

Task-Oriented GIS for Water Management at Taipei Water Resource District

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Abstract: Taipei Water Management Office (TWMO) is one of the eleven district offices in Water Resource Agency. Water management is the top priority to be pursued both on daily management and long-term management at TWMO. There are five departments to perform a wide range of tasks in addition to water management. All management prescriptions are simply to provide sustainable clean water for about four millions population in Taipei. TWMO has gone through 16 years experience of development and implementation of GIS in water management. The objectives of this paper are to provide the major ingredients of successful and operational GIS for water management. The five departments at TWMO have performed tasks such as city planning, construction management, forest management, land use enforcement, soil and water conservation, water quality monitoring and protection, garbage collection, and sewage disposal management. Data base creation was one of the major jobs to be done. Update of data base has to be done on a daily basis. Computers, its peripheral, and software are essential for GIS developed at TWMO. Know-how and technical skill on computers and GIS for every technician are contributing significantly such that GIS can be implemented on most of jobs performed at TWMO. Implementations of GIS have been pursued by application modules on a task-oriented basis. Application modules are simple, easy to use, and menu driven with only Chinese. Web-based and mobile GIS are the new components that make water management at TWMO stay on the right course. To solve problems encountered in water

management by GIS at TWMO can be easily and user-friendly may be the most important experience.

Keywords: GIS, water management.

1. Introduction

Taipei Water Management Office (TWMO) is one of the eleven district offices in Water Resource Agency. Water management is the top priority to be pursued both on daily management and long-term management at TWMO. There are five departments to perform a wide range of tasks in addition to water management. All management prescriptions are simply to provide sustainable clean water for about four millions population in Taipei. Now, water resource management is one of several top priorities that government agencies have to take care seriously in Taiwan. Especially, TWMO has its own capacity to provide more drinking water to northern Taiwan in addition to Taipei. TWMO has its own jurisdiction that can manage two watersheds almost everything such as garbage collection, zoning enforcement, sewage treatment, tree planting, housing management, soil and water conservation, and water resource management. There are five departments at TWMO that have to perform tasks such as city planning, construction management, forest management, land use

enforcement, soil and water conservation, water quality monitoring and protection, garbage collection, and sewage management. TWMO has gone through 16 years experience of development and implementation of GIS in water management. GIS may be not the only contribution that makes TWMO do the right job but certainly it contributes something.

The objectives of this paper are to provide the major ingredients of successful and operational GIS for water management at Taipei Water Management Office.

2. Development Strategy

GIS development for water management at TWMO has gone through from the basic steps of database creation, software and hardware installation, and techniques transfer. The idea was quite simple to implement GIS to solve problems encountered in water management more efficiently. Task-oriented is the major ingredient that problems can be solved on a basis for one technician. Easy to use and menu driven are the two key components that a successful GIS should provides.

Field operations for water management required combinations of GIS, remote sensing, global positioning system (GPS), and radio communication. In those days that Internet was not available, a self-developed mobile GIS was created using notebook computer for field operations. Hardware was assembled and software was written with C programming language to create one type of mobile GIS.

Database comes first and it should be updated as soon as possible. On-line updating of the database by TWMO technician is a very important factor that GIS can be successful. Hardware and software have to update as well. New application module has to be developed to solve new types of problems in water management. Stay in the right course of main-stream GIS is to implement web-based GIS. ArcIMS was bought for web-based GIS implementation. ArcView was used for personal computers and ArcPad was used for personal digital assistant (PDA). PDA can work as mobile phone in the open field with Internet browsing capability in Taiwan by

PHS or GPRS. A combination of PDA, a GPS device, and software ArcPad provides very nice functions of mobile GIS for field operation in water management.

3. Application Modules for Task-oriented GIS

Task-oriented GIS has its own capability to solve problems on a single technician basis. Build-to-order and customized GIS was created in several application modules to solve only one type of problem by one application module. English that inherited in commercial GIS software has created some sorts of problems for all staff at TWMO. All in Chinese with functions provided by menu-driven is the basic component that every single application module has to follow. All developed application modules have met these guidelines. ArcPad is the only exception that it is an English version. But with a little bit of training, ArcPad can be used by TWMO technician without difficulty.

Know-how is the key component that an application module can be made and served as it should be. Two way communications between one who will use an application module and one who developed it were quite critical. Inquiry is not the only function provided by an application module. Table output capability and map generation provided by an application module are usually the required components. Automatic table generation in Microsoft Word or Excel by an application module for further paper works is a popular item. Application modules can be developed to solve one township, one watershed, one district, and the whole TWMO. Three levels of management at TWMO, say technician, department head, and director, required that application modules can serve them well.

4. Conclusion

Taipei Water Management Office(TWMO) is one of the eleven district offices in Water Resource Agency. Water management is the top priority to be pursued both on daily management and long-term management at

TWMO. There are five departments to perform a wide range of tasks in addition to water management. All management prescriptions are simply to provide sustainable clean water for about four millions population in Taipei. Water quality and quantity provided by TWMO is one the best in Taiwan can be shown that TWMO has done a nice job in the last two decades. Task-oriented GIS has gone through 16 years at TWMO and it can be categorized as successful and operational.

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