of the demographic vector on the environment.

Although it is not easy to establish a capacity threshold, the sensation of saturation that has resulted is evident;in terms of human pressure a peak level of over 1,500,000 persons was reached in the month of July 2000, an increase of 250,000 visitors between 1994 and 2000.

Parallel to this demographic pressure was an increase in **accommodation capacity**. Although the number of hotels stabilised due to the tourism moratorium, the explosive growth in construction explained by the constant increase in accommodation,which in 2001 was approximately 1,884,505 beds, compared to slightly over 1,650,000 beds in 1989.

As far as the **Tourism Seasonality Index** is concerned, a clear upward trend is shown during high season, which means an excessive concentration of tourist activity during specific months (June, July, August, September) compared to the rest of the year.

3.2. Socio-Economic Indicators

a) Employment

From the analysis of the employment situation in the Balearic Islands, it can be seen that the majority of jobs tend to be in the service sector which,in spite of resulting in low **unemployment levels**, is characterised by high seasonality and precariousness (89% of all contracts signed in 1999 were temporary job contracts).

As far as **wages** are concerned, these are always lower than the national average with a more or less stabilised evolution which is not in proportion to the evolution of tourism. It is worth noting that the average monthly salary per worker displayed the sharpest growth in 2000, both at the national as well as local level.

b) Housing

Another aspect to be considered when analysing sustainability in the Balearic Islands is the sharp increase in the pressure on real estate which has taken place in recent years. This fact has led to a **steep rise in the cost of housing** (61,2% 1998 – 2000) and **difficulty in acceding to same** (102.0% of family/personal income in 2000 devoted to housing purchases). Housing has turned into a market good and as such, is the object of transactions. Furthermore, housing is the object of a speculative process of a financial character which thus impedes its social function. On one hand, housing speculation occurs through residential tourism, with the imposition of exorbitant rental prices in summer months in the most highly desired areas. On the other hand, speculation also occurs through the constant sale-purchase process and the maintenance of unoccupied housing in order to take advantage of the rise in prices which permits exorbitant profits.

c) Number ofVehicles in Use

Other clear indicators of saturation are those which relate demographic density to the availability of scarce resources, e.g. the number of vehicles in use. In the period analysed, there were a total of 730,120 vehicles in the Balearic Islands, approximately 831 vehicles per 1000 inhabitants. The percentage of road surface occupied by these vehicles is almost 40% of its surface.

d) Use of Beaches

Another example of congestion in the Balearic Islands is demonstrated by the level of beach use. Human pressure on beaches has caused a considerable decrease in the surface area of beach per user (in some cases values below 6 m^2/user).

3.3. Environmental Indicators

a) Territory and Land Use

The pressure exerted by the urbanising process has had the most important impact on basic natural resources. In 2000, 5% of the surface area in the Balearic Islands was devoted to urban uses, compared to 1% in 1956.22% of coastal areas was devoted to urban uses. This pressure, exerted on spaces previously dedicated to agriculture and nature, has not been compensated by an increase in surface area designated as protected natural spaces, which only amounts to 3.4%.

b) Residual Waste, Energy and Water

The evolution of these three environmental vectors is the most worrying, due to the elevated consumption of resources involved. The two large sectors consuming the most resources are domestic/services and transport.

Gross **energy** consumption per capita is situated around an equivalent 3.06 tonnes of petroleum per person and

year and has undergone an increase of 43.2% in 12 years. CO2 emissions caused by this consumption surpassed the limit established in the Kyoto Protocol of 2001 by 42.4%.

As far as **water** is concerned, consumption per capita reached 199.2 litres per inhabitant and day in 2001, an increase of 2.3% compared to 1989.

Finally in the area of **residual waste**, production in terms of kg./inhabitant/day is situated over 1.5 kg. at the Balearic level; but Ibiza is where consumption is higher (almost 2 kg./person/day). In absolute terms, the maximum production in Mallorca is cited, with more than 450,000 kg. in 2000. This elevated production of residual waste has seen an increase in recycling in response, although in a very weak form if compared to the total volume of residual waste produced.

