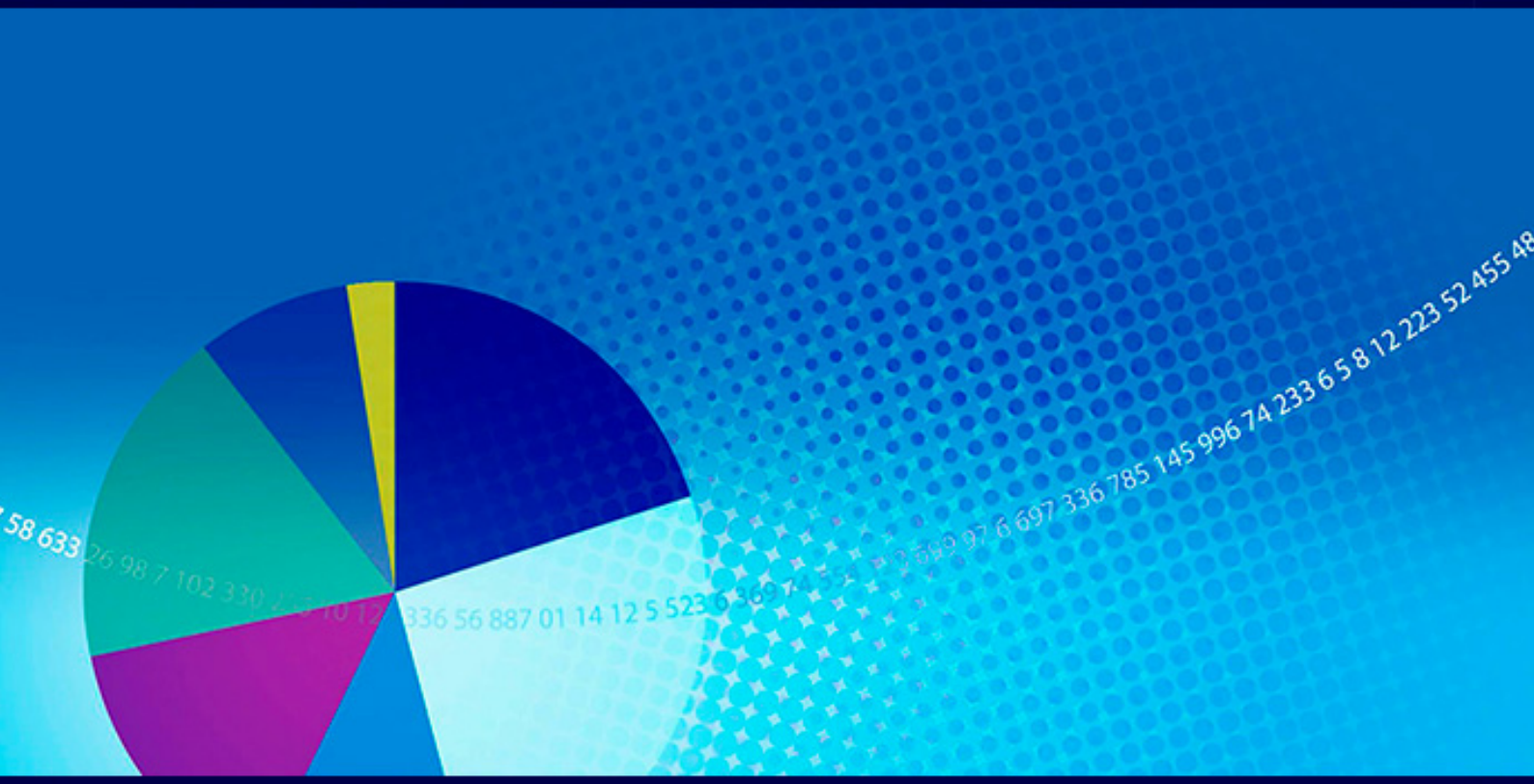
ENVIRONMENTAL PERFORMANCE INDEX (EPI) 2013

BASQUE COUNTRY



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BASQUE COUNTRY

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This document has been prepared by the technical teams of the Department for the Environment and Territorial Policy and its environmental management company, Ihobe.

Presentation

Over the last few years, the Basque Country has undergone a spectacular advance in environmental policy matters, taking position among the most advanced European regions both in policies and instruments started up and the results obtained. This report corroborates this statement through rigorous analysis and calculation, for the first time, of the Basque Country EPI 2013. It is the result of a responsible environmental policy and a vertebral territorial strategy , both strategically planned and evaluated, which have started up instruments propitious to the protection of the environment, of the improvement of the quality of the environment (water, air, soil, biodiversity) and the sustainable management of resources and waste.

We need to measure to improve, not to prove. The Environmental Performance Index of Basque Country (EPI 2013) which is presented in this report advances along these lines to measure to improve, fundamentally directed to improving decision-taking in environmental protection policy. Everyone knows that measuring in a single index the diverse environmental performance plans is a complex, inexact task, one of approximation and continual improvement, and that it requires adjustments in concepts and focus, but that to make progress along these lines will provide us with knowledge and tools for action in the field of sustainability.

The construction of an index constitutes the most fruitful road in the task of clarification and securing of the protection of the environment. Today we need integral methods of measuring that put environmental and social matters at the same level as economic ones. The international conference Rio+20 underlined this and the EPI is an index constructed and obtained by rigorous methods which offers us a holistic vision of environmental protection.

The EPI is backed by more than a dozen years of calculation and perfection by the Universities of Yale and Columbia, obtaining the position of the environmental index of reference for reports such as that of Global Competitiveness produced by the World Economic Forum, and the Global Manufacturing Competitiveness Index produced by Deloitte and the Competition Bureau of the USA. In addition, many countries include it of their own volition in their analysis of environmental sustainability or in their competitiveness reports (Ireland).

We find ourselves in an era of information dilemmas. In spite of data and statistics being more accessible than ever - a result of technological advances such as satellites and the internet - we still suffer from a lack of data, asymmetries of information and spaces to reflect upon and understand and correct trends. Sometimes, the most difficult task is to put the correct information in the right hands and at the right time.

In the field of the environment, in particular, the uncertainties tend to be high, and political decisions must be made based on objective data. Indexes based on environmental performance indicators can help to fill these gaps in information and clarify political debates. The Environmental Performance Index bridges the "gap between science and politics", a gap understood to be the space between those who create and understand environmental science and those who use the science to make political decisions.

This report has been carried out with the aid of a group of experts in different environmental fields, who have been checking and verifying its development based on the best information and knowledge available.

The Basque Country sits at the top of the EPI 2013 countries, and is in line with Norway, France and Austria. This 4th position in the ranking shows us that the tools used over the years have borne fruit, and at present we have first class environmental quality. These results are in line with the different reports periodically carried out by the Department of the Environment of the Basque Government (state of the environment and environmental profile). Meanwhile, the EPI trend, which measures changes in the environmental performance of the last decade, indicates that the policies adopted in Basque Country during the last few years have been highly efficient from an environmental point of view. We can therefore conclude that the application of the instruments derived from both environmental planning (Environmental Framework Programme mainly) and legislation (General Environment Law) have been very effective.

The Basque Government's new Environmental Framework Programme 2015-2020, as a planning instrument for the next few years, requires this prior report which synthesizes on the one hand the environmental position of Basque Country with the rest of the world, and on the other hand, shows the effectiveness of the implemented policies. This report becomes a good guide to designing correctly focused environmental strategies.

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Executive Summary

The Environmental Performance Index (EPI) is a good approximation to the complexity of measuring environmental sustainability.

The Environmental Performance Index presented in this report follows the path of measuring to improve, not prove, fundamentally directed towards improving knowledge for policy making. The EPI has benefited from a dozen years of calculation and improvement by the Universities of Yale and Columbia, obtaining the position of the environmental index of reference for reports such as that of Global Competitiveness produced by the World Economic Forum. In addition, many countries include it of their own volition in their analysis of environmental sustainability or in their competitiveness reports. It is, therefore, a contrasted and validated model of measuring environmental sustainability. Its metrics are not perfect but it is the best approximation currently in existence, mainly due to its focus on results. To make visible environmental results is important to make society aware of the cost effectiveness of implemented public policies. In addition, it identifies the environments with the best potential for improvement based on specific objectives. The application at regional scale (subnational) that is carried out in this report is a pioneering one in Europe.

The Basque Country takes its place in the vanguard of environmental performance.

Of the analysis of the 22 variables which cover questions from environmental health, air pollution, protection of biodiversity or climate change, it can be concluded that Basque Country sits in the top group (4th position in the international ranking) of advanced countries in environmental performance matters. The EPI also offers us the strengths and weaknesses of our environmental policy, reflecting the environmental questions that are being tackled with greater or lesser success. The strengths for Basque Country are found in the objectives of environmental health (for example, the level of particles and drainage) and in policies such as protection of biodiversity, habitat and forests. The main weaknesses arise from the pressure of fishing and the over-exploitation of the fishing stock, as well as CO2 emissions per head and the percentage of net generation of renewable electricity.

In the last decade the Basque Country has made very significant advances in the improvement of its environmental quality.

The EPI trend reflects the rate of improvement in environmental performance in a specific period. In the EPI trend ranking between the years 2000 and 2010, Basque Country sits in sixth place, reflecting significant advances in environmental performance. The environment policies applied in Basque Country during the last few years, directly related to European policies, have been effective. The areas which have made the greatest contribution to this good EPI Trend in Basque Country are:

- ✓ The reduction of more than a half in tons of SO2 emitted into the atmosphere, going from 43,000 tons of SOx emitted in the year 2000 to 17,000 in the year 2010.
- ✓ The outstanding reduction in CO2 emissions derived from energy, going from the equivalent of 21,000 kilotons of CO2 in the year 2000 to a total emission of CO2 due to combustion of 17,000 in the year 2011.
- ✓ The increase in the protection of the earth's biomass, going from 12% of protected territory in the year 2000 to almost 23% of the surface that is currently part of the Red Natura 2000 network.

It is possible to improve the effectiveness of public spending on the environment.

At European level there is a low correlation between the amounts of public money devoted to environmental protection and performance tied to the objectives obtained. Countries with a high EPI index (of which Basque Country is one) devote a high proportion of the GDP to environmental costs,

while other territories are being more efficient, because they achieve high performance with lower public spending. This approach gives us guidelines in order to compare and improve performance to maximize the effectiveness of resources, and emphasizes the scope for action for future innovation.

The EPI as a tool for the new environmental policy of the 21st Century

The EPI focuses on environmental health and ecosystem vitality objectives and includes fundamentals of the 21st century international debate, such as climate change and biodiversity protection. However, this is no longer enough to achieve the necessary changes, and the drastic reduction of consumption of natural resources is also presented as a pressing problem. The Basque Government, through the new Environmental Framework Programme which is under development, will address all these aspects on the basis of objectives, such as ensuring and improving environmental quality and contributing by means of environmental policy to the improvement of public health, protection of natural capital and increase in welfare. Tools like the EPI are fundamental to measure, contrast and optimise the efficacy and efficiency of public resource use.

How to guarantee prosperity towards an economy with a low carbon footprint and more efficient in terms of natural resource use, and what it means for the competitiveness of the productive activity, is analysed in a different report about sustainable competitiveness in Basque Country, which will be published in 2014.

Block 1. Environmental Performance Index (EPI)

Why EPI Basque Country 2013

1. **Because it offers a global overview on environmental sustainability, which is comparable and focused on results.** These results provide knowledge for policy making.
2. **Because it is a contrasted and validated model of measuring environmental sustainability.** Its metrics are not perfect, but right now it is the best existing approach. This report and its regional (subnational) application is groundbreaking in Europe.
3. **Because environmental sustainability is currently an essential competitive and development factor** for our society and within a global context and, to a greater degree, in a European context.
4. **Because the environmental dimension brings new solutions to complex global challenges** (climate change, energy crisis, food crisis, among others). These challenges require vision and action at a local (regional) level. The environmental phrase "Think global, act local" is today more necessary than ever.
5. **Because it is necessary that environmental results be made visible** so our society is aware of how important they are and knows the cost-effectiveness of the public policies that have been implemented.
6. **Because** the Environmental Performance Index (EPI) **lets us identify the fields with greatest improvement potential based on particular objectives.** In order to improve, we need to measure.
7. **Because the EPI Basque Country 2013 is the deployment of the global EPI model and shows significant results:**
    a. Basque Country sits among the territories, both at a global and European level, with high levels of environmental development and, ultimately, of environmental sustainability.
    b. Our capacity for improvement is mainly situated in relation to the variables that join together in the objective of Vitality of Ecosystems.
    c. Over the last few years notable advances have been made in environment policies which have led to our position among the highest levels in the objective of Environmental Health.
8. **Because the EPI model can be applied at regional level**, with the aim of stabilising the system of indicators and their shaping into an index, so that comparable results can be obtained and which allow the evaluation of those obtained through the EPI Basque Country 2013 initiative.
9. **Because it underlines the margin of action for future innovation.** Innovation tied to the environment in is widest concept, where Basque Country can position itself as a reference in Europe, should be supported by the strengths and take advantage of the abundant social capital, technological capacities and business tradition in environmental material.
10. **Because it opens a new line of work for the next few years in the measuring of the variable of environmental sustainability.** The Administration and Universities will make the greatest effort to improve the metrics in environmental matters.

PART 1. INTRODUCTION. TOWARDS A REGIONAL ENVIRONMENTAL SUSTAINABILITY INDEX

"The indicators constitute a tool of communication to inform about the state of a matter in particular. For that purpose the indicators correspond to three main functions: simplification, quantification and communication. In fact, in general the indicators simplify matters in order to be able to turn a complex phenomenon into something quantifiable, so that the information can be communicated" ***Delbaere. 2002***

An indicator can be seen as something which provides a clue to a more important question or makes perceptible a trend or phenomenon which is not immediately apparent to us. The main defining characteristics of an indicator, environmental in this case, are that it quantifies and simplifies the information so that it promotes the comprehension of environmental problems, for both those with political responsibility and the general public. Above all, an indicator should be practical and realistic given the many limitations people face when executing and carrying out the monitoring of projects. Often they are a compromise between scientific precision and information available at a reasonable cost.

The mathematical combination (or aggregation) of a group of indicators is called an "**index**" or a "**combined indicator**"**.** Indexes are based on sub-indicators which do not have a significant unit of measurement in common and there is no obvious means of weighting these sub-indicators. An index is, therefore, a numerical value which expresses the statistical relationship between quantities referring to the same phenomenon. It is precisely the numerical value that gives us a vision of the phenomenon that we try to analyze and measure.

PROS AND CONS OF USING INDEXES

PROS

- ✓ They can be used to summrarise complex or multi-dimensional issues in order to support decision making.
- ✓ They provide a global vision: they can be easier to interpret, instead of trying to find a tendency in many different indicators.
- ✓ They can help to attract public interest by means of a summarised figure, which can be used to compare the performance of different countries and its evolution with time.
- ✓ They could help to reduce the size of a list of indicators or add more information to an existing one.

CONS

- ✗ They can send misleading non-robust political messages if they are badly elaborated or are misinterpreted.
- ✗ The results of the simple "global vision" that they show can invite those with political responsibilities to draw simplistic political conclusions.
- ✗ Their construction involves phases where judgments need to be made: selection of sub-indicators, choosing a model, indicators' weighting, etc.
- ✗ The amount of necessary data increases because data are required for all sub-indicators and to obtain a statistically meaningful analysis.

Source: Joint Research Centre

Throughout the planet, and in every economic and social sector, main performance indicators are used to inform about the advances made in management towards the objectives of the established policy. In the field of economics, indicators such as the Gross National Product (GNP) and the rate of inflation are used to measure the vitality of an economy and to guide the economic policy. In the socio-economic field, a well-known example is the Human Development Index, made up of data about income, education and life-expectancy.

