



An Application of Geospatial Technology with Special Reference to Geography: A Brief Case Study of Ranaghat -1 Block (Nadia, West Bengal)

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Research Paper

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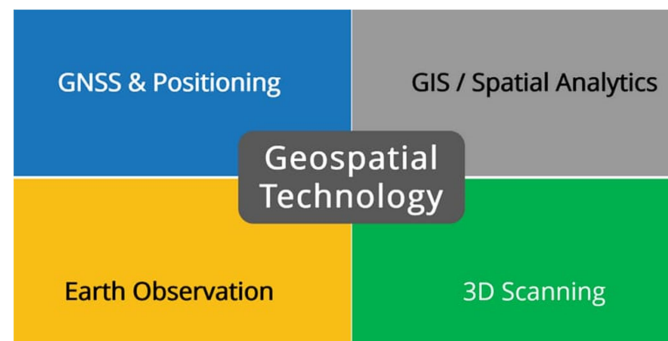
ABSTRACT

Geospatial technology is a great innovative idea to enhance geography, such as field work, and encourage practical knowledge to enhance the idea of the area or any spatial unit. It is a very useful tool for geographic mapping purposes, not only that but also to explain Earth's surface and the patterns of human societies and activities. This refers to a specific location in geospatial mapping. This paper attempts to discuss how this technology is important in geography for the explanation of any spatial details. This paper uses various journal studies to find out the advantages of geospatial technology in geography. To effectively study these elements, geographers use a variety of tools. Because geography is a fascinating field that involves the study of Earth's physical features and human activities, it relies on a variety of tools to collect, analyze, and interpret spatial data. In this paper, I will explore how to use geospatial technology in geography and how it contributes to our understanding of the location and special information. This technology is used by geographers to understand various aspects of any location. Geographers use various tools, including GIS. This tool enables you to analyze, interpret, and visualize geographic information effectively. A Geographic Information System is an applied system; this system is also widely used in the field of

geography. A Geographic Information System is a scientific term that encompasses all existing spatial knowledge systems in addition to studying geographic knowledge.

INTRODUCTION: In the new era of information technology and data base management systems, technology is required to continue to innovate in presenting various layer analyses, which is more interesting and effective. Geography is not about maps and coordinates but also about understanding spatial patterns, regional analysis, and human interactions with the environment. In this paper, geospatial technologies are described as innovative tools to enhance the way we understand geography. This technology includes GIS, GPS, and various tools that visualize geographic data in the form of maps and spatial analysis.

As an important fact, a GIS is able to handle a huge range of spatial data in various layers of maps. This multiple layer is enabled so that all such data includes information on its precise location, hence the term ‘geospatial’. Geospatial technology, particularly GIS, allows for the visual depiction of information in the form of digital maps. The visualization of data through geospatial technology also helps to understand spatial relationships in the field work of geography.



METHOD: This paper uses the descriptive and applied method to show the importance of geospatial technology in geography.

This paper uses the literature study method to determine the importance of geospatial technology in geography. The literature study was used because the focus of this paper is on the analysis of a particular case study with the help of geospatial technology. The sources obtained included various journals, research articles, books, and academic online sources. Data obtained from secondary sources and from

the literature were analyzed through a descriptive approach. It is clear that geospatial technologies are deeply related to geography from the focus on the physical and cultural set-up of a particular case study on Ranaghat-1 block. This technology has been widely applied in the academic, research, and professional fields. GIS is providing beneficial tools in this era with its ability to understand and visualize geospatial data.

OBJECTIVES:

1. To analyze and interpret spatial data.

2. To analyze geographic mapping.

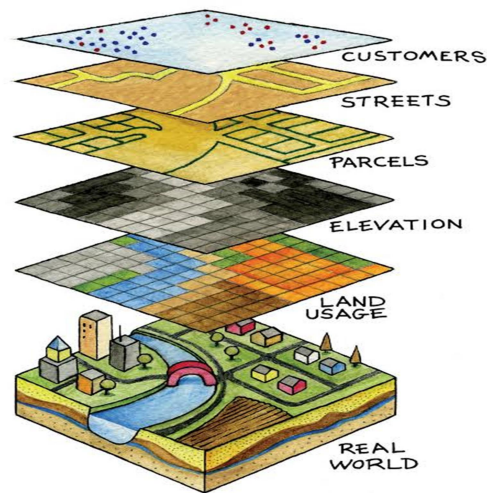
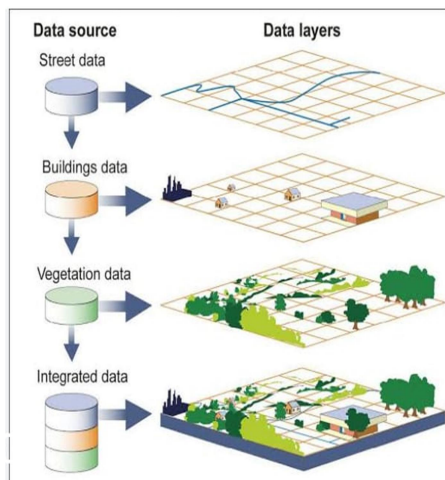
Analysis: The idea of geospatial, which refers to the study of absolute location and gathering information on a particular geographic area, is the geographic component in terms of spatial or attribute data, or raster and vector data.

GIS integrates different types of data, such as population figures, composition, environmental factors, topography, etc., and then extracts the information into the geographic data layer to create map visualization and three-dimensional features. Each layer has taken responsibility for showing its own identity and analyzing various spatial features.

Using geospatial technologies to gather location information provides us with data that can give a deeper understanding of a whole range of issues. This spatial data can answer the facts and help with predictions, analysis, and decision-making.

Spatial data refers to real-world geographic objects of interest, such as streets, buildings, lakes, and locations; each object possesses certain traits of interest, such as name, number, or population. GIS software keeps track of the spatial and attributes data and allows us to link the two data types together to create information and facilitate analysis.

Spatial data can be combined with other data from different sources, creating different data layers. Things like census data, secondary data, and satellite imagery can help build up a visualization that gives us a lot about the area.



