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GIS BASED MAPPING OF FARMERS FOR SUSTAINABLE LAND MANAGEMENT

Aslanov I.M.¹ Jumanov A.N.¹ Khasanov S.S.¹

ABSTRACT

Mapping of agricultural land is an important operation as it plays an important role in the land management and precision agriculture how it can be used sustainably. To improve efficiency and sustainable land management of agriculture Geographic Information Systems (GIS) is a multifunctional tool, indispensable for solving problems of managing land data. It is used both to optimize data entry and to control the quality of available information, and can significantly reduce the time and financial costs of bringing the database to the proper level of quality for sustainable agricultural production. By using data interpolation techniques in a GIS environment. Results showed that the mapping of agricultural land

АННОТАЦИЯ

Қишлоқ хўжалиги ер майдонларини хариталаш қишлоқ хўжалиги ер майдонлари менежментида муҳим аҳамиятга эга. У ерни бошқариш ва аниқ қишлоқ хўжалигида уни қандай қилиб барқарор ишлатилишини таъминлашда муҳим рол ўйнайди. Қишлоқ хўжалигининг самарадорлигини ва барқарор ер бошқарувини яхшилаш учун Географик Ахборот Тизимлари (ГАТ) - бу ерга оид маълумотларни бошқариш муаммоларини ҳал қилиш учун ажралмас кўп функсияли восита ҳисобланади. У маълумотлар киритишни оптималлаштириш учун ҳамда, мавжуд маълумотларнинг сифатини назорат қилиш учун ҳам ишлатилади ва барқарор қишлоқ хўжалиги маҳсулотларини ишлаб чиқариш учун маълумотлар базасини тегишли сифат даражасига этказиш учун вақт ва молиявий харажатларни сезиларли даражада камайтириши мумкин. Маълумотлар интерполяцияси техникасини ГАТ муҳитида қўллаш орқали. Натижалар шуни кўрсатдики, қишлоқ хўжалиги эрларини хариталаш

АННОТАЦИЯ

Картирование сельскохозяйственных земель - важная операция, поскольку она играет важную роль в управлении земельными ресурсами и точном земледелии, поскольку их можно использовать устойчиво. Для повышения эффективности и устойчивого управления земельными ресурсами в сельском хозяйстве Географические информационные системы (ГИС) - это многофункциональный инструмент, незаменимый для решения проблем управления земельными данными. Он используется как для оптимизации ввода данных, так и для контроля качества доступной информации и может значительно сократить временные и финансовые затраты на доведение базы данных до надлежащего уровня качества для устойчивого сельскохозяйственного производства. Используя методы интерполяции данных в среде ГИС. Результаты показали, что картографирование сельскохозяйственных земель

Keywords: mapping; agriculture; agricultural land; Geographic Information Systems (GIS);

Калит сўзлар: хариталаш, қишлоқ хўжалиги ерлари, Географик Ахборот Тизимлари (ГАТ);

Ключевые слова: отображение; сельское хозяйство; сельскохозяйственная земля; Географические информационные системы (ГИС);

INTRODUCTION

Nowadays, information support of this most important type of human economic activity is achieved due to the rapid development of remote sensing technologies, the creation of modern sensors and monitoring systems in real time, more powerful and smaller computers and mobile devices, advanced communication tools and, to a large extent, constant expansion opportunities and usability of geographic information systems and applications based on them. Geographical information system (GIS) technologies has great potentials in the field of soil and has opened newer possibilities of improving soil statistic system as it offers accelerated, repetitive, spatial and temporal synoptic view. It also provides a cost effective and accurate alternative to understanding landscape dynamics. GIS is a potential tool for handling voluminous data and has the capability to support spatial statistical analysis, thus there is a great scope to improve the accuracy of soil survey through the application of GIS technologies. Therefore, assessing spatial variability distribution on nutrients in relation to site characteristics including climate, land use, landscape position and other variables is critical for predicting rates of ecosystem processes, understanding how ecosystem work [7] and assessing the effects of future land use change on nutrients [8].

