

# *DATABASE-LEVEL INTEGRATION FOR WATERSHED DEVELOPMENT*

## Integrating GIS and MIS

Management information systems (MIS) are used in a multitude of applications. Maps improve decision-making but GIS has not yet become an integrated part of MIS. Integration can take place at various levels, but most important are those of user interface and database. The former helps the layman understand information. Database-level integration enables up-to-date data transfer between MIS and GIS. Here, the authors present an example of the latter in an application for watershed development in India.

It is common practice to develop different software applications separately for the same user-group. This complicates satisfaction of user requirements and increases development costs. A MIS is important for project planning, implementation and monitoring, provides strength and improves systems and processes. It also provides the right information at the right time to facilitate decision-making processes, both in respect of executive and technical functions, and enables efficient use of all types of available resources (see text box). Users will benefit from MIS-GIS integration because it reduces the cost of development and difficulty in using a software application. The right information can be efficiently extracted and easily understood with the help of maps.

### MIS-GIS Integration

MIS and GIS can be integrated at various levels, most importantly that of user interface and database. At user-interface level, the most essential for the layman, MIS and GIS are incorporated into a single application so that the user has a single interface with which to interact, whilst separate databases for MIS and GIS might be in use. Integration of the interface means MIS and GIS teams cannot work independently. Database-level integration will lead to MIS and GIS sharing a common database; data changes will be reflected in both applications. After designing tables for the common database, MIS and GIS teams have the option of developing their applications independently. If the database is designed for one, already running, application restructuring of existing data and tables becomes impossible; thus views may be created for adaptation of data and table structure for the other application. Spatial data may be saved separately and attribute data shared between GIS and MIS. Both can separately use non-shared data. The best database-level integration involves integrating all data with a single database. For example, Oracle Spatial can save both spatial and attribute data, enabling access and modification to spatial and attribute data from MIS and GIS applications. The best overall solution is full integration of both databases and user interfaces.

### Management Information System

MIS refers broadly to a computer-based system that provides managers with the tools to organise, evaluate and efficiently run their department. To provide past, present and prediction information an MIS may include software that helps in decision-making, data resources such as databases, the hardware resources of a system, decision-support systems, people and project-management applications and any computerised processes that enhance departmental efficiency. A MIS enables faster and better control and decision-making, improves monitoring of various operations and optimises resource-use by tracking and extrapolation of data. From the human-resource point of view, the user benefits from MIS thanks to its productivity increasing potential. It reduces the clerical and routine work of technical personnel.

### Watershed Development

MIS and GIS systems were developed for managing and monitoring watershed-development activities for an Integrated Watershed Development Programme (IWDP) in Himachal Pradesh, under the aegis of IWDP Solan. The main objective of the IWDP HILLS-II, a World Bank-aided project, is to improve the productive potential of the project area in the States of Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab and Uttaranchal using evolving watershed-development technology through community participatory approaches. The project, which has contributed significantly to reducing soil erosion, increasing water availability and alleviating poverty in Shivalik region, puts special emphasis on building the capacity of the community to take responsibility for maintaining assets after project completion.

### Case-study

The MIS application is web-enabled and the GIS consists of a standalone software package. The two applications were developed separately and had separate login screens. Required menus, as per the requirements of IWDP Solan, were included in the MIS and GIS software. After successful login to the GIS, a map is displayed of districts in Himachal Pradesh State (Figure 1). By clicking on the desired district a map of the area is loaded into the map viewer (Figure 2), in this application, Geomatica 9.0. The application was developed using VB.NET and PCI SDK 9.0 and Geomatica was used to carry out various GIS functions, such as query. The MIS system was developed

using ASP.NET and SQL Server 2000 and has options for data entry and report generation based on user-specified criteria (Figure 3).

## Concluding Remarks

Excellent applications can be developed by fully integrating MIS and GIS at user-interface and database level. Database-level integration enables up-to-date data transfer between MIS and GIS while user-interface level integration will facilitate laymen in understanding information easily.

---

<https://www.gim-international.com/content/article/integrating-gis-and-mis>

---