Each layer has its own identity and the ability to be edited. All layers together make up the entire map or d Geospatial mapping is a wide definition of all the operations involved in the process of creating maps that use geospatial data, which leads to the visualization of a spatial object on a map.

Geospatial mapping is a wide definition of all the operations involved in the process of creating maps that use geospatial data, which leads to the visualization of a spatial object on a map. Geospatial mapping is to show objects that have geographical coordinates in some geographical context.

Mapping is a major part of GIS. This provides a visual interpretation of the data. This technology is used to analyze population growth and urban growth and to find suitable sites for further development.

Mapping can be seen in at least four stages.

1. Data Collection: Primary and secondary data are required for the description of geospatial analysis.

2. Data Processing: After correction, which plays an important role in error detection, we will process the entire data set.

3. Design: The next stage involves the design and graphical representation of the map or diagram with the help of cartographic rules.

4. Visualization: The final stage of visualizing the entire area or map to identify the details of the area. They are also helpful in prioritizing specific needs.

CASE STUDY: The present study focused on identifying different locations, land use, land cover types, transport and communication types, natural vegetation indexes, and other socio cultural aspects that can

be interpreted with the help of the GIS technique from a geographical perspective to monitor and manage natural resources and socio cultural aspects. In this paper, I create the overall scenario of the area, introduce the geospatial mapping, and explain the spatial data that occurred during the study.



GIS technologies are regularly used to create survey infrastructure for villages, develop urban maps, and generate accurate land records for planning. Geography and geospatial is a two-part pyramid, with geography at the base and digital data and tools above the base. GIS is one part of the larger geospatial whole.

Technology has always been a companion to man and has helped in his development. GIS is one of the advanced technologies that has enabled man to understand changes that have taken place in the past, analyze space at one place, and predict the future of the same. The technology is computer-based and easy to use, but it requires expertise so that predictions and outcomes can be accurate. The technology has a geographical base but is released to every possible field and is still progressive.

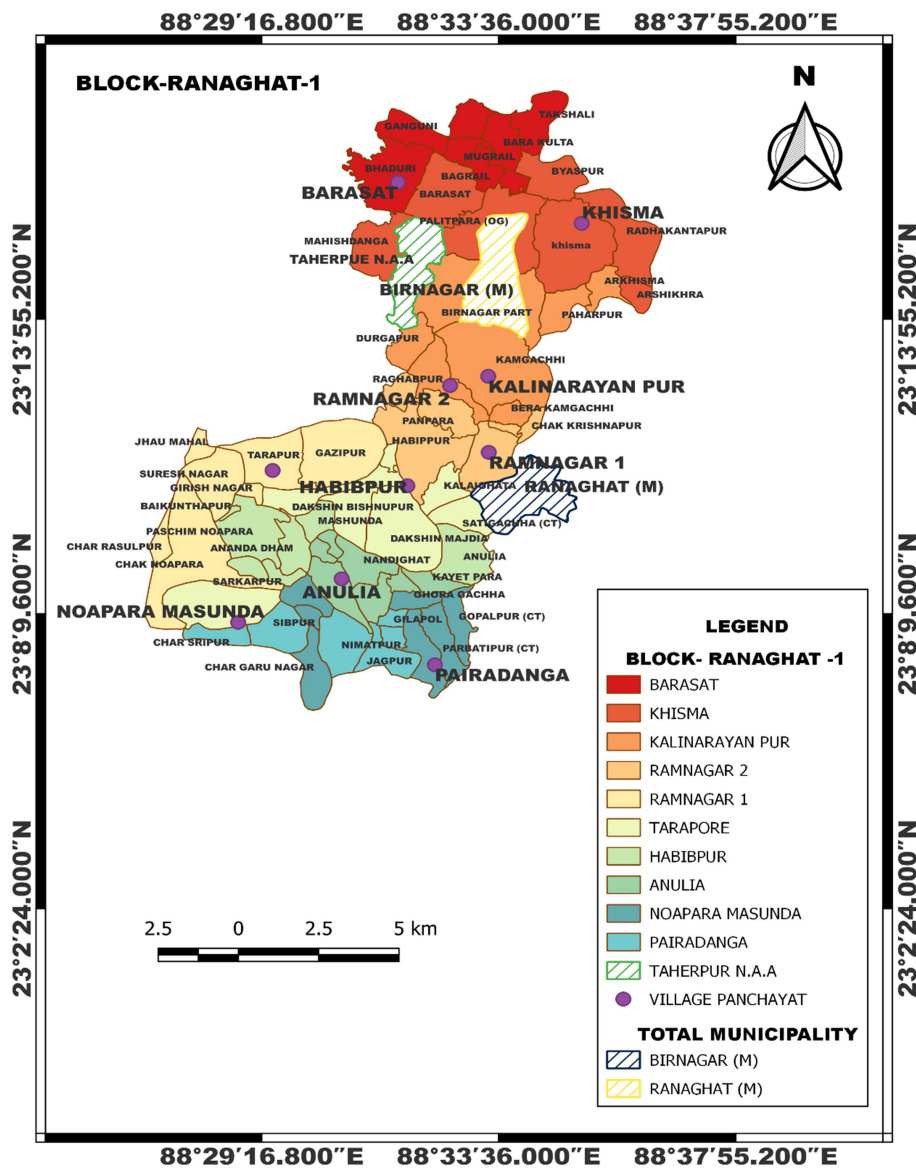
GIS is primarily a mapping technology. It may be carried out manually or digitally. It is heavily dependent on spatial and attribute data. It allows the data to be created and stored in the form of geometrical features in different layers. GIS basically helps in analyzing land without visiting it much.

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PERSPECTIVE: Geography is defined as the study of the physical features of the earth and human activities, including the distribution of population and resources, land use, etc., and their relationships at global and local levels. Field studies enable the investigator to understand situations and processes holistically and at the place of their occurrence. All geographic skills, for example, geospatial tools, are used in practical cases during field work and post-field work. Data collection, data processing, mapping,

and statistical techniques to extract results. An analysis of that information will help answer geographic questions. The use of digital technologies to support fieldwork is increasing rapidly. Deploying digital support for field survey studies has enormous benefits, as virtual fieldwork can democratize geography by making places more accessible for location, trend, and pattern analysis. GIS also has an important role in exploring locations for study.

