



DESERTLINKS

**COMBATING DESERTIFICATION IN MEDITERRANEAN EUROPE
LINKING SCIENCE WITH STAKEHOLDERS**

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Review of other indicator systems
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REVIEW OF OTHER INDICATOR SYSTEMS

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Indicators are already widely used by governments to set targets for and to monitor a wide variety of things such as health, education and quality of life. Indicators derived from the results of research can also be used to simplify complex phenomena, making scientific research understandable by the general population.

There are various lists of environmental indicators in existence, and DESERTLINKS has examined the best known to determine which indicators already in general use can be adapted for the specific purpose of desertification. Some of the lists described have been developed into Indicator Systems, where indicators are grouped for different purposes. There are different methods for classifying indicators in the literature and the most commonly used ideas are incorporated into the DESERTLINKS System. Although there is a wide variety of indicator lists available, few Indicator Systems are actually being used to test and amend indicators using real data in a variety of situations. DESERTLINKS is making progress in this area.

CSD <http://www.un.org/esa/sustdev/>

In 2001, the United Nations Commission on Sustainable Development (CSD) published the results of its five-year Work Programme to translate physical and social science knowledge about sustainable development into sustainable development indicators. During this time they developed a working list of 134 potential indicators, tested them in 22 different countries, and finally identified a short list of 58 core indicators. They recommended that these be used across the world as a common base for monitoring and reporting on sustainable development. Their experience has been a very valuable starting point. The standardised format for describing the indicators has been adopted for use with desertification indicators by the Italian Environment Protection Agency [1] and subsequently by DESERTLINKS for DIS4ME.

Although the CSD started to organise its indicators according to the widely used driving force-state-response framework, they later revised the framework to one based on four dimensions or capitals (social, environmental, economic and institutional), sub divided into fifteen themes (for example the environmental themes are: atmosphere, land, oceans, seas and coasts, fresh water and biodiversity) and 38 sub-themes. It was felt by those who tested the indicators that this better reflected the main issues in sustainable development, and made the indicators easier to use. The CSD procedures for testing and evaluating the chosen indicators are also being adapted for use in DESERTLINKS.

OECD <http://www.oecd.org/agr/env/indicators.htm>

The Organisation for Economical Cooperation and Development (OECD) began to assemble ideas about agri-environmental indicators in the early nineties, based on the pressure-state-response (PSR) model for indicator classification. They have also suggested criteria for accepting indicators as useful: indicators should be specific, measurable, achievable, relevant, and time-bound. As well as compiling lists of indicators the OECD have circulated questionnaires on their usefulness to OECD member countries, set up data bases and hosted expert meetings to discuss specific categories of indicator. OECD recognises that there cannot be one set of indicators suitable for use in all situations. They suggest that indicators

are just one tool among others for monitoring desertification, and that they should be adapted according to national circumstances [2].

EAA-EIONET <http://terrestrial.eionet.eu.int/Indicators>

The European Environment Agency includes the European Topic Centre on Terrestrial Environment and the Environmental Information and Observation Network (EIONET) whose main objective is to develop indicators relevant to environmental policies in Europe. There is a preliminary list of about 400 indicators from which a shorter list will be selected and validated, and finally implemented. It was the EEA who introduced the DPSIR (Driving force, Pressure, State, Impact, Response) system of indicator classification, expanded from the PSR model developed by Environment Canada and then the OECD. DPSIR [3] can be used to describe interactions between different types of indicators and also observe feedback loops. The DPSIR framework seeks to classify indicators by highlighting the ways in which human activities relate to environmental problems. For example the state of the soil may be affected by human management practices or changes in climate and this may perhaps affect crop yields or population size.

The EEA have a list of published indicators [4], (revised to April 2003) related to themes and policy issues. They are seeking to integrate the indicators and reduce the total number. They are also distinguishing between short, medium and long term indicators. Some of the indicators on the list are not specific enough to measure and compare easily, e.g. the indicator “protection of grasslands”. Although all the indicators are related to problems in the terrestrial environment not many can be related directly to desertification. An integrated information framework is now being developed, relating indicator sets to environmental issues/sectors and providing fact sheets for each indicator, along similar lines to DIS4ME. The EEA are attempting to address the problems of data collection and transfer, with special focus on collecting data to serve more than one policy objective.