These combined indexes have specific aims and each one has its advantages, disadvantages and limitations, as is shown, for example, in the Stiglitz and Fitoussi Report (2009), "Beyond GDP" and in the Global Project on "Measuring the Progress of Societies" (OECD, 2010). These initiatives underline the limitations of using GDP as the sole indicator of economic results and social progress, and make a case for refining the collection of economic parameters like capital depreciation, standard of living and inequalities, as well as the adequate reflection of the environmental dimension and the concept of sustainability. It is also argued that quality of life is not only a material question, but that it also depends on non-economic factors, such as health, environmental conditions, social relationships and similar, and they all require appropriate indicators.

Over recent decades at a global level there has been a rapid expansion of development and use of indicators and indexes to inform about environmental policy. Greater and greater efforts are being made in the calculation of indicators to measure and manage environmental problems, whether at global, state or subnational level, and to identify the principles, lessons and "good practice" that may be transferable.

However, in the field of the environment there has been considerable disagreement about what should be measured, about how disparate environmental measurements should be included in aggregated indexes and about what are the pre-existing or proposed indexes that best describe the health of the physical world.

Although important efforts have been made from the 1992 Earth Summit onwards to identify the key environmental indicators for monitoring environmental problems and political responses (for example, the Sustainable Development Commission of the United Nations lists 58 indicators of sustainable development), and compendiums of indicators are regularly produced (for example, the World Resources Report by the World Resources Institute), environmental indexes existing at the global level have not been able to garner the international support necessary to gain a place in the measuring of environmental performance and report on policy decisions, similar to that reached by GDP and social development statistics.

Since 1995, when Jonathan Walsh of the World Resources Institute declared that "there is not the remotest chance of having a number similar [to the GDP] to indicate how the environment is developing", several indexes, focal points have arisen with sufficient longevity to be analyzed and even adopted by some countries. These include the Ecological Footprint (and its close relation the Living Planet Index of the WWF), the Environmental Sustainability Index (ESI) and its successor, the Environmental Performance Index (EPI), the satellite state accounts like Green Accounting and the Genuine Progress Indicator. In addition to these, there are many new indicators of environmental sustainability in development. The main environmental indicators - Footprint, EPI and Green Accounts - have caught the attention of the media, the academic world, and to a lesser extent, politicians. However, they all entail inconveniences that limit their use.

The **Ecological Footprint**, developed by the Global Footprint Network, measures the impact of consumption in hectares of biologically productive land. It has been adopted by environmental NGOs

and a series of countries. It has been successful in generating debates about global environmental sustainability in terms of consumption of resources of a country (or any other jurisdiction) above its allocation of natural resources - the so-called "ecological deficit". However, it provides little orientation for the actions of those responsible politicians who try to confront a series of environmental questions beyond the reduction of consumption. In accordance with the Ecological Footprint, humanity uses the equivalent of 1.5 planets to provide the resources we use and absorb the waste we produce. If populations and consumption trends continue we will need the equivalent of 2 planet Earths to support humanity in the decade of the 2030s.

The **Green Accounting** programme of the World Bank was developed to measure and value the benefits of ecosystems and to provide, in this way, more information to countries to evaluate the true costs and benefits of projects that could endanger the integrity of relevant ecosystems. Green Accounting and its close cousin Environmental Accounting are based in frameworks which include environmental actives which are commercially exploited, with end results expressed in economic terms. Although these programmes have been successful in some countries where they have shone a light on the economic impact of the degradation of the environment (and the potential economic benefits of its protection), in general they have been excessively dependent on "official" statistics. On the other hand, some people oppose the reduction of complex environmental problems to a simple cost-benefit analysis which omits intangible aspects, pointing out that in some cases it can be considered economically beneficial to harm the environment

The **Environmental Performance Index (EPI)**, produced by the Universities of Yale and Columbia, covers a wide range of environmental parameters and has made a big impact on the policies of countries like South Korea, Malaysia, China, Ireland, Tunisia, etc. The EPI was preceded by the Environmental Sustainability Index, published between 1999 and 2005. The new EPI index (2012) includes 132 countries and uses indicators oriented towards results, so that it serves as an index of comparison, thus permitting better understanding on the part of politicians, scientists, environmental defenders and the general public. The five countries at the top of the EPI table are: Switzerland, Latvia, Norway, Luxembourg and Costa Rica. The bottom five countries are: Iraq, Turkmenistan, Uzbekistan, Kazakhstan and South Africa. This index helps identify the key priorities of environmental policy and offers a framework in which to measure progress towards reaching aims in a format that is comprehensible to those responsible for policies. Its biggest drawback lies in the existing deficiencies of some of the data at world level and in the inadequate collection of the environmental impact of commercial flows.

PART 2. ENVIRONMENTAL PERFORMANCE: EPI MODEL

2.1 Methodological approach

Governments have been trying for years to show the improvements they make in environmental policy through indicators about the control of pollution and about the management of natural resources. The Yale Center for Environmental Law and Policy (YCELP) and the Center for Earth Information Science Information Network (CIESIN) of the University of Columbia responded, for the first time, to this need in the year 2000, presenting the *Environmental Sustainability Index*. This index, the predecessor of the Environmental Performance Index (EPI), was launched as a complement to the Millennium Development Goals and a counterpoint to the Gross Domestic Product (GDP), which had for a long time been the only measure of wellbeing.

This index was the first attempt to classify countries in 76 different elements of environmental dimension in sustainability. The wide reach limited the usefulness of the index as a pragmatic guide for the use of political representatives and in the year 2006 it was changed to the **Environmental Performance Index (EPI)**, centered on a smaller group of environmental questions about which governments can provide accounts. The EPI offers signs of indicators oriented towards results and based on the best available data about the main political aspects. In addition, the "***EPI Trend***" measures environmental performance over time and allows its monitoring in the future. Via the EPI Trend countries are able to evaluate their advances in environmental matters over time, as well as measuring the efficiency of policies applied to cope with questions related to their performance.

The EPI is based on **two main objectives** of the environmental policy:

1. Environmental Health, which measures environmental pressures on human health, and
2. Ecosystem Vitality, which measures the health of ecosystems and the management of natural resources.

The EPI evaluates the countries/territories using **22 performance indicators** which cover **ten categories of the policies**, reflecting facets of both environmental health and ecosystem vitality. These environmental policy categories are:

Categories of environmental policy reflected by the EPI	
1. Environmental Health 2. Water (effects on human health) 3. Air pollution (effects on human health)	4. Air pollution (effects on the ecosystem) 5. Water Resources (effects on the ecosystem) 6. Biodiversity and Habitat 7. Forests 8. Fishing 9. Agriculture 10. Climate Change and Energy

Next the general framework of the Environmental Performance Index EPI 2012 is collected where the alignment of the aims is observed with the established categories and their indicators. Annex 1 presents in greater detail the methodological aspects, results obtained at ranking-by-country level and the main conclusions reached in 2012. The summary of the methodological fact sheet of each one of the 22 indicators can be seen in Annex 2.

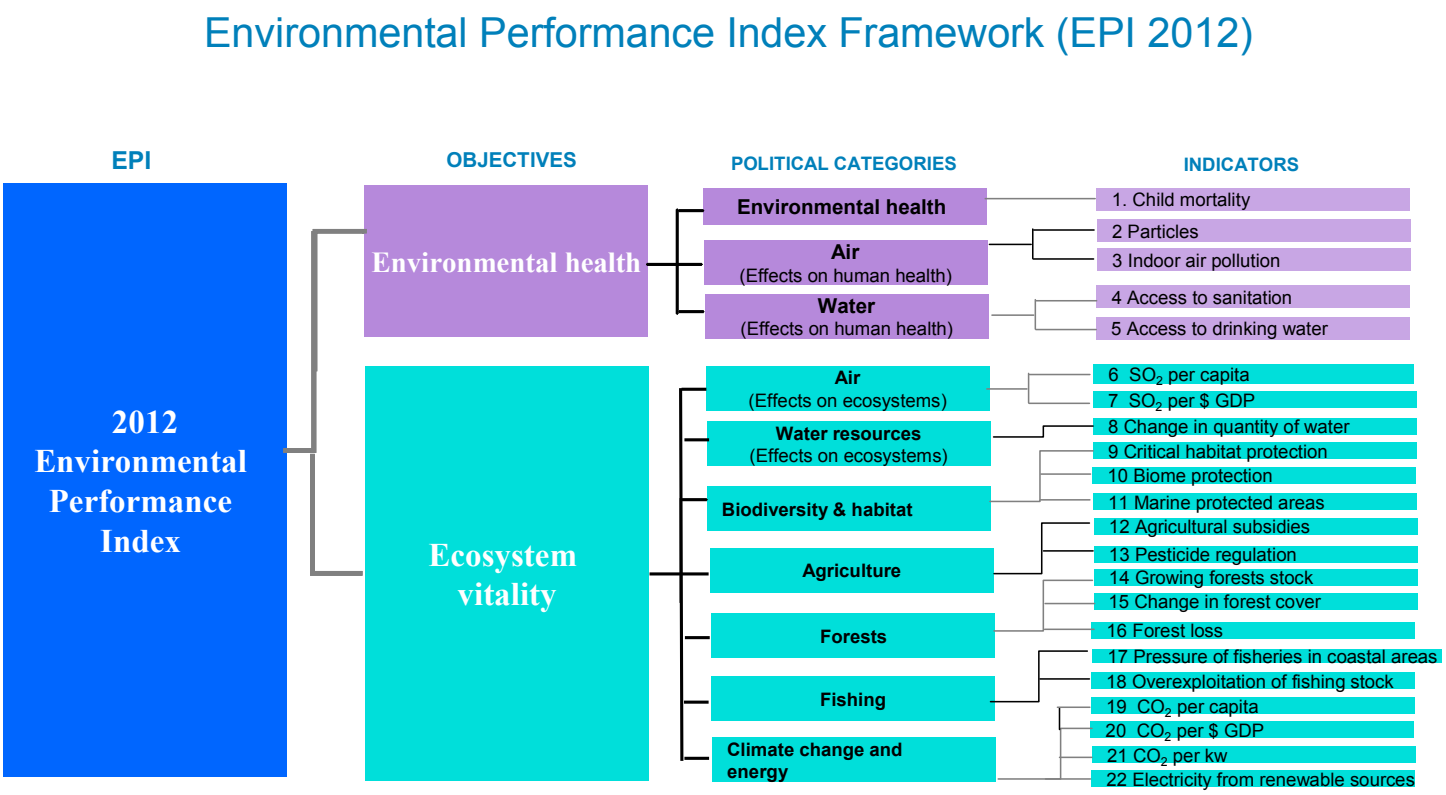


Figure 1. General framework of the Environmental Performance Index 2012.

2.2 Limitations and pertinence

The EPI index presents a series of limitations which must be borne in mind and which are summarised in the following figure:

MAIN EPI LIMITATIONS 2012

Water quality/contamination not reported. The health of the population is determined by the availability of drinking water and indirectly affects migration patterns. Water management comprises minimization of water use and maintaining ground water levels totally usable.

Water quality (contamination and erosion) not reported. Protection of soil as a resource is fundamental as it has natural functions (habitat and biological support, natural cycle component, filtering element, absorber and transformational capacity) and usage functions (renewable and non-renewable raw material site, housing and infrastructure location, and historical archive). An inadequate soil protection can have negative effects on people's health and ecosystems.

Material flow and reuse not reported. Material reuse is critical to maintain the production of new goods without depleting the available natural resources. The amount of reused material incorporated to consumer goods will be a good reference to reflect the exposition to limited resources.

Waste management nor reported. Waste management is essential to establish a recycling culture and to avoid improper disposal of dangerous materials that have negative effects on the population's health.

Natural and technological risks are not reported. Correct management of natural risks (floods, forest fires, droughts, landslides, windstorms, snow) and technological risks (explosions, leaks or toxic emissions, transport accidents, industry fires, spills, nuclear accidents) is fundamental, although these aspects are difficult to report due to the gaps in long-term environmental impact knowledge caused by natural disasters or accidents.

Source: Compiled by the authors.

In addition, as for the pertinence of the EPI to adequately evaluate environmental policy of a territory, there are a series of factors which should be indicated:

- The selection and weighting of some indicators of the EPI have been promoted to complement the environmental indicator of the Millennium Development Goals of the United Nations. In consequence, the selection reflects, above all, environmental problems with a wide repercussion at global level, inadequately reporting specific dimensions of environmental problems typical of industrialised countries and, therefore, reduces its explanatory powers for European countries and regions. This happens with environmental problems related to quality (for example, access to sanitation services is a lesser worry in comparison with sewage treatment).
- As shown by Stiglitz, Sen and Fitoussi (2009), the messages about derivatives of this type of index are ambiguous. The world ranking of countries makes sense but it is thought to often present an excessively optimistic view of developed countries. For example, the the index shows a very close score for the United States and France, despite large differences in emission of CO2. In fact, the EPI essentially tells us about a mixture of the current quality of the environment, the pressure on resources and the intensity of environmental policy, but it does not tell us if a country is on a sustainable trajectory: no value can be defined as a threshold to be able to say that a country is or is not sustainable. In conclusion, the best option to arise from pragmatic commitment is a small control framework, rooted in a focus on sustainability stock. This combines an indicator derived from the focus on extended

wealth and then "environmentalised", whose main function would be that of sending warning messages about "economic" unsustainability (for example due to insufficient reinvestment of income generated by fossil resources), together with a combination of physical indicators, which are centered on the dimensions of environmental sustainability, and which are still difficult to capture in monetary terms.

2.3 The EPI index in the European context

Due to the above, it is important to show the relationships between the EPI (with a global planetary focus) and the official metric existing in Europe in environmental matters (focus on developed countries and regions) and led mainly by the European Environment Agency (EEA).

The main differential factor is that in the last 40 years Europe has created a considerable amount of legislation related to environmental matters which is among the most modern and complete sets of rules in the world and this has contributed to solving some environmental problems that till loom large on a global scale.

The European Environment Agency (EEA) has published numerous reports of indicators of many European environmental issues in the last two decades . Currently it maintains an extensive set of over 200 environmental indicators (37 is the set of core environmental indicators) across 12 environmental issues. These environmental indicators are designed to support EU policies.

The 37 core indicators' defined aims are:

- giving priority to improving the quality and coverage of the data flows, thus improving the reliability and comparability of the information and evaluations;
- rationalizing the contributions to other indicator initiatives in Europe and beyond;
- establishing a manageable and stable system of assessments based on indicators of progress in relation to environmental policy priorities.

The EEA's work is based on a conceptual framework known as the DPSIR assessment framework, "Driving Forces, Pressures, State, Impacts and Responses", that describes the state of the environment, its impact on human beings, ecosystems and materials, pressures on the environment, driving forces and system response.

Since its inception the EEA considered that having reliable environmental information that is relevant, specific and timely was an essential element in the implementation of environmental policy and management processes. The EEA considers environmental indicators to play a crucial role in policy with three main objectives:

- the provision of information on environmental issues, with the objective that policy makers assess their seriousness (this is especially important for new and emerging issues);
- to support policy development and priority setting, highlighting the key factors in the causal chain that produce environmental pressures that policies can address;
- monitor the effectiveness of policy responses.

Indicators play a particularly important role in the evaluation of the "*distance to objective*". The establishment of environmental objectives and proper identification of indicators to monitor progress over time toward these goals are closely linked. It is difficult to implement policies and management measures, should there not be means of associating them with the corresponding indicators.

It is worth noting, however, that while indicators can provide an accepted criterion for benchmarking between countries, regions or municipalities, they can also be misleading in their simplicity. The basis

for the selection of indicators, calculation and communication therefore, should be kept under constant review to grasp the situation and maintain the relevance of policies.

The following table shows the relationship between EPI and European indicators collected in the state of the environment in Europe (SOER 2010). Annex 3 shows in more detail the relationship between basic indicators of the EEA and EPI.

