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PROBLEMS AND PROSPECTS OF LAND INFORMATION SYSTEMS IN LAND RESOURCES MANAGEMENT

The article reviews the contemporary land information systems of land management. Based on the analysis carried out in the research paper, the current problems of information support for land management are identified. Suggestions how to improve the information systems using technologies are presented.

Keywords: land data systems; land resources; land relations; managerial decisions.

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ПРОБЛЕМИ І ПЕРСПЕКТИВИ ВИКОРИСТАННЯ ЗЕМЕЛЬНО- ІНФОРМАЦІЙНИХ СИСТЕМ В УПРАВЛІННІ ЗЕМЕЛЬНИМИ РЕСУРСАМИ

У статті розглянуто сучасні земельно-інформаційні системи земельного управління. На основі проведеного аналізу виділено існуючі проблеми інформаційного забезпечення процесу управління земельними ресурсами. Сформульовано пропозиції щодо вдосконалення інформаційних систем з використанням сучасних технологій.

Ключові слова: земельно-інформаційні системи; земельні ресурси; земельні відносини; управлінські рішення.

Табл. 1. Літ. 13.

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ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ ИСПОЛЬЗОВАНИЯ ЗЕМЕЛЬНО- ИНФОРМАЦИОННЫХ СИСТЕМ В УПРАВЛЕНИИ ЗЕМЕЛЬНЫМИ РЕСУРСАМИ

В статье рассмотрены современные земельно-информационные системы земельного управления. На основе проведенного анализа выделены существующие проблемы информационного обеспечения процесса управления земельными ресурсами. Сформулированы предложения по совершенствованию информационных систем с использованием современных технологий.

Ключевые слова: земельно-информационные системы; земельные ресурсы; земельные отношения; управленческие решения.

Problem statement

Current conditions of the world economy influence greatly the development of the national economy in the Republic of Kazakhstan. A significant part of economic transformations is realized through the use of land tracts, the effective management of which can significantly increase the efficiency of various investment resources. Wide land areas are the advantage of the country, so the proper policy of land tenure and land use needs to be formed on the basis of improved land data systems. Different forms of land ownership complicate the control of their state, land tenure and land use. Disagreements in land management require a search for new approaches to it.

The use of land resources, efficient management, monitoring, protection of land, managerial decisions at different hierarchical levels require reliable dataware. Land data systems allow analyzing promptly large amounts of geospatial and other

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specialized information on land areas. They can be created on the basis of GIS (geographic information system) technologies, which specifics has recently changed greatly. GIS results might be used by state institutions, enterprises of various sectors of economy; this information is especially important for farmers, farm enterprises' leaders, the management of agriculture and forestry. On this basis, the search for problems and prospects of the use of land data systems is the key issue to improve land management in the Republic of Kazakhstan.

Recent research and publications analysis

Both foreign and domestic scientists studied the problems of development and application of data systems in land management, including H. Berkeley, R. Gassel (2011), J. Hansen (2011), I. Williamson (2011), J. Larson (2010), J. Zevenbergen (2011), M. Gazaliev (2008), I. Goncharov (2011), G. Kurmanova (2009), P. Kuhtin (2004), A. Levov (2004), S. Lomakin (2012), G. Seythamzina (2011) and others. These authors examine different approaches to land management, including those based on the application of land data systems. It should also be noted that the current practice gives a lot of opportunities to improve dataware of processes of land use and ownership, having some issues that require further study.

Objectives of the study

The current paper is to identify the prospects for improving land data systems in land management of the Republic of Kazakhstan in the view of the existing problems.

Research findings

The main purpose of land data systems is to create a dynamic multi-level information environment for the formation of the optimal information flows between administrative systems and the systems of land management of human settlements, land tracts of enterprises and other territorial entities (Goncharov, 2011). The purpose of land data systems is to provide current information on land resources, changes in their condition, quality and structural composition, dynamics of land use and land management for the implementation of efficient public policy, creation of favourable informational, technological and regulatory environment to ensure the transition to the continuous development of a particular territory (Lomakin, 2012).

Land data systems are developing in the Republic of Kazakhstan, including software and hardware systems, space-attribute database, channels for information exchange and other resources helping to automate digitalized land cadastral information flows by means of GIS software. Geographic data systems are also developed, used to solve the tasks and perform the functions of land management and regulation of land relations at the country level, but they are not yet widely spread.

