UNITED NATIONS E

ESCWA UNSD OPEC

Distr.
LIMITED
E/ESCWA/SDPD/2003/WG.3/2
2 July 2003
ORIGINAL: ENGLISH

ECONOMIC AND SOCIAL COMISSION FOR WESTERN ASIA
Expert Group Meeting on Statistics of Sectoral Energy Production,
Consumption and Related Environmental Issues, and
Workshop on Energy Data in ESCWA Member Countries
With Special Focus on Oil Statistics
Beirut, 8 - 11 July 2003

ENERGY RELATED ENVIRONMENTAL DATA AVAILABILITY, QUALITY AND DISSIMINATION IN WEST ASIA

03-0553

ENERGY RELATED ENVIRONMENTAL DATA AVAILABILITY, QUALITY AND DISSEMINATION IN WEST ASIA

Sustainable Management of Environment Team
Sustainable Development and Productivity Division

I. INTRODUCTION

Availability and reliability of energy related environmental information has always been necessary to characterise subtle and complex problems that cut across all environmental media (air, water and land) and that transcend national boundaries (loss of species diversity, acid deposition, and stratospheric ozone depletion).

Sound environmental information is key to determining what environmental problems pose greatest risks to human health, ecosystems, and the economy, and to develop cost-effective strategies to reduce those risks. The absence of such scientific information could misguide policies and regulations that may tackle high-profile but low-risk problems while other more significant threats are ignored. Access to this information is also one of the cornerstones of sustainable development (Principle 10 of the Rio Declaration), whereby individuals have the right to information about their environment – to know if the drinking water contains dangerous levels of pollutants, or if an emergency chemical spill could make them sick.

There is no doubt that available and reliable information is also needed to help anticipate future energy related environmental challenges. For example, carefully structured monitoring programmes combined with rigorous analysis could paint an accurate picture of present conditions, describe what is happening to an ecosystem over time, and help predict the environmental consequences of future actions.

Safeguarding the future of a sustainable development in this region will depend greatly on the capacity of governments of the Economic and Social Commission for Western Asia (ESCWA) to better integrate energy related environmental concerns into the development and implementation of policies at the earliest stage possible, instead of limiting such consideration of environmental issues to immediate crises; a 'reactive' mode that generally fails to avoid foreseeable problems or address long-term concerns.

The capacity to make informed decisions concerning the environment and development, nevertheless, will rely heavily on the flow and quality of energy related environmental information in countries of the region, which in turn suffers from significant gaps to availability, quality, and dissemination.

Historically, this gap in information was seen as just a phase of the scientific development process; a simple knowledge-gap that remains to be diminished through more effort. But when we know that the information is entering the policy process, this knowledge-divide becomes more than purely scientific information; it becomes the reliable source to discover environmental threats, to interpret consequences, and to suggest policy options.

II. OVERVIEW OF ENERGY RELATED ENVIRONMENTAL DATA AVAILABILITY

Significant differences exist between countries of the region as to generation and availability of energy related environmental data. While certain countries have fairly long traditions in energy related environmental statistics, the majority of countries have just launched energy related environmental statistics

programmes.[1] This means that development work needs to be established and solid ground must be constructed for national environmental statistics work in countries of the region.

In all ESCWA member countries, governments are the main national environmental data custodians. However, within each country, different government agencies (statistical offices in addition to ministries of water, environment and agriculture) have established their own information facilities for decision-making. In light of the inadequate coordination between such agencies, and because data is usually maintained in paper format rather than in a digital form, aggregation of environmental data is considered time consuming, expensive and may result in incomparable data. Consequently this data is not interchangeable, as it should be, on a nation-wide scale. While limited volumes of environmental data are officially exchanged among government agencies, even less is disseminated to other sectors as research centres, universities, private sector and non-governmental organisations (NGOs).