Relationship between environmental areas in Europe and EPI 2012

	SOER 2010 (EEA)	EPI 2012	Relationship
Climate change	■ GHG emissions	■ Ind. 19: CO2 per capita	■ **Medium-High**
	■ Energetic efficiency	■ Ind. 20: CO2 per $ GDP & Ind. 21: CO2 per kw	■ **High**
	■ Renewable energy sources	■ Ind. 22: electricity from renewable sources)	■ **High**
Nature and biodiversity	■ Pressure on ecosystems (air pollution as eutrophication)	■ Ind. 6: SO2 per capita	■ **Medium**
	■ Conservation status(safeguard habitats and more important species in the EU)	■ Ind. 9: Critical habitat protection, Ind. 10: Biome protection & Ind. 11: Marine protected areas	■ **Medium-High**
	■ Biodiversity (marine and terrestrial habitats and species)	■ Ind. 14: Growing forests stock, Ind. 16: Forest loss, Ind. 17: Coast fishing pressure & Ind. 18: Fishing stock overexploitation	■ **Medium-High**
	■ Soil degradation (soil erosion)	■ Ind. 15: Change in forest cover, Ind.12: Agricultural subsidies & Ind. 13: Pesticide regulation	■**Medium**
Natural resources and waste	■ Decoupling(of resource use in relation to economic growth)	■ Material and energy productivity not reported	■ **Low**
	■ Waste generation	■ Not reported	■ **Low**
	■ Waste management (recycling)	■ Not reported	■ **Low**
	■ Water stress (water exploitation)	■ Ind. 8: Change in quantity of water	■ **Medium**
Environment and health	■ Water quality (ecological and chemical status)	■ Not reported	■ **Low**
	■ Water contamination (from isolated sources and quality of bathing water)	■ Ind. 1: Child mortality, Ind. 4: Access to sanitation & Ind.5: access to drinking water	■ **Medium**
	■ Crossborder atmospheric contamination (NOX, COVNM, SO2, NH3, primary particles)	■ Ind. 2: Particles & Ind. 7: SO2 per $ GDP	■ **Medium**
	■ Air quality in urban zones (particles and ozone)	■ Ind. 3: Indoor air pollution	■ **Low**

Source: Compiled by the authors based on the European Environment Agency's status of environmental areas in Europe (SOER 2010).

Block 2. EPI BASQUE COUNTRY 2013

PART 1. GLOBAL OVERVIEW OF ENVIRONMENTAL INDICATORS IN BASQUE COUNTRY

In 2002 the Basque Government undertook the work to present in a seminal report, entitled "*Environment in the Basque Autonomous Community of the Basque Country*. *Environmental Indicators 2002*", the development of headline environmental indicators for Basque Country. The Basque Environmental Strategy for Sustainable Development 2002-2020 collected as a commitment to be undertaken by the Department of Environment, the annual preparation of a report that selects a small number of indicators showing overall trends in established priority environmental objectives.[1] This commitment resulted in a first report which offered for the first time a quick overview of environmental evolution, reflecting imbalances and trends.

Environmental Strategy established four **categories of indicators**:

- **Basic Indicators**, which answer the questions: What is the state of the environment? What are the impacts of human activities on the environment? These basic indicators, around 300 of them, are the basis for the development every three years of the State of the Environment in the Basque Country.
- **Headline Indicators** respond to the question: what are the evolution and tendencies of the principal environmental objectives that we have set? 22 indicators of this type were defined and they are used to prepare annually a report that shows us simple and rapid environmental changes in our region, reflecting existing imbalances so as to facilitate decision-making to correct these imbalances. The 22 selected headline indicators are intended, therefore, to provide information on sustainable environmental development of a synthetic and aspect-oriented form fundamental for making policy decisions.
- **Integration Indicators**, measuring the level of incorporation of the environmental variable on different public policies and their relevance to the objectives of sustainability.
- **Sustainability Indicators** reflect how development of Basque society proceeds holistically, that is, from the economic, social and environmental points of view. As a guideline the European Union has made a proposal for this type of indicator that the 36 include aspects such as economic background, employment, innovation, economic reform, social cohesion and environmental issues.

To summarize, we can say that the first two categories of indicators (**core and headline**) are established and consolidated in their preparation, evaluation and communication. The Basque Government has produced five reports (1986, 1998, 2001, 2004, 2009) called "State of the Environment in the Basque Country", and has established since 1998 a framework of established core indicators, in line with the European Union, which will be updated and improved. Meanwhile, since 2002 work has taken place on the development and annual publishing of the environmental headline indicators report (called Environmental Indicators to Environmental Profile 2008 from that year onwards).

[1] "Environment in the Basque Country. Environmental Indicators 2002" http://www.ihobe.net/Publicaciones/ficha.aspx?IdMenu=750e07f4-11a4-40da-840c-0590b91bc032&Cod=5515b56d-d80a-411e-87d2-7933a0eeb723&Tipo=

Regarding **Integration Indicators**, conducted specific reports have been using the environmental approach for the following sectors (Transport 2002, Energy 2003, Agriculture 2006, Health 2007, Forestry 2008, and a global one covering Eco-efficiency in the sectors in 2003). From the year 2008 the various sectoral policies of the Government collect environmental variables as indicators regularly in their planning and monitoring.

Finally, in relation to **Sustainability Indicators**, Eustat, the Basque Statistics Institute, has established several working lines on the holistic progress of the development of the Basque society, that is, from the economic, social and environmental points of view. Within the Structural Indicators section are included several perspectives:

- **Europe 2020 Indicators:** The Europe 2020 Strategy adopted by the European Council in 2010 is the common agenda for the current decade. It prioritizes smart, sustainable and inclusive growth as a way to overcome the structural weaknesses in Europe's economy, improve competitiveness and productivity and spur a sustainable social market economy. Its five main objectives are:
    - 75% of the European population between 20 and 64 years old should be employed.
    - Domestic expenditure on R&D should reach 3% of GDP.
    - The goal should be to reach "20/20/20" in matters of climate and energy: reduce emissions of greenhouse gases by 20%, saving 20% of energy consumption and promote renewable energy consumption to 20% .
    - The percentage of early school leavers should be under 10% and at least 40% of the younger generation should have completed higher education.
    - The risk of poverty in the EU should threaten 20 million fewer people.

  Monitoring these objectives for Basque Country is achieved through eight main indicators. The latest report (May 2013) states that Basque Country is positioned in five of the eight indicators selected in the 2020 strategy at levels above the EU-27, domestic expenditure on R&D, primary energy consumption, early school leavers rate, higher education level and population at risk of poverty or exclusion. By contrast, the values of the occupancy rate, the emissions of greenhouse gases and the share of renewable energies are below the European average.

- **Sustainable Development Indicators**: In 2012 Eustat calculated for the first time the monitoring indicators set out in the Sustainable Development Strategy of the Basque Country. This is a set of 27 indicators associated with the strategic objectives, and which supplement the so-called headline indicators, which coincide with those defined for the Europe 2020 strategy. Of the subgroup of ten indicators that can be compared to the European Union average, those of the Autonomous Basque Region have better or similar values recorded in eight of them: Natural resource productivity, GDP per capita, public debt, consolidated gross urban waste, transport energy consumption, PISA Assessment, Official Development Assistance and CO2 emissions per capita. By contrast, the position in the European Innovation Scoreboard (IUS) and, above all, energy dependence are below average for the EU-27.

- **Human Development Index (HDI)**: Calculated for the Basque Country for the first time and unique for the year 2007 with a score of 0.98, the HDI measures the average achievements in a country in three basic dimensions of human development: a long and healthy life (measured by the expectation of life at birth), knowledge (measured by adult literacy rate and the combined gross matriculation rate) and a decent standard of living (measured by GDP per capita). A new version of HDI developed by the Human Development Report 2011 takes into account how achievements in health, education and income are distributed (UNDP, 2011). This new version of the index, called the ***Inequality-adjusted Human***

Development Index (IHDI), is a measure of human development that takes account of social inequality. Under conditions of perfect equality, the IHDI equals the HDI, but will gradually fall below the HDI as inequality increases. In this sense, the IHDI is the actual level of human development, while HDI can be considered as an index of potential human development that could be achieved if there were no inequality. The IHDI "discounts" the average value of each dimension of the HDI according to the level of inequality. Countries with the lowest human development tend to have greater inequality in more dimensions and, thus, higher losses in human development. The average loss in the HDI due to inequality is around 23%, that is, adjusted for inequality, the global HDI would fall to 0.525 from 0.682 in 2011 .

PART 2. ENVIRONMENTAL APPROACH TO BASQUE COUNTRY ENVIRONMENTAL INDICES:

As noted above, in recent years there have been some indicators that attempt to reflect, in aggregate, the pressures on the environment. Some of these are:

- Human Appropriation of Net Primary Production, which shows the percentage of biomass used by human activities in energy units;
- The Material Flow Analysis (MFA), which serves to give a systematic view of the physical flows of natural resources from extraction to final disposal, including the processes of production, use and recycling, and taking into account losses along the way. This technique is based on the desire to link the consumption of natural resources with the capacity of the environment to provide materials and absorb waste.
- Ecological Footprint, which indicates the extent of biologically productive area used by a population, and

In the case of the Autonomous Community of the Basque Country, in the last decade, both the Material Flow Analysis (MFA) and the Ecological Footprint have been calculated. The following summarizes the most important aspects of these proxy indicators of environmental sustainability.

Material Flow Analysis (MFA). Collected by the Department of Environment and Regional Policy as official statistics. One feature of modern society is the production and consumption of goods, with consequent environmental impacts from the extraction, processing, use and disposal of finite natural resources. Therefore, the evolution towards an economic model based on sustainable development involves the reduction of material consumption of economies, especially in developed countries, decoupling natural resource use (water, materials and energy) and ecological services (nature's capacity to absorb waste and emissions) from economic growth. This process of reducing the consumption of materials is known as dematerialisation. It can occur both in relative terms, per unit of GDP (weak dematerialisation), and in absolute terms (strong dematerialisation).

To analyze the consumption of materials and economy dematerialisation, the process is monitored using the Material Flow Analysis (MFA). The MFA is a methodology for quantifying the materials (raw materials, semi-finished products and final products) exchanged between the system and the environment. The MFA is based on the concept of social metabolism, which compares the economy to a living thing: the economy "feeds" on resources and materials, taking advantage of them and extracting their "nutrients", later to return them to the environment as waste. A mass balance relates these inputs to the economy (food) to the outputs (excretion), the difference being the accumulation of materials in the economy in the form of consumer goods (biomass growth). Counting materials in and out of the economic system can produce readily available indicators which

are easy to understand, providing an overview of the physical dimension of the economy of a country.

Two of the indicators used in Material Flow Analysis are the Total Material Requirement (TMR), which represents all materials entering the economy and Domestic Material Consumption (DMC), which gives an idea about external dependence in terms of materials of an economy.

The **Total Material Requirement (TMR)** is an indicator developed by the Wuppertal Institute to describe, in terms of mass, not just the amount of natural resources pertaining to goods produced by an economy, but also hidden flows (materials for displaced natural resources) associated with this production. The indicator is used to compare the efficiency in resources of an economy. Any increase in the efficient use of resources is a step forward towards achieving the goal of environmental sustainability. This method is used to give an overview of the physical basis of industrial economies and provide a set of sustainability indicators. It is accounting for all natural resources extracted from the environment (materials processed and/or displaced) to support various economic activities.

The first study of the Total Material Requirement (TMR) for the Basque Country was carried out in 2002 by calculating the TMR between 1989 and 1998. The Basque TMR in 1998 was 80.4 tonnes per capita, having risen 6.65% from 1989. Its main component is external hidden flows, ie, materials that are moved abroad in order to obtain materials that are imported to the Basque Autonomous Community. These account for 60% of the TMR. In millions of tons, the Basque TMR for the year 1990 was 165 million and 351 million in 2009.

The following table shows the evolution of the **Resource Productivity Index** for Basque Country between 1990 and 2011. It is the ratio between the GDP in Euro units in chained volume with reference to the year 2000 exchange rate, and Domestic Material Consumption (DMC).

Resource productivity index (€ per kg)	1990	2000	2005	2009	2011
Germany		1.6	1.7	1.8	1.8
The Netherlands		2.4	2.7	2.8	2.9
Spain		1.1	1.0	1.4	1.8
France		1.9	2.0	2.1	2.2
Basque Country	**0.5**	**1.5**	**1.5**	**2.03**	**2.1***

Source: Compiled from reports of the Basque Government and Eurostat.
* Estimation

The **Ecological Footprint**, as has been previously said, was developed in the nineties by Mathis Wackernagel and William Rees. The aim of the ecological footprint is to show the sustainability level of consumption habits of the population in relation to the availability of natural territory on the planet, i.e., nature is used to determine how much nature each person is using to maintain their standard of living (ecological footprint) and what is the ecologically productive land available for each person on the planet (planet's biocapacity). The ecological footprint is defined as "the area of ecologically productive land (crops, pastures, forests and aquatic ecosystem) required to produce the resources used, and to assimilate the wastes produced, by a defined population with specific standard of living indefinitely, wherever is this area." From the point of view of local sustainability, the ecological footprint of a region should be such that it does not exceed the biocapacity of the territory studied. From the standpoint of global environmental sustainability, the ecological footprint of the inhabitants of a territory should not be greater than biocapacity available per person on the planet, that is, the area used to produce goods consumed and absorb the wastes generated should be less than the biologically productive area available on planet.

The first study of ecological footprint for Basque Country was made in the year 2005 (2001 data) by the Department of Environment of the Basque Government in collaboration with the University of the Basque Country (Environmental Economics Unit). The main results of this report show that every inhabitant of Basque Country has an ecological footprint of 4.66 global hectares (year 2001), its main components are the area required to absorb CO2 emissions (46%) and the space used for crops (24%). In this regard consumption patterns globally unsustainable for Basque Country were revealed, since to meet needs resources from other regions or from other generations are committed. This means that if everyone on the planet followed the same consumption patterns as us, the surface of the planet would need to be 2.5 times higher.

The following table shows the evolution of the Ecological Footprint for Basque Country and Spain between 1990 and 2013.

Ecological Footprint (gha/cap)	1990	1997	2001	2005	Estimation 2013
Basque Country	4.1	4.5	4.6	5.1	**5.2**
Spain	5.0	5.4	6.0	6.4	**6.6**

Source: Compiled from reports of the Basque Government and the Ministry of Environment[2]

At Historical Territory level there have also been reports of Ecological Footprint calculation in Biscay in 2010 (data 2007) and Gipuzkoa in 2005 (data 2004).

	Ecological Footprint (gha/pers)	Biocapacity (gha/pers)	Ecological Deficit (gha/pers)
Bizkaia (2007)	4.8	1	3.8
Gipuzkoa (2004)	5.3	1.8	3.5
Basque Country (2001)	4.6	1.8	2.8
World (2007)	2.9	0.9	1.8

Source: Compiled from reports of the Provincial Councils.[3]

The CO2 absorption area is the main contributor to the ecological footprint in both Gipuzkoa and Bizkaia, and also the Basque Country in general, as is the case in the other countries and regions of the "north". Therefore, from the perspective of the ecological footprint, CO2 emissions are the main factor controlling environmental sustainability in Basque Country, imported energy, wasteful consumption and consumption of fossil fuels are mainly decreasing.

Globally, as the ecological footprint summarizes the environmental pressures on the hypothetical amount of land that would be needed to cover the current rates of use of resources, it is expected that China and India take ownership of 37% of the estimated increase in the global ecological footprint during the period 2001-2015, unless they are capable of improving production efficiency annually by 2.9% and 2.2% respectively.

