# FORMATION OF A LIVESTOCK FACILITIES DATABASE BASED ON GIS TECHNOLOGIES (EXAMPLE OF TASHKENT REGION)

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**Abstract:** It is known that GIS occupies an important place in the field of modern information technologies and serves as an effective tool for developing databases in the livestock sector. Using GIS, it is possible to visualize and analyze the location of livestock facilities, their infrastructure, the level of resource utilization, and other essential indicators. This article examines, from an academic perspective, the process of creating a livestock facilities database based on GIS technologies, its advantages, applications, and practical examples.
[Kuvondikov Rustam. **FORMATION OF A LIVESTOCK FACILITIES DATABASE BASED ON GIS TECHNOLOGIES (EXAMPLE OF TASHKENT REGION).** Nat Sci 2026,24(2):14-18]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). http://www.sciencepub.net/nature 03. doi:10.7537/marsnsj240226.03

**Keywords:** livestock; GIS; ArcCatalog; pasture; modeling; map; evaluation.

**INTRODUCTION.** GIS occupies an important place in the field of modern information technologies and is used as an effective tool in the formation of a database in the field of animal husbandry. With the help of GIS, it is possible to visualize and analyze the location of livestock facilities, infrastructure, the level of resource use, and other important indicators. This article covers the process of forming a database of livestock facilities based on GIS technologies, its advantages, applications, and practical examples from an academic perspective.

GIS is a software and hardware complex designed for collecting, storing, analyzing, and visualizing geographical data. It includes the following main components:

In the livestock sector, GIS can be used to systematically manage farms, the number of livestock, the condition of pastures, and other parameters.

**METHOD AND METODOLOGY.** When GIS technology is integrated with meteorological, transport, topographic, or other data systems, it is possible to easily assess the distribution of livestock and facilitate the creation of predictive models. Thus, the use of GIS technology and its programs in livestock research is an important tool for making quick decisions [1].

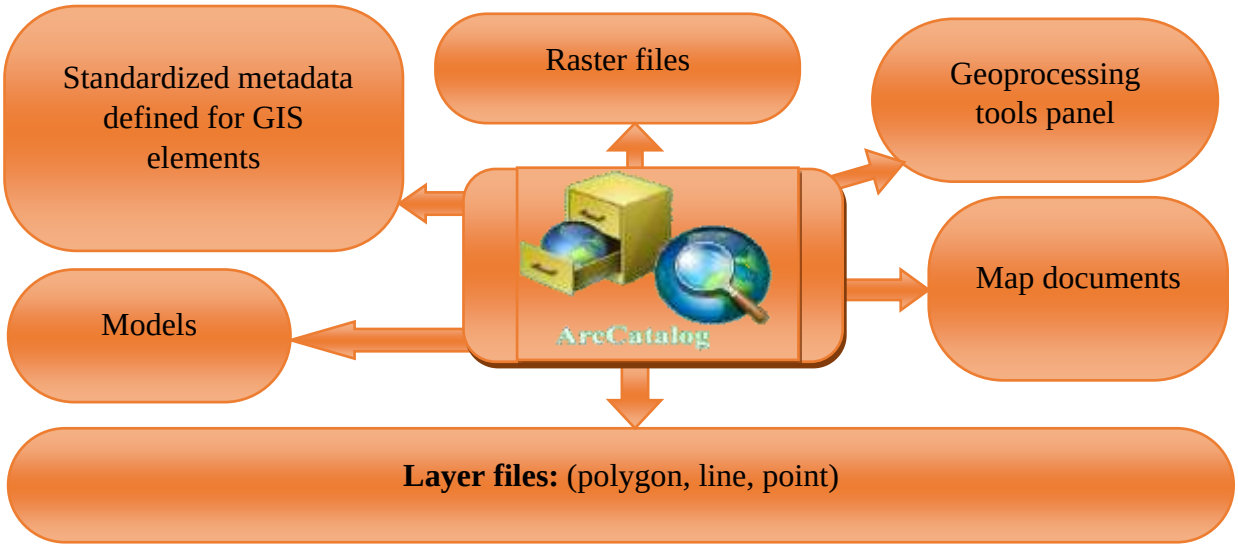


**Figure 1. Types of data that can be created and managed in the ArcCatalog window**

The software of GIS technologies also serves as the basis for creating a database of livestock. To place livestock data in GIS technologies, we will use the above diagram (Fig. 1).

