CHALLENGES IN THE COMPILATION OF ENVIRONMENT STATISTICS IN MALAYSIA

Lim Soh Wah[1]

Abstract

Demand for environment statistics has been growing over the last few decades. The Department of Statistics, Malaysia (DOS) commenced work on environment statistics through the Regional Technical Assistance (RETA). The Framework for the Development of Environment Statistics was prepared in 1998 and the first Compendium of Environment Statistics (CES) Malaysia was published in the same year. The statistics is organised according to four environmental media while the analyses are based on the state-pressure-response model. This paper highlights the experience and challenges faced by DOS in the compilation of environment statistics. The challenges include data availability, timeliness, data gaps and differences in classification. Due to the multi-disciplinary nature of environment statistics, data have to be acquired from diverse data producers. However, the biggest challenge is to produce reliable statistics based on observations or raw data that were not specifically designed for statistical purposes. This paper also discusses some of the challenges that lie ahead for DOS in this area of work.

Introduction

Demand for environment statistics has been growing over the last few decades. There is a need for aggregated, summary information as well as detailed and highly localised data. Environment statistics play a significant role in providing information for policy formulation, planning, management, monitoring and evaluation pertaining to sustainable development and human survival.

The Department of Statistics, Malaysia (DOS) commenced work on environment statistics through the Regional Technical (RETA) Project: Institutional Strengthening and Collection of Environment Statistics in Selected Developing Countries via an agreement signed on 10 August 1994 between the Asian Development Bank (ADB) and the Malaysian Government. DOS was selected as the Implementing Agency for this project and this commitment was reinforced in the Seventh Malaysia Plan when DOS was appointed as the Central Depository for Environment Statistics in Malaysia.

---

[1] Lim Soh Wah is currently the Director of Environment Statistics Division, Department of Statistics, Malaysia.

The Framework for the Development of Environment Statistics (FDES) was prepared in 1998 with the help of a consultant funded by ADB. The first Compendium of Environment Statistics was published in the same year. The latest issue of the Compendium (year 2008) was released at the beginning of 2009.

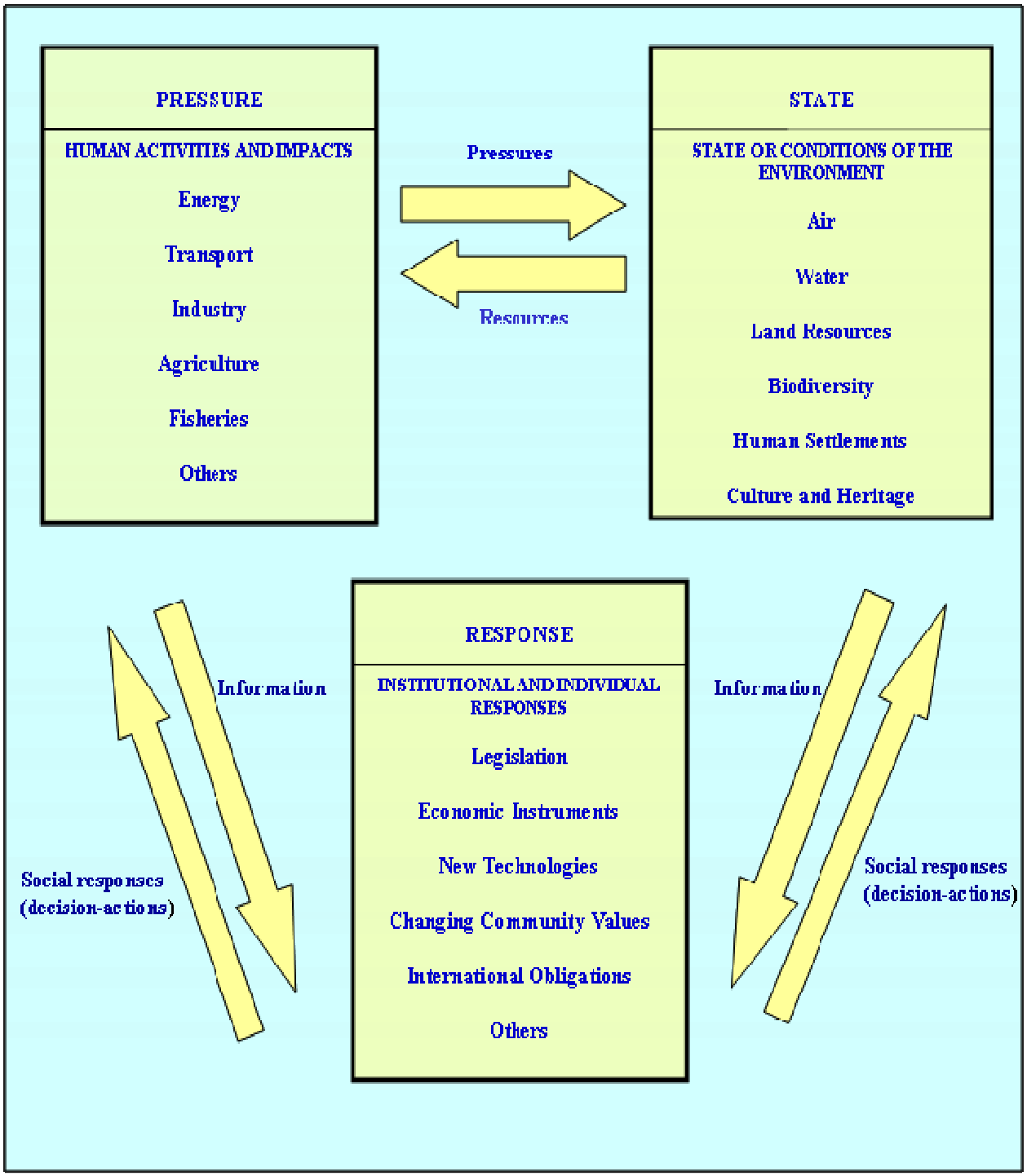
Scope and Coverage of Environment Statistics

