

Ge indicators for sustainable urban management

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Ge indicators are high-resolution measures of short-term surface and near-surface processes and phenomena that are significant for environmental monitoring and assessment. They can be used to track changes in fluvial, coastal, highland and other terrestrial areas where urban centres are located. They provide a framework for recognizing and assessing abiotic landscape changes that are important to environmental planning and management. A checklist of 27 earth system processes and phenomena that are significant for environmental sustainability and ecosystem integrity has already been identified (Berger and Iams 1996). However, these have yet to be adapted and tested for tropical terrain where the nature and rate of earth processes are different.

Malaysia, through the Economic Planning Unit of the Prime Minister's Department is in the process of developing a Sustainable Development Indicators (SDI) framework for national reporting. The framework that is being planned will utilize the Pressure-State-Response approach (Mohd Nordin 1998). Sectoral initiatives on indicators in the country include the Malaysian Urban Indicators Programme (MURNINET) lead by the Town and Country Planning Department of Peninsular Malaysia and the Healthy Cities Programme established of the Ministry of Health Malaysia (Zainuddin 1998). Both these initiatives will eventually fit into the overall framework of the SDI.

The SDI framework, MURNINET and the Healthy Cities Programme emphasises aspects that are relevant to the human habitat, where cities are defined in political and geographical terms. The ecological reality is that cities are mere nodes of consumption in a much larger ecosystem. Thus, the use and availability of non-renewable material resources required to support the urban population and economy for the present and future generations are not taken into account in the sectoral initiatives. Another aspect that is missing from these initiatives is the category of "extreme natural events" which is made worse by human activities, particularly in urban areas. Such events, which relate to surficial and sub-surface earth processes and phenomena, include landslides, subsidence, storms, floods, rivers and coastal erosion as well as groundwater salination. Examples of ge indicators proposed for landslides are movement of surficial rock formations and critical slope angles, which require measurement of slope stability, mapping, monitoring using benchmarks and historical record. Sea level changes, rainfall and changes in river levels are examples of ge indicators for flooding while negative vertical movements has been proposed as a ge indicator for subsidence. There is a need to identify appropriate ge indicators for geohazard occurrences in the tropical setting and define thresholds in changes that lead to such events.

In order to fill in the gaps and establish a holistic approach to the national indicator programmes, the Institute for Environment and Development (LESTARI) and the Geological Survey Department Malaysia has embarked on a project to establish a menu of ge indicators to assess abiotic landscape changes that are significant for urban planning and management. It is anticipated that the results of this project will benefit urban planners, policy and decision-makers by providing information that illustrate the trends and status of environmental sustainability, and evaluate the success of existing policies in ensuring urban sustainability, particularly with regard to earth material consumption and hazard occurrences. The project will also identify tangible and measurable targets to shape future urban policies, strategies and guidelines to achieve urban sustainability.