**DISCUSSIONS AND RESULTS.** The ArcCatalog application is a directory window used for organizing

and managing various types of geographic data for the ArcGIS program. In ArcCatalog, you can organize and manage the data types shown above (Figure 1). ArcCatalog is software that can be used to organize, locate, and manage GIS datasets and ArcGIS documents. It is working window is shown in Figure 2 below.

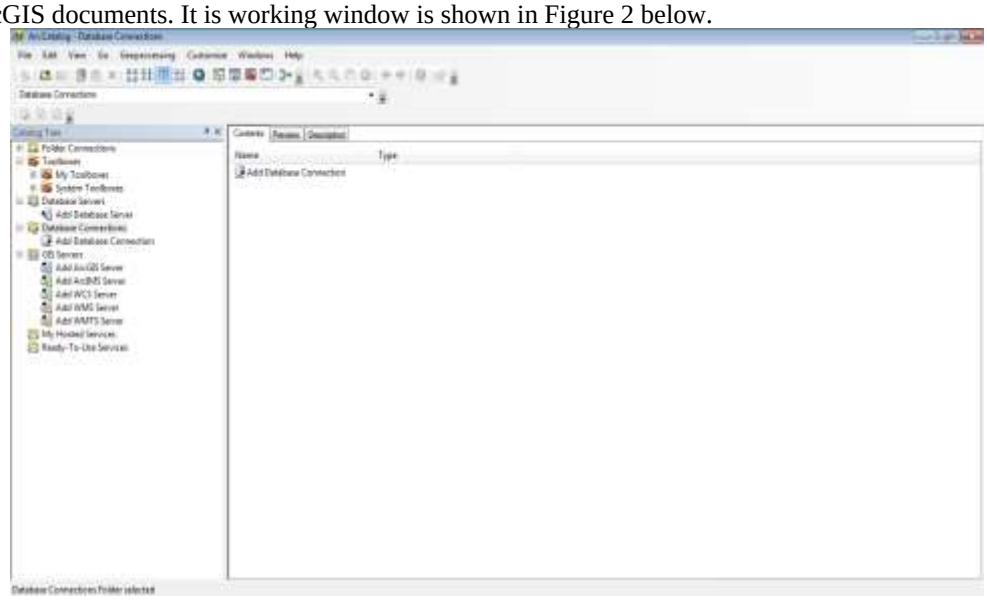

**Figure 2. ArcCatalog window**

ArcCatalog database connections and workspace folders, ArcGIS Server sites and desks are the main tools for storing and processing geographic data for ArcGIS. Workspace folders are simple file folders on a disk that store files, file and personal geodatabases, file datasets, and a series of ArcGIS documents. One of the main workspace folders in ArcMap is the main folder of each map, where the map document is stored by work and new data sets are created. Folders may contain third-party datasets of various formats, as well as links to geodatabases. For example, it is possible to work with file geodatabases, connect to corporate geodatabases. ArcCatalog can work with the following files: JPEG images, DXF SAPR files, dBASE tables, Excel spreadsheets, and GML data files. When updating and exchanging data sets, it is necessary to ensure a communication environment. It will be necessary to organize, document, and catalog large collections of geographical information.

The ArcCatalog consists of several toolboards for viewing data sets and information and work in ArcGIS is used to solve management issues in the field. For example, when using the view supplement page as a map, you can use the geographic toolbar for navigating the dataset. The standard toolbar is usually located at the top of the ArcCatalog application.

To create a geographic database in the ArcGIS program, owned by ESRI, the ArcCatalog application of this program is used. After opening the ArcCatalog working window, the required memory disk is selected.


**Figure 3. ArcCatalog window**

Right-click on the viewing window, and as a result, auxiliary elements of the viewing window will appear. From the resulting auxiliary item, select the Personal Geodatabase (Personal Database) from the new line and enter a name.


**Figure 4. Stages of database creation**

The created personal database is entered, and the Feature Dataset row is selected using the right mouse button [2].


**Figure 5. Stages of database creation**

In the resulting New Feature Dataset window, a name is entered, and the next coordinate system is entered using the follow button.