Environment statistics are compiled based on the scope set in the Malaysian FDES. This scope follows the guidelines of 'A Framework for the Development of Environment Statistics' developed and published by the United Nations in 1984. Based on this scope, environment statistics encompass statistics on natural resources, natural disasters as well as human activity and effects on the environment and human. In other words, environment statistics encompass almost every aspect of life.

The statistics in the CES Malaysia is organised according to four environmental media, namely Air/Atmosphere, Water/Aquatic Environment (Inland and Marine), Land/Terrestrial Environment and Urban Environment/Human Settlements. The analyses are based on the state-pressure-response (SPR) model which is a modified version of the pressure-state-response (PSR) framework (Refer to Figure1) constructed by the Organisation for Economic Cooperation and Development (OECD) for the development of environment statistics. It integrates multifarious socio-economic information with multifaceted environmental parameters. Using this approach, it is especially advantageous as it is easy to explain the impact on the status of each environmental media in simple terms such as water and air pollution. However, for purpose of effective presentation and easier understanding, the PSR format was modified to show the state first, followed by the pressure on the environmental media and finally the response taken to minimise the pressure.

Figure 1: Pressure State Response Model Framework

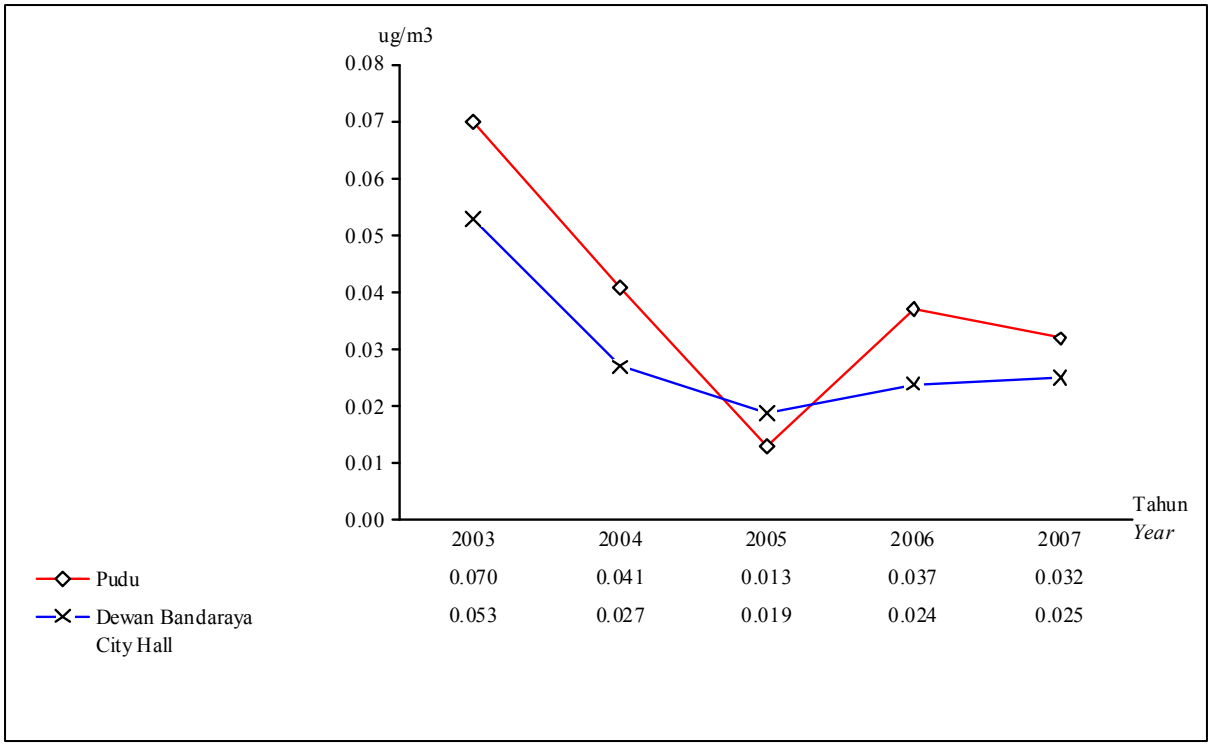
"Human activities exert pressure on the environment and change its state or condition. Society responds to this changed state by developing and implementing policies"



Source: OECD

Figure 1 shows the inter linkages of human activities, the changed state or condition of the environment and the responses. Society responds to this changed state by formulating and implementing policies pertaining to environment. As an example, in Malaysia increased use of motor vehicles is the main cause of lead emission to the atmosphere. Generally lead levels remain low after unleaded petrol was introduced in 1991 and the full implementation of unleaded petrol in 1998. Lead levels have remained low since then as shown in the average level of atmospheric lead monitored in the Klang Valley[2].