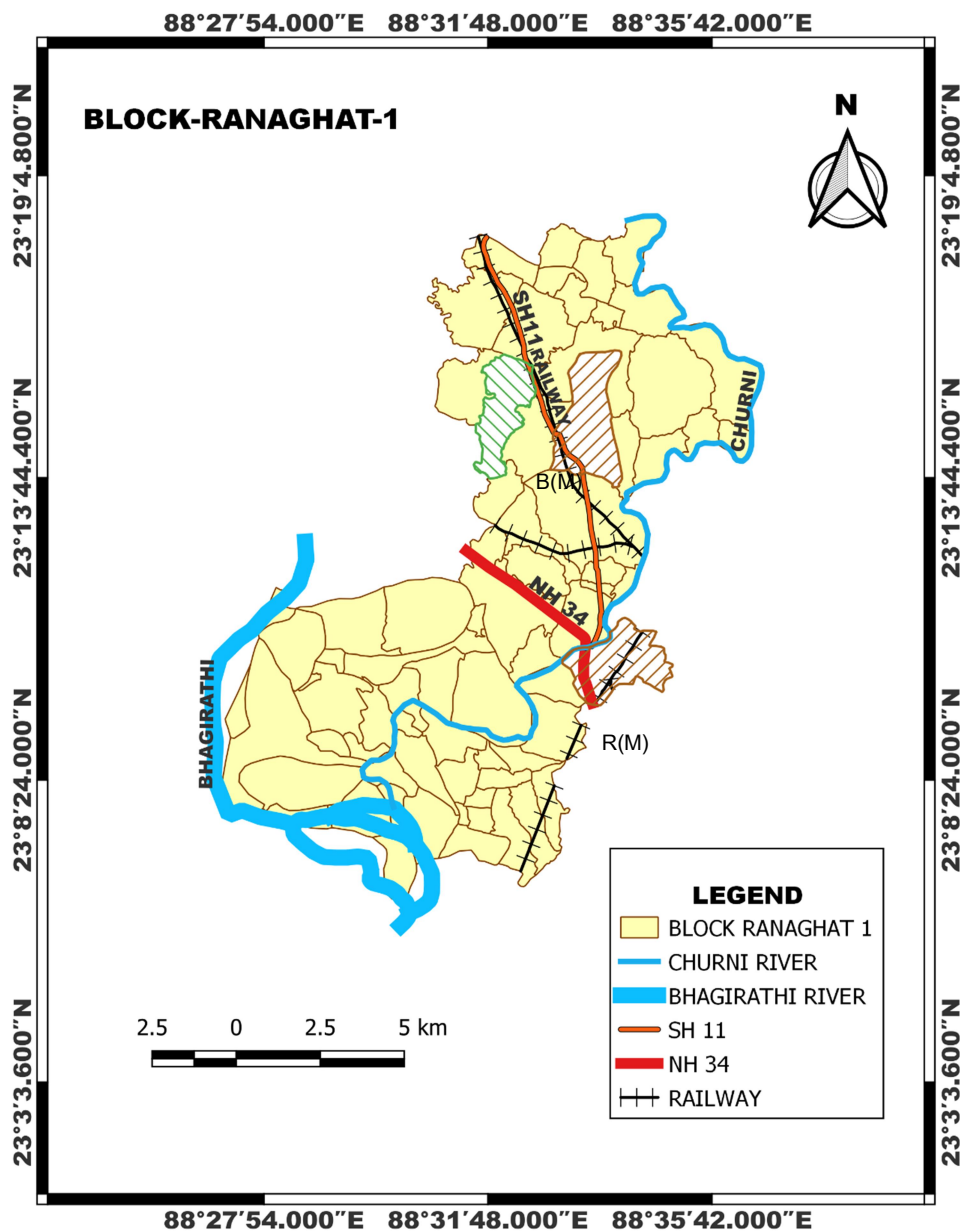
LOCATION MAP & CASE STUDY



Maps that contain graphically recorded information about administrative matters are called administrative maps. such as supply and evacuation facilities, medical facilities, and collection points for stragglers and enemy prisoners of war.