Although a wealth of raw data has been and continues to be accumulated in ESCWA countries, well established and organised procedures for the collection of data are only limited to some areas of environmental statistics, while there is much dependence on ad-hoc sample surveys for other environmental areas. Often, ad-hoc sample surveys collect energy related environmental data upon the demand of separate governmental agencies that lack an effective database management system, which in turn causes duplications in data. These ad-hoc attempts at energy related environmental data collection from the field are not driven by policy objectives as they are, so often at present, by the availability of funds from donor agencies. While this allows the generation of overwhelming information, it does not generate time-series data, which is crucial for decision-makers to understand patterns of energy related environmental changes.

While gaps in energy related environmental data vary amongst ESCWA member countries, there is a consensus on the inadequacy of data throughout the region, namely air quality and air emissions.

Against the backdrop of data availability (due to inadequate environmental monitoring systems), and the insufficient level of technical expertise (experienced and well-trained environmental statisticians), in addition to the scarce financial resources, adequate generation and availability of energy related environmental data present a challenge in the ESCWA region.

Setting-up energy related environmental monitoring system usually comes about due to public and political demands. While some regions (Europe) have already established energy related energy related environmental monitoring systems that are close to the ideal system (proposed in figure1) and are well acknowledged with growing budgets, other regions (West Asia) still have their energy related environmental monitoring functions at the project stage, whereby several government agencies, research institutes and significant NGOs are conducting some of the monitoring functions. While Lebanon is at its initial stages of managing an energy related environmental monitoring system; Syria has just completed a feasibility study; and Egypt is undertaking efforts to integrate the monitoring role into existing environmental institutions. Clearly, few countries of the ESCWA region have formal monitoring systems and capacities in place.

However, even when energy related monitoring programmes do exist in the region, they are confronted with a number of challenges. For example, because monitoring stations – responsible for collecting energy related environmental data – are restricted to urban areas where many air pollution resulting from energy consumption do converge, data generated only covers part of the country, and is therefore not comprehensive. Consequently, systemic measurements of the level of emitted pollutants and their concentrations in the ambient environment are inadequate in most of the ESCWA countries. [2]

Monitoring requires a good baseline data to be able to compare 'before and after' and 'with or without action' situations. Nevertheless, because the establishment and maintenance of monitoring systems is time consuming and expensive, and since it is practically impossible to monitor all energy related environmental aspects, energy related environmental monitoring programmes should be kept to a realistic

[1] Raddad, K. 2002. Assessment of the Situation of Environment Statistics in ESCWA Member States (draft). *United Nations Statistics Division*. United Nations, New York.

[2] ESCWA. 1999. Overview of Compliance and Enforcement of Environmental Legislation in the ESCWA Region. *Economic and Social Commission for Western Asia* E/ESCWA/ENR/1999/WG.4/3. United Nations, New York.

minimum and should therefore select data relevant to the energy related environmental phenomena of greatest importance to the country. This selection could vary according to the field involved (local actions, national policy implementation, international agreements) and according to the determined goals (scientific research, public awareness, support for decision-making).[3]

III. ENVIRONMENTAL DATA QUALITY

In the past, energy data quality might have been synonymous with accuracy, but today a consensus is emerging that quality is a much wider, multidimensional concept.[4] Being able to collect energy related environmental data of high quality using an agreed-upon cluster of parameters and methods, which in turn could be harmonised at national and regional levels, is a major challenge for effective environmental decision-making and policy formulation in the ESCWA region.

The development of relevant, analytically sound and responsive energy related environmental indicators, is always limited by the quality of the underlying data. Optimally, environment monitoring systems should ensure that data are readily available; are adequately documented and of known quality; and are updated at regular intervals in accordance with reliable procedures. Another factor influencing data quality is the original purpose of data collection that in turn dictates the further uses of this information. This is important to seriously consider, since the absolute quality of environmental data is not critical provided the quality is known and adequate for its intended use (i.e. at a reasonable cost/benefit ratio).

Quality assurance (QA) is a basic requirement of any analytical method. No measurement has value for decision-making unless its accuracy is known and understood. QA should be of prime concern for every monitoring system, it provides a history of every piece of data, enabling validation and traceability of the data however, cost implications, inadequate data management software, lack of technical capacities and the lack of legislation result in little data being recorded. With a greater need to provide justification of data and higher technology in the form of electronic data transfer and comprehensive data systems, a good QA/QC system, from either national or international bodies, is critical to establishing the credibility and competitiveness of existing laboratories.