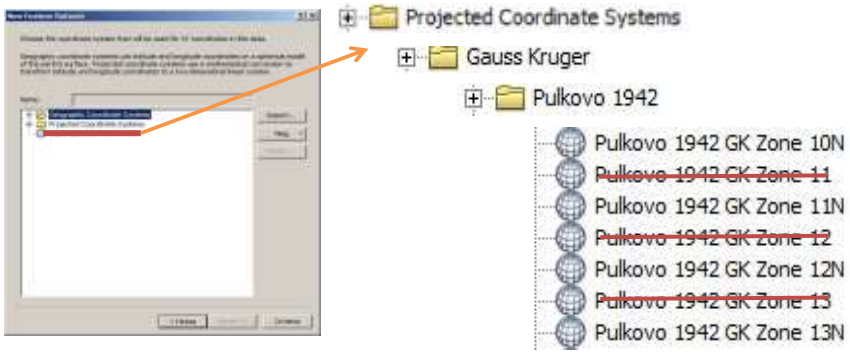


**Figure 6. Selecting a coordinate system**

The zone corresponding to the selected area is selected, and after two consecutive clicks of the continue button, the finish button ends in the Feature Dataset window.

Enter the resulting Feature Dataset and right-click again to select Feature Class.

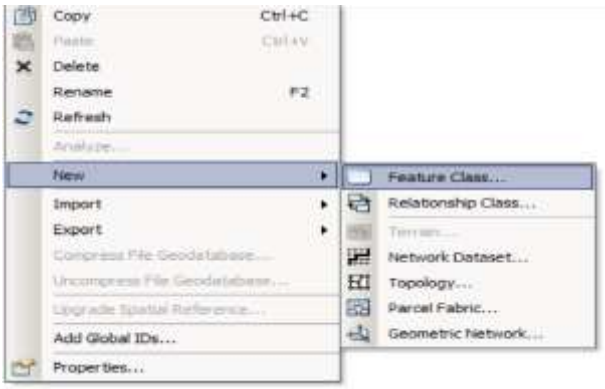


**Figure 7. Layer creation stage**

In the newly created Feature Class application, enter the name of the object to be named in the Name field. Then, select the layer type from the rows in the Type section based on the type of layer. For example, Polygon Features for area layers, Line Features for linear layers, and Point Features for point layers.