Chart 1: Annual average concentration of lead in the air of Klang Valley, 2003-2007



Source : Compendium of Environment Statistics Malaysia, DOS

[2] Malaysia Environmental Quality Report 2007

Experience and Challenges faced by DOS

DOS faced challenges in undertaking the task of developing environment statistics right from the initial stage. This wide coverage had a direct effect on manpower needs and expertise, timeliness of data, financial resources and work priorities in the compilation of the statistics. The main challenge was to equip the officers with the necessary knowledge and expertise. In capacity building, ADB played a crucial role in supporting the training programmes for the staff of the Department. An Inter Agency Committee on Environment Statistics (IACES) chaired by the Economic Planning Unit was set up officially on 7 May 1997 with the relevant government agencies as its members. At the initial stage, this committee met regularly to discuss and resolve issues pertaining to priority, resources, availability and timeliness of data.

Data Availability, Reliability and Timeliness

At the international level, A Framework for the Development of Environment Statistics was first published by the United Nations in 1984. Unlike economic statistics, where the collection and compilation have been guided by a clear and widely accepted framework of the System of National Accounts as early as in the 1940s and 50s, environmental statistics has largely been collected and compiled on an ad-hoc manner. Data collection and reporting have mostly been carried out to cater to the needs of the respective environmental agencies following their environmental concerns. Such an approach has produced patchworks of the environment statistics. Some of the patchworks are of good quality and reported regularly while others are less so. As a result, the overall quality of environment statistics has suffered, frequently lacking one or more of the standard attributes of high quality statistics.