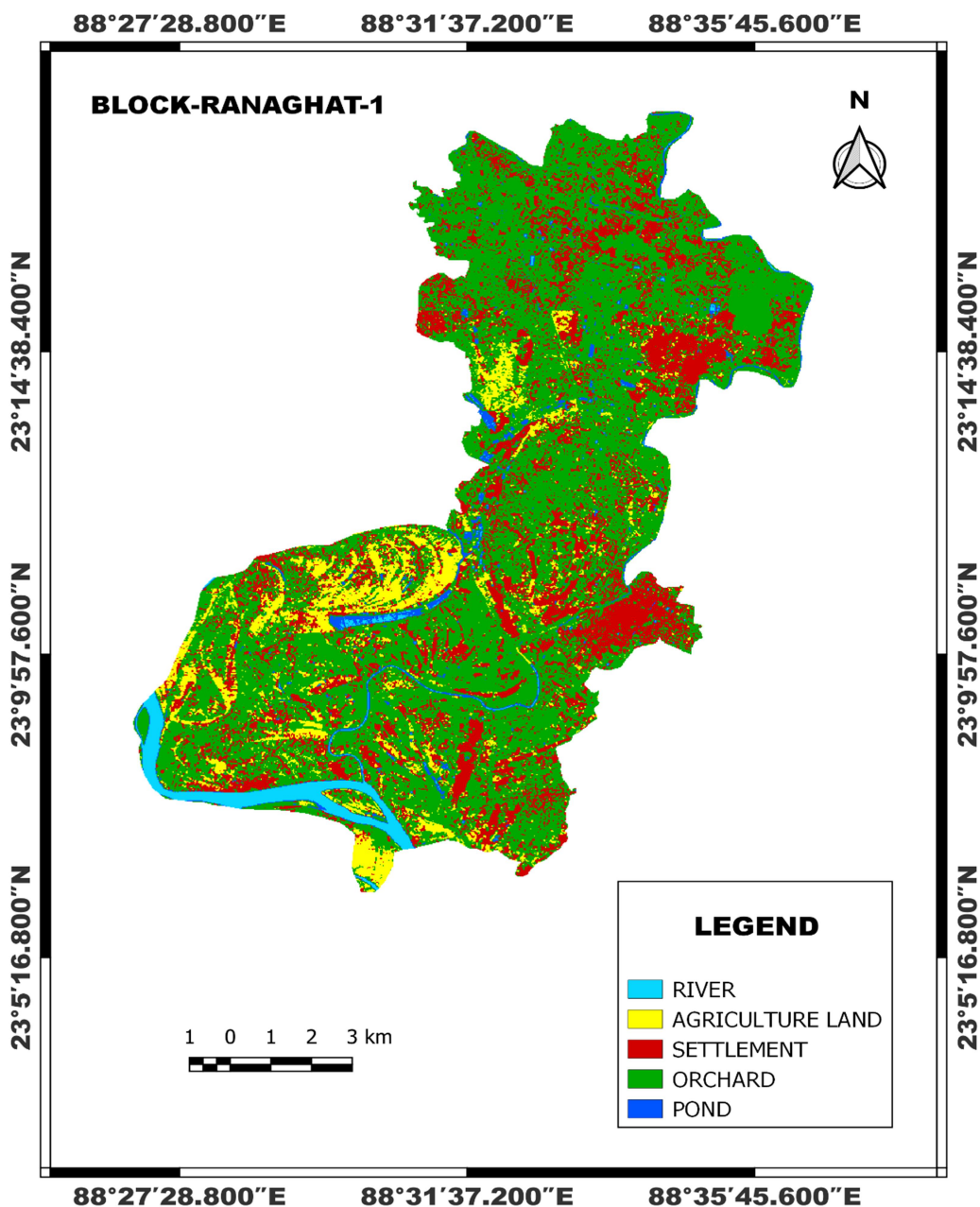
In this map, we can know about the total territorial distribution of Ranaghat Block 1. Border identification is also available. On the map, we can see the distribution of panchayat and municipal areas with different color indicators. Hatching zones indicate municipal areas

TRANSPORT & COMMUNICATION



This map shows all the transport services in Ranaghat Block 1. All the waterways, roads, and railways are displayed on the map. National Highway No. 34 runs along the center of the map, and State Highway No. 11 joins the National Highway in the north-western part of the map. At the western edge of the map, there is the Bhagirathi River, which flows from north to south. The Churni River flows from the eastern edge and joins it in the southwest. The map also spans the railway line from north to south.

LANDUSE

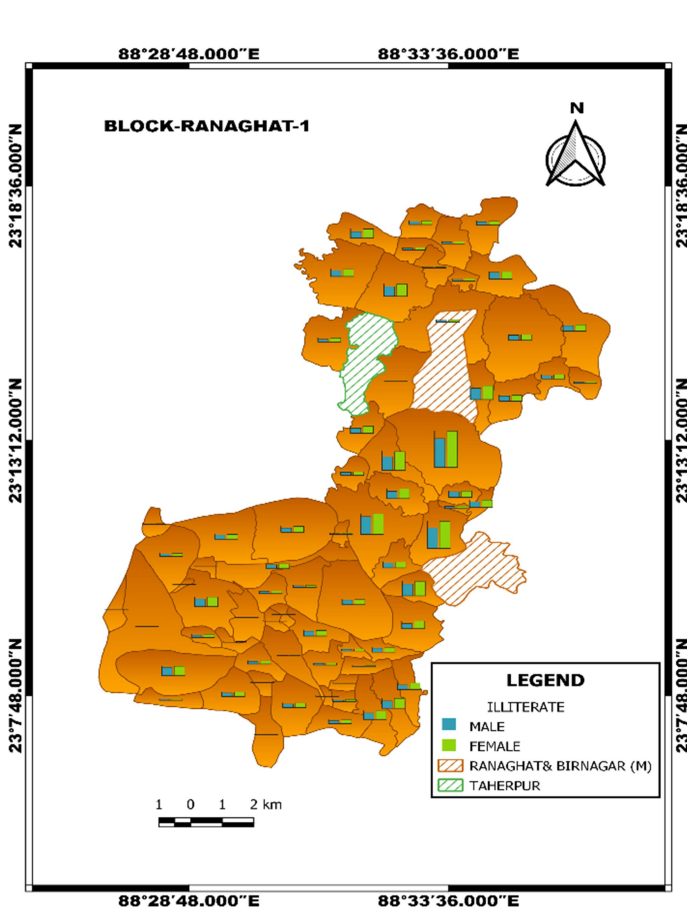


One of the maps used nowadays is the satellite image map. It provides an aerial view of our study area with meaningful, precious colors. In the satellite image map, blue appears as rivers, yellow appears as agricultural land, red as settlements, green as orchards, and dark blue as ponds.