Given the costs in time, and in human as well as financial resources, it is essential to establish responsibility for the collection of data and maintenance of the information systems. Personnel training, instrument calibration, performance testing, data management, and data quality assurance are major factors in producing data of adequate quality. In ESCWA member countries, where there is inadequate experience of monitoring, training is a vital component of capacity building as it helps to create the institutional knowledge so important to the development of monitoring networks. Moreover, governmental institutions in some ESCWA member states fear the loss of prestige and reputation if results are made public. This is mainly due to either lack of self-confidence in their analytical capabilities and/or lack of inter and intra-laboratory calibration.

These problems are commonly compounded by the lack of a national harmonized standards infrastructure, which could accredit or certify these laboratories. The challenge and opportunity to achieve standardized environmental performance measurement, monitoring and reporting are daunting. In the ESCWA region, efforts should be exerted to replace the generic and/or commercial analytical techniques used by different institutions and laboratories by internationally recognized standardized methodologies to increase confidence among stakeholders and decision-makers, reduce environmental liability, enhance reputation and public image, increase efficiency and reduce costs.

---

[3] Sustainable Development Strategies: A Resource Book. Organisation for Economic Cooperation and Development, Paris and United Nations Development Programme, New York.

[4] Holt T. and T. Jones. 1998. Quality Work and Conflicting Quality Objectives. *A Paper Presented at the 84th DGINS Conference*. Stockholm.

