

# Chapter XIV

## Information Technology and Environment

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### ABSTRACT

*The development of science and technology enhances the economy. However, it also involves many environmental problems. In China, as a developing country, the concentration of the population in cities causes several things. The first is an ecological crisis caused by the environmental problems. On the other hand, with the help of IT, we can monitor the environment in real time online. IT provides so many methods to analyze the data and to control the pollution. So many environmental information systems for environmental impact assessment and environment management have been developed. Making mathematic models to simulate the environment's change, such as to simulate the diffusion of gas in the air, is very helpful for environment impact assessment and environment protection. Information technology is very helpful in handling environmental information.*

### INTRODUCTION

With the development of the economy, environmental problems become more and more seri-

ous all over the world. In developing countries, environmental pollution even restricts economic development. In the science sector, a rapidly growing community conceived new computer

applications making and exchanging information in the field of environmental protection. Many information technologies, such as database management systems, real-time computing, geographic information systems (GISs), remote sensing (RS), and multimedia, have been used in dealing with environmental problems. During the past two decades, environmental informatics has been established as an interdisciplinary subject (a combination and integration of computer science, environmental science, and approaches to sustainable development; Werner, Werner, & Kristina, 2006).

Environmental pollution is very serious. The situation of the environment is considerably severe. National SO<sub>2</sub> and COD exhaust exceeds the environment's capacity at 60% and 70%, respectively, 70% of seven water systems are subjected to pollution in different degrees, 75% of lakes have become eutrophic, the air quality of two thirds of cities does not reach environmental standards, one third of the national territories are polluted by acid rain, 50% of city residents are living with noise over the environmental standard, and groundwater in 90% of larger cities is subject to pollution in different degrees. These data well-explain that the environmental situation we face is rigorous. Environmental problems become the most concerning (Wu, 2005).

Information technology permeates extensively in every trade, changing economic and social features deeply. In the environment realm, information technology mainly applies to environmental quality monitoring and management, pollution-source supervision and management, environmental statistics, environmental assessment, ecosystem construction and management, nuclear safety and management, environmental information release, and so forth. It provides technical support and service to environmental management workers and assistance in decision making. It has an important function to raise synthesized decision ability regarding the environment, and to develop and promote environmental supervision

to a modern level, strengthen governmental public service ability, set up a resource economy friendly to the environment, and carry out the strategic target of environmental protection.

In this chapter, the application of information technologies in the environmental realm (environmental data collection, data processing, and information systems establishment) are discussed. Automonitoring is widely used in environment quality monitoring and pollution-source monitoring. It uses many information technologies, such as online data collection equipment, data delivering technologies, and data processing technology. Databases, data warehouses, and mathematic models are used in data processing and management. Many information technologies must be integrated in establishing environmental information systems. The most useful and helpful information technology is space technology. IT can also be used to help construct decision support systems.

## **BACKGROUND**

Information technology's development in the environmental protection realm can be divided into three stages: the early part of the 1990s to mid-1990s, the preparation period; 1996 to 2001, the foundation period; and from 2002 to the present, the growth period (Xu, 2005).

In the preparation period, the main content of environmental informatization was the construction of simple management information systems (MISs) and the development of databases.

In the foundation period, all levels of environmental protection bureaus took to transaction automation, and the construction of a network system for environmental information was core. With the construction of environmental information organizations and network development as the foundation, information technology was mainly used in transacting governmental management affairs and providing technical support

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