



**Economic and Social
Council**

Distr.
RESTRICTED

CES/1996/R.1
23 November 1995

ORIGINAL : ENGLISH

STATISTICAL COMMISSION and ECONOMIC COMMISSION FOR EUROPE

CONFERENCE OF EUROPEAN STATISTICIANS

Forty-fourth plenary session
(Paris, 11 - 14 June 1996)

METHODOLOGICAL ISSUES OF ENVIRONMENT STATISTICS

Note by the secretariat

1. The Joint ECE/EUROSTAT Work Session on Methodological Issues of Environment Statistics was held in Mèze from 11-14 September 1995 at the invitation of the Government of France. It was attended by Albania, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Norway, Poland, Romania, Slovak Republic, Slovenia, Sweden, The former Yugoslav Republic of Macedonia and the United Kingdom.
2. Australia participated under Article 11 of the terms of reference of the ECE.
3. Also in attendance were the UN Environment Programme (EAD/GRID-Geneva), Food and Agriculture Organization, European Centre for Environment and Health (Bilthoven Division) of the World Health Organization (Regional Office for Europe), Mediterranean Action Plan/Blue Plan Regional Activity Centre, and the World Wildlife Fund for Nature International (WWF-International).
4. The meeting was opened by Mr. Yves Piétrasanta, Mayor of Mèze and first President of the French Institute of the Environment (IFEN). He stressed both the importance and current urgency for the development of generalized environmental information in the form of statistics
5. The participants were unanimous in their appreciation of the excellent organization of the meeting by both the French Institute of the Environment and the local authorities.
6. Mr. Jean-Louis Weber (France) chaired the meeting.

7. The following substantive items were discussed:

Indicators of environmental quality and of sustainable development
Statistical aspects of environmental regulations
Use of geographical information systems
Use of statistical sources, modelling and monitoring
Statistical databases of the environment

The conclusions reached during the consideration of these items are summarized in Annex to this note.

8. Regarding future work, the Work Session noted with thanks the invitations by Norway and by Switzerland to host the 1996 and 1997 meetings, respectively. The following tentative suggestions were made regarding the substantive items to be discussed on these two occasions:

1996

1. Sampling design for purposes of waste statistics
2. Use or modification of existing data or survey vehicles for environment statistics
3. Environment statistics of agriculture
4. Contents of environmental statistical databases
5. Land use statistics

1997

1. Sustainability indicators
2. Biodiversity indicators
3. Fauna, flora and habitat statistics
4. Environmental accounting
5. Chemicals in the environment

ANNEX

Conclusions reached at the Joint ECE/EUROSTAT Work Session on Methodological Issues of Environment Statistics

I. INDICATORS OF ENVIRONMENTAL QUALITY AND OF SUSTAINABLE DEVELOPMENT

Documentation: Working Papers No. 4 and No. 5

1. The development of environmental indicators can be looked at from several angles. The discussion of the meeting focused in the first instance on possible conceptual approaches, in particular the stress-response approach. This approach was originally meant to be a principle for the organization of environmental databases. As such, however, it did not receive particular recognition. By contrast, the approach has become universally accepted as a very adequate device for the presentation of environment statistics. The widespread use of the approach for presentational purposes can be explained by its ease in associating measures in intuitively convincing sequences. At present, the approach also seems to be used for the classification of

indicators, which would be considered being pressure, state or response indicators. After discussion, the meeting was of the opinion that such a classification should not be applied too strictly, and should not compromise efforts of integration or inter-connection. It was also agreed that accounting and indicator approaches should be seen as complementary co-existing together.

2. Another focus of the discussion concerned the methodological requirements that have to be met in the collection of basic data before indicators can be compiled from them. In relation to Working Paper No. 4, it was noted that statistical samples cannot easily be drawn for purposes of indicators describing the quality of environmental quality in terms of ecosystems. The absence of fully and widely accepted relevant results from ecosystem research, as well as the absence of data in some fields, or varying data quality, were identified as two of the main reasons explaining this state of the art. The development of mutually exclusive land classes covering the national territory in the framework of the German pilot study was noted with great interest in this connection.

3. The paper from the Australian Bureau of Statistics described the development of sustainability indicators for agriculture. Their concept of sustainability is based on three main axes: economic, social and environmental. This feeds through to the development of an information model. Data are required about the nature of the problem (from scientific, economic or social research), the extent of the problem (time series), the location, and the seriousness (for example, by scientific and political judgement). In this way it should be easier to determine the threshold of sustainability.

4. The next steps will be the actual testing of the sustainability indicators on a regional basis (ie: in different climatic areas of Australia) and the development of targets.

5. The discussion brought out the difference between the technical activity of producing a list of indicators with the more political task of setting top-level objectives and establishing the priority list of environmental problems. Another important area for future work could be the explicit inclusion of externalities (such as for water resources) in the indicator values.

6. A comparison was made between the Australian list which had been developed in close consultation with farmers and that of the OECD. It was also felt important to limit the number of indicators as much as possible.

II. STATISTICAL ASPECTS OF ENVIRONMENTAL REGULATION

Documentation: Working Papers No. 2 and No. 7

7. The two papers on this topic examined the use of surveillance systems for air quality (paper submitted by ISTAT) and of the authorisation and regulation of emissions (UK HMIP).

8. The ISTAT paper made a critical review of legal statistical requirements for air quality in Italy. The objectives of the monitoring system, the

variables examined, the monitoring plan (covering urban and industrial areas), and the location of the monitors in urban and industrial areas were presented. A key question that needs to be further addressed is whether it is cost-effective to have continuous or punctual monitoring.

