

DEMAND OF E-LEARNING TECHNIQUES IN THE FIELD OF LAND MANAGEMENT USING GIS IN MONGOLIA

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ABSTRACT:

Acceptance of e-learning issues and techniques in the land management sector is slow, due to insufficient number of professionals skilled with this matter. Scarcity, accessibility and sharing of information are a challenging development in Mongolia. Acquisition, edition, updating, and development of skills for e-learning environment in the field of Geomatics are not yet transparent and open to many Mongolian young researchers and scientists. E-learning techniques, training materials, online tutorial videos, guidelines and courses are needed for many land specialists who work far away from capital city.

Hence, land information system over settlement and agricultural area using GIS in selected pilot areas of project is trying to help for improvement of land management and e-learning environment in Mongolia. Developed and used software stack, tools, training materials and guidelines of the project will improve and facilitate the user's software skills and land managers daily work.

Developed e-resources, offered Open Source tools and trainings are crucial for land administration offices around Mongolia.

1. INTRODUCTION

1.1 Use of GIS in the Land Management sector in Mongolia

The use of GIS for land management related issues are in developing phase in Mongolia. Market oriented economical transition started in Mongolia since early 1990s after socialist time and land administration efforts have started with a new vision. New land law entered into force in 2002. Application and use of modern technology like GIS and RS in the field of land management is very recent. Land Administration field started using GIS during middle of 1990s in Mongolia. Nowadays, many government organizations and private sectors are using GIS software and RS data in their working environment. Demand of GIS use and maintenance of spatial data is increasing day by day.

Use of GIS is important in many fields, especially environment, meteorology, environmental management and land cadastre in developing countries like Mongolia. Due to Mongolian nomadic culture and sparsely distributed settlement, most of the citizens and land officers are working far from the capital city. Land officers often travel to the capital city and attend several days training in the head office. Travelling is waste of time and resources and difficult for them as well. All aimag's (province) land administration offices are connected to internet now-a-days. Use of internet based distance education, data sharing and e-learning techniques are challenging issues in this sector. However, E-learning techniques in GIS and Remote Sensing field can be provided to many people working in land administration and can provide transparent information sharing, quicker access and better management in their daily work environment. Thus, implementation of E-learning can help to efficient use of resources and time.

1.2 Geodatabase for agricultural land

In Mongolia, main class of land inventory is divided into 6 classes viz: a. settlement, b. agricultural land, c. road and transportation, d. special protected area, e. forest and f. water (ALAGAC, 2010). These categories are further divided into sub categories in detail. These spatial data needs to be maintained in a unified Geodatabase nationwide in Mongolia. In this paper, only agricultural area examples are considered. Agricultural land occupies 73.9% (115,586.2 thousand hectare) of whole territory of Mongolia (ALAGAC, 2010). The Mongolian citizens have right to privatize, possess and use their land.

With the help of “Land Manager” program which was developed by GIZ-funded “Land Management and Fiscal Cadastre” (LMFC) project land officers could register land possessor, user and ownership information which is related to land management in Mongolia. The program is meant to register land contract, fee, tax, and valuation information. One of the advantages of the program is continuous cadastral update and historical registration information using Open source GIS software. Program stack is using open source platform software like PostgreSQL and QGIS.

Currently a unified land information system is not available in Mongolia. The National Land Information System (NLIS) is under construction and there is a lack of well educated and equipped land officers in the countryside area. Capacity building, land related legislation and regulations, land management, and cadastre issues are not unified or centralized and transparent. Above mentioned challenging issues and problems need to be solved.

Land information system over settlement and agricultural area using GIS is operating in few selected pilot areas of the project aiming to improve land management through using geomatics in Mongolia. The in the frame of the project developed software stack, tools, training materials, and job training will improve and facilitate the users and professional software skills and land managers daily work. One of the project's main works in the frame of geodatabase and cadastre updating till now is acquisition, quality checking, maintenance and utilization of existing data in the pilot areas.

The trainings and summer schools every year involve different institutions physically and joint education is taking place. Virtually, like web-based GIS is used in different land administration offices in their daily work. New vision of the project is open source based land information system development and establishment of valuation database in selected pilot areas.

After organizing and use of existing agricultural data and making it accessible to public, education and e-learning techniques can be developed for students and young professionals.

