CONTEMPORARY APPROACHES TO PASTURE RESEARCH

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Annotation: This thesis explores the development of the Automated Pasture Information System (APIS) to enhance pasture management using Geographic Information Systems (GIS) and remote sensing technologies. APIS gathers and analyzes data on pasture productivity, soil salinity, and surface temperature, presenting the information in an accessible format. The system is built on a MySQL database, organized into three key modules: NDVI (plant productivity), SI (soil salinity), and LST (land surface temperature). By leveraging these advanced technologies, APIS aims to improve the efficiency of pasture management and address the complex challenges associated with rangeland management.

Key words: pasture, geographic information system, remote sensing, PHP programming language.

Аннотация: В этой тезис рассматривается разработка Автоматизированной информационной системы пастбищ (APIS) для улучшения управления пастбищами с использованием географических информационных систем (ГИС) и технологий дистанционного зондирования. APIS собирает и анализирует данные о продуктивности пастбищ, засоленности почвы и температуре поверхности, представляя информацию в доступном формате. Система построена на основе базы данных MySQL, разделенной на три ключевых модуля: NDVI (производительность растений), SI (засоленность почвы) и LST (температура поверхности земли). Используя эти передовые технологии, APIS стремится повысить эффективность управления пастбищами и решить сложные проблемы, связанные с управлением пастбищами.

Ключевые слова: пастбище, географическая информационная система, дистанционное зондирование, язык программирования PHP.

Introduction. The utilization of pastures within the agricultural sector serves as a critical element in maintaining ecological equilibrium and promoting economic sustainability. However, the effective management of these essential resources necessitates a thorough comprehension of their dynamics. The incorporation of contemporary Geographic Information Systems (GIS) and remote sensing technologies presents a transformative methodology for the management of rangelands.

This research work examines the need to create a modern automated information system specially adapted for pasture land management using the relationship between GIS and remote sensing data. Using these advanced technologies, it is aimed not only to improve the efficiency of pasture management, but also to solve the multifaceted problems that characterize this field.

Main part. The primary objective of the "Automated Pasture Information System (APIS)" is to gather data on various parameters, including pasture land productivity, salinity levels, and soil surface temperature within the research area

«ПЕРСПЕКТИВЫ РАЗВИТИЯ ОТРАСЛЕЙ НАРОДНОГО ХОЗЯЙСТВА В БАССЕЙНЕ АРАЛЬСКОГО МОРЯ В УСЛОВИЯХ ГЛОБАЛЬНЫХ КЛИМАТИЧЕСКИХ ИЗМЕНЕНИЙ»

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through remote sensing techniques. This information is then presented to users in an accessible format, accompanied by specialized imagery.

The development of the system is initially conducted utilizing the MySQL database management system, which currently operates on the principles of client-server technology in the design and development of the database. This database management system is founded on the relational model.

In this case, all tables are interconnected with the tables representing months and years, which contain the textual representation of the corresponding months and years. Additional tables are associated with these tables through their identification numbers. All other tables include year_id and month_id columns, with the identification numbers in these columns linked to the respective month and year tables.

This database contains three main modules as follows:

The NDVI module encompasses data pertaining to plant condition and productivity;

The SI module retains information related to soil salinity;

The LST module is specifically designed to store data concerning soil surface temperature.

Each module comprises several tables that are logically interconnected with other tables. All pertinent information pertaining to the NDVI module of the system is organized across five tables, making this module the most extensive within the system. Within the *ndvi_indices* table associated with the module, data regarding the NDVI index is stored; the *ndvi_ quruqs* table contains information about the extent of dry grass, the *ndvi_pichans* table pertains to sparse hay grass, and the *ndvi_ gektars* table provides data on the hectares of water, sparse vegetation, and dense vegetation.

The information pertinent to the SI module of the system is organized across three tables. The first table, *si_indices*, contains data regarding the salinity index. The second table, *si_classifications*, encompasses information about various land classifications based on differing degrees of salinity. The third table, *si_gektars*, records the area of land, measured in hectares, that corresponds to these varying degrees of salinity.

There are three tables pertinent to the LST module of this system. The first table, *lst_indeces*, contains information regarding the LST indicator. The second table, *lst_classifications*, provides data on classified lands exhibiting various temperature ranges. The third table presents information concerning the areas of classified land measured in hectares.

The database is hosted on the server, with data retrieval and manipulation conducted through the PHP programming language. An information system has been developed utilizing this database (Fig. 1).
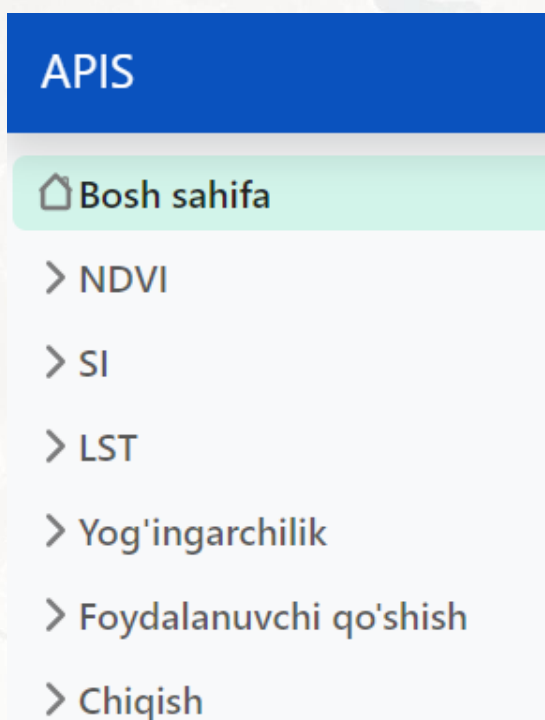
APIS

🏠 Bosh sahifa

❯ NDVI

❯ SI

❯ LST

❯ Yog'ingarchilik

❯ Foydalanuvchi qo'shish

❯ Chiqish

Figure 1. APIS system structure

Conclusions. The developed information system provides users with comprehensive insights into the status of land, alterations in vegetation cover and associated productivity, variations in soil salinity, and fluctuations in soil surface temperature. Consequently, this system facilitates continuous access to critical information regarding the condition of pasture lands, thereby enabling proactive planning for their utilization.

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