The modern land data system of land administration in the Republic Kazakhstan is characterized by a significant number of problems related to the uncertainty of the legal status of land data and procedure of land management, lack of accuracy and completeness of the existing land information. In addition, the lack of necessary restrictions on land use, lack of automation and computerization of land management procedures, lack of documentary status of electronic information resources and so forth complicate the operations of land data systems.

Irrational keeping of current land data system increases greatly potential land relations conflicts, as corruption related to the spatial characteristics of land plots,

recorded in the data systems, disables accurate identification of their condition and fair resolution to land disputes. Among the problems of the land data systems development there is a significant complication of state control over the use and protection of land, there are no prerequisites for regular monitoring of land and soils (Strategic Plan..., 2010). Land data systems do not play a significant role in managing land and providing agricultural enterprises with current information on land resources; the quality and composition of lands are one of the most important factors for these enterprises.

Significant challenges are hidden in the inability to solve some environmental problems by means of land data systems. According to some researchers (Gazaliev, 2008), it is these systems that can provide information on the maintenance of territories, the need for entities to comply with environmental rules and regulations, or prohibit operations at all because of the protected area or excessive environmental pollution.

According to experts, mechanisms for keeping land data systems formed in the Republic of Kazakhstan contain a significant risk of corruption, preferentially connected with the delegation of functions of keeping state register of land to several business entities, non-transparent administrative procedures for the implementation of public policy of land management and so forth (Kurmanova, 2009). In terms of the above problems in operation of land data systems there is a need to find promising areas for their development.

Effective suggestion on how to improve the mechanisms of managing land tracts is to create an integrated land data system based on different departmental cadastres (land, water, forest, town planning), registries and records, institutionalized system of information exchange. At the same time, integrated data system looks like a set of databases and data banks on land and other resources, application practices, functioning to meet the information needs of public and private entities. Such information environment can be provided by means of a number of the following measures (Table 1).

Table 1. Measures to create common information space for land management

Measure	Way of implementation
1. Consistency of information exchange	Agreement between different departments of information resources' sharing (conditions, data exchange format, volume of the information provided).
2. Development of methodology for identification of land	The development of typical techniques of identification of land and other real estate at all territorial levels (division of territory, cadastral numbering of land plots, determining the position and boundaries of land plots).
3. Formation of the structure of databases	Formation of a structure common for all users of data banks, formats, and semantic content of dictionaries, classifiers, reference books for all organizations in the field of land management.
4. Managing software and hardware	- coordination of software and hardware used for cooperation of all information keepers in an integrated information environment; - combination of software to keep databases and their conversion, compatibility of guides and dictionaries.
5. Binding of cartographic information	Binding of cartographic information from the databases of the land cadastre.

Source: Developed by the author on the basis of (Lomakin, 2012; Henssen, Williamson, 2011; Larsson, 2010)

The basic element of an integrated land data system should be the information of the state land cadastre. This refers to the fact that the land, located in a particular territory (country, region, district, city, village) should be the basis for imposing on them the information about other fixed assets (buildings, facilities, communications etc), facilities of forest and water reserves, mining and agriculture. At each administrative and territorial level it is necessary to create a common information space meeting the needs of land service and other relevant agencies and organizations (Seythamzina, 2011). A possible option for creating a single information environment can be a database accessed by interested users through a local network or from the information center.

The priority for the Republic of Kazakhstan is the agricultural use of land resources, which information provision has some problems. One of them is low provision of agricultural enterprises with reliable and timely information on the agroecological condition and potential production opportunities of land. This creates a distortion of management decisions on the prospects to use specific land plots. A significant proportion (20–30% of the 3.093 mln ha) (5) of a meliorating land is used inefficiently, about 11 mln ha of arable lands are unreasonably withdrawn from circulation (from 35.6 in 1991 to 24.6 mln ha in 2011) (Agency on Statistics), land management planning organizations do not virtually develop projects of land use.