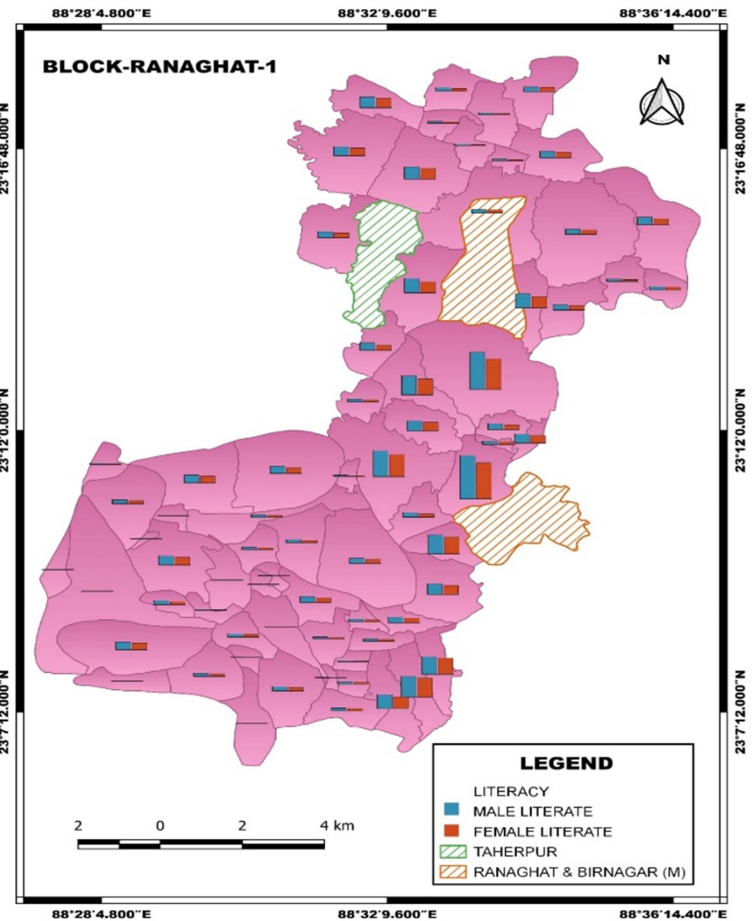
LITERACY & ILLITERACY WITH MALE FEMALE BREAK

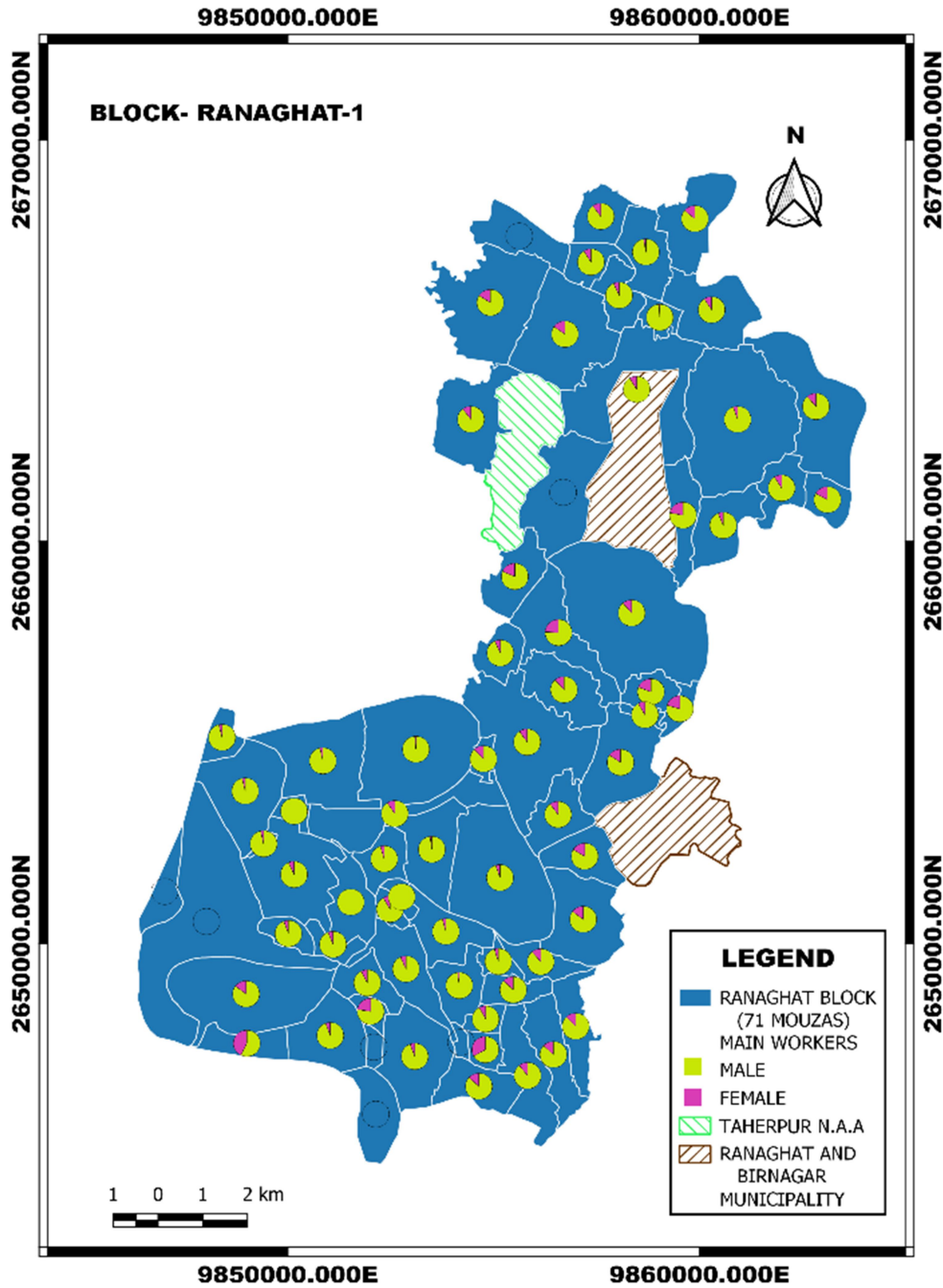
The literacy rate in a place carries a lot of variation in that place. Similarly, in this map, the literacy rate of block Ranaghat-1 is shown through a bar graph. Here, the blue bar shows the male population. Light green and red bars show the female population. The right-sided map represents a literate male and female population, and the left-sided map represents an illiterate male and female population.