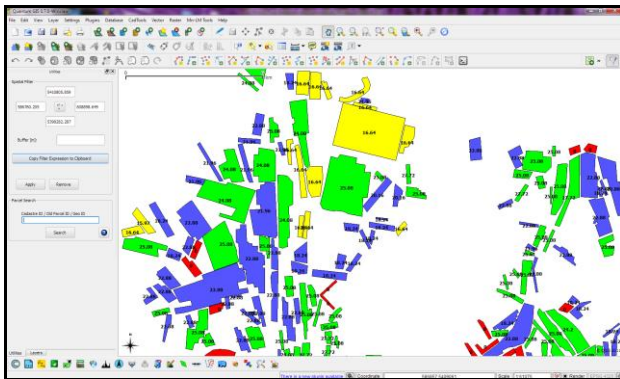


Figure 1. Soil quality status information over cropland (green and blue are having better soil quality than yellow and red.)
Data source: ALACGaC.

1.3 Problems and demand of GIS e-learning issues

Acceptance of e-learning issues and techniques in the land management sector is slow. Due to insufficient number of professionals, scarcity, accessibility and sharing of information e-learning is a challenging development in Mongolia. Lack of open and transparent information and data access, governmental institutions' data exchange and geomatics policy are main problems of developing geomatics education. Similarly, separate intranet connection for E-learning facilities in universities and contents of several subjects like in GIS and mathematics are not sufficient for young professionals.

Most of the students and young professionals have started using GIS in their work but there are no standardized geomatic regulations, learning techniques, and data sharing between governmental and private organizations. Many people are teaching GIS just for their wish; there is lack of information distribution and environment for young specialists in Mongolia. But internet connection is rapidly distributed for many Mongolians, they could access to internet from office and home. The problem is that most of professional information is in

English. Another problem is missing digital data quality and data migration issues.

One of the main goals of distributing the geomatics related information and knowledge is the development of a high quality E-learning platform and training for specialists and students.

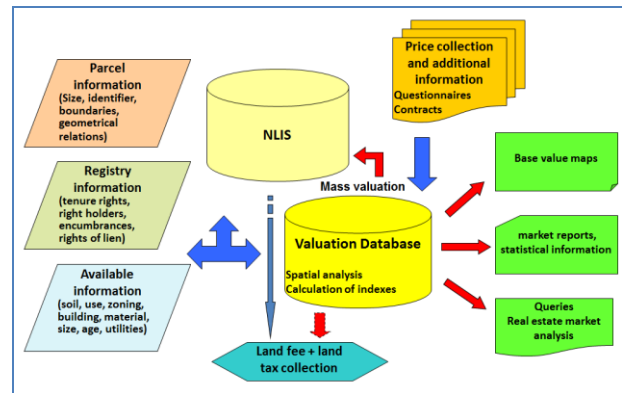


Figure 2. Land valuation database (Source: Harald Finkemeyer)

2. VALUATION DATABASE

2.1 Rural database

Aim of the work is to create a rural cadastral database and delineate a parcel structure for a complete coverage of all land resources using GIS and RS data for agricultural areas, based on Open Source GIS software.

The reason of separating agriculture land from main categories is simple. Land transactions number is much higher in settlement areas and updating process is more complex than in agricultural areas. Especially, cropland geodatabase can be created using open source GIS software. Use of open source GIS software will be helpful for many people who want to start geomatics as it is available free of cost. An extended land valuation database and Land Manager program description is given in Figure 3.

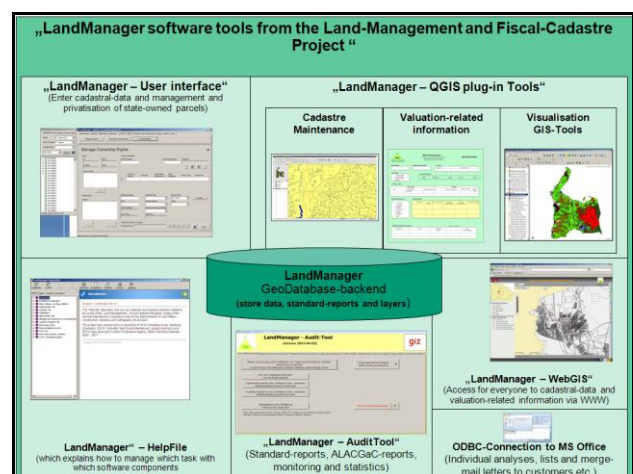


Figure 3. Land management software stack. Source: Andreas Glaesel

Land administration software stack works with Land Manager (LM), QGIS, and PostgreSQL. Land Manager consists of 9 modules like Administration, Cadastre, Right holder,

Applications, Contracts, Payments, Base value, Reports and Help module. The programs main window is given in Figure 4.

