## 1. What is APEIS-IEM?

### 1.1 Objectives

Environmental Conditions are deteriorating in the Asia-Pacific region, home to about 60 percent of the world's population and currently experiencing rapid population and economic growth. The fact that many countries in the region are at different stages of economic development creates a complex set of problems that seriously constrain balanced and sustainable economic development. Examples are the health impacts of industrial pollution, degradation of natural resources through industrial development, increased pollution associated with greater use of motor vehicles and the concentration of populations in cities, and increased greenhouse gas emissions. If we are to take effective countermeasures against such environmental depletion and degradation we need to examine the present environmental conditions and changes in natural resources (Fig. 1).

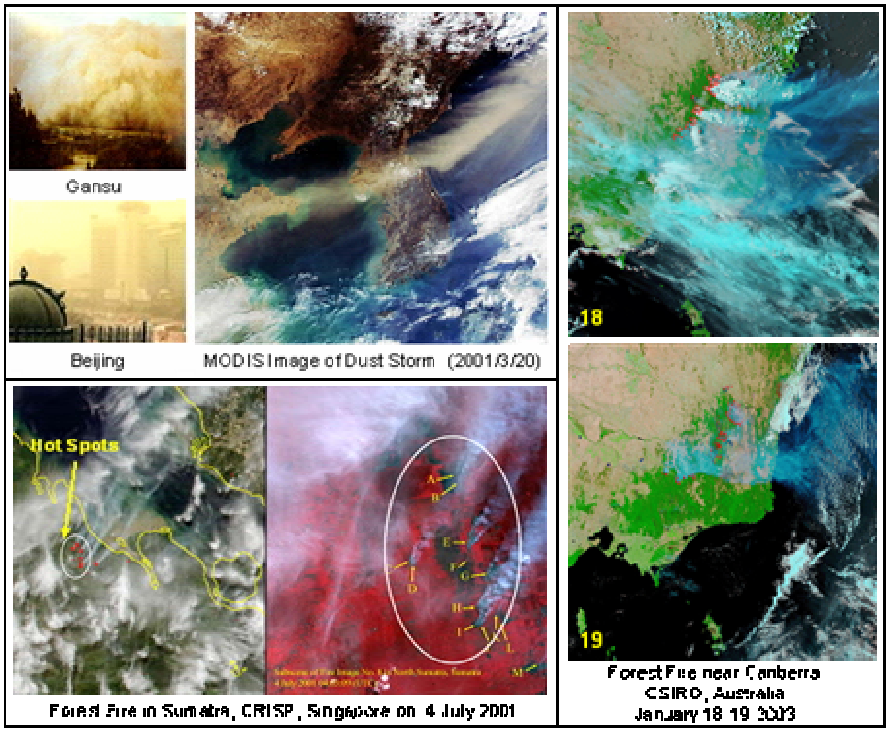


Figure 1 Examples of recent environmental disasters in the Asia-Pacific region

As one step toward solving these problems, the Asia-Pacific Environmental Innovation Strategy Project (APEIS) was proposed at ECO ASIA 2001. APEIS seeks to develop and promote practical, science-based tools and policy options for enhancing environmental innovation, and thus sustainable development, in the region through Integrated Environmental Management. In addition, APEIS aims to promote capacity-building and international cooperation in the region. As

mentioned in the Plan of Implementation of the World Summit on Sustainable Development (WSSD), the basic concept of APEIS is to assist developing countries, through international cooperation, to enhance their capacity to address issues pertaining to environmental protection and their ability to formulate and implement policies for environmental management and protection. This includes taking action at all levels to: (a) improve their use of science and technology for environmental monitoring, construction of assessment models, and creation of accurate databases and integrated information systems; and (b) promote and, where appropriate, improve their use of satellite technologies for quality data collection, verification, and updating, and for further improvement of aerial and ground-based observations, in support of their efforts to collect high-quality, accurate, long-term, consistent, and reliable data.