TYPES OF WORKERS

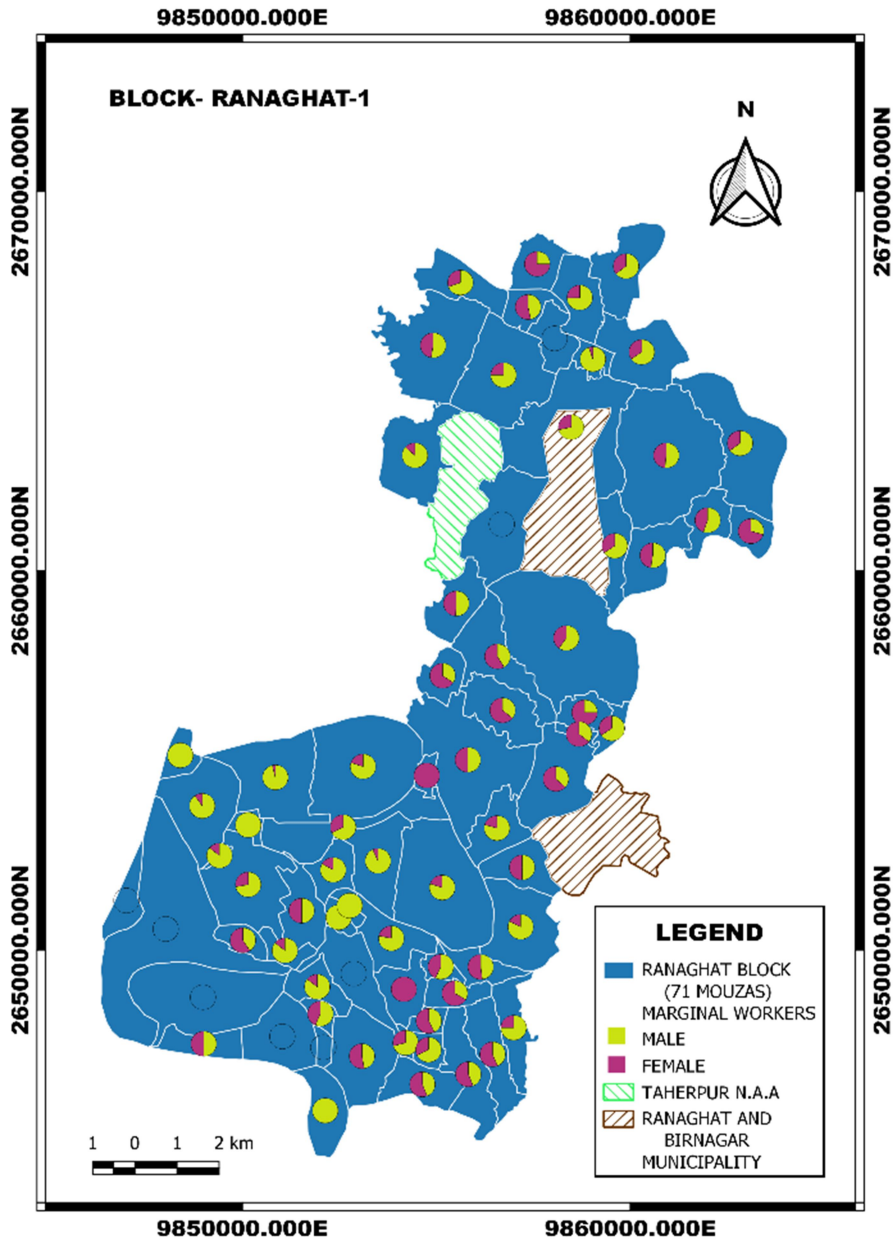


MAIN WORKERS



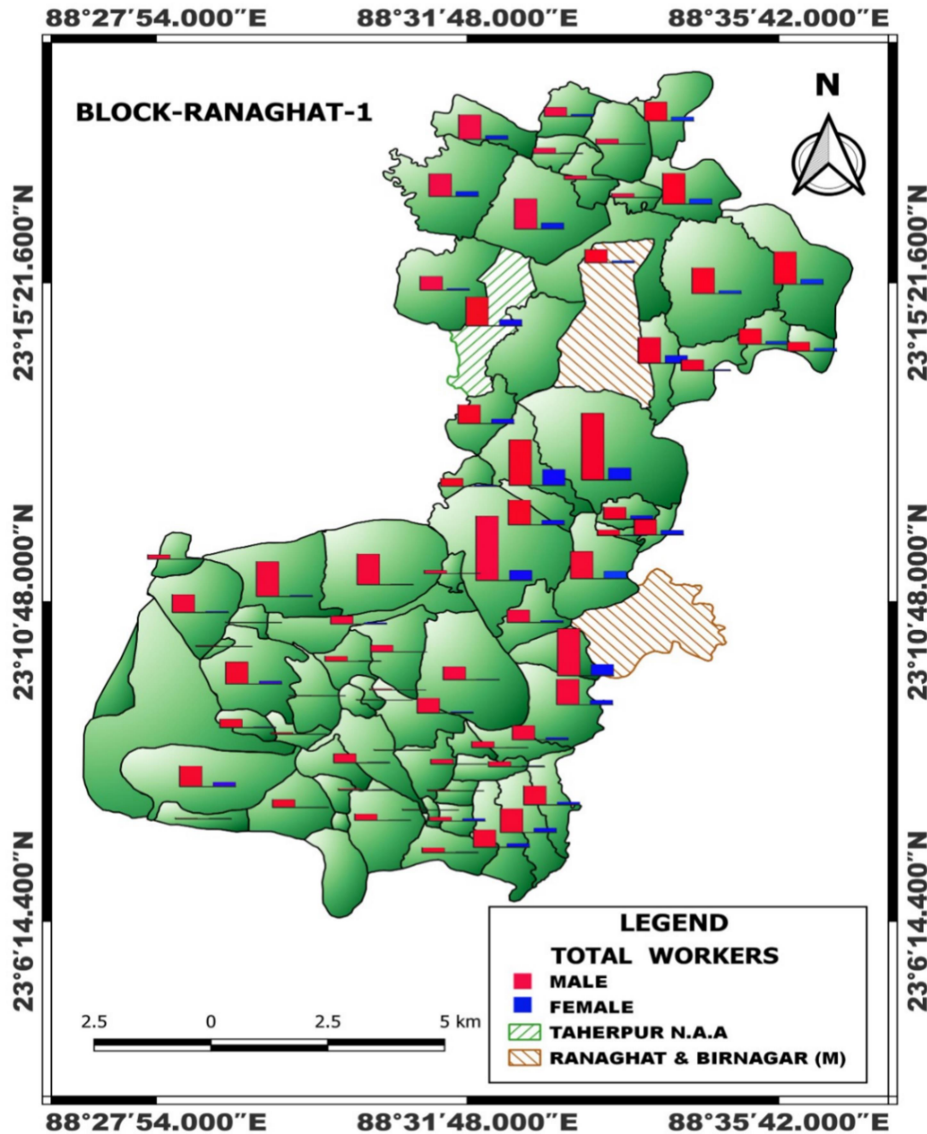


MARGINAL WORKERS



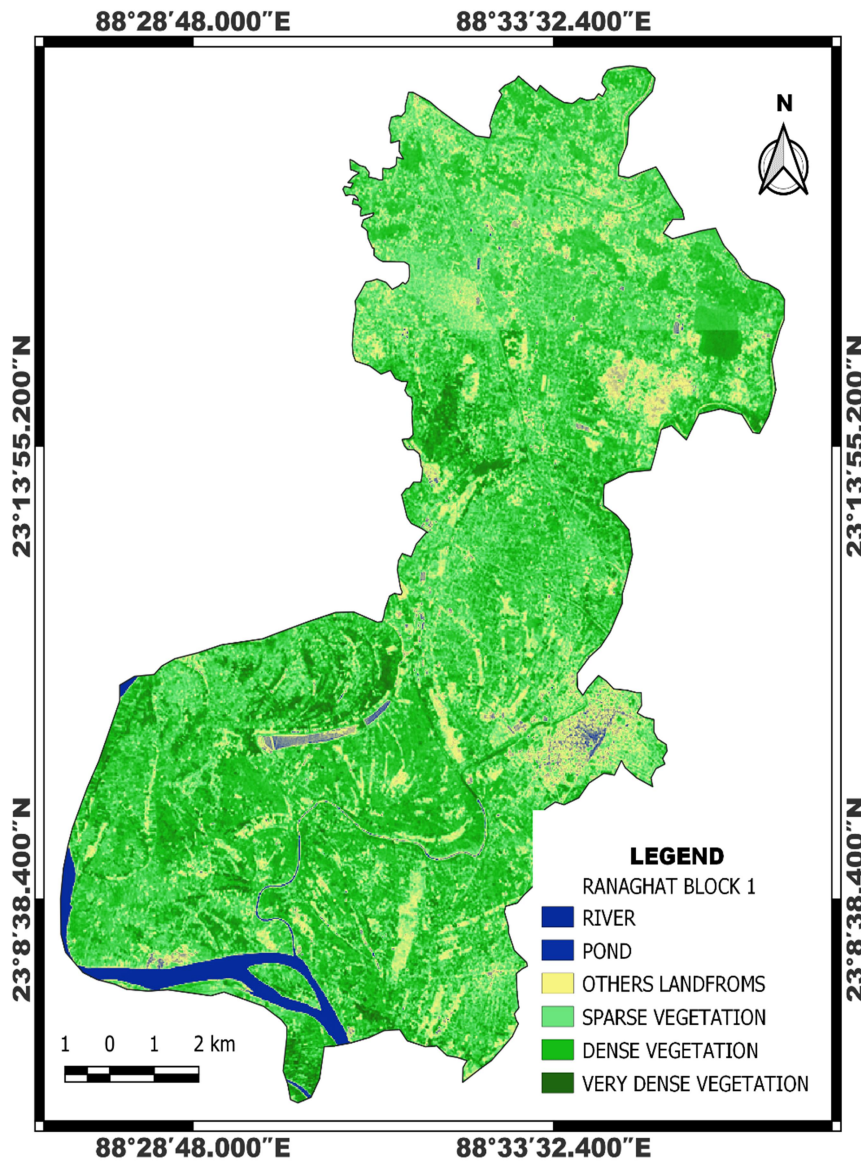
The map represents the total main and marginal working distribution of the block Ranaghat-I. The map also represents the total male-female ratio in main and marginal works. Here, we represent the data with a pie diagram. The pie is divided into two categories: one is a light green color that indicates male workers, and the other is pink, which indicates female workers.