Although this indicator integrates multiple aspects, it must be taken into account that the Ecological Footprint:

[2] http://www.footprintnetwork.org/images/uploads/Huella%20ecologica%20de%20Espana.pdf

[3] http://www.ehu.es/cdsea/web/rm_documents/Milenio/Difusion/Conferencia_25-26Nov/Ficha3.pdf
http://www4.gipuzkoa.net/MedioAmbiente/gipuzkoaingurumena/adj/documentacion/La-huella-ecologica-de-gipuzkoa_2005_opt2.pdf

- Does not reflect some environmental impacts such as water pollution, soil pollution, toxic waste, erosion, air pollution (except for CO2), the loss of biodiversity or the condition of the landscape.
- Assumes that practices in agriculture, livestock and forestry are sustainable and does not consider the impacts associated with water use, rather than direct land occupation by dams and water infrastructure and the energy associated with the management of the water cycle .
- Compares human demand on biodiversity with the world's natural capacity to meet this demand. Serves as an indicator of human pressure on local and global ecosystems but does not indicate the intensity with which biologically productive areas are used. In 2008 humanity demand exceeded the rate of regeneration of the biosphere by more than double. This overshoot can cause depletion of ecosystems and the filling of waste dumps, and can negatively impact biodiversity. However, the footprint does not directly measure the latter impact, or specify the overshoot to be reduced to avoid negative impacts.
- The Ecological Footprint accounts indicate what has happened in the past, providing snapshots of past demand and resource availability. They do not predict the future. Thus, while the Footprint does not consider future losses caused by actual degradation of ecosystems, if it persists in future, it may be reflected in accounts as a reduction in biocapacity.
- The footprint can make a quantitative description of ecological resources used by an individual or a population, but does not recommend what should be used. Resource allocation is a political issue, based on social beliefs about what is fair or not. While footprint accounting can determine the average biocapacity available per person, it does not stipulate how that biocapacity should be allocated among individuals or countries. However, it provides a context for such discussions.

The Stiglitz report summarises the assessment of this indicator as follows: *"The ecological footprint could have been an option for this type of tracking. ... However, the group noted its limitations and, in particular, that it is far from a pure physical indicator of pressure on the environment: it keeps aggregation norms that may be problematic. In fact, much of the information transmitted on contributions to statewide unsustainability is based on a more simple indicator, the carbon footprint, which is therefore a good candidate for monitoring the pressure of humanity on climate."*

The educational value of the ecological footprint concept is that it makes two linked realities evident that fall outside the scope of intuition. First, that the typical lifestyle of the world's richest countries cannot be extended to all its inhabitants. Second, that a sustainable global economy demands from that wealthy minority a reduction of their consumption, and of their standard of living, to the extent that it cannot be offset by an equivalent increase in the efficiency of production processes.

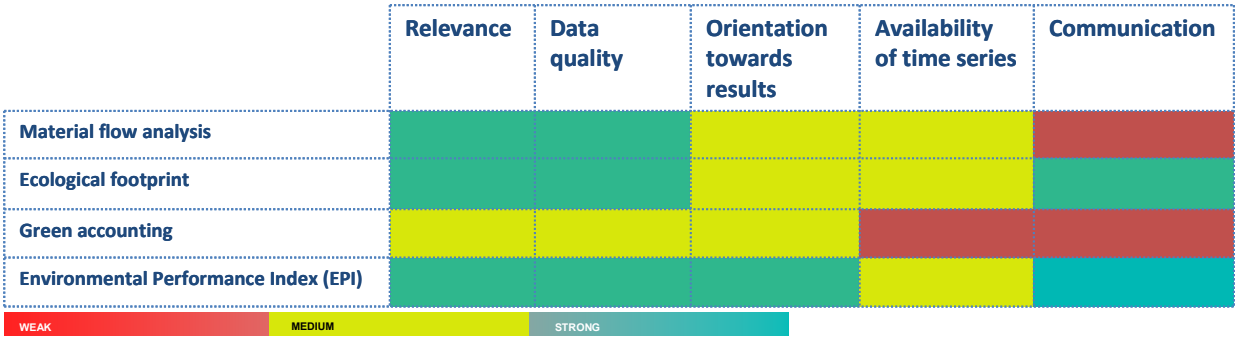
Evaluation of Environmental Index for Basque Country

On the basis of the following criteria, an approximation to the adequacy of existing environmental indexes is to be established:

- **Relevance:** Reflecting environmental sustainability in a way that is applicable to different territories (country/region/municipality) under a wide range of circumstances and provides a synthesis of empirical data on indicators of environmental conditions or the results of the specific issue, or have the data for the best possible approximation for these outcomes.

- **Quality of data:** It is based on data or scientific information and proven critical United Nations or other institutions responsible for data collection understandable for monitoring progress towards environmental sustainability. The data must represent the best measure available verifiable, and whenever possible, the index should be based on existing statistical data in either official sources or, alternatively, in other agencies, institutions, associations, etc.., whose prestige in the field in question is publicly acknowledged.
- **Orientation towards results/objectives:** Indicators in the index are linked to environmental policy objectives, so that the index becomes a management tool that allows giving responsibilities to actors in the formulation and implementation of policies. That is, to synthesize knowledge for decision-making.
- **Availability of time series:** Make it measurable and possible to analyse time series and upgradeable at a reasonable cost. Should be possible to use the index to analyze over time the progress towards environmental sustainability and prevent or correct negative trends.
- **Communication.** That users become familiar with its presentation and meaning, so that they are easily understood and interpretable by all stakeholders, being capable of being understood by the vast majority of the population.

The following table shows the valuation of different environmental indexes with the above criteria:



Source: Compiles by the authors.

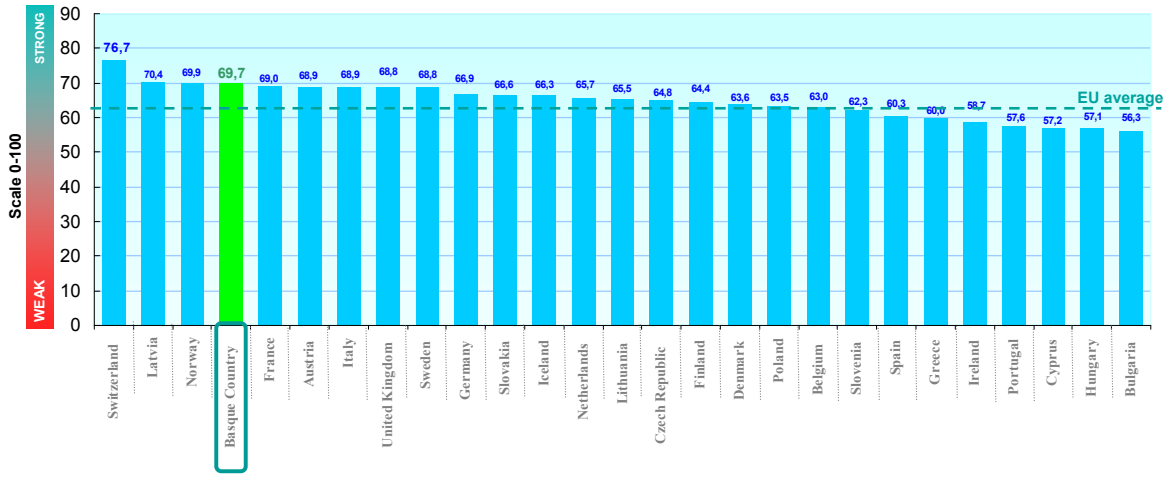
In summary, at present there is at global level no scientific and political consensus sufficient to fix the index which holistically covers the complexity and variety of environmental policy. However, the EPI can be considered one of the best existing indexes, noting especially his focus on results. In the coming years we will require greater methodological efforts and practical experience to perfect the weaknesses of these indexes but it is clear that the exercise of their calculation and comparative analysis represents a substantial advance in the overall measurement of the environmental sustainability of an area.

PART 3. EPI BASQUE COUNTRY 2013 RESULTS

Based on the established methodology for calculating the Environmental Performance Index-EPI-(see Annexes A1 and A2) and establishing criteria of approach based on the expert knowledge of the writing team, the following graphs summarize the main results obtained for Basque Country and its positioning with other countries.

Figure 1 shows the EPI for Basque Country 2013 which reached 69.7 points, ranking fourth in relation to European countries, whose average EPI is 64.6 points. We conclude that Basque Country is currently positioned in the leading group in Europe in terms of environmental outcomes.

Figure 1. Environmental Performance Index (EPI) in Europe



The following tables present the scores and global rankings (with the 132 countries surveyed) and the position of Basque Country in both the Environmental Health and Ecosystem Vitality objectives. As can be seen the economically developed countries/regions achieve a maximum score of 100 or close to 100 in the Environmental Health objective (high correlation with GDP per capita). Therefore, in order to improve, the magnifying glass will focus on the Ecosystem Vitality Objective and observe the positioning of Basque Country in each of the seven policy categories established in this objective.

RANKING EPI 2012

	Country	EPI points
1.	Switzerland.....	76.6
2.	Latvia.....	70.3
3.	Norway.....	69.9
4.	Basque Country	69.7
5.	Luxembourg	69.2
6.	Costa Rica...	69.0
7.	France.....	69.0
8.	Austria.....	68.9
9.	Italy.....	68.9
10.	United Kingdom	68.8
11.	Sweden.....	68.8
12.	Germany.....	66.9
13.	.....	.....
32.	Spain.....	60.3
33.	.....	.....

OBJECTIVE RANKING ENVIRONMENTAL HEALTH 2012

	Country	EV points
1.	Norway.....	100
2.	Luxembourg	100
3.	Italy.....	100
4.	Sweden.....	100
5.	Iceland.....	100
6.	Finland...	100
7.	Canada.....	100
8.	Cyprus.....	100
9.	Singapore...	100
10.	Basque Country	100
11.	Austria	98.9
12.	Germany...	98.9
13.	Denmark	98.9
14.	Spain.....	98.9
15.	.....	.....

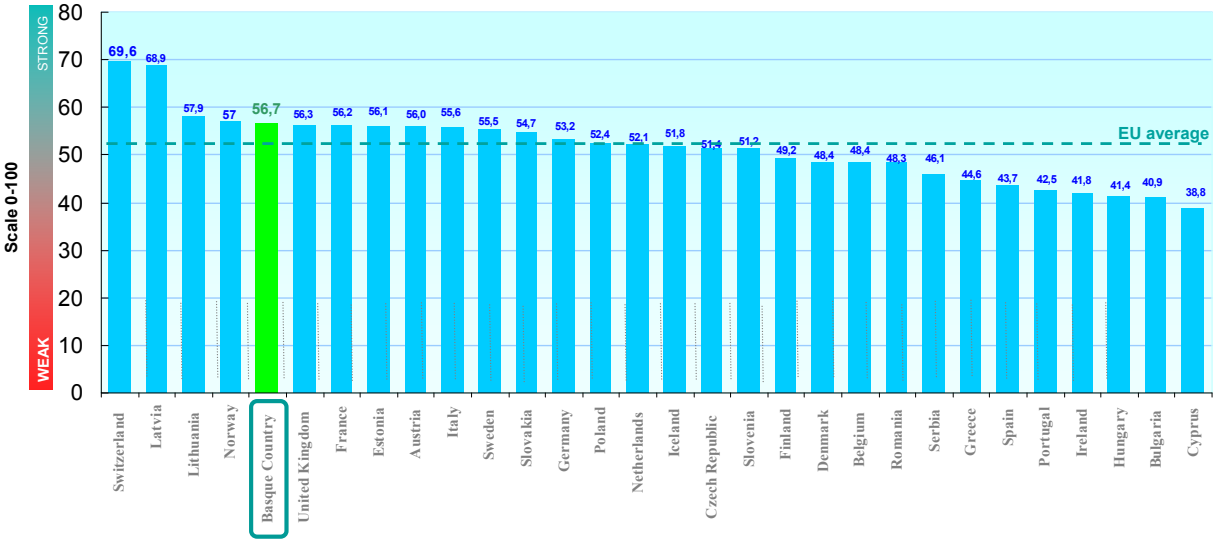
OBJECTIVE RANKING ECOSYSTEM VITALITY 2012

	Country	EV points
1.	Switzerland.....	69.6
2.	Zambia....	69.4
3.	Latvia...	69.9
4.	Gabon.....	66.7
5.	Nepal.....	66.5
6.	Costa Rica...	65.9
7.	Tanzania.....	65.7
8.	Cambodia.....	65.5
9.	.....	....
31.	Basque Country....	56.7
32.	United Kingdom	56.2
33.	France.....	56.2
34.	.....	.....
83.	Spain.....	43.7
84.	.....	.....

As shown in the above table, Basque Country is globally ranked at position 31 for Ecosystem Vitality, with a total of 56.7 points out of a possible 100, in line with countries like France and the UK.

Sticking to the European context, **Figure 2** shows the results obtained in this area of Ecosystem Vitality. With a European average of 52 points, Basque Country is in fifth place with 56.7, behind Switzerland, Latvia, Lithuania and Norway.

Figure 2. Objective of Ecosystem Vitality (EV) in Europe



The details for Basque Country and comparison with each of the 7 established policy categories in the area of Ecosystem Vitality are presented below. It can be seen in the sections for Fisheries, Water Resources and Energy and Climate Change, that these are our greatest weaknesses in relation to the objectives, since we do not reach 50% in them, in line with the general situation in Europe. Therefore, it is the policies that make up this target where the greatest potential for improvement is found.

Ecosystem Vitality Objective

Environmental policies	European average results	Results in Spain……..	Results in France……..	Results in Basque Country
04. Air (Effects on ecosystems)	52.7	33.8	54.9	58.1
05. Water resources (Effects on ecosystems)	32.1	5.7	30.7	30.6
06. Biodiversity & habitat	78.1	74.2	80.8	93.5
07. Agriculture	43.5	20.8	52.4	48.0
08. Forests	81.4	84.7	85.4	93.9
09. Fishing	18.4	19.0	32.2	18.9
10. Climate change and energy	37.8	39.5	44.6	35.4
Ecosystem Vitality total	52.3	43.7	56.2	56.7

In particular, the policies of Fisheries and Water Resources require greater depth in its detail from expert knowledge to obtain greater detail, as the results come from assimilation and approximations of the results of Spain and France, along with data from recent reports by the European Environment Agency regarding the fishing stock. In Water Resources (*Change in amount of water*) the European countries that have the best results are: Austria, Switzerland, Finland, Estonia, Ireland and Iceland. In the section on Fishing (*Fishing pressure and overexploitation of coastal fisheries stock*), no European country scores over 50 points, the best results being: Bulgaria, Cyprus, Romania and Finland.

However, in the results in the section "*Climate change and energy*" countries such as Iceland, Switzerland, Sweden, Norway and Latvia are the only ones over 50 points. Basque Country shows comparative weaknesses in terms of CO2 emissions per capita and per kilowatt, as well as the percentage of total net generation of renewable electricity. Those with the lowest scores are: Estonia, Luxembourg y Serbia. Delving deeper into this climate change policy, in the contribution of renewable energy standout countries are Iceland, Norway, Austria and Latvia, whereas countries such as Malta, Cyprus and Lithuania are located at the bottom of the table. Regarding GHG emissions relative to GDP, countries such as Switzerland, Sweden, Iceland, Norway and France are positioned at the top, while Serbia, Estonia and Bulgaria are at the bottom.

Finally, it is interesting to note the existence of a correlation between the results obtained through the EPI index and the periodical analyses that have been conducted on the quality of the environment in Basque Country, mainly recorded in the reports on the state of the environment and environmental profile. The graph shows that there is such a correlation but interesting nuances are also observed because the reports indicated went deeper with a larger battery of indicators for each area of environmental performance.

Relationship between EPI and environmental status in the Basque Country results

Source: Compiled by the authors based on the Basque Environment Agency's status of environmental areas in Euskadi.