One classification within the EEA indicators illustrates well why benchmarks are not always possible. The indicators are classified according to whether they are related to description (What is happening?), performance (Does it matter?), efficiency (Are we improving?), or total welfare (Are we on the whole better off?). This seems a very valuable approach. Performance indicators can be related to practical benchmarks and thresholds quite easily, but with description indicators it may not be possible.

IRENA <http://agrienv.jrc.it/activities/indicators/>

The EEA are also collaborating in the IRENA Project (Indicator Report on the Integrated Environmental Concerns into Agricultural policy) with the JRC (Joint Research Centre, DG Environment and DG Eurostat). The objectives are to compile a set of agri-environmental indicators, develop data sets to match the indicators for regional analyses, and to use the indicators to assess the integration of environmental and agricultural policies. Trends in space and time will be monitored and mapped using GIS. The list of 35 indicators [5] includes some similar to those being used in DIS4ME.

TEPI <http://www.e-m-a-i-l.nu/tepi>

A European System of Environmental Pressure Indicators was developed by the TEPI project (Towards European Pressure Indicators) in association with EUROSTAT. The main aims were to determine priority pressure indicators in the environmental fields of air pollution, climate change, loss of biodiversity, water pollution, etc. that could be used by all the EU member states. A difficulty with this system was that although some proposed

indicators were fairly specific, such as change in traditional land use practice, others such as soil nutrient balance, or water consumption were not. Such indicators would require intensive or uneconomical data collection. Lack of data from the different countries and lack of access to existing data were identified as the main problems.

FAO-LADA <http://lada.virtualcentre.org>

One of the most comprehensive lists of possible indicators has been proposed by the Land Degradation Assessment of Drylands (LADA) [6]. This project aims to develop a standardised methodological framework for assessment of land degradation causes. Recognising that it is crucial to address the needs of stakeholders, the project carried out an email conference in October/November 2002 to which all interested parties could respond. The draft paper: “Some suggested indicators for land degradation assessment of drylands” [7] includes some useful definitions of criteria for indicators, and also a clear explanation of the uses of the DPSIR system. The main framework for classification is based on scale (global, national, village and farm), and whether the indicators are bio-physical, socio-economic or institutional. LADA expects users to choose the best indicators from their lists for their own purposes, and is testing them in pilot areas, including China, Africa and South America. First of all they are identifying the status and trends of land degradation, including consideration of biodiversity. Then they are identifying hotspots, that is areas with severe land constraints and risk of degradation. Brightspots are areas where appropriate policies and actions are slowing or reversing desertification. Drawing on these case studies it is possible to suggest: where it is cost-effective to take action, and the range remedial measures and supportive policies that are available to both governments and individual communities. LADA are also exploring the concept of a capital base, where sustainable systems accumulate stocks of resources and unsustainable systems deplete resources without replenishing them. The assets are categorised as natural, social, human, physical and financial capital.

LADA have recognised that indicators will only be useful if the required data is already available or is easy to collect. They therefore provide details of national and sub-national data bases where they exist.

ELISA <http://www.ecnc.nl/doc/projects/elisa.html>

Agri- Environmental indicators for sustainable agriculture in Europe have been developed by the European Centre for Nature Conservation (ECNC) in a project named ELISA. A team of experts and policy analysts in the fields of agriculture and environment produced a detailed report [8] describing the concepts, issues and indicators. The report focuses on state and driving force indicators. Twenty-two state indicators cover the three media of the soil, water and air. The driving force indicators cover land use intensity, nutrients and pesticides. The four soil indicators (water erosion, wind erosion, soil compaction and pesticides in the soils) are all appropriate for desertification.

