Chapter 4

Geographic Information Systems in Developing Countries: Issues in Data Collection, Implementation and Management

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Decision making at the national level in both developing and developed countries requires the integrated use of information from a multitude of sources. Both local and national governments in many developed countries have found geographic information systems (GIS) to be a critical tool in resource management, regional planning, and economic development. Unfortunately, the practical use of GIS in many developing countries is hampered by the lack of accurate and detailed spatial and demographic data, political considerations, and management issues. To highlight importance of these issues, we present a framework for GIS adoption in less developed countries and discuss these and other constraints in the context of this framework. We also offer ideas for technical, managerial, and policy initiatives that should be helpful in addressing impediments to GIS adoption. These ideas are summarized in a set of propositions and a related framework that shows our expectations about the impact of these initiatives on implementation success.

INTRODUCTION

The role of centralized planning, management, and decision making is continuing to increase in importance in many developing nations because of increasing pressures from overpopulation, depletion of natural resources, and financial instability (Todaro, 1994; Gillis, et al., 1992). As is the case with most planning and decision making activities, insufficient and inaccurate information will hurt these efforts. In fact, Todaro suggests that the two most prominent factors limiting the success of planning efforts in less developed countries (LDCs) are the lack of adequate data and a shortage of trained decision makers (1994, Ch. 16).

Spatial data is particularly valuable for planning and development efforts because they describe the geographic distribution of economic resources, population, and other relevant factors. However, the collection, management, and application of spatial data can present unique and seemingly insurmountable problems for organizations seeking to leverage this data. Reasons for this situation include:

1. Data describing the geographic distribution of a nation's resources are often difficult to collect, they are hard to verify, and they typically change frequently.
2. Many information systems do not adequately handle spatial data; therefore development personnel, managers, and computer specialists working in LDCs may have little or no experience with these types of data resources or the software used to manage and analyze them.
3. There are political issues associated with the implementation of any governmental information system that may be exacerbated by the inclusion of spatial data in the system.
4. Personnel issues associated with system development in any country may also be more important in LDCs or because of the use of GIS technologies.

Mennecke and West briefly mentioned many of these obstacles to GIS implementation in their paper summarizing the role of GIS as a decision support and administrative tool for governments in LDCs (1998). This paper builds on this earlier work by exploring these and other obstacles to implementation in greater detail and by offering solutions that will help economic developers to find, create, and better manage both spatial and attribute data resources. Government policy makers, system developers, and academics working with support systems for decision making in LDCs will have a richer understanding of how to improve the chances of a successful GIS implementation.

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