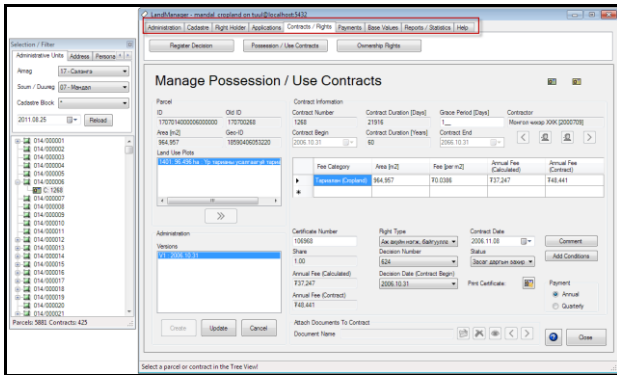


Figure 4. Land Manager program (Contracts registration module). Source: LMFC project

Registered land information will be basic for many purposes like capacity building of land officers through modern technology and better information supply, updated cadastral system, improved legislation, data sharing between organizations (property rights), bank mortgage, against corruption, land fee and tax control, improved land use planning, reports and statistics to public and good governance policy over land administration.

To cover nationwide establishment of NLIS, correct registered land information and data should be accessible through e-learning method. E-learning techniques using GIS will be the right solution for many Mongolians right now.

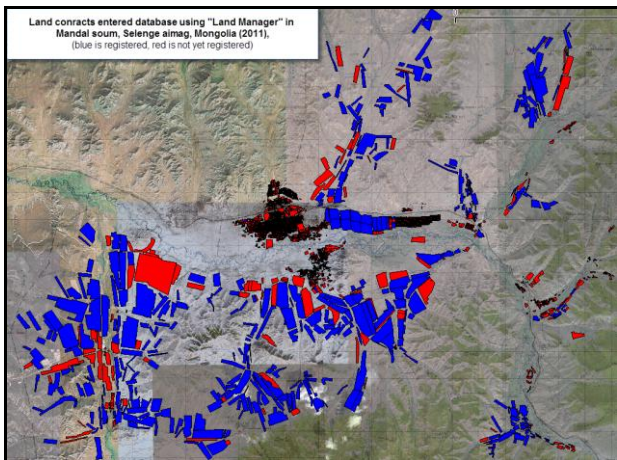


Figure 5. Cropland possession contract registration in LM over Mandal soum, Selenge aimag.

2.1 Developed e-resources

Existing land possessor state registration books, digital state registration data, parcel registered information, cadastral delineation and registration data, hardcopy contracts, and cropland soil quality status are main inputs into the database. Also existing digital data covering the pilot area is collected different from different sources of the organizations. Quality checking of data and migration into database is the next step. LandManager, WebGIS configuration, tools and help files

which are based on existing legislation are prepared to land officers and professionals. WebGIS, WMS configuration in pilot areas is helpful to land officers to easily get information about parcel, overlaps with raster images, analysis and search functions. Existing data quality and migration from different resources, projection and missing information are main problems in creation of database starting phase. Well organized data archives, data updating, educated land officers, open and transparent work environment will help to establish a quick service to the public and better development of land administration sector. Land price collection, printing cadastral map and LandManager-Audit tools are offered potential tools for many land specialists.

2.2 Trainings

Universities, projects, government and private organizations are involved in GIS training in Mongolia. However most of them are located in the capital city. Thus virtual, web-based education like e-learning methodology is necessary to deliver GIS education to the remote parts of the country. However e-learning process is new here. Over 300 soums have land officers. Developed e-resources, offered open source GIS tools and trainings from project side are crucial for land administration offices around Mongolia for judicial use of resources and achieving effective education in this field. To achieve this goal, the project developed continuous job training and workshops which are helpful for many specialists.

3. CONCLUSION

Land is the main source of production for Mongolians. Good land management can be maintained by proper policy and well educated human resources. Modern technologies like GIS and e-learning are very important and effective solutions in many applications. Countries in transition like Mongolia are facing several problems in the use and apply of these technologies. Learning from others experiences, knowledge and opinion-sharing and exchanging are important for many young professionals. There is an urgent need to use and coordinate e-learning GIS techniques in the field of land administration in Mongolia. It will contribute to the economic development of the nation.

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