In summary, we can conclude that the EPI Basque Country 2013 first presents a picture of the performance of the environmental policy that largely adequately reflects the current situation of environmental quality linked to objectives, and on the other hand, Basque Country has some results on the EPI index ranking among the most advanced countries, our greatest weakness being found in their relative weight in aspects related to climate change and energy and fishery resources.

PART 4. EPI TREND ESUKADI 2000-2010: EVOLUTION AND EVALUATION.

The EPI Trend is based on the same frame of EPI indicators and measures performance changes over a period of time. It reflects the rate of improvement or worsening where a zero result would be no change.

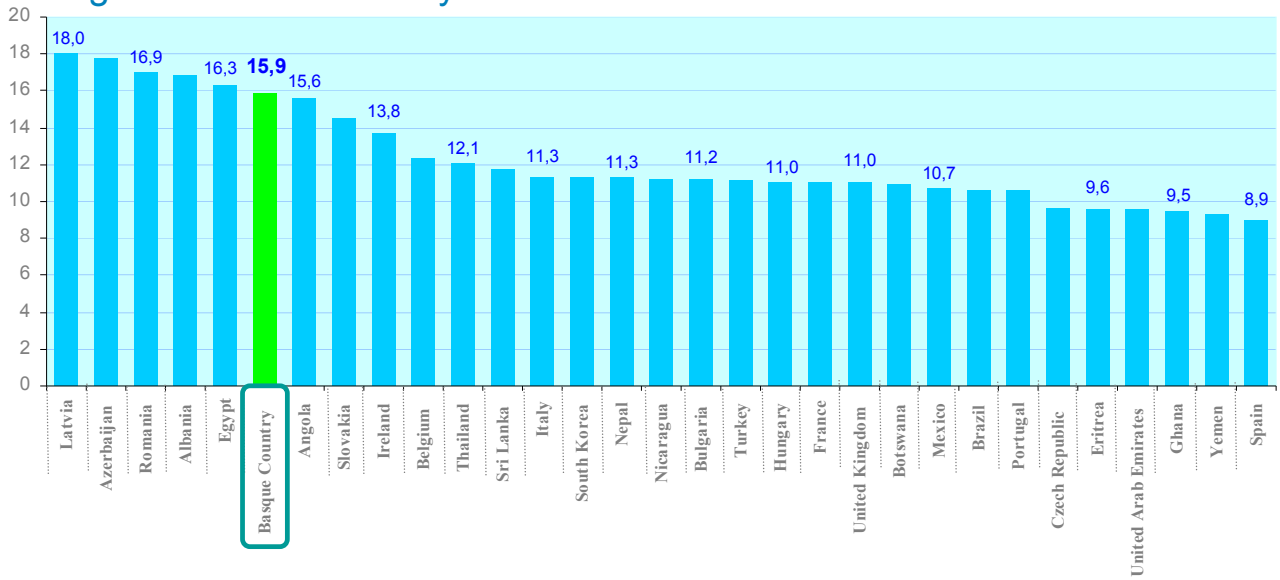
By EPI Trend we can assess progress over time in the environment, as well as measuring the effectiveness of policies to address issues related to performance. Keep in mind that indicators are themselves variable, (for example, the loss of forests) and for the calculation of indicators for which a full time series is not available, a linear regression is performed. (See details in Annex 1).

The 2000-2010 Trend EPI ranks countries on the change in environmental performance over the last decade and shows which countries are improving or deteriorating in terms of environmental performance. General Trend EPI analysis reveals significant improvements for many countries in a significant number of areas. For example, the Environmental Health objective global trends shows a decline in child mortality and increasing access to sanitation and drinking water. However, there are persistent challenges in the Ecosystem Vitality target area. In particular, with regard to climate change, emissions of greenhouse gases continue to rise worldwide with few countries on a path towards sustainable emissions.

Figure 3 shows the results obtained in the EPI Trend from 2000 to 2010 for the 32 countries with the highest score. Analysing only the ranking of European countries, a bloc of countries can be seen at the top, such as Latvia, Romania, Slovakia, Ireland and Belgium. Another block would cover intermediate positions such as Hungary, France, UK, Portugal and Spain. A third block would contain positions above 50 in the ranking, such as Denmark, Germany, Norway, Austria, Switzerland. Finally, above the 100th position are countries like Luxembourg, Poland, Serbia, Cyprus and Estonia.

Basque Country, with 15.9 points is in 6th place in the EPI Trend, ie. among the countries that have progressed to a greater extent in environmental matters in the last decade. We conclude therefore that policies in the Basque Country during the past few years have been highly effective from the point of view of progress towards environmental goals.

Figure 3. EPI Tendency 2000-2010



Keep in mind that the data for Basque Country being used to calculate the EPI Trend is the latest available, but as a trend indicator, whose main purpose is to reflect that the Basque Country in the last decade has seen a remarkable improvement in environmental performance.

In explaining which areas have contributed to this positive EPI Trend for Basque Country between 2000 and 2010, we would have to highlight three aspects:

- **Reduction by more than half the tons of SO2 emitted into the atmosphere.** In the year 2000, 43,435 tons of SOx were emitted, of which 91% came from three processes: Combustion in energy production and processing, industrial combustion plants, and industrial processes without combustion. In 2010 a total of 17,067 tons (2.5 times lower than that of 2000) was emitted, with a 70% reduction in combustion in energy production and processing, mainly due to improvements in processes at Petronor and at power plants in Pasaia and Santurtzi. For reference, European countries which have outstanding results in reducing SO2 emissions relative to GDP are: Hungary, Latvia, Slovenia and Ireland.
- **Significant reduction in CO2 emissions from energy.** In the period 2000-2011, the total CO2 emissions due to combustion in Basque Country have dropped by 18% from 21,064 kton CO2 equivalent in the year 2000 to 17,281 in 2011. In the same period, GDP increased by 25% and energy consumption by 4%. This implies greater efficiency of Basque socioeconomic sectors (lower energy intensity) and greater environmental efficiency of energy use (cleaner energy). The emission intensity (GHG emissions / GDP) has decreased by 35% which clearly demonstrates the increased efficiency due to the aforementioned factors. Analysing the reduction of CO2 emissions, it was noted that the greatest reduction occurred in the "transformation of energy" sector. On the one hand, imported electricity is reduced, being replaced by domestic production (the self-sufficiency rate rises from 20 to 40%), which has been based to an increasing degree on combined cycle cogeneration, renewable energy and less coal/fuel oil. Therefore, despite increased production, emissions were reduced. On the other hand, imported electricity (national network) has also undergone an improvement in production through renewables supported by combined cycles, reducing fuel oil and coal. European countries who in the decade of analysis have most improved their intensity of CO2 emissions are: Slovakia, Ukraine, Romania and Bulgaria.
- **Doubled protection of the terrestrial biome.** Basque Country in 2000 had nearly 12% of its territory protected. The initial steps in the implementation of the Natura Network Basque Country 2000 occurred in 1997, 2000 and 2003, when 6 Special Protection Areas for Birds (SPAs) were declared and 52 spaces were proposed to be designated as Sites of Community Importance (SCI). These SCI were taken to the European Commission, which approved and designated them as Sites of Community Importance (SCI) for the Atlantic and Mediterranean biogeographical regions respectively, to which the Basque Country belongs. These decisions of the European Commission have undergone several upgrades and currently 22.7% of the area of the Basque Country is integrated into the Natura 2000 Network. European countries that have protected their biome in recent years are: Iceland, Belgium, Greece, Slovenia and Italy.

The following table shows the relationship between the results of the 2000-2010 evolution of the environment in Basque Country that we have seen reflected in the different State Reports for the Environment (2001, 2004 and 2009) and the EPI Trend Basque Country 2000-2010. It can be seen that both analyses show very similar results, confirming the consistency of both approaches.

Relationship between the environment status evolution and the EPI Tendency in Basque Country

Environmental policies	Status evolution 2001-2009	EPI Tendency 2000-2010
01. Environmental health		
02. Air (Effects on human health)		
03. Water (Effects on human health)		
04. Air (Effects on ecosystems)		
05. Water resources (Effects on ecosystems)		
06. Biodiversity & Habitat		
07. Agriculture		
08. Forests		
09. Fishing		
10. Climate change and energy		

Environment status evolution Basque Country 2001-2009

- *Advance or positive tendency*
- *Some advances or crossed tendencies*
- *Advance or negative tendency*

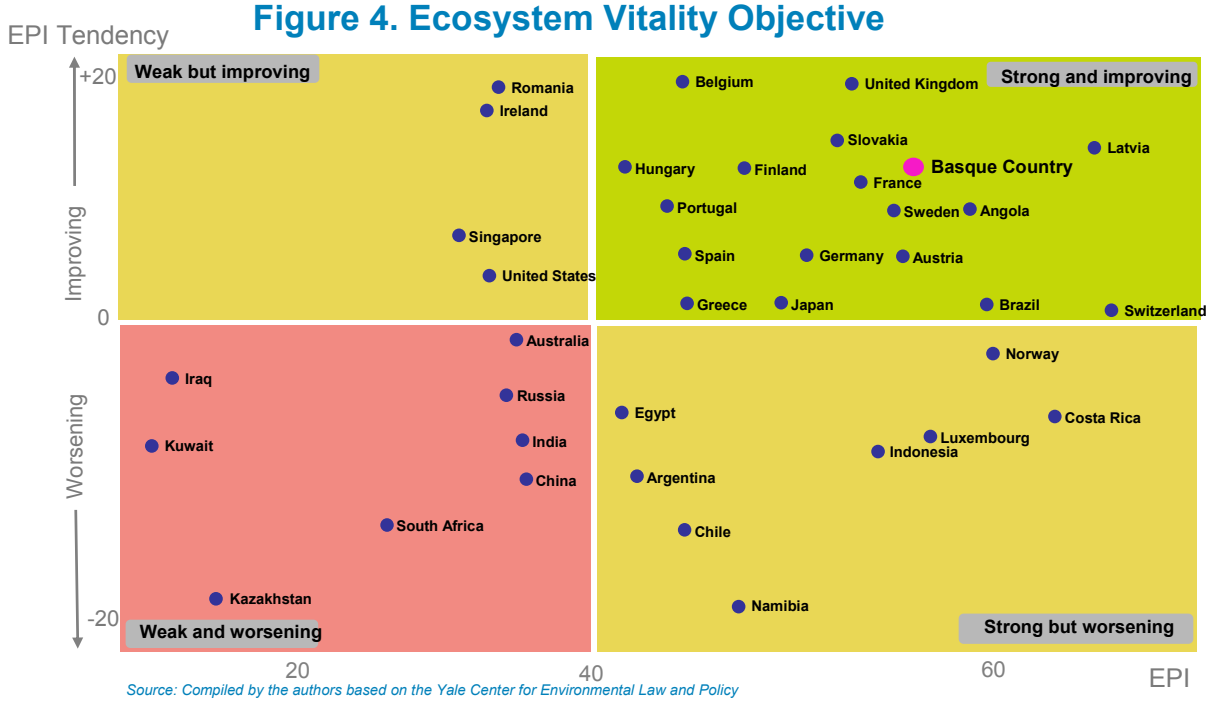
EPI Tendency 2000-2010

- *Over 10 points for range policies (50-50) and over -15 for the rest.*
- *Between +10 and -15 points for range policies (50-50) and between -15 and -30 for the rest.*
- *Under -15 points for range policies (50-50) and under -30 for the rest.*

Source: Compiled by the authors.

Finally, **Figure** 4 shows the relative position of countries in the Ecosystem Vitality Objective, relating the result of EPI to its trend. It can be seen that there are a significant number of European countries in the quadrant of "*Strong and Improving EPI*". Basque Country is in the Improving High EPI quadrant, reflecting the significant efforts made in the last decade, and is above countries like France, Sweden, Germany, Austria or Spain.

Figure 4. Ecosystem Vitality Objective



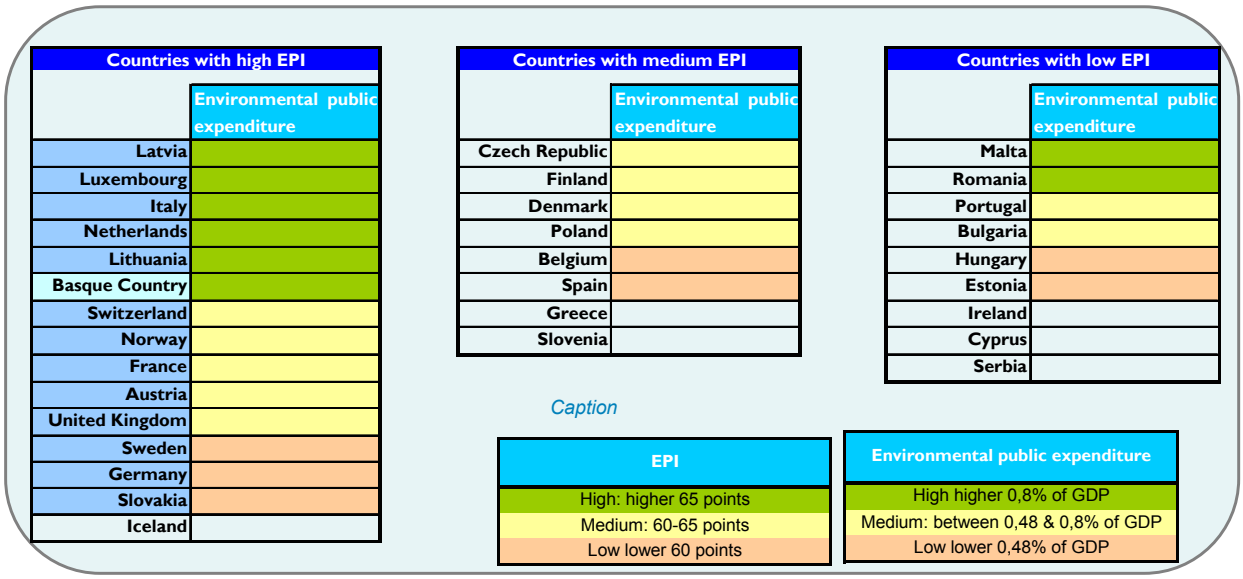
Source: Compiled by the authors based on the Yale Center for Environmental Law and Policy

PART 5. RELATIONSHIP AND SPENDING INDEX EPI ENVIRONMENTAL PROTECTION

Having analyzed the results of the EPI index and its trends, the question arises whether there is a direct relationship between the results of these indexes and the expenditure made by the Public Administration in the protection of the environment, that is, between the economic efforts undertaken by the public sector and the results obtained. This analysis is performed by adhering to the European standard with official statistics collected by Eurostat in the category of Environmental and Energy by country.

Figure 5 shows this relationship for Europe. Among the first group of countries, those with High EPI index (above 65 points), some spend a high percentage of GDP on the environment. One of these is the Basque Country. Meanwhile, others such as Sweden, Germany and Slovakia are being more efficient, low public spending producing high yields. On the other hand, in the group of countries with low EPI, heterogeneity is also seen in the economic effort, with countries like Malta and Romania. It is noticeable that despite important efforts in environmental public expenditure, they have achieved less than optimal results.

Figure 5. Relationship between public sector environmental protection expenditure and EPI levels



Source: Compiled by the authors based on Eurostat and the Yale Center for Environmental Law and Policy

We can conclude from this comprehensive review that there is a low correlation between the amounts of public money devoted to environmental protection and performance tied to the objectives obtained. It is necessary to dig deeper into the details, based on the objectives set at EU level, but this approach offers guidelines to compare and improve performance in order to maximize the effectiveness of resources. Thus, Basque Country could delve into the policies and tools in countries like Germany, Sweden, France and Austria to improve its efficiency.

PART 6. CONCLUSIONS AND KEYS TO THE FUTURE

Conclusion 1. The Environmental Performance Index (EPI) is a good approximation to the complexity of measuring environmental sustainability.