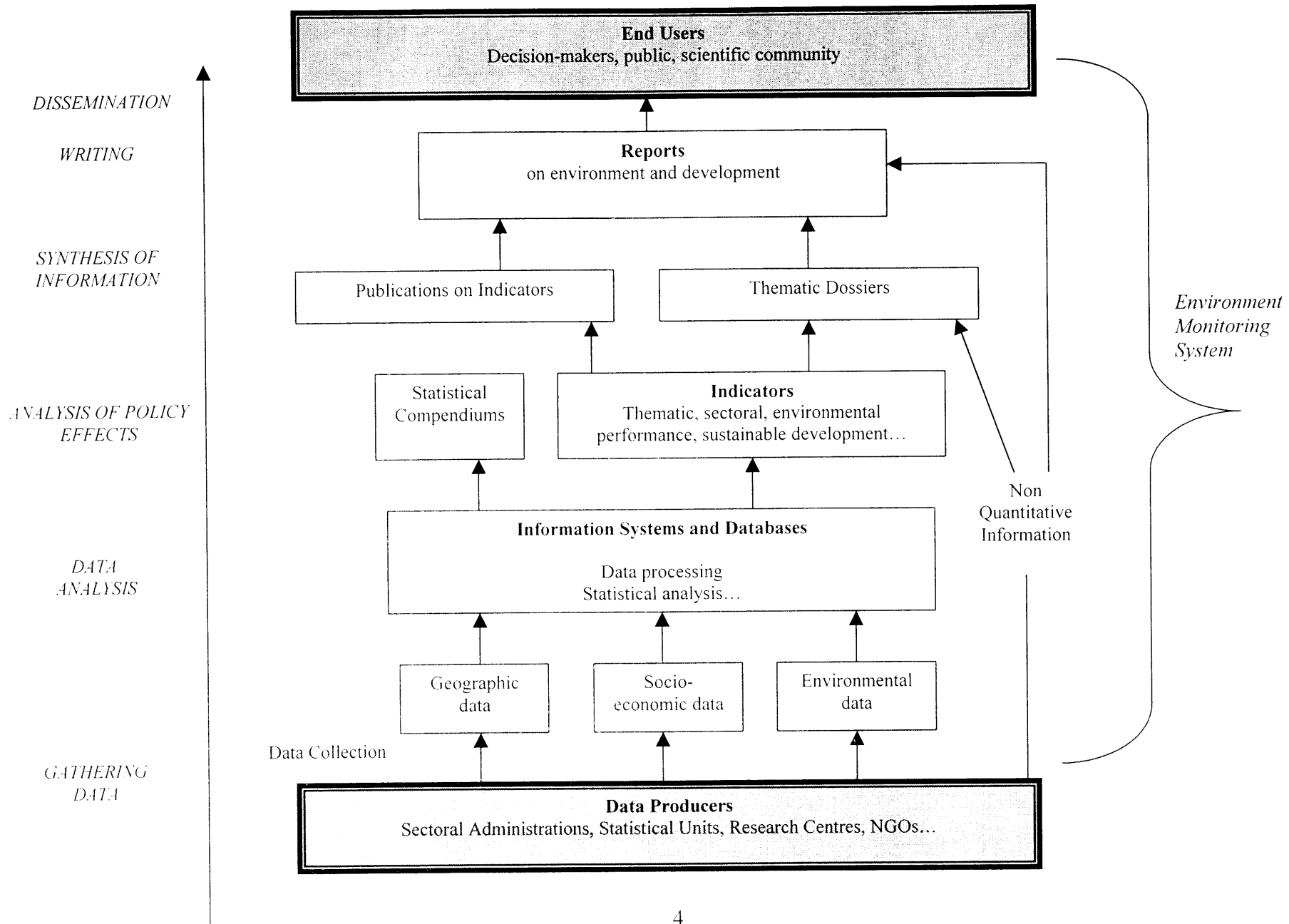

Figure1: Diagram of an Ideal Environment Monitoring System
Source: Extracted from Plan Blue. 2003. http:// www.planbleu.org

A. VALIDITY AND CREDIBILITY OF ENVIRONMENTAL INFORMATION

Because energy related environmental monitoring is done in a relatively uncontrolled manner subject to many variables, large sources of error may exist. Therefore, adherence to good science, internationally recognized standards and certified analytical methods and rigorous QC/QA over the collection of samples is crucial for answering any questions regarding the validity of data.

While QA/QC are often used synonymously, they are quite distinct in the energy related environmental sector. As QC involves a procedure that evaluates a single aspect of data analysis, QA entails a systematic process for reviewing data against a pre-established set of QC acceptance criteria. There are several types of QC samples, namely: (1) field blanks to detect contamination during the collection and shipment of samples; (2) split replicates to ensure that results from the separate laboratories are comparable, or to measure the variability of one laboratory; (3) sequential replicates to ensure comparability of samples collected by different methods; and (4) spike samples to verify the accuracy or recovery of method performance.[5] In addition to assessing the laboratory's performance of analysis within set tolerances, QA plans for environmental laboratories, should also assess the legality of the reported results. This legal criterion is met through the chain of documents that accompany the data and verify its credibility.

Good data validation requires time, experience and training – with human, technical, and financial resource implications – to ensure that invalidation of extreme but valid data does not occur. Because the additional costs are a very constraining factor in countries of the region, avoiding un-necessary costs of utilising too narrow or overly stringent (QA/QC) acceptance limits, for example, should be taken into consideration. In many instances, while given laboratories may afford additional costs required for QA/QC; trained staff may not be available to undertake this task.

ESCWA region lacks the necessary awareness of the importance of quality assurance. Even when (QA/QC) plans do exist, there is concern about fragmented laboratory accreditation programmes establishing differing and sometimes conflicting standards for laboratory inspections and proficiency testing, since they deal with multiple issues involving drinking water, wastewater and hazardous waste in addition to air quality and emissions. Establishing and promoting mutually acceptable performance standards that are modelled after international guidelines for the operation of environmental laboratories is a challenge in the ESCWA region. Achieving such a goal will ensure greater consistency of data quality and will lead to more reasonable and cost-effective large-scale policy and regulatory decisions (see figure2).