COMPOSITION OF WORKER



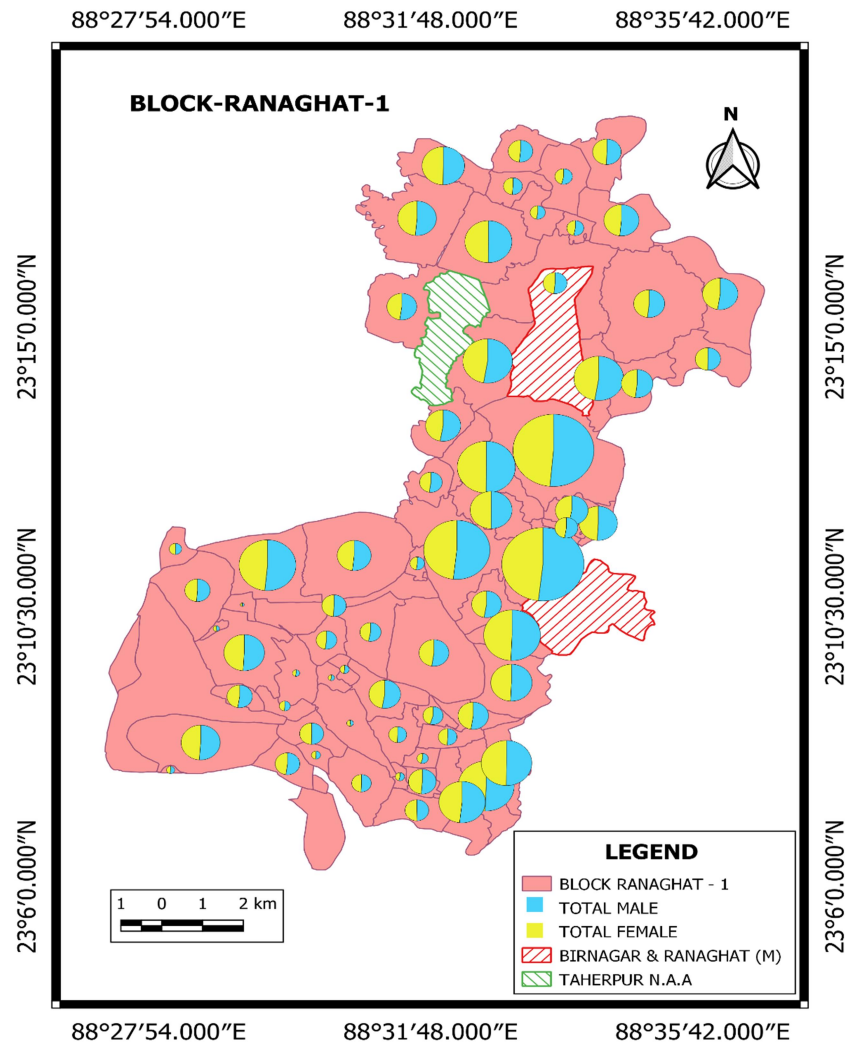
The map shows the total working distribution of Ranaghat Block 1. In this map, we can also differentiate the ratio between male and female workers. Here, male workers are indicated by the red bar graph, and female workers are indicated by the blue bar graph. On the map, we can easily identify the general concept of total workers at Ranaghat Block 1.