Although currently there is no sufficient scientific and political consensus to set an index holistically which collects the complexity and variety of environmental sustainability, progress is needed in its measurement to promote better policies to run . The EPI can be considered one of the best existing indexes, especially in its focus on results. However, in its analysis it should not be forgotten that this index does not adequately capture specific dimensions of typical environmental problems in industrialised countries (eg water pollution and soil or waste management), thereby offering an optimistic vision of developed countries and regions and reducing its illustrative power.

In the coming years we will require greater methodological efforts and practical experience to perfect the weaknesses of these indexes, but it is clear that the exercise of their calculation and comparative analysis represents a substantial advance in the overall measurement of the environmental sustainability of an area.

Conclusion 2. Basque Country takes its place in the vanguard of environmental performance.

After analysis of the 22 performance variables which cover questions from environmental health, air pollution, protection of biodiversity or climate change, it can be concluded that Basque Country sits in the top group (4th position in the international ranking) of advanced countries in environmental performance matters linked to the established international goals. This good position globally and at European level is very positive but it should not lead to complacency as this metric is a rough outline for comparison among all countries. Europe has been leading global environmental policies for more than 30 years and therefore would be appropriate to conduct studies in greater detail to suit the ambitious targets set by the European Union for 2020.

From another perspective, the EPI offers the strengths and weaknesses of our environmental policy, reflecting the environmental issues that are being addressed more successfully and those that are less pleasing. The strengths for Basque Country are found in the objectives of environmental health (for example, the level of particles and drainage) and in policies such as protection of biodiversity, habitat and forests. The main weaknesses arise from the pressure of fishing and the over-exploitation of the fishing stock, as well as CO2 emissions per head and the percentage of net generation of renewable electricity.

In summary, we can conclude that the EPI initially presents a picture of the performance of the environmental policy that adequately reflects the current situation of environmental quality linked to objectives, while Basque Country has some results on the EPI index ranking among the most advanced countries, our greatest weakness is found in their relative weakness in aspects related to climate change and energy and fishery resources.

Conclusion 3. In the last decade Basque Country has made very significant advances in the improvement of its environmental quality.

The EPI Trend reflects the rate of improvement in environmental performance experienced in a particular period; the rate at which progress has been made in achieving the objectives. The comparative result of the EPI Trend between 2000 and 2010, in which the Basque Country ranks sixth, concludes that progress in environmental performance has been very significant, placing us among the countries that to a great extent have thrived in this past decade in environmental matters.

Environmental policies in the Basque Country in recent years, directly related to European policies, have proved highly effective (cost-effectiveness) from the point of view of progress towards the objectives. The three areas which have made the greatest contribution to this positive EPI Trend in Basque Country are:

- ✓ The reduction by more than a half in tons of SO2 emitted into the atmosphere, falling from 43,000 tons of SOx emitted in the year 2000 to 17,000 in the year 2010.
- ✓ The outstanding reduction in CO2 emissions derived from energy, going from the equivalent of 21,000 kilotons of CO2 in the year 2000 to a total emission of CO2 due to combustion of 17,000 in the year 2011. In the same period, GDP increased by 25% and energy consumption by 4%.
- ✓ The very significant increase in protection of the terrestrial biome, from 12% of the area protected in 2000 to the almost 23% of the area which is now integrated in the Natura 2000 network.

Conclusion 4. It is possible to improve the effectiveness of public spending on the environment.

There is a low correlation between public financial amounts involved in protecting the environment and performance objectives obtained. Countries with a high EPI index (of which Basque Country is one) devote a high proportion of the GDP to environmental costs, while other territories are being more efficient, because they achieve high performance with lower public spending. This approach gives us guidelines to compare and improve performance in order to maximize the effectiveness of resources.

Keys to the future 1. The EPI index improved to increase the environmental performance of regions in Europe.

From a global point of view, a comparison between EPI and EPI Trend shows persistent gaps in environmental management and governance over time. In general, the countries show progress towards the goal of Environmental Health at all levels of performance. However, regarding Ecosystem Vitality, the results are much more varied. Some countries are improving, but many are not. And a disturbing number of countries are low in the rankings and descending.

However, as noted, from a more local view this index requires more academic precision work for developed areas if we want it to become a benchmark for measuring the environmental dimension. Territories of the European Union such as regions can use this index if its methodology is complemented by indicators that are not currently addressed, such as the quality / pollution of water and soil, the flow of materials and reuse and waste management, and if it is tailored to the goals set by the Union. This could become a benchmark for comparison and improvement between regions, promoting the exchange of experiences and analysis of successes and failures.

Keys to the future 2. The EPI as a tool for the new environmental policy of the 21st Century

The EPI focuses on environmental health and ecosystem vitality objectives and includes fundamentals of the 21st century international debate, such as climate change and biodiversity protection. However, this is no longer enough to achieve the necessary changes, and the drastic reduction of consumption of natural resources is also presented as a pressing problem.

The Basque Government, through the new Environmental Framework Program which is under development in 2015-2020, will address these issues based on objectives such as ensuring and improving environmental quality of Basque Country and will help through environmental policy to improve public health, protect natural capital and increase the general welfare of the citizenry. Tools like the EPI are fundamental to measure, contrast and optimise the efficacy and efficiency of public resource use.

How to guarantee prosperity to move towards an economy with a low carbon footprint and more efficient in terms of natural resource use, and what it means for the competitiveness of the productive activity, is analyzed in a different report about sustainable competitiveness in Basque Country, which will be published in 2014.

Annexes

A1. **Environmental Performance Index (EPI). Methodology and results.**

A2. **Summary of the methodological fact sheets of the 22 EPI indicators**

A3. **Environmental indicators in Europe**

Annex 1 Environmental Performance Index (EPI)[4]. Methodology and results.

20 years after the Earth Summit in Rio, governments are still trying to demonstrate the improvements in environmental policy through quantitative indicators on pollution control and the management of natural resources. With budgetary constraints worldwide, governments are facing increasing pressure to show tangible results from their investments in the environment.

The Yale Center for Environmental Law and Policy (YCELP) and the Center for Earth Information Science Information Network (CIESIN) of the University of Columbia responded, for the first time, to this need in the year 2000, presenting the *Environmental Sustainability Index*. This index, the predecessor of the Environmental Performance Index (EPI), was launched as a complement to the Millennium Development Goals and a counterpoint to the Gross Domestic Product (GDP), which had for a long time been the only measure of wellbeing. The objective of the Environmental Sustainability Index was to provide a scientific and quantitative metrics as an aid to achieving long-term sustainable development goals. While the Millennium Declaration includes environmental sustainability as an objective, it contained virtually no relevant quantitative indicators to support this goal - in contrast to other objectives such as poverty reduction, health and education. The Environmental Sustainability Index, published the same year, helped address the lack of relevant quantitative indicators to support the MDGs and governments around the world to incorporate environmental sustainability into their political objectives.

This index was a first attempt to classify countries on 76 different elements of environmental dimension of sustainability, including natural resource endowments, levels of past and present pollution, environmental management efforts, contributions to protection commons, and the ability of society to improve environmental performance over time. This broad scope ultimately limited the usefulness of the index as a pragmatic guide for the use of policymakers.

To address this challenge, in 2006 the research team from the Universities of Yale-Columbia switched to the **Index of Environmental Performance (EPI)**, which focuses on a smaller set of environmental issues on which governments can provide accounts. The EPI offers signs of indicators oriented towards results and based on the best available data about the main political aspects. In addition, this index seeks to promote action through transparent and easily visualised metrics that enable political leaders to see the strengths and weaknesses of the performance of their country or territory compared to similar countries or territories. The analysis focuses on two overarching environmental objectives: 1) reducing environmental stresses on human health and 2) promoting ecosystem vitality and sound natural resource management.

Applying these strict criteria to the index allowed us to compute the "***EPI Trend***" that measures environmental performance over time and allows monitoring in the future. The EPI Trend ranks countries on the change in environmental performance over the last decade and shows which countries are improving their environmental performance with time and which countries are reducing it. Via the EPI Trend countries are able to evaluate their advances in environmental matters over time, as well as measuring the efficiency of policies applied to cope with questions related to their performance.

Main methodological aspects:

The EPI is based on two main objectives of environmental policy:

1. Environmental Health, which measures environmental pressures on human health, and

[4] Emerson, J.W., A. Hsu, M.A. Levy, A. de Sherbinin, V. Mara, D.C. Esty, and M. Jaiteh. 2012. 2012 Environmental Performance Index and Pilot Trend Environmental Performance Index. New Haven: Yale Center for Environmental Law and Policy.

2. Ecosystem Vitality, which measures the health of ecosystems and the management of natural resources.

The EPI evaluates the countries/territories using 22 indicators of performance which cover ten categories of policies, reflecting facets of both environmental health and ecosystem vitality. These environmental policy categories are:

Categories of environmental policy reflected by the EPI	
11. Environmental Health 12. Water (effects on human health) 13. Air pollution (effects on human health)	14. Air pollution (effects on the ecosystem) 15. Water Resources (effects on the ecosystem) 16. Biodiversity and Habitat 17. Forests 18. Fishing 19. Agriculture 20. Climate Change and Energy

Next the general framework of the Environmental Performance Index EPI 2012 is collected where the alignment of the aims is observed with the established categories and their indicators. The summary of the methodological fact sheet of each one of the 22 indicators can be seen in Annex 1.

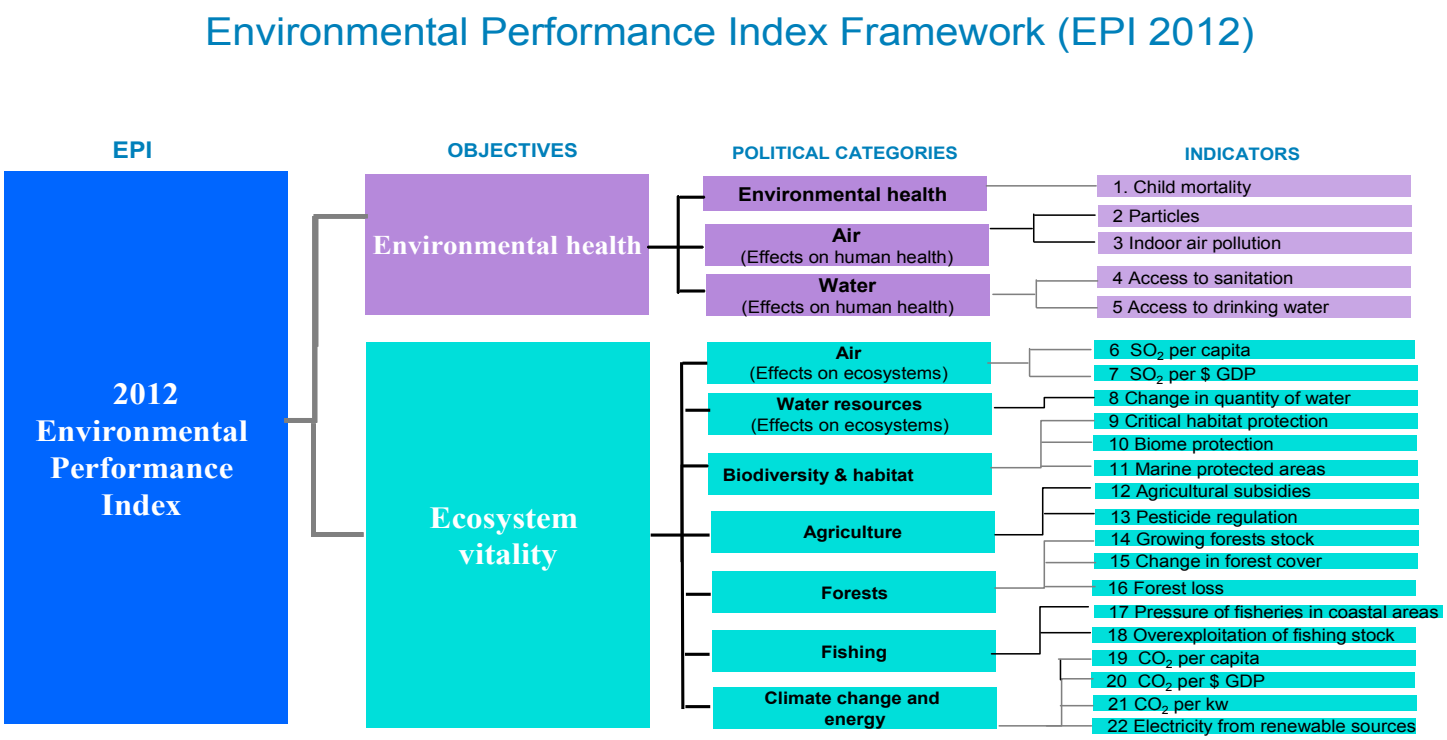


Figure 1. General framework of the Environmental Performance Index 2012.

An important aspect of this index is based on a **methodology of approach to the objective**, by which the performance of each country / territory in each of the indicators is measured based on their position within a range set by the country with the lowest yield (equivalent to 0 on a scale of 0 to 100) and the objective (equivalent to 100).

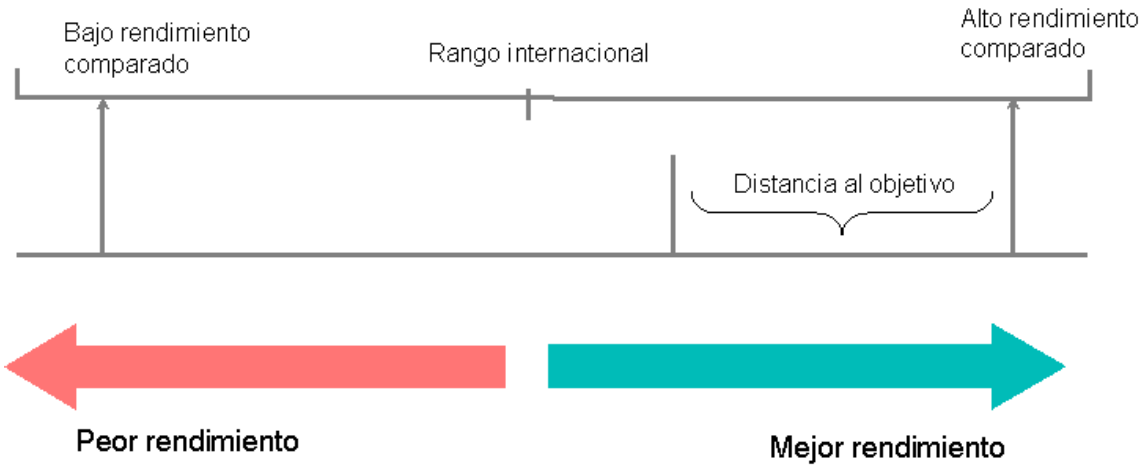


Figure 2. Diagram illustrating the methodology of approach to the objective used to calculate performance indicators. "Best" and "Worst" are relative terms only and refer to the distance to the objective.

$$\frac{(\text{Rango internacional}) - (\text{Distancia al objetivo})}{(\text{Rango internacional})} \times 100$$

For example, the score for the Sanitation Access indicator (ie, the percentage of population with access to adequate sanitation) is calculated as follows:

- The goal is 100% access to sanitation.
- The country with the worst outcome could have 5% of the population with access to adequate sanitation.
- Another country might have 65% access to sanitation.
- The international range is 100-5 = 95.
- For the country with 65% access to sanitation, the approach to the objective score is calculated as follows: (95-35/95) x 100 = 63.1.

As the objectives are essential for calculating the indicator, for identification purposes international targets have been used (for example, from environmental treaties or global organisations like the World Health Organisation), as well as scientific criteria and the opinion of experts. In the EPI, to reach or exceed the target is equivalent to a score of 100 on a scale of 0-100. It is also necessary to establish the point of "compared underperformance", which is the lower end of the range of EPI (equivalent to 0 on the 0-100 scale). The point of "compared underperformance" is usually set by the country with the worst performance in that particular indicator, but can also be used to establish the 95th percentile benchmark.