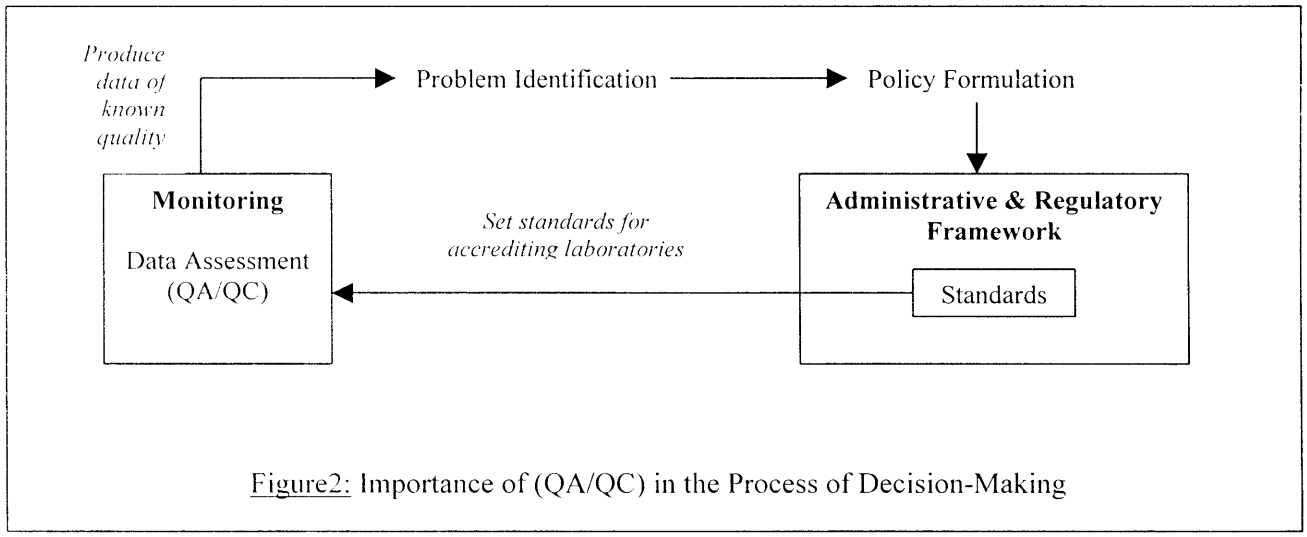

Figure2: Importance of (QA/QC) in the Process of Decision-Making

[5] EPA. 1988. You and Quality Assurance in Region 10. *U.S. Environmental Protection Agency. Region 10 Quality Assurance Management Office.* EPA 910/R-88-100, Seattle

Major constraints facing the credibility and validity of environmental information in most ESCWA Member countries include (a) lack of enforcement of environmental legislation in relation to development of inspection procedures, credible monitoring and accredited measuring systems; (b) Absence of regional or national accreditation schemes for environmental laboratories; (c) Lack of coordination between various institutions dealing with data collection and analysis; (d) Deficiency in technical expertise and poor funds allocated for training and assistance; and (e) Inadequate funding needed to upgrade technology and equipments used to provide meaningful and valid data.

B. COMPARABILITY OF ENERGY RELATED ENVIRONMENTAL DATA

Data has greatest usefulness when it enables reliable comparisons of values taken across space and over time through a common language, on which legislation and other actions are based so as to ensure a common appreciation of the same problem. The fact that energy related environment statistics must often be produced through combinations of data from several sources gives rise to many problems connected to differences in definitions, classifications, methodology soundness and time periods, making comparisons difficult if not impossible. In west Asia countries, the different governmental institutions involved in data collection and analysis – implying differences in nomenclatures, criteria, methodologies and interpretation – and the insufficient drafting of regulation, guidelines and standards for environmental management and data collection in these institutions, stands in the way of forming basis for improved national standardisation in the region.

A good example of ensuring comparability of environmental data is that of Oman, which has adopted necessary procedures to control air quality through ensuring a constant documentation of monitoring processes of air pollutants. By reviewing the tables[6] below, all pollutants – from mobile and stationary sources – were under the level of concentrations permitted by the United States Environment Protection Agency (USEPA) and the World Health Organisation (WHO).