To achieve these aims, the National Institute for Environmental Studies (NIES) in Japan and the Institute for Geographical Sciences and Natural Resources Research (IGSNRR) of the Chinese Academy of Science joined forces in 2001 and set up collaborative research to develop an IEM network system. This collaboration was further expanded in 2002 with the formal participation of the National University of Singapore and the Earth Observation Centre of the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia. The system employs data covering the entire Asia-Pacific region, primarily from the MODIS (MODerate resolution Imaging Spectrometer) sensor mounted on the Earth Observation System (EOS)–Terra/Aqua satellite, but also from ground observations. The monitoring system will involve the following processes (Fig. 2):

- Establishing an integrated network of satellite data receiving stations and analytical systems for MODIS data that covers the Asia-Pacific region.
- Developing a ground-truth observation network for various ecosystem types to validate satellite remote-sensing data.
- Developing a data-processing software system to derive environmental indices that can be used to monitor environmental disasters and degradation.
- Developing an integrated model to simulate territorial ecological processes, water resources, and agricultural productivity at a catchment scale.

The implementation of this system will enable the monitoring of ground cover status over time, soil erosion, water resources, environmental disasters, and agricultural production.

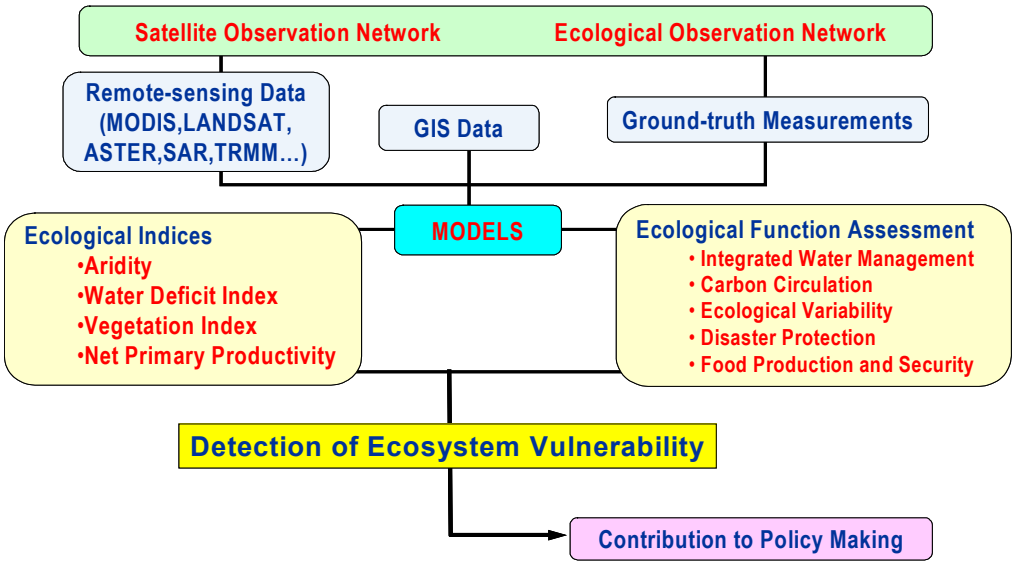


Figure 2 Flowchart for the integrated monitoring system

1.2 Expected outcomes

The expected outcomes of IEM include the following:

- Providing policymakers with precise monitoring data from both MODIS and ecological stations through the Internet (http://www.nies.go.jp/basin/index-e.html) for early warning or detection of environmental disasters and degradation.
- Establishment of a regional information system that can provide regionally standardized high-level MODIS products.
- Submission of reports and proposals for sustainable management to the governments of the countries involved. For example, a cooperative study has been conducted between IEM and the China Council for International Cooperation on Environment and Development (CCICED) and the Changjiang Water Resources Commission of China. Through this cooperation, IEM will develop an integrated model based on scientific observations, MODIS data, and research into the ecological functions of the upstream Changjiang river basins, and will use this model to forecast the effects of construction of the Three Gorges Dam on regional ecology. The simulated results will be presented to CCICED and the Changjiang Water Resources Commission of China.