Objectives have been established for EPI 2012 using five sources:

- objectives of treaties and international agreements;
- standards set by international organisations;
- major state regulatory requirements;
- technical criteria based on the established scientific consensus and
- ranges of values observed in the data throughout the duration of the time series.

The EPI Trend is based on the same framework of indicators as the EPI 2012. The trend takes advantage of available historical data to measure performance changes from 2000 to 2010. In some cases there is no time series available, for example in the political category of Water Resources. In other cases, the same indicators are variable rate (eg, loss of forests) and could be used directly. For each indicator which has a significant time series, a model of simple linear regression of annual results and its proximity to the objective to determine the rate of improvement or deterioration in each indicator is used. This number is then translated into a score between -50 to 50, where 0 represents no change. The extremes (50 is the "best" improvement and -50 represents the steepest decline) are based on the results of trends, indicator by indicator. For the few indicators that are already indicators of change (loss of forests, growing forests stock, Change in Forest Cover and change in the amount of water), the range of scores of the trend is from -50 to 0.

The aggregation of individual indicator categories and the objectives of the policy proceed with the same methodology and EPI weights. However, the aggregation of policy objectives to create the EPI Trend uses different weights to help maintain a balance between trend performances in Environmental Health and Ecosystem Vitality.

Main findings and conclusions:

RANKING EPI 2012

1.	Switzerland
2.	Latvia
3.	Norway
4.	Luxembourg
5.	Costa Rica
6.	France
7.	Austria
8.	Italy……..
9.	United Kingdom
10.	Sweden
11.	…..
12.	…..
32.	Spain
125.	India
126.	Kuwait
127.	Yemen
128.	South Africa
129.	Kazakhstan
130.	Uzbekistan
131.	Turkmenistan
132.	Iraq

EPI TREND RANKING (2000-2010)

1.	Latvia
2.	Azerbaijan
3.	Romania
4.	Albania
5.	Egypt
6.	Angola
7.	Slovakia
8.	Ireland
9.	Belgium
10.	Thailand
125.	India
126.	Kuwait
127.	Yemen
128.	Kyrgyzstan
129.	Estonia
130.	Bosnia-Herzegovina
131.	Saudi Arabia
132.	Kuwait
133.	Russia

- **The EPI ranking reveals a wide range in the results of environmental sustainability.** Many countries are making progress in at least some of the challenges they address. As an indicator of level, the analysis shows that some environmental issues are being addressed successfully worldwide. However, progress in some other challenges, including climate change, is declining.
- **Economic development matters.** Scores on the objective of Environmental Health show a significant relationship with GDP per capita, although there is a diversity of performance in each of the levels of economic development.

- **The pattern of results makes clear that environmental challenges come in many forms and vary with the specific circumstances of each country and the level of economic development.** Some resource difficulties and pollution problems arise from the impact of industrialisation, such as air pollution and increased levels of waste. These impacts greatly affect developed countries. Other challenges are commonly associated with poverty and lack of investment in environmental factors, such as access to safe drinking water and basic sanitation. These problems mainly affect developing countries.
- **There are countries at the tail end of EPI which have very outstanding results in the EPI Trend.** For countries that have been at the top of the EPI ranking in the past decade, the results of the trends are less significant. The overall ranking of EPI and EPI Trend, by themselves, can be seen only as indicative. Often, a more detailed view looking at the individual indicator level and the results of the political category is obtained.
- **General EPI Trend analysis reveals big improvements for many countries in a significant number of areas.** In the Environmental Health objective, global trends show a decline in child mortality and increasing access to sanitation and drinking water. However, there are persistent challenges in the Ecosystem Vitality target area. In particular, with regard to climate change, emissions of greenhouse gases continue to rise worldwide, with few countries on a path towards sustainable emissions.
- **A comparison between EPI and EPI Trend shows persistent gaps in environmental management and governance over time.** In general, countries show progress towards the goal of Environmental Health at all levels of performance. However, regarding Ecosystem Vitality, the results are much more varied. Some countries are improving, but many are not. And a disturbing number of countries are low in the rankings and descending.

Annex 2 Summary of the methodological fact sheets of the 22 EPI indicators

1. INFANT MORTALITY:

Description: Probability of dying between the first and fifth years of a child, per 1,000 children.

Rationality: This indicator is considered a useful approximation for underlining the environmental conditions, because the causes of mortality of children of 1-4 years of age are strongly influenced by environmental causes. The objective is set so that a score of 100 is given to countries with better realisation because higher levels of development means the causes of death of a child are less likely to be of an environmental nature.

Main sources:

http://esa.un.org/unpd/wpp/Excel-Data/mortality.htm
http://www.ine.es/jaxi/menu.do?L=0&divi=IDB&his=0&type=db

Basque Country observations:

Infant mortality rate (deaths/1000 1-4 years old)					
	1980-5	1990	2000	2005	2011
Basque Country	**3.01**	**1.9**	**0.19**	**0.17**	**0.17**
Spain	2.61	1.8	0.99	0.82	0.6

Source: INE/Eustat

2. PARTICLES:

Description: Levels of suspended particles. Population exposed to suspended particles of diameter less than 2.5 micrograms per cubic meter.

Rationality: Particulate matter, especially fine particles PM2.5, are the most significant air pollutant that damages human health (WHO 2011; Carnelley and Le 2001). The major sources of particles are related to the energy, transport and industrial sectors, but the open burning of agricultural waste solids and is also a major source. Global health research reveals that there is no safe threshold of exposure, since even very low levels can affect health (WHO 2006, 1999). The health effects are predominantly associated with respiratory and cardiovascular disease, but the range of effects is broad for exposure to both acute and chronic levels. Chronic exposure to particulate matter increases the risk of cardiovascular and respiratory diseases and lung cancer.

Main sources:

World Health Organisation: http://www.who.int/mediacentre/factsheets/fs313/es/

Air Quality Guidelines 2005: PM2.5 values set: 10 ug/m3 and 25 ug/m3 annual average 24-hour mean.

Basque Country observations:

Air quality network of Basque Country. Department for the Environment and Territorial Policy of the Basque Government.

3. INDOOR AIR POLLUTION:

Description: The percentage of the population that depends on a specific solid fuel as the main source of domestic energy for cooking (coal, wood, dung, crop residues and other agricultural residues, shrubs and straw).

Rationality: The burning of solid fuels indoors releases harmful chemicals and particles that represent an acute health risk. The use of solid fuels in households is associated with increased mortality from pneumonia and other acute lower respiratory illness among children, as well as increased mortality from chronic obstructive pulmonary disease and lung cancer (where coal is used) among people adult. (WHO 2011)
One study found that 4.6% of all deaths worldwide are attributable to acute infections of the respiratory tract caused by indoor fuel use (WHO, 2006).

Main sources:

World Health Organisation:
http://www.who.int/indoorair/en/index.html
http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=2267
http://ehs.sph.berkeley.edu/hem/?page_id=43

Basque Country observations:

No aspect differentiating from the State is contemplated.

4. ACCESS TO SANITATION:

Description: Access to adequate sanitation measures the percentage of the population of a country that has access to improved sanitation. This metric is useful for estimating the environmental risks that people face from exposure to poor sanitation. "Improved" sanitation technologies include public sewer connection or septic system, no public latrines, simple pit or pit latrine with improved ventilation.
Rationality: Human health depends largely on the resources of clean water and adequate sanitation. According to WHO, diarrhea is the disease most commonly attributed to the quality of the local environment, estimating that 88% of cases of diarrhea result from the combination of drinking water, inadequate sanitation and improper hygiene (WHO 2006). Environmental factors account for approximately 94% of worldwide diarrhea, a leading cause of death among children. A major source of diarrheal illness is contamination by fecal-oral pathogens that are caused largely by the lack of drinking water and sanitation facilities.
Main sources: WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation http://www.wssinfo.org/data-%C2%AD%E2%80%90estimates/table/
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

5. ACCESS TO DRINKING WATER:

Description: The percentage of the population of a country that has access to an improved drinking water source. An improved source of drinking water is defined as water pipes within the dwelling, plot or yard, excavated and protected well, protected spring and rainwater collection (UNICEF and WHO 2008).
Rationality: An improved source of drinking water is defined as water pipes within the dwelling, plot or yard, excavated and protected well, protected spring and rainwater collection (UNICEF and WHO 2008). Polluted water consumption-related diseases have a major impact on the health of people. A satisfactory supply of water (sufficient, safe and accessible) is essential to avoid the risk of outbreaks of intestinal diseases and other infectious diseases. Improved drinking water sources provide access to clean water supply, which prevents the spread of quality-related environmental illnesses such as diarrhea.
Main sources: World Health Organisation: http://www.who.int/water_sanitation_health/dwq/gdwq3rev/es/index.html
Basque Country observations: Health Department of the Basque Government.

6. SULPHUR DIOXIDE EMISSIONS (SO2) PER CAPITA:

Description: Emissions of sulfur dioxide (SO2) per capita represents the ratio of SO2 emissions in relation to the population (kg SO2/persona)
Rationality: The depositing of sulfur dioxide has negative effects on aquatic and terrestrial ecosystems, and in turn is detrimental to human health. It is the main cause of acid rain and degrades trees, crops, water and soil. The indicator is based on estimates of global emissions of sulfur dioxide from anthropogenic sources using a mass balance bottom-up method (Smith et al. 2010). Emissions of sulfur dioxide comes mainly from the use of fossil fuels for power generation, industry and transport, causing adverse effects on human health by contributing to emissions of PM2.5 in terrestrial ecosystems and freshwater acidification (Rodhe et al. 1995), on man-made materials and cultural heritage due to corrosion (Kucera et al. 2007), and biodiversity (Bobbink et al. 1998) and forestry (Menz and Seip 2004).
Main sources: Basque Government: http://www.ingurumena.ejgv.Basque Country.net/r49-estamapt/es/ http://databank.worldbank.org/data/home.aspx http://www.htap.org/
Basque Country observations: Pollutant Released to Air Inventory of the Autonomous Community of the Basque Country. Department for the Environment and Territorial Policy of the Basque Government.

7. SULPHUR DIOXIDE EMISSIONS (SO2) PER CAPITA:

Description: Emissions of sulphur dioxide (SO2) by GDP represents the ratio of SO2 emissions relative to GDP (PPP grams per U.S. $) (purchasing power parity: at constant 2005 dollars)
Rationality: The depositing of sulfur dioxide has negative effects on aquatic and terrestrial ecosystems, and in turn is detrimental to human health. It is the main cause of acid rain and degrades trees, crops, water and soil. The indicator is based on estimates of global emissions of sulfur dioxide from anthropogenic sources using a mass balance bottom-up method (Smith et al. 2010). Emissions of sulfur dioxide comes mainly from the use of fossil fuels for power generation, industry and transport, causing adverse effects on human health by contributing to emissions of PM2.5 in terrestrial ecosystems and freshwater acidification (Rodhe et al. 1995), on man-made materials and cultural heritage due to corrosion (Kucera et al. 2007), and biodiversity (Bobbink et al. 1998) and forestry (Menz and Seip 2004).
Main sources: Basque Government: http://www.ingurumena.ejgv.Basque Country.net/r49-estamapt/es/ http://databank.worldbank.org/data/home.aspx http://www.htap.org/
Basque Country observations: Pollutant Released to Air Inventory of the Autonomous Community of the Basque Country. Department for the Environment and Territorial Policy of the Basque Government.

8. CHANGE IN QUANTITY OF WATER:

Description: - The reduction in percentage of the average annual area of "natural" flow (pre-industrial) of the river due to water withdrawals and reservoirs. Water extraction and water consumption are estimated separately for the sectors of irrigation, livestock, homes and industry.
Rationality: Water withdrawals and management and dam construction have a negative impact on river ecosystems, wetlands and floodplains, affecting the biodiversity of aquatic ecosystems (Doll et al. 2009).
Main sources: http://sedac.ciesin.columbia.edu/news/browse
Basque Country observations: No differentiating aspect from France is apparent.

9. CRITICAL HABITAT PROTECTION:

Description: - The International Alliance for Zero Extinction identified species and hotspots for protection called AZE areas. The indicator shows the percentage of surface AZE areas within the study area that are protected.
Rationality: It is difficult to develop comparable indicators for species conservation in a country. This is partly due to the fact that in countries with large natural resources (eg, more endemic species), there are heavier conservation loads. In addition, species are assessed as threatened in terms of their global conservation status. Even if a country has a comprehensive measures to protect species in their territory, you could go wrong classifying with in an index that looks at the number of endangered species within their borders. Therefore, in a country with few species, endangered or otherwise, you may get a higher score, while a country with many endemic and endangered species that is working hard to preserve them could be penalised by a neighboring country that is doing little towards the conservation of biodiversity. The protection of critical habitat indicator in part addresses these issues by countries assigning responsibility for the protection of endangered species found in the Alliance for Zero Extinction (AZE) sites within its borders. The Alliance is a joint initiative of 52 organisations working for biodiversity conservation. It aims to avoid extinction by identifying and protecting key sites selected as the remaining refuges of one or more species, Endangered or Critically Endangered, identified by the criteria of the IUCN Red List. The standard provides a consistent IUCN designation approach for AZE sites worldwide. Due to the stringent criteria used to allocate AZE sites, this indicator provides a good measure of the number of threatened species are receiving immediate conservation protection.
Main sources: http://www.zeroextinction.org/ http://www.wdpa.org/
Basque Country observations: This indicator is not looked at for Basque Country.

10. BIOME PROTECTION:

Description: - The weighted percentage of biomass under protection status in which the weighting is determined by the relative size of the biomass in the country.
Rationality: This indicator measures the extent to which a country achieves the goal of protecting at least 17% of each terrestrial biome within its borders, and represents a weighted average of the biome protection. The 17% target was set in 2010 at the 10th Conference of the Parties (COP) to the Convention on Biological Diversity (CBD). The weights are determined by the size of the biome (larger biomes receive greater weight in the score of a country). Coverage for each biome is capped at 17%, so that a greater biome coverage can not be used to compensate for poor coverage of other biomes. Protected status is a necessary but not sufficient condition for an ecological region to be classified as effective in conservation. How protected areas, the strength of legal protections, and actual results on the ground are handled, are vital elements for a complete evaluation of the effectiveness of conservation.
Main sources: http://www.protectedplanet.net/ http://worldwildlife.org/biomes
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

11. MARINE PROTECTED AREAS:

Description: - Percentage of the exclusive economic zone (EEZ 0-200 nautical miles) which is under protection as a Marine Protected Area (MPA).
Rationality: Marine Protected Areas (MPAs) are the aquatic equivalent of terrestrial reserves. They are an essential warranty policy for the future of marine life and the local community. They safeguard the rich diversity of life in the oceans and provide safe places for endangered species, as well as commercial fish stocks. Well-designed networks and ecologically representative MPAs can also provide better security against environmental changes such as global warming. They are legally established for protection from human disturbance, such as fishing, industrial development and recreational activities (depending on the type of MPA). They help to alleviate fishing mortality, to reduce the catch of non-target species, and to ensure that fishing does not affect the marine environment. In addition to protecting biodiversity, these areas help restore populations of commercially viable fish. The World Database on Protected Areas (WDPA), a joint project of UNEP and the World Conservation Monitoring Centre, is the most complete set of global spatial data on terrestrial and marine protected areas.
Main sources: http://www.unep-wcmc.org/ http://www.wdpa.org/Statistics.aspx
Basque Country observations: No aspect differentiating from the State is contemplated.