Table1: Monitoring results recorded on selected air pollutants in Oman, by area (2001)

Monitoring Area / Pollutants	Ruwi	Rusayl Industrial Estate	Sur	Salalah	**International Standard**
Lead	0.169	0.498	0.084	0.019	**1.5**
Suspended Particles	88.26	103.61	143.77	73.29	**150**
Total Hydrocarbons	3.24	3.27	2.43	2.11	**160**

* *measured by microgram/cubic meter by PM10*

Table2: Monitoring results recorded on concentrations of selected gaseous emissions in Oman, by area (2001)

Pollutant	Mina Al-Fahal	Al-Ghubra	Al-Rusayl	Sohar	**International Standards**	Unit
O_3	18.249	6.402	-	-	**80**	PPB
CO	-	1.373	-	-	**9**	PPM
SO_2	16.583	2.592	14.024	14.65	**140**	PPB
NO_x	-	14.822	-	-	**150**	PPB

* *PPB = Parts per billion PPM = Parts per million*

[6] Ministry of Regional Municipalities, Environment and Water Resources. 2002. Environment in the Sultanate of Oman.

On the other hand, countries as Lebanon and Egypt are currently completing the Blue Plan questionnaire, which applies classifications used in the European Union. The Blue Plan questionnaire is part of a project that aims at compiling national environmental statistics of the Mediterranean basin as a whole and of certain bordering countries.[7] While activities of these countries through a temporary project whose questionnaire is completed with the assistance of Blue Plan experts that take part in data collection and tabulation, constitute a first step in the path of adopting international recommendations for the classification and standardisation of environmental statistics, much development and resources (human and financial) are needed to improve data consistency and to ensure intra- as well as inter-country comparability.

IV. ENERGY RELATED ENVIRONMENTAL DATA DISSEMINATION

Dissemination is a vital step in the information chain, for it is not sufficient to have 'good statistics' yet keep it stored somewhere inside the statistical office. Energy related environmental information must be made available to all potential users – general public, independent experts, or decision makers – in appropriate forms.

A. CLARITY AND ACCESSIBILITY

Energy related environmental information should be disseminated in a form that is easily interpreted by non-experts. Users of information should be able to clearly understand the presented data, know how this data was put together, and be able to count on knowledgeable support from data producers for their inquiries.

While the availability of energy related environmental data in the region seems abundant, it is often not processed nor presented in a suitable form and does not take account of the different levels of sophistication or simplification required, nor of the fact that different types of decision require different types of levels of information.

Usually, the raw data collected is used to develop energy related environmental indicators that provide summarised information of interpretive value, designed to meet specific information needs. These are crucial especially when data sets are large, complex and consequently difficult to draw conclusions from, particularly by non-expert decision-makers. Nevertheless, a number of difficulties are encountered in this region when developing environmental indicators, namely: inconsistencies become obvious when calculating an indicator that involves data from different sources; difficulties in integrating data into indices – that consist of a number of constituent indicators – because of complications in weighting the components of an index; and problems in the generalisation from site-specific data, which is not recommended due to the lack time-series data over long periods of time. In light of these challenges, there is urgency to explore new ways to identify and establish quality data infrastructure that could lead to necessary indicator development.

Initially, indicators were limited to describing environmental quality and its change, in terms of pollutant load or some other biochemical indicator. However, it became apparent that while this might be directly linked to some specific change in the environment (e.g. loss of habitat or species) this sectoral approach did not necessarily support decision-makers in better management of the environmentally damaging activity.

Figure 3 describes the dynamic relationship between indicators of pressure and the state of the environment and the response to prevent the damage. The Human subsystem exerts pressure on the environment, which could be in the form of driving force. Driving force include consumption patterns, population growth or resource depletion. Indicators of the state of the environment should be used parallel with indicators of pressure or response or feedback for better providing information for decision-makers.

[7] Plan Blue. 1994. International Conference on Environment and Development Observatories: An Information and Decision Making Tool. *Plan d'Action pour la Méditerranée*, Rabat.