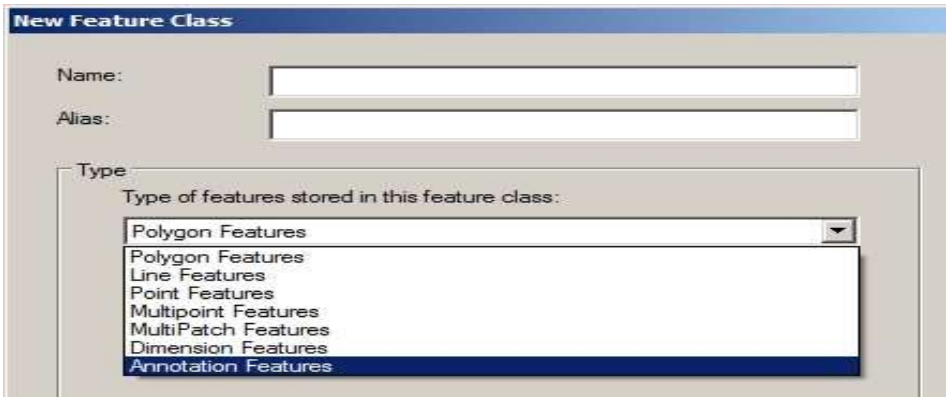


**Figure 8. Point Features and Annotation Features are selected for the text layer**

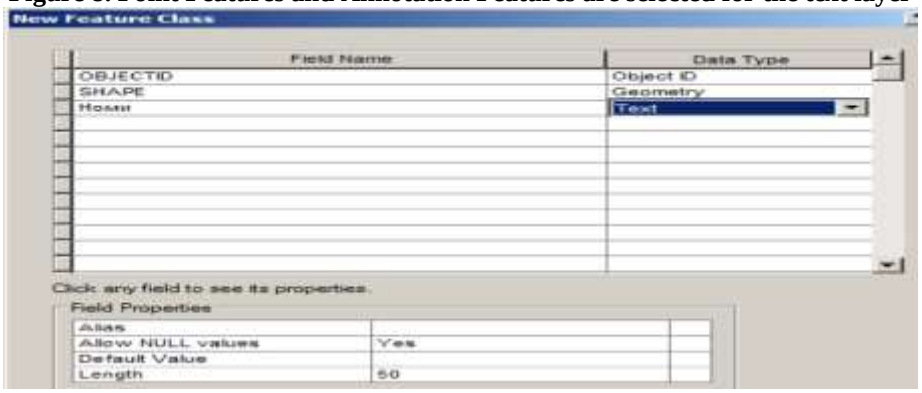


**Figure 9. Data table providing information about the layer to be created**

When the Next button is pressed, a table of information about the layer to be created opens [3]. If words containing information about the layer are entered into the Field Name column, then the type of words is specified in the Data type column. For example: if the answers to the words in the entered question form are in word form, then in the Data type column you will select the type Text, if there is a question about numbers - Double, if there is a question about a date - Date, if there is a question about a picture - Raster. Enter the number (50) indicated in the Length row of the Field Properties command located at the bottom of the window (i) the number of characters (for example, Name - 4 characters, unlimited number of characters) for the answers to the question words given in the Field Name column and click the Finish button. Thus, the process of creating each layer is observed[4].

In recent years, one of the important directions in the livestock sector of Uzbekistan is the digitalization of production, rational use of resources, and conducting regional analyses based on GIS. In this process, ArcGIS

technologies allow combining such objects as livestock infrastructure, pastures, water sources, fodder lands, and transport networks into a single digital database.

The database formation scheme consists of:

1. Data sources (space images, GPS, statistics)
2. ArcGIS database (Geodatabase)
3. Vector layers (farms, pastures, water, road)
4. Analysis stage (overlay, buffer, modeling)
5. Resulting maps (pasture-water-transport integration) using this data, we propose the following scheme [6].

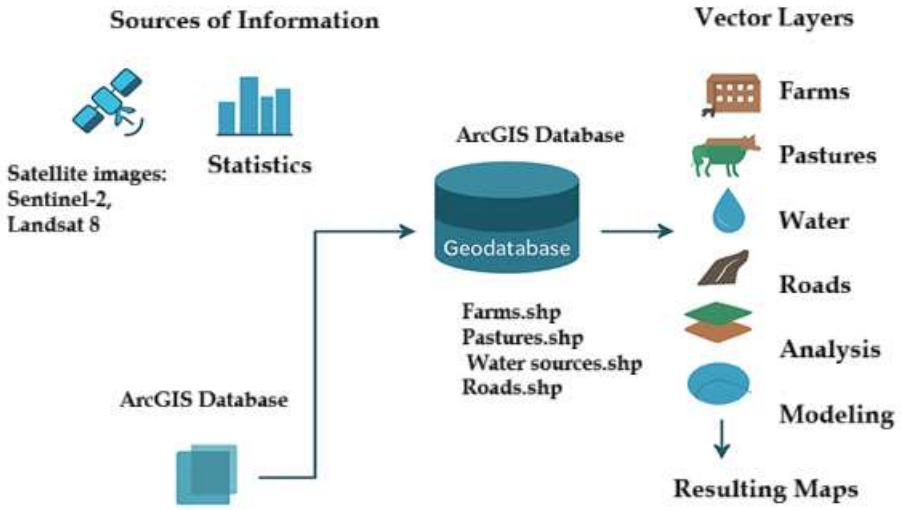


**Figure 10. Scheme of database formation**

When integrating data into a GIS program, they are loaded into programs such as ArcGIS or QGIS. With the help of these programs:

- Livestock facilities are shown on the map as points, lines, or landfills.
- The quality of pastures and the level of resource utilization are analyzed.
- Data is visualized (e.g., heat maps or thematic maps).

Using ArcGIS, a map of livestock farms of the Tashkent region is created, which is indicated by colored symbols depending on the number of livestock and the area of pastures of each farm [6].

**CONCLUSION:**

GIS technologies are an effective and innovative solution for the formation of a database of livestock facilities. They allow for accurate data collection, analysis, and visualization, which improves the decision-making process. In the conditions of Uzbekistan, the database created on the basis of GIS serves to develop the livestock sector, ensure the efficient use of resources, and ensure sustainable development.

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