

MANAGEMENT OF ILLEGAL SLOPE LAND USES IN TAIPEI CITY

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ABSTRACT:

Illegal slope land uses in Taipei City is now managed by a 3-D GIS. Where are they and who are liable to a fine are identified on the ground and in personal computers. An automatic process implementing WINDOWS 3.0 Chinese version was developed and configured as a module of the 3-D GIS. All illegal slope land use locations need further management prescription or a second fine can be automatically shown on a color monitor. All paper work is simply a process of mouse clicks.

KEY WORDS: 3-D GIS, Slope land uses.

1. INTRODUCTION

Bureau of Reconstruction, Taipei Municipal Government is in charge of slope land uses management to insure that soil and water conservation at slope land will not be jeopardized. Illegal slope land uses were usually monitored by a traditional approach. That was a process of about six days from identifying on the site and till issuing a fine to its land owner. A second fine has to be issued if there is no improvement has been taken.

A self-developed 3-D GIS was implemented at one watershed to demonstrate that soil and water conservation can be facilitated (Wu and Liao, 1991). A full GIS functionality may be too complicated for untrained users to use properly (Mark and Gould, 1991). A GIS should provide limited functionality, chiefly viewing and browsing, for the general public. It is desirable that a GIS can provide an automatic or semi-automatic process to take care all paper work required for a soil and water conservation management prescription. A smooth interaction can be achieved that every one can implement a module in a GIS to identify land parcels violating the soil and water conservation regulation on sites and find out their land owners. This paper will discuss how an interaction was made to make a process of six days work into a single day.

2. METHOD

2.1 Identifying Illegal Slope Land Uses on Sites

Identifying illegal slope land uses has to be performed on sites by an inspector. A notebook computer is very useful in this regard. A module of a GIS is configured that only viewing, browsing, and overlay functionalities are provided. One user has to input a map sheet number and to zoom out a portion of the sites. On the

color monitor that land parcel numbers can be identified. A color photo has to be taken as a proof that might need in the court. All pictures were scanned into a computer and saved as image files.

2.2 Finding Out the Land Owner

If land parcel numbers were identified on a personal computer, then the land owners can be extracted from the data base quite easily. A new file will be created to monitor all land owners who are violating the soil and water conservation regulation. A fine will be issued to the land owners accordingly.

2.3 Monitoring All Identified Land Parcels

Monitoring all identified land parcels is simply a process to insure that proper measure has been taken by the land owners to achieve soil and water conservation. A small program was written in Visual BASIC to automatically display those land owners have to be fined one more time based on date. In a windowed environment that text files, images files, digital parcel maps, and land uses maps are all can be reviewed and browsed by mouse clicks. Every one at Bureau of Reconstruction can implement the monitoring process because of its simplicity and no training is required. The cultural differences between an English user and a Chinese user are taken cared. Interface programs are all adaptable to one single user in an all Chinese environment. This is a function provided by the WINDOW 3.0 Chinese version.

2.4 Paper Work

Management of illegal slope land uses need a little bit of paper work. In a bureau level that several tables are required. A spread sheet program was used to compile all tables that were usually made manually. All

interface programs that make paper work so simple were written in Visual BASIC.

3. RESULTS AND DISCUSSION

3.1 Data Base

Data base for Noname River Watershed consists of land parcel maps 74 sheets, topographic maps 48 sheets, three-dimensional contour maps 48 sheets, slope maps 48 sheets. All are at a scale of 1:1,000. Every single sheet of map has graphic layers more than 180. Slope land uses and suitability maps are at a scale of 1:5,000 and only 10 sheets are needed and all are available. They can overlay to one another both in two dimensions and three dimensions. The whole process is confined to this watershed.

3.2 GIS Analysis

Overlay analysis is simply a process of layer on and off. Slope maps and contours maps can be displayed in three dimensions by a single command. A 3-D display of an illegal slope land use site is very useful to review several different "what if" might happen in the near future such as, landslide. It is an overlay analysis that can provide the key land ownership information, that is, parcel numbers. Then a small program will display all attributes associated with a particular parcel number automatically.

3.3 All Land Parcels Under Monitoring

All illegal slope land uses were identified on a color monitor and their land parcel numbers were picked by a mouse and stored as a new file. This new file then serves as a basic file to meet needs in further management. A list of land owners who is confined to one more fine can be automatically displayed and printed out. A color photo can be displayed on a color monitor to indicate what happened on a particular site to decide what management prescription is needed. All paper work is performed on a table by table basis. That is, an interface program takes care a single table. The interface programs are very easy to be configured into different forms to meet different needs.

In short, a GIS provides functions that will indicate parcel numbers for those illegal slope land use sites. A fine for the illegal slope land uses is issued automatically. One more fine is needed or not is also decided by a GIS. All paper work required to monitor illegal slope land uses is also an automatic process that needs user interaction.

4. CONCLUSION

Management of illegal slope land uses in Taipei City is now performed by the use of geographic information system. Only limited functionalities were provided by a self-developed GIS. Interface programs have been developed to make the management process very simple and easy to use. No training is required. Interface programs are very easy to write that interaction of one single user can be made very smoothly. The whole process can adapt to users and organizational needs. Information content of the existing data base is very critical. Slope land uses maps and digital parcel maps of the whole Taipei City have to be created into the data base such that the whole process can be implemented to soil and water conservation problem in the city instead of only one watershed.

5. REFERENCES

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