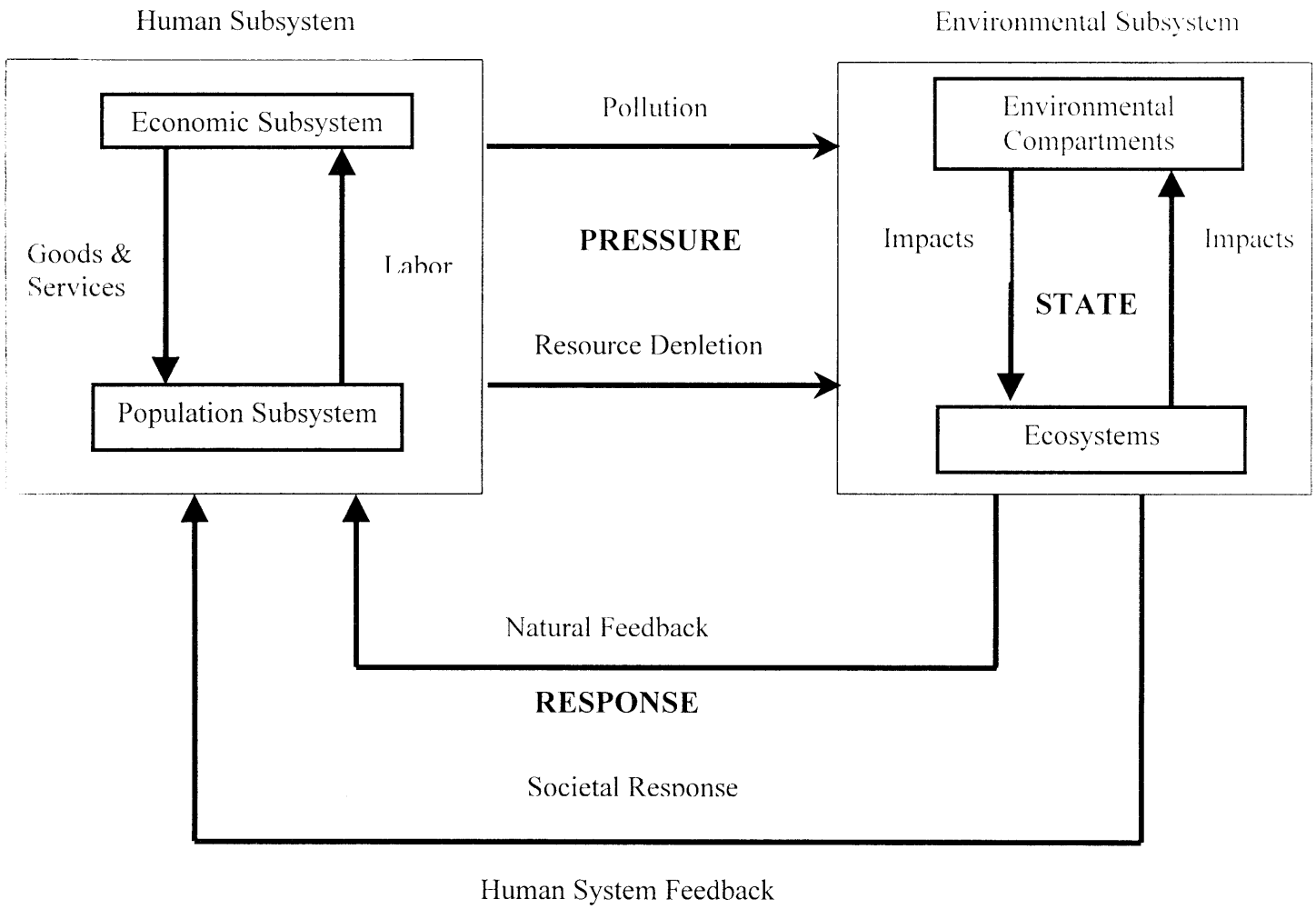

Figure3[8]: The Driving Force-Pressure-State-Impact-Response

As regards accessibility, while mechanisms by which energy related environmental data are disseminated vary between countries of the region, they usually entail tables filled with raw data and technical jargons. Most data are available through internal reports that are produced in limited number of copies and not easy to obtain. On-line electronic access to databases is almost nonexistent. This may be due to a number of reasons; the lack of staff, the absence of expertise and facilities, or even the absence of demand for the information generated, simply because end-users are not aware of the types of data available.

Most of reports on energy related information in the region have been prepared with the sponsorship and encouragement of donor agencies rather than solely through the initiative of countries of the region themselves.