In the case of Malaysia, environmental data were initially obtained through secondary data and administrative records. Besides the socio-economic data that are collected by DOS, environment statistics are sourced from other government agencies. Due to the wide spectrum and multi-disciplinary nature of environment statistics, raw data have to be acquired from diverse data producers whom by nature of their core business are responsible for the collection of environmental related statistics that arise from their day-to-day activities. The process of data collection requires systematic, effective and continuous cooperation from these agencies.

There are also inherent and operational issues of quality associated with the use of these administrative records as official statistics. Institutionalising the compilation of environment statistics from the various agencies was initiated through efforts by IACES which has since evolved into a mechanism to effect commitment in the provision of reliable and timely data to DOS.

Methodological Issues

The main challenge for the statistician is to produce reliable statistics based on observations or raw data that were not designed for statistical purposes and were generated by other parties. Data on the state of environment basically come from monitoring data obtained through observations using scientific measurements by the environmental agencies. DOS does not have control over these data. The coverage of administrative data is normally exhaustive as they usually pertain to well-defined field. A monitoring network bears a resemblance to a sample. It is a set of stations that have been chosen to perform measurements. However, statistical generalisation of monitoring data is impeded by the site specificity and the characteristics of the measuring sites. Consequently in collecting and compiling the relevant data for each environmental related topic, it is vital for DOS to overcome the heterogeneity in data sets that were sourced from the various non-collaborating sources in order to integrate and link the data in a format that gives coherent information on each environmental related topic and displays the links between environmental and socio-economic issues. Such coherent information will support better understanding of environmental trends and conditions and help to develop and implement policies, plans and actions.

Due to the wide and multi-disciplinary nature of environment statistics, DOS adopts other appropriate tools besides statistical methods for its data analyses. However, effective use of non-statistical tools needs further 'investment' in acquiring the relevant knowledge as well as close cooperation with specialists in these disciplines. In line with this, IACES initially served as a platform for the exchange of knowledge and expertise among the various agencies. Continuous enhancement of the skill of the staff involved is also crucial. Apart from training, participation of the Department's staff in local as well international seminars, conferences, workshops and meetings is important in enhancing their knowledge and to ensure that they keep abreast with the latest development of environment and environmental related statistics.

Standards, Classifications and Definitions

There are numerous internationally recognised classification systems available to assist in the compilation and dissemination of environment statistics. However, in environment statistics there are numerous players and data collection is not always coordinated. DOS faces difficulties in the electronic integration of data from these sources due to irreconcilable differences e.g. in data storage and classification. Sometimes digitized data have to be manually processed. These organisations use different methods in acquiring, storing, processing and analysing these environmental data and information. This makes it very difficult for DOS to develop an integrated environmental information system based on consistent standards, definitions and data depositories. A typical example is the differences in the classification on protected areas for forestry in Peninsular Malaysia, Sabah and Sarawak.

A set of standard concepts, classifications and definitions is one of the most important tools for ensuring consistency and continuity in the compilation of environment statistics. Without which there can be no continuity in comparison over time and space. In this respect, the challenge is to harmonise the standards, classifications, concepts and terms used for all the data compiled by the line agencies. It is also recognised that internationally comparable data are needed by international organisations to assess and resolve cross boundary, regional and global environmental problem. However, harmonising these standards for international comparison purposes poses another challenge for DOS as the priority of the environmental agencies/data providers is to cater to their respective needs.

Data Gaps

During the initial stage, statistics published in the CES Malaysia was limited by the data available from the producers mainly the line agencies. The availability of statistics for flora and fauna constitutes a major concern and has yet to be fully addressed. There are still gaps to be covered, in particular, areas related to biodiversity and business expenditure on environment protection due to the unavailability of data at the national level. Efforts have been initiated to collect some of these statistics through regular surveys. The data from the Survey on Biodiversity and Protected Areas have already been included in the CES Malaysia. The first report on the Survey of Environmental Protection Expenditure (reference year 2007) was released in October 2009. This report contains information pertaining to environmental protection expenditure by the four environmental media.