The situation could be improved on the basis of implementation of a complex of measures, one of which is to apply automated systems for the collection, processing and use of information for taking optimal administrative decisions. These include geographic information systems (GIS) and land data systems distinguishing by regulatory support, tasks and content. MapInfo Professional for Windows, LPS 1.2, AutoCAD, GIS "Panorama" can be used as software products, as well as ArcGIS 9.3 with the license level of ArcView and software module interface between ArcGIS 9.3 and PostGIS – ZigGIS 2.0. To implement land data system based on the GIS technology it's necessary to provide for a legal decision support system, being not available in most tool GIS packages. This subsystem can be build in the GIS or bind to it through an interface of work with databases (Zevenbergen, 2011).

Land data system can also be considered as a subsystem in the systems to support managerial decisions. Efficient use of land is connected with taking optimal management decisions – land management aimed at addressing environmental and economic tasks of land use. Thus, one of the functions of land information systems is to provide users with comprehensive, accurate and timely information on land resources at different hierarchical levels of management, including: operational (executors), tactical (managers), strategic (state strategic planning) levels (Berkely, 2011).

Managerial decisions of low levels – tactical and operational – are made on the basis of strategic planning. The tactical level involves information analysis and the development of new methods approved at the strategic level. The operational level involves solving typical production problems through the land data systems. Application of land data systems allows processing and analyzing large arrays of geospatial and attribute data, making optimal managerial decisions on this basis. This will allow using more efficiently land resource potential of the Republic of Kazakhstan.

Conclusions

At the present stage of development of land relations there are a lot of issues being in need of adoption to major changes. To address the problems of application the land data systems, a single information space between users through a local network or an information computer center can be created. It is also proposed to make optimal managerial decisions by means of extensive use of automated data collection, processing and testing of information flows concerning the condition and use of land. This will allow forming a civilized system of land areas management through land data systems.

References:

- Газалиев М.М.* Формирование системы управления земельными отношениями / М.М. Газалиев / Труды Кубанского аграрного университета. – 2008. – № 4. – С. 34–42.
- Гончаров И.А.* Интеграция информационных ресурсов для целей управления земель на региональном и муниципальном уровнях / И.А. Гончаров // Информ.-метод. сб. АСДГ № 57. Новосибирск: АСДГ, – 2011. – С. 86–88.
- Круглый стол "Совершенствование законодательства по вопросам орошаемого земледелия и пути эффективного использования поливных земель в Казахстане". Комитет по водным ресурсам Министерства сельского хозяйства Республики Казахстан – Астана – 2010.
- Курманова Г.К.* Современное состояние автоматизированных информационных систем земельного кадастра в Казахстане / Г.К. Курманова // Вестник науки КАТУ им. С. Сейфуллина. – 2009. – № 2. – С. 148–153.
- Кухтин П.В.* Совершенствование системы управления земельными ресурсами / П.В. Кухтин, А. А. Левов // Муниципальное управление. – 2004. – №11–12. – С. 26–29.
- Ломакин С.В.* Система информационного обеспечения процесса управления земельными ресурсами / С.В. Ломакин // Проблемы современного управления в АПК: материалы научно-практической конференции. – Воронеж, – 2012. – С. 87–96.
- Официальный сайт Агентства Республики Казахстан по статистике // [Электронный ресурс] – Режим доступа – www.stat.kz.
- Сейтхамзина Г.Ж.* Методические основы создания автоматизированных информационных систем управления земельными ресурсами и недвижимостью в Казахстане. / Г.Ж. Сейтхамзина // Экономика и управление народным хозяйством. – 2011. – №12. – С. 27–31.
- Стратегический план ГУ "Отдела земельных отношений Тарбагатайского района" на 2010–2014 годы. – Аксуат. – 2010. – 23 с.
- Henssen, J.L.G., Williamson, I.P.* Land registration, cadastre and its interaction; a world perspective. / Proceedings XXI FIG Congress, Commission 7, Paper 701.1, – Helsinki – 2011. – P. 14–43.
- Hill, B., Gassen, R.* (2011). Farm tenure and farming practice. Journal of Agricultural Economics, 36: 19–28.
- Larsson G.* Land Registration and Cadastral Systems // Longman Scientific & Technical, New York, – 2010. – P. 16–23.
- Zevenbergen J.* The interrelated influence of the technical, legal and organisational aspects on the functioning of land registrations (cadastres). // Proceedings XXI FIG Congress, Commission 7, Brighton, – 2011. – P. 130–145.

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