Numerous international environmental conventions generate environmental information by requiring countries to report on their compliance activities. There is usually little enforcement of these reporting requirements, however, and little assessment has been made on the quality and completeness of this information.

[8] ESCWA. 2003. Explanation of Environmental Information and its Indicators for Media Use. *Economic and Social Commission for Western Asia* E/ESCWA/SDPD/2003/WG.2/10.

On a global level, a new driving force for the reporting on energy related environmental information is technology. Satellites could now take pictures of the earth, which could in turn be analysed to reveal changes in attributes as ocean temperatures, ozone depletion and forest cover. Since satellites do not recognise political boundaries, these photographs allow the study of environmental problems without complications of different national reporting styles.[9]

B. SERVICEABILITY

Another concern for users of environmental information is whether the data that is produced and disseminated is actually useful. This dissemination of quality relates to the need to ensure that data is produced and disseminated in a timely fashion, with an appropriate regular periodicity. Keeping production time to a minimum implies that the whole process of data collection, editing, imputation, estimation and dissemination has to be kept under control in order to minimise the processing period. A partial solution to this challenge is to provide early estimates, based on sub-samples. However, care needs to be taken over the presentation of these estimates, and also with the subsequent dissemination of the revised information.

While one might expect that such a demand may result in competition between information producers (especially the private sector), we find that it is very common in this region to suppress such information in order to preserve the bargaining power these producers gain through consultancy contracts. Governments and media may also withhold environmental information so as not to sabotage tourism and trade.

As these may be common challenges throughout regions of the world, west Asian countries have also not been very successful in responding adequately to the process of deterioration of environmental quality troubling the region. Closing the gap between disseminating environmental information and taking necessary action at the lowest economic cost possible should seriously be addressed.

A good example in this context is that of the black cloud over Cairo. It was only until the level of air pollution in Cairo attained levels much higher than the standards set by WHO, that environmental risk assessment reports were prepared and policy initiatives at the national level were passed (law 4/1994 which established new standards for containing pollution and gave industries three years to meet compliance – many did not achieve this target[10]). However, a 1994 USAID study[11] stated that the air pollution in Cairo had actually resulted from decades of unregulated car emissions and urban industrial operations, which have lead to the unfortunate 10,000 to 25,000 deaths annually from pollution. Meanwhile, public exposure reduction measures, such as advising people at risk – namely individuals with respiratory or cardiovascular illness – to remain indoors; to abstain from vigorous exercise; and to increase preventative and alleviating medication, were not undertaken. Ideally, such information should be widely and rapidly disseminated to the public through the media. Other actions that could've been enforced include control of additional emissions by road closures and restrictions of vehicle use.

V. RECOMMENDATIONS: THE WAY FORWARD

While countries of the region are aware of the pitfalls of inadequate data, there is a need to address the complexity of the different aspects of environmental data management, which is necessary for optimisation of policy and for large-scale investment decisions. To that end, the following recommendations may be suggested:

---

[9] Gordon S. and D. Tunstall, 1995, The Creation and Distribution of Environmental Information, World Resources Institute.

[10] McDonald, N. 1999. Eyes on Cairo Skies. *Cairo Times*. 226 (March)

[11] USAID. 1994. US Agency for International Development. www.usaid.gov/regions/ane/newpages/perspectives/egypt/egenv.htm

(a) Invest (financially and technically) in energy related environmental data collection so as to generate time-series data used for monitoring environmental trends, instead of relying on ad-hoc surveys;

(b) Set-up environmental monitoring systems so as to compile comprehensives data based on systematic measurements into information databases;

(c) Ensure that quality assurance and quality control practices (QA/QC) are fully built into all environmental monitoring laboratories, with accepted performance standards in light of international guidelines;

(d) Improve the comparability and exchange of energy related environmental information within and between countries of the region, in compatibility with the existing international frameworks;

(e) Harmonise and integrate energy related environmental indicators with more traditional economic and social indicators so as to enable more comprehensive policy decisions in the broader concept of sustainable development;

(f) Disseminate data of known and documented quality, in a suitable form, with an appropriate regular periodicity.