9. Once monitoring is completed it is necessary to check the measurements obtained for errors. This aspect of checking is not considered in the body of law. It relates in particular to the identification of outliers and the treatment of missing values. Such statistical concerns, combined with meteorological factors, are particularly worrying in the formulation of alarm limits used to inform competent authorities of the need for a rapid intervention. The lack of a theoretically well-founded statistical basis has therefore implications for the correct monitoring of the atmosphere and the efficiency of environmental policies.

10. Future solutions to such problems would include more elaborate modelling linking monitoring data with climatic and socio-economic data. This can in turn lead to the development of better indicators.

11. The discussion focused on the increasing need to develop methods for the purpose of linking atmospheric pollution statistics with other data (such as for health), and the need to set up a background monitoring system as well as punctual monitoring to reduce statistical difficulties.

12. HMIP attempts to limit the amount of pollutants discharged by a process to the air, water and land by providing authorisations up to a certain amount or up to a certain concentration. This entails the use of the principle, Best Available Technology Not Entailing Excessive Cost (BATNEEC). The paper examined the case of the introduction of continuous monitoring in place of a few samples taken during the course of a year. From a statistical point of view this is possible as an authorised standard already exists and the relation between the new and old monitoring methods is established according to defined criteria.

13. The discussion focused on ways to combine different pollutants together based on the principles of natural science. Aggregated information is more useful to assess the effect of regulation. An example of such a system is an internationally agreed system of toxic equivalence (e.g.: one already exists for dioxins).

III. USE OF GEOGRAPHICAL INFORMATION SYSTEMS

Documentation: Working Papers 8 and 9

14. The two papers on this theme illustrated the usefulness of Geographic Information Systems (GIS) in providing useful information for decision-makers.

15. The Norwegian paper described how a tool is being developed for administrative authorities for better management of river systems that are threatened by hydro power construction. This project is new in that a GIS is used to provide a basic classification, it could be extended all over Norway,

and if possible the data could be re-examined. Localised data on human activities were gathered from many sources.

16. The principal aim of the project was to devise a weighting system for the effect of the encroachments (for example, dams and fish ladders) on the river systems. The encroachments were put on an index from 1 to 4 according to the opinions of experts in the overseeing project group. The size of the encroachments were also taken into account. Another innovative feature is that each encroachment had an influence area or buffer which is defined in metres from the encroachment itself. The buffer technique allows the weighting together of different kinds of encroachments. Through an overlay technique it is possible to add encroachments together, to obtain a total buffer.

17. The results for the test case in 2 protected river systems showed that the most important encroachments were roads and other communication systems. Reservoirs and small encroachments counted for more than expected, and agriculture for less. A further conclusion was that the location of communication lines (ie: transport routes) were correlated with agricultural land (important as the digitising of all farmland is too expensive for this project alone). The project was judged a conditional success in the light of the lack of human resources available and the low priority accorded by the Norwegian Water Resources and Energy Administration.

18. Some statistical implications of the project were also presented in terms of providing an appropriate presentation of the river system: a digitized river system, the register of drainage basins and a digital terrain model. All created considerable difficulties.

19. The French Institute for the Environment (IFEN) presented examples of the use of the CORINE Landcover database. In particular these were:

- The linking of the CORINE Landcover with traditional forestry statistics. This is innovative as the data are coming from different sources. Some discrepancies are inevitable.
- Landcover can be related with areas considered important from a faunistic and floristic point of view (conforming with the EC directive). This has led in France to the extension of the ZNIEFF database. CORINE Landcover allows to distinguish within and between different ZNIEFF areas. Perhaps most useful, it allows the description of the buffer zones around the ZNIEFF areas, which also merit a certain degree of protection.
- Another example was the linking of CORINE Landcover with data on water quality and quantity, and other statistics. Landcover is being examined in relation with runoff, human activities (such as the application of nitrogenous fertilizers) and on reservoirs.

The CORINE Landcover project has now been extended to more than 20 European countries.

IV. USE OF STATISTICAL SOURCES, MODELLING AND MONITORING

Documentation: Working Papers No. 1 and No. 6

20. The consideration of Working Paper No. 1 highlighted the potential for the use of specific traditional data sources when deriving statistics of interest to environmental considerations in France. The results obtained in the course of the study concerned also demonstrate that major data collection vehicles like population censuses could become more valuable for the production of environment statistics, if questions are being re-formulated, or questions re-introduced that might have been abandoned in the course of time. It was furthermore shown that the review of existing statistical sources might become useful as sampling frames for specific environmental surveys. Finally, the use of administrative data sources, which were not originally established for statistical purposes, holds the promise of improving the reliability of environment statistics compiled from traditional statistical sources.

21. A question arose in the discussion regarding the possibility of developing a limited basic set of questions with broad applicability that might be asked in standard data collection vehicles, and which might be useful for the production of environment statistics. On one side, it was argued that such an approach would be a positive contribution to a harmonized development of information at the international level. On the other, the differences in national contexts in which statistical data collection is being organized and perceived may require specific approaches, even when internationally comparable information is envisaged.

V. STATISTICAL DATABASES OF THE ENVIRONMENT

Documentation: Working Paper No. 3

22. The consideration of this item gave rise to impressions on the side of a number of participants, referring to both optimal and practicable conditions for the establishment and maintenance of environmental statistical databases. In general, it was noted that the authority of those responsible for the development of statistical information systems in statistical offices over the technical database questions is limited in several ways. It was suggested to complement the discussion of technical aspects with a consideration of the contents of existing databases on a future occasion.