12. AGRICULTURAL SUBSIDIES:

Description: - This indicator aims to assess the magnitude of subsidies to assess the degree of environmental pressure exerted. The NRA (Nominal Rate of Assistance) is defined as the price of products in the domestic market (plus any direct subsidy) minus the border price, expressed as a percentage of the border price (adjusting transport costs and differences in quality).
Rationality: Agricultural practices depend heavily on natural resources such as soil, water and climate. As the population keeps growing, the demands of an adequate food supply are increasing pressure on environmental systems. Agricultural demands have a huge impact on accounting of ecosystems globally with about 40% of land use and 85% of water consumption (FAO, 2005). Inadequate policies in agriculture can cause negative environmental aspects, such as deforestation, soil degradation, overuse of non-renewable water, generation of greenhouse gases, agrochemical pollution, and destruction of natural habitat and biodiversity. According to a report by the OECD (2004), public subsidies for crop protection and agrochemical inputs exacerbate environmental pressures through the increased use of chemicals, expansion of land in sensitive areas and overexploitation of resources.
Main sources: http://econ.worldbank.org http://www.oecd.org/tad/agricultural-policies/agriculturalpolicymonitoringandevaluation2012oecdcountries.htm
Basque Country observations: No aspect differentiating from the State is contemplated.

13. PESTICIDE REGULATION:

Description: This indicator examines the legal situation in countries according to the Stockholm Convention on Persistent Organic Pollutants (POP). The extent to which these countries have met the objectives of the conventions to limit or prohibit the use of certain toxic chemicals is evaluated.
Rationality: Pesticide regulation measures the political commitment of legislation on the use of pesticides. Pesticides are a significant source of pollution in the environment that affects human health and ecosystems. Pesticides damage ecosystems by killing beneficial insects, pollinators, and wildlife. Human exposure to pesticides has been linked to increased headaches, fatigue, insomnia, dizziness, tremors, and other neurological disorders. Moreover, many of the pesticides included in this index, are persistent organic pollutants (POPs), endocrine disruptors or carcinogens. The Rotterdam and Stockholm conventions limit or prevent the use of certain toxic chemicals.
Main sources: http://www.chem.unep.ch/pops/ http://www.pops.int/documents/meetings/inc7/mastlist5/ml5.pdf
Basque Country observations: No differentiator is apparent to that established by the European Commission.

14. GROWING FORESTS STOCKS:

Description: - Growing forests stocks are measured as a volume of cubic meters of timber with bark out of all living trees more than X cm DBH (Diameter at Breast Height). The definition of X can vary between countries.
Rationality: It is defined as the volume of standing trees (in cubic meters) in a forest above a certain minimum size. Generally, a higher growth means a more permanent stock biomass and thus a higher quality of forests, while a reduction in the stock generally indicates conditions of forest degradation. The measurement represents the change in stocks over one five-year period to the next, with data from the United Nations (FAO). It is important to note that the volume of standing timber alone is not sufficient for detailed analysis of forest health. For example, the diversity and distribution of tree species and age are also important for future wood supply and biodiversity. In terms of carbon sequestration, soil carbon should also be considered, which may not be directly related to the volume of trees in a forest. Another specific objection to the use of the stock in growth as an indicator is that the conversion of primary forests to forest plantations can increase the volume of trees but generally degrade ecological conditions.
Main sources: http://www.fao.org/forestry/fra/fra2010/en/ http://www.globallometree.org/
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

15. CHANGE IN FOREST COVER:

Description: - Measures the change in the area between periods (percentage variation from 2005 to 2010) and considers the objective unchanged.
Rationality: It is a measure often used in global assessments of deforestation as it has important implications for ecosystem services and habitat protection. The reductions in the extent of forest may be related to agriculture and urban expansion, and it is generally regarded as negative for the health of forest ecosystems. The countries that are actively reforesting are not being explicitly rewarded, but the countries that are losing forest cover are penalised.
Main sources: http://www.fao.org/forestry/fra/fra2010/en/ http://www.globallometree.org/ http://www.ingurumena.ejgv.Basque Country.net/r49-6172/es/contenidos/libro/selvicultura_mambiente/es_doc/adjuntos/selvicultura_mambiente.pdf
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

16. LOSS OF FORESTS:

Description: - The indicator represents the loss of forest area due to deforestation both by human or natural causes such as fire.
Rationality: The loss of forest cover is a measure that reflects the lower forest biodiversity of the forest ecosystem services and forest carbon emissions in a territory. While it would be desirable to measure the health of forests and species composition, or alternatively its management, no data consistent and comparable across countries of these parameters are available.
Main sources: http://www.pnas.org/content/107/19/8650 http://www.globallometree.org/
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

17. PRESSURE OF FISHERIES IN COASTAL AREAS:

Description: - This indicator reflects the trawling and dredging area divided by the EEZ (Exclusive Economic Zones) by country and year (tonnes of catches).
Rationality: This indicator is the best currently available to measure the extent of bottom trawling and dredging. Fishing activities such as bottom trawling are highly damaging to marine ecosystems. The capture volume data of species normally caught with these destructive fishing methods is used. Trawling is one of the most common forms of platform fishing globally, so this indicator is an indirect measure of the intensity of trawling on the coast. Measuring the extent of trawling is important, because there are more fishing activities that are destructive to the ecosystem in use today (Watson, 2006). This fishing method is based on large nets that are dragged along the bottom to collect fish and invertebrates non-selectively. Trawling and dredging typically result in large amounts of bycatch and discards. The bottom habitat is adversely affected and the damage can be long lasting, especially in cases where trawling and dredging occurs continuously. In some cases, biodiversity is significantly reduced. This process exerts a heavy toll on the natural habitats of the sea floor, breaking the fragile flora and fauna of the seafloor, such as sponges and coral.
Main sources: http://seaaroundus.org/
Basque Country observations: No aspect differentiating from the State is contemplated.

18. OVEREXPLOITATION OF FISHING STOCK:

Description: - It is the fraction of species that are caught in the exclusive economic zones of each country (EEZ) that are overexploited or collapsed. The definition of overfishing is that catches are between 10 and 50% of maximum catches over time series, and the definition of collapse is that catches are less than 10% of these maximum catches.
Rationality: Overfishing occurs when the fishing activity intensifies beyond a sustainable level, and the ability of a species to replace its population through reproduction and growth is reduced, ie, when mortality due to fishing reaches a level such that it causes a decrease in biomass growth. Overfishing has devastating effects on ecosystems, beyond the direct impact exerted on the species caught, as a remarkable and sudden change in the number of individuals of a species can put intolerable pressure on the ecological environment. According to the United Nations (UN), between 10% and 15% of the oceans are directly affected by overfishing, but with impacts that affect or will affect "at least three quarters of the world's major fisheries" .
Main sources: http://seaaroundus.org/ http://www.eea.europa.eu/soer/europe/marine-and-coastal-environment Marine and coastal environment - SOER 2010 thematic assessment. EEA
Basque Country observations: No differentiating aspect is apparent the European Environment Agency for the Cantabrian Sea's reflections.

19. PER CAPITA CO2 (CARBON DIOXIDE EMISSIONS PER CAPITA):

Description: - Ratio of CO2 emissions and population.
Rationality: CO2 emissions contribute to climate change. In order to address the performance level of country/territory in energy sources based on fossil fuels, emissions are calculated by population. CO2 data for countries are from the sectoral approach of the International Energy Agency (IEA), which includes emissions from the production of electricity and heat as well as the extraction of energy, in manufacturing, construction, transportation, residential, agriculture, forestry and fisheries sectors. The EPI 2012 set a common goal for all countries, reflecting a 50% overall reduction below 2000 levels by 2050. The goal of per capita emissions is based on half of the total global emissions in 2000 divided by the world population projected for 2050 (World Population Prospects of the United Nations, the medium variant). This is equal to 1,262 kg of annual CO2 equivalent emissions per person.
Main sources: http://data.iea.org/IEASTORE/DEFAULT.ASP
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

20. CO2 PER $ GDP (CARBON DIOXIDE EMISSIONS BY GDP):

Description: - Ratio between CO2 emissions and GDP.
Rationality: CO2 emissions contribute to climate change. CO2 per unit of GDP is the common metric used by countries to assess intensity at the output of carbon dioxide emissions. The IPPC indicates that emissions need to be reduced by 50% from 2000 levels to contain the rise in global temperature to 2 degrees Celsius. The objective of emissions per GDP is based on half the emissions in 2000, divided by projected global GDP for 2050. This equates to 0.07842 kg CO2 per U.S. $ of GDP PPP (constant year 2000 dollars).
Main sources: http://data.iea.org/IEASTORE/DEFAULT.ASP
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

21. CO2 EMISSIONS BY KW:

Description: - Emissions of carbon dioxide per kilowatt-hour to represent the proportion of CO2 emissions from electricity generated by power plants separated into electricity plants and central heating plants (CHP) and the production of nuclear and hydropower (excluding production warehouse pumping), and geothermal, among others (documentation IEA). (grams of CO2 per kWh)
Rationality: CO2 emissions contribute to climate change. Three denominators (population, GDP and electricity generation) are used to assess the relative carbon efficiency of economies in these three aspects.
Main sources: http://data.iea.org/IEASTORE/DEFAULT.ASP
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

22. RENEWABLE ELECTRICITY:

Description: - Percentage of total net generation of renewable electricity over the total net electricity generation.
Rationality: Because the energy sector contributes most of the anthropogenic GHG emissions globally, the percentage of all energy from renewable sources indicates the performance of each country in this critical sector. Renewable sources of energy include electricity generators and liquid fuels used in transportation. The total production of renewable energy is divided by total electricity production, and the target is 100%.
Main sources: http://data.iea.org/IEASTORE/DEFAULT.ASP
Basque Country observations: Department for the Environment and Territorial Policy of the Basque Government.

Annex 3 Environmental indicators in Europe

The European Environment Agency (EEA) aims to support the development and implementation of appropriate environmental policies in the EU and other EEA member countries with the delivery of timely, targeted, relevant and reliable information to policy makers and the general public. An important part of the activities of the EEA is based on the production, use and dissemination of environmental indicators.

The environmental indicators established by the EEA are designed to support EU policies. The EEA uses statistics from international organisations and EU partners, as well as state data collected through EIONET.

The EEA's work is based on a conceptual framework known as the DPSIR assessment framework, "Driving Forces, Pressures, State, Impacts and Responses", that describes the state of the environment, its impact on human beings, ecosystems and materials, pressures on the environment, driving forces and system response. This framework is based on the existing model in the OECD and the basis for the analysis of interrelated factors that affect the environment.

- **Driving forces indicators** describe the social and economic developments in societies and the corresponding changes in lifestyles and overall levels of consumption and production; the main driving forces are demographic changes and economic activities.
- **Pressure indicators** describe developments in the release of substances (eg emissions to air or water), physical and biological agents, the use of resources and land use, pressures applied often become manifest in changes in environmental conditions.
- **Status indicators** provide a description of the quantity and quality of physical phenomena (eg, temperature) , biological phenomena (eg, species diversity and habitat) and chemical phenomena (eg, nutrient critical loads) in a given area .
- **Impact indicators** are used to describe the significance of changes in the state of the environment, and the corresponding consequences for ecosystems, economy and human well-being and health.
- **Response indicators** refer to responses of society and responsible politicians trying to prevent, compensate, mitigate or adapt to changes in the state of the environment, including recycling rates for household waste or the use of renewable energy.

EEA indicators can also be classified according to their type, ie, depending on the environmental problem they address:

- Descriptive indicators (type A): "What's going on?"
- Performance Indicators (type B): "Are we reaching the objectives?"
- Performance Indicators (type C): "Are we getting better?"
- Indicators of policy effectiveness (type D): "Are policies working?"
- Indicators of policy effectiveness (type E): "Are we generally better off?"

The EEA currently covers 225 environmental indicators, of which 37 were established and approved in 2004 as a set of key environmental indicators.

These core indicators are intended to:

- giving priority to improving the quality and coverage of the data flows, thus improving the reliability and comparability of the information and evaluations;

- rationalizing the contributions to other indicator initiatives in Europe and beyond;
- establishing a manageable and stable system of assessments based on indicators of progress in relation to environmental policy priorities.

The development of the core set of the EEA has been guided by the need to identify a small number of relevant indicators for regulatory action, which would be stable, but not static, and that would provide answers to specific issues and policy priorities. However, we emphasise that the analysis of these indicators should be performed in conjunction with additional information to ensure their full effectiveness in environmental reporting.

The core indicators were selected based on a much larger set on the basis of nine criteria widely used in the EU and the OECD: political relevance, progress towards meeting objectives, availability of routinely collected data, spatial and temporal coverage, national and representativeness of the data, methodologically well-founded intelligibility indicators and priority issues for the EU policies.

Basic indicators include six environmental themes (air pollution and ozone depletion, climate change, waste, water, biodiversity and terrestrial) and four sectors (agriculture, energy, transport and fisheries). All topics addressed priority EU policies. The core indicators are descriptive or performance-related, given that one of the challenges is the future development of more and better indicators of eco-efficiency, effectiveness and welfare policies. Thus issues such as the value and the degradation of natural capital, resource flows, cost-effectiveness and intergenerational and environmental aspects of quality of life are taken into account.

All the basic indicators can be seen in the DPSIR framework, but are not evenly spread over all categories. The main purpose of the core indicators is to focus on priorities and be relevant to the policies, not the basis for an integrated assessment in DPSIR framework.

Many of these basic indicators are also used in other processes of international indicators, particularly in the European Commission, OECD, WHO and the UN.

The EEA has incorporated into its management plan several activities related to indicators, which range from methodological aspects and development to the publication of indicators. These are published as a contribution to other EU indicator initiatives (TERM, IRENA or EU headline indicators) as part of evaluations containing the thematic reports. The core set of indicators is regularly published in the report of EEA Signals and on the website.

Relationship between EEA and EPI 2012 core indicators

	Core indicators (EEA)	EPI 2012
Air pollution and depletion of the ozone layer	1. Emissions of acidifying substances 2. Emissions of ozone precursors 3. Emissions of primary particles and secondary particle precursors 4. Exceeding limit values of air quality in urban areas 5. Ecosystems exposure to acidification, eutrophication and ozone	Ind. 1: Child mortality Ind. 2: Particles Ind. 3 Inside air pollution Ind. 6: SO2 per capita Ind. 7: SO2 per $ GDP
Nature and biodiversity	7. Endangered and protected species 8. Designated areas 9. Species diversity	Ind. 9: Critical habitat protection Ind. 10: Biome protection Ind. 11: Marine protected areas
Climate change	6. Production and consumption of substances that deplete the ozone layer 10. Greenhouse gas emission tendencies 11. Greenhouse gas emission projections 12. European and global temperature 13. Greenhouse gas atmospheric concentrations	Ind. 19: CO2 per capita Ind. 20: CO2 per $ GDP Ind. 21: CO2 per kw
Terrestrial environment	14 Land occupation 15 Advances in contaminated space management	Ind. 14: Growing forests stocks Ind. 16: Forests loss Ind. 15: Change in forest cover
Waste	16. Urban waste generation 17. Packaging waste generation and recycling	
Water	18. Use of continental water resources 19. Substances consuming oxygen in rivers 20. Nutrients in continental waters 21. Nutrients in transitional, coastal and marine waters 22. Quality of bathing waters 23. Chlorophyll in transitional, coastal and marine waters 24. Urban waste water treatment	Ind. 4: Access to sanitation Ind. 5: Access to drinking water Ind. 8: Change in quantity of water
Agriculture	25. Gross nutrient balance 26. Areas used for organic farming	Ind. 12: Agriculture subsidies Ind. 13: Pesticide regulation
Energy	27. Final energy consumption per industry 28. Total primary energy intensity 29. Primary energy consumption per fuel 30. Renewable primary energy consumption 31. Renewable electricity consumption	Ind. 22: Electricity from renewable sources
Fishing	32. Status of marine fish stocks 33. Aquaculture production 34. Capacity of fishing fleet	Ind. 17: Pressure of fisheries in coastal areas Ind. 18: Overexploitation of fishing stock
Transport	35. Passenger transport demand 36. Freight transport demand 37. Use of cleaner alternative fuels	

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