PAIS <http://www.landsis.lu/>

The Proposal on agri-environmental indicators (PAIS) [9] is following three indicator themes: landscapes, agricultural practices and rural development. Indicators are listed according to issues within these themes but are not classified in any other way. Some indicators, such as “% population aged 65 or over”, (relevant to abandonment of agricultural land) are easy to understand and measure, and also appear in DIS4ME. Other indicators such

as “willingness to pay for provision of agricultural landscapes or landscape features” are interesting ideas but are not defined in a measurable way.

iisd <http://www.iisd.org/measure/>

The International Institute for Sustainable Development (iisd) has been working on measurements and indicators of sustainable development since 1995. They have designed the Dashboard of Sustainability that is an internet tool providing information and analysis for a wide range of users, from experts to the general public.

OTHER INDICATOR SYSTEMS

There are also desertification indicators and systems available from many other organisations world-wide that are not reviewed here. All the groups, developing and using environmentally-related indicators, can offer valuable experience to those working on desertification indicators. DESERTLINKS is seeking to use indicators with widespread acceptance, suggested in other European and world-wide systems, wherever possible.

RECENT EUROPEAN RESEARCH PROJECTS IDENTIFYING DESERTIFICATION INDICATORS

MEDALUS III (1996-1998) <http://www.medalus.demon.co.uk>

The MEDALUS III (Mediterranean Desertification and Land Use) project developed indicators of desertification at two scales, Mediterranean-wide and sub-national. The methodologies are fully described in Kosmas et al., 1999 [10]. The Regional Degradation Index (RDI) is a composite index that estimates soil erosion by water. It uses a one-dimensional hydrological model, which is used to estimate potential vegetation cover and storm runoff based on climatic and vegetation data. At the sub-national scale, key indicators for assessing the capability of land to withstand further degradation or the suitability of land for supporting specific types of land use are identified. The four quality indices (soil, climate, vegetation, management) were then combined to give an environmentally sensitive area (ESA) index. Three general types of Environmentally Sensitive Areas (ESAs) to desertification are distinguished based on the stage of land degradation: critical, fragile and potential. Areas not threatened by desertification are also identified.

MEDACTION (2001-2003) <http://www.icis.unimaas.nl/MEDACTION/>

This project made a full assessment of the DPSIR classification of desertification indicators and concluded that the four capital forms: ecological, economic, social and institutional were likely to be a better basis for a general indicator framework. They linked this indicator framework to the Factor-Actor-Sector framework [11] where Factors included water availability, land degradation, migration and economic stability. The primary Sectors were agriculture, tourism and forestry. Most of the indicators suggested within MEDACTION have been incorporated into DIS4ME.

GEORANGE (2001-2004) <http://www.georange.org/>

Indicators employed to monitor changes in rangeland conditions included: vegetation/land use unit, vegetation cover, vegetation height, soil depth, percentage of rocks and biomass ranking estimation.

INDEX (2004-2007) <http://www.soil-index.com>

INDEX will develop multivariate indicators to assess remediation, as well as the dynamic state, of land degradation.

DISMED <http://dismed.eionet.eu.int>

The purpose of DISMED was “to improve the capacity of national administrations of Mediterranean countries to effectively program measures and policies to combat desertification and the effects of drought” [12]. The information system that they initiated was based on a minimum set of agreed indicators. Products include a vegetation quality index, and a map of sensitivity to desertification for Italy.

DESERTNET <http://www.uniss.it/nrd>

This project is concerned with monitoring desertification and providing sustainable management solutions across the Mediterranean region. DIS4ME will be used and tested within this framework.

RIADE (2002-2005) <http://www.riade.net/>

Development of a decision support system will help public administration with environmental planning processes. Activities will include monitoring areas of southern Italy and developing key indicators of desertification.

SURMODES <http://www.eeza.csic.es/surmodes/>

SURMODES methodology is being used within the Spanish National Action Programme to combat desertification. This examined and mapped thresholds of climatic and socio-economic boundary conditions for desertification in Spain, and combined them to produce a map of potential desertification. It also provides early warning of risk of desertification in terms of hotspot detection and trends of scenarios.

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