The task that any specialist working with data on land plots faces is to verify and ensure their accuracy. Information may: come from different sources, from several contractors; plotted on an electronic map based on the results of geodetic surveys, digitization of aerial photographs and satellite images, scanned plans; Receive in real

¹ Tashkent Irrigation and agricultural mechanization engineering institute. 39 Qori-Niyoziy str. Tashkent. e-mail: ilhomaslanov@gmail.com, ilhomaslanov@tiame.uz

time or recreate based on archived data. With any of these options, and especially when used together, errors can occur, such as intersecting fields, mismatched borders, typos in the name of the crop, or simply unfilled characteristics of the objects. ArcGIS allows you to correct the errors found, as well as ensure high quality data with the subsequent introduction of additional information.

1. DATA AND METHODS

To evaluate (locate) the current situation in the field in the best possible way, the field was recorded during visit to the main local farms and their owners. Shorter surveys can be carried out in the process with farm owners. In addition to obtaining important technical data, this also provides an insight into the main issues in production. Also, each farm owner is required to submit a map showing the current situation and the location. These mostly include sketches or old plans that were either copied by hand or photocopied and thus diminished from the original cadastral maps. Maps very often include a legend on the field boundaries showing the types of crops grown, and each field has its own identification number. Preparation of the thematic GIS layers in the process of preparing GIS layers, several raster resolutions are used:

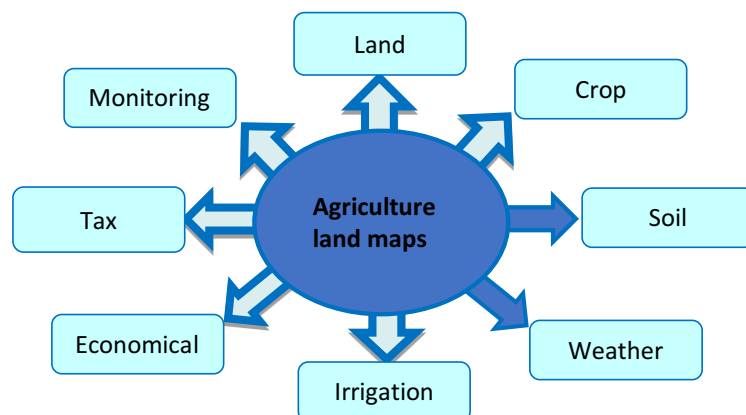
- (1) Basic resolution for calculation of suitability, 100 m;
- (2) LANDSAT image at 30 and 15m resolution;
- (3) A detailed topographic map 1:100 K, also at 15 m resolution.

Boundaries of the area are set to Xmin = 6490027; Ymin = 5005476; Xmax = 6587527; Ymax = 5088076 (Gauss-Krueger system, zone 6), which means that the total area is 97 × 83 km. Panchromatic image is at 15 m resolution (5508 × 6501 pixels). According to this methodology, the following thematic layers are made.[6]

The methodology of preparing thematic layers follows.

Our objective is to accurately Geo-information system (GIS) has been in used in Croatia for the purpose of planning at the regional level for some ten years. The methodology used in this example and for the purpose of planning in the field of management of resource use is specific in the part that parameters for land evaluation are clearly and precisely defined (geomorphological, pedological and actual condition of land cover). The methodology of parameterization of relief is used for In the first phase of our work we collect data from GPS field measurements calculation of geomorphological parameters [3], and pedometric mapping methods are used for calculation of pedological variables [10]. Inventory of the actual condition of land cover is made by using sketches and plans obtained during field data gathering.

(Figure 1).