Sustaining the Collection of Environment Statistics

While IACES played a crucial role during the initial stage, the Environment Statistics Division of DOS has an important role to play in maintaining good rapport with the various agencies. Continuous networking, discussions and follow-ups with the relevant agencies also help to sustain the collection of environment statistics from these agencies on a regular basis. Involvement of the Department's staff in the workshops and seminars organised by these agencies also helps to improve mutual understanding on each others' needs with regards to data.

Survey of Environmental Protection Expenditure

There are numerous challenges related to the collection of environment protection expenditure from the commercial sector. The main challenge is to provide respondents with a clear definition on 'environmental protection expenditure' instead of leaving it to their own interpretation and judgment. The importance of this definition has become even more crucial as industries moved away from the traditional end of pipe solutions to integrated technologies for pollution prevention. In this respect, the Department has

supplied a definition to the respondents based on the 'compliance criterion'. Respondents are required to report expenditure incurred in accordance to or in anticipation of environmental laws or regulations in Malaysia.

Application of this definition poses another challenge for the respondents. They also have difficulties separating their environment expenditure from other types of expenditure, especially for integrated technologies. Their accounting systems do not keep track on environmental expenditure. As for the small and medium enterprises, some of them are not even familiar with concepts such as pollution prevention, abatement and control.

A manual outlining the procedures on editing and coding has been prepared and validation checks for completeness and consistency have been carried out by the Department to ensure that the data produced are of high quality. Designing the edit specification and imputation for this survey is another big challenge as environment expenditure does not correlate with other economic variables.

Current Work Programme on the Compilation of Environment Statistics

The current work programme on environment statistics comprises the following;

1. Compilation of environment statistics based on data acquired from all the existing line agencies. Both the central and line agencies will in turn manage their individual databases.

2. Addressing the needs to cover certain data gaps. In this respect, DOS conducts two regular surveys i.e. **Survey on Biodiversity and Protected Areas** and **Survey of Environmental Protection Expenditure** to collect environment statistics for these two areas.

3. Dissemination of data through publication and electronic media.

4. In line with its role as the Central Depository for Environment Statistics, DOS has taken initiative to develop a database on environment statistics. Development of this database is still in progress.

5. Climate change is currently an important global issue with social, economic and environmental impacts and official statistics plays an important role to close the data gaps. At this point in time, data on Green House Inventory are prepared by a few government agencies and the role of DOS is to provide population and industrial production statistics to these agencies for the calculation of Green House Gas emission.

Challenges Ahead

Demand for more comprehensive environment statistics is increasing. DOS has to be responsive to meet these challenges. Being the Central Depository for Environment Statistics for Malaysia, DOS needs to review and enhance the CES periodically.

Usage of Geographical Information System (GIS) in environment statistics by DOS is still at its infancy stage and in moving forward, its utilisation needs to be further enhanced. GIS technology is relevant as its multi-disciplinary nature will enable the integration of data from divergent sources to present in a visual format

DOS needs to develop and compile the Integrated Environmental and Economic Accounts to address the need for more comprehensive data for policy formulation The Department is currently sourcing for consultancy services and training programmes to acquire the necessary technical expertise and skill to develop this account.

The Sustainable Development Indicators (SDI) are currently being developed by the Institute of Environment and Development (LESTARI) for the Economic Planning Unit to address the need of sustainable development. This research is carried out in collaboration with other relevant government agencies including DOS. The current role of DOS under this research is to provide the relevant information to LESTARI. However there has been suggestion that DOS eventually takes over the task. In order to maintain these databases and improve on it as necessary, DOS needs to acquire the technical expertise and skill. In this respect LESTARI has initiated discussion with DOS on the framework for information provision and capacity building.

Conclusion

The task of compiling environment statistics has proven to be a very challenging experience for DOS. As for the statistician, the adventure is both exciting and demanding. DOS will continue to position itself to adopt appropriate strategies to enable the compilation of environment statistics that better reflects the changing needs and emerging concerns.

References

1. Framework for the Development of Environment Statistics, United Nations, 1984

2. Framework for the Development of Environment Statistics (FDES) in Malaysia by DOS.

3. A Framework for Developing Environment Statistics, Statistics Canada

4. Environment Surveys of Establishments: The Canadian Experience by Jeff Fritzche