4. Conclusions

The main purpose of the publication has been to elaborate a synthesis of the Indicators of Sustainability in the Balearic Islands[8] through selecting the indicators of the project with the highest economic, social and ecological relevance. These key indicators and their publication contribute the elements needed for political and social debate on the current type of regional development and on the policy for future development which must inevitably lead to greater sustainability of human activity in the archipelago.

Within this context, the role played by indicators of sustainability is clear: they are instruments which provide objective information on the reality of the Balearic Islands, facilitating the interpretation of the present situation for deciding policy and promoting citizen participation in the public debate on sustainable development.

At the environmental level, the situation observed in these last years has improved as regards some concrete aspects, such as water consumption and protecting the territory, and has deteriorated in others, such as the emission of CO, electricity consumption and the production of residual waste. This particular evolution of environmental indicators is due to an increasingly common phenomenon in western societies that some authors have called improvement in local habitability.

This means that an improvement in those environmental indicators having an immediate effect on the Island's population (water and protecting the territory) and is contradicted by the concept of global sustainability with a continuous increase without apparent effective restrictions in carbon dioxide emissions, the production of residual waste (incineration) and electrical consumption which contributes to increased atmospheric contamination and the greenhouse effect.

In the socio-economic aspect, macro-economic data on the growth of the economy is positive. Nevertheless, social indicators reflect an important deficit in the distribution of wealth (wages) and the increasing social vulnerability of its citizens, expressed in a greater precariousness in jobs and a decreasing capacity in acceding to housing, especially during the second half of the 1990's.

In a region such as the Balearic Islands where tourism is the prime motor of the economy, it is necessary to assume responsibility for palliating its effects on increasing environmental risks and social inequality, not only in local areas directly related – such as tourism destinations – but also in global and inter-generational areas.

5. Bibliography

ATKINSON, G. et al (1999), *Measuring Sustainable Development: Economics and the Environment.* Edgar Elgar Publishing, UK.

BLÀZQUEZ M., MURRAY I., GARAU J.M. (2002), *El Tercer Boom. Indicadors de Sostenibilitat del Turisme de les Illes Balears 1989 – 1999*, Palma, Centre d'Investigació i Tecnologies Turístiques de les Illes Balears and Ed. Lleonard Muntaner.

COSTANZA, R. (1997), *An introduction to Ecological Economics.* St. Lucie Press, Florida.

8 *The "Indicators of Sustainability in the Balearic Islands" project is the updated document containing the 52 indicators based on work carried out by CITTIB since 2000.*

DALY, H.E. and COBB J.B (1989), *For the Common Good: Redirecting the Economy Toward the Community,* the Environment and Sustainable Future. Beacon Press, Boston.

DALY, H.E. (1992): "Allocation, Distribution and Scale: Towards Economics that are Efficient, Just and Sustainable", in *Ecological Economics*, 6(3), pp. 185-193.

EUROPEAN ENVIRONMENT AGENCY (2001): *Environmental Signals 2001. European Environment Agency Regular Indicator Report*, European Environmental Agency.

FALCONÍ, F. (1999). *Indicadores de sustentabilidad débil:un pálido reflejo de una realidad más robusta y compleja.* Ecología política, vol.18, pp. 65-99. Eds. Fundación Hogar del Empleado, Icaria Editorial, Barcelona.

JIMÉNEZ-BELTRÁN, D. (2001): *Making Sustainability Accountable: the Role and Feasibility of Indicators. From Gothenburg to Barcelona and Beyond via Laeken (a Road Map)*, European Environment Agency.

MARTÍNEZ-ALIER, J. (1994). *De la economía ecológica al ecologismo popular.* Icaria, Barcelona.

RULLAN SALAMANCA O. (1998),"De la Cova de Canet al Tercer Boom turístic. Una primera aproximació a la geografía històrica de Mallorca", *El medi ambient a les Illes Balears. qui és qui?*, Palma, Sa Nostra, pp. 171-213.

REDCLIFT, M. (1987). *Sustainable Development: Exploring the Contradictions.* Methuen, London.

NAREDO, JM & VALERO, A. (1999). *Desarrollo económico y deterioro ecológico.* Fundación Argentaria, Madrid.

WCDE (1987). *Our Common Future*. Oxford University Press.