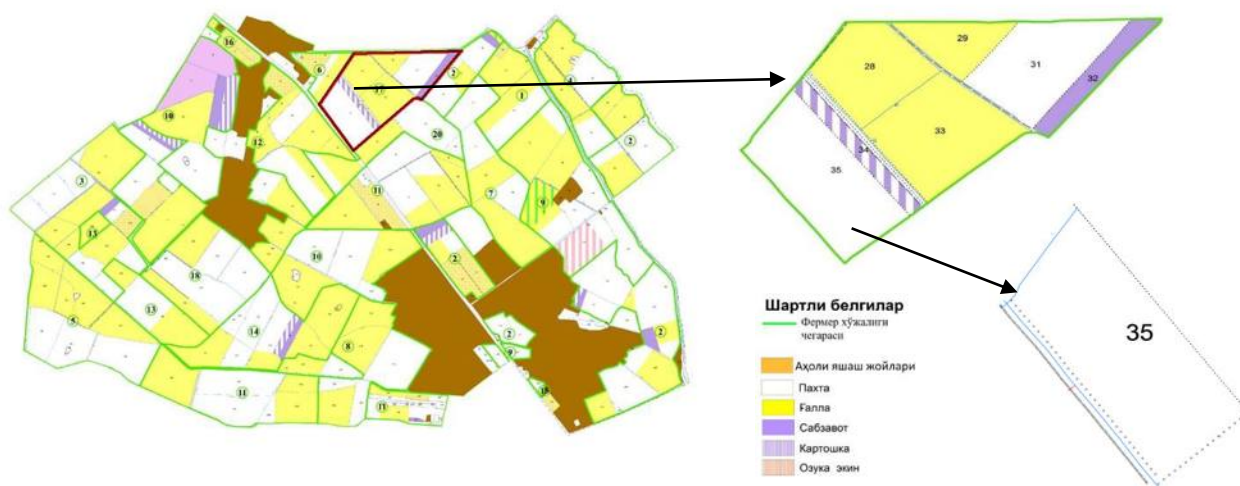


We can create a layer of agricultural maps as follows, which can cover not only the cost of soil fertility and its monitoring. GIS-enabled agricultural maps are very useful because they are constantly updated and can store a large database. (Figure 1). These sketches are then georeferenced and overlapped with LANDSAT satellite images to determine the actual situation. The methodology of raster GIS modelling was used throughout the study, which means that the basic decision making unit was pixel or cell grid square.[4]

2. Results

In addition to the clustering of swine farms, poultry production facilities tend to be centrally located around the same feed mills, or neighboring feed mills advantageously located close to the rail transportation. As a result, areas with intensive swine production will often have intensive poultry production. In fact, it is not uncommon to have swine and poultry barns on the same farm. These areas of intensive animal production will often have manure nutrients available for application that far exceed P, Cu, and Zn needs of local crops. Crops management map for 2017 farm of “Eshquvvatov Farxod” (Figure 2). When creating agricultural maps using GIS technology, the development of land plots of the region and all farms in it, as well as all the data in it are collected in a database based on attributes.

(Figure 2).



(Figure 3).

Жами ер майдони	1 224 га
ш.ж: - экин ерлари	1 146 га
- кўп йиллик дарахтзор	37 га
- яилловлар	10 га
- ўрмонзор	10 га
- бошқа ерлар	21 га
Ўртача бонитет балли	60 балл
Кадастр рақами	14:08:05:03
Фермер хўжаликлари сони	17 та

контур рақами	экин ер майдони (га)	экин турлар				бонитет балли
		пахта	галла	сабзавот	полиэ	
28	9,8		9,8			69
29	7,9		7,9			69
31	10,2	10,2				69
32	2,2			2,2		69
33	4		4			69
34	1,9				1,9	69
35	11,3	11,3				69
жамми:	47,3	21,5	21,7	2,2	1,9	

Контур:	35
Экин тури:	Пахта
Майдон :	11,3 га
Хосилдорлик:	28,9 ц
Бонитет балли:	69 балл

With the help of an attributive database, complete information about not only the area but also the farm and a single plot of land is clearly indicated and collected over the years. This is easy to monitor over the years. As a result of obtaining and analyzing attributive data, a complete understanding of the economic efficiency of the land.

CONCLUSION

Creating the agricultural map using GIS technology have been incorporate into our GIS in order to carry out advanced spatial queries. We have detected that there is a relationship between data. Also we can see using the GIS maps that monitoring of agricultural land. And as the same time analyses are very useful for enhancing the management of land, because this system makes possible analyze results in detail or map them at small scales. Once the consequences of soil and economic efficiency are analyzed it is necessary to contemplate a change in farming techniques in order to reduce the advance of the land management process

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