NATURAL VEGETATION USING NORMALIZED DIFFERENCE VEGETATION INDEX

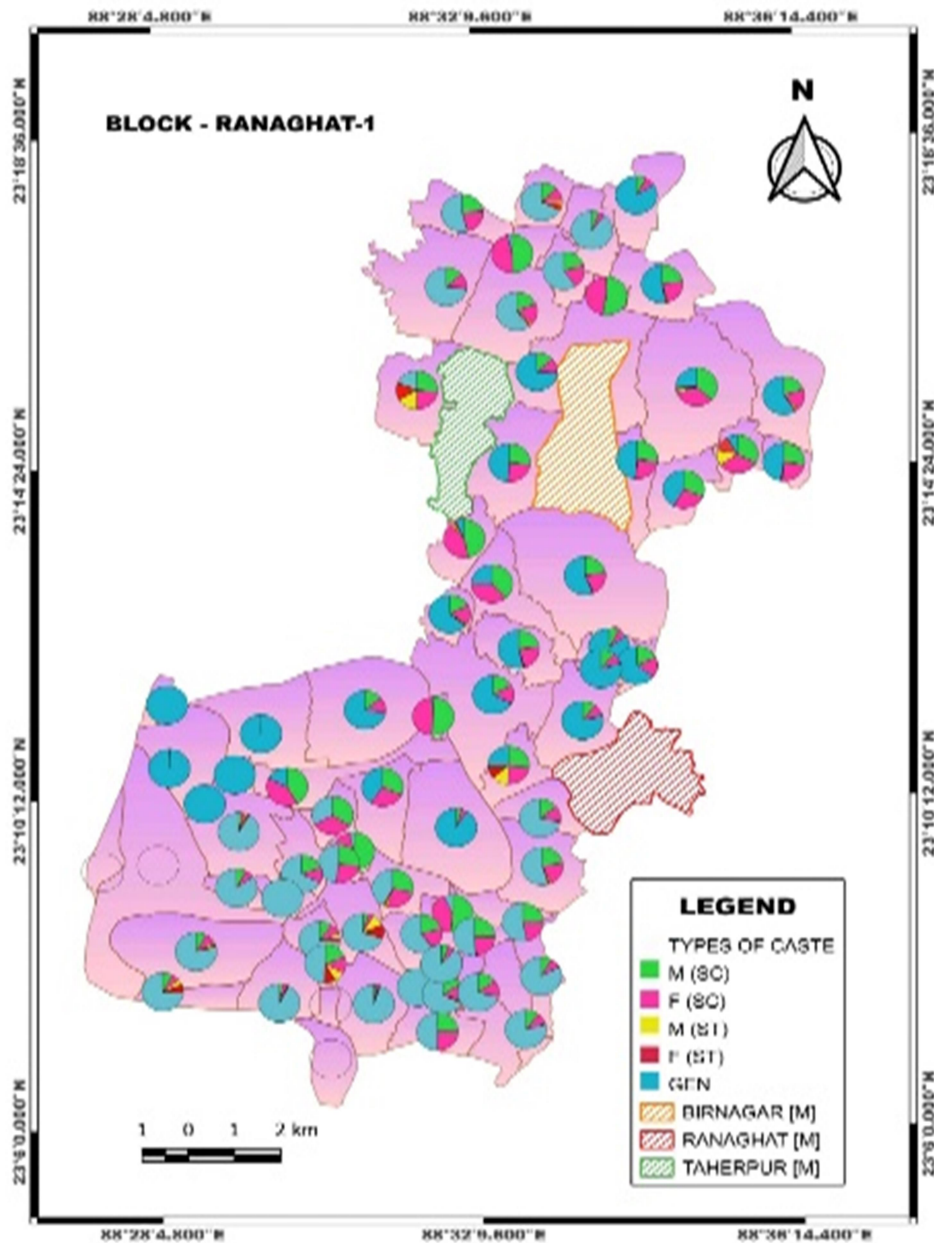


The Normalized Difference Vegetation Index (NDVI) is used to quantify vegetation greenness and is useful in understanding vegetation density and assessing changes in plant health. Through this map, we can understand the totally different kinds of vegetation in block Ranaghat-1. In the map, green is shown as dense vegetation, light green as sparse, and dark green as very dense vegetation.

SEX COMPOSITION



CASTE COMPOSITION



The map shows different types of caste categories by pie diagram. That's showing three types of caste categories: SC, ST, and general. The categories are also divided by male and female populations. Here, green represents the male SC population, magenta represents the female SC population, yellow represents the male ST population, red represents the ST female population, and sky blue represents the general population.

CONCLUSION: In conclusion, a GIS tool enables the collection of information, and this data collection is extremely valuable. Using technology to gather location information and provide us with data can give us a deeper understanding of many issues. This spatial data can answer questions and help with prediction, analysis, and decision-making. Just like how we visualize and try to understand our area.

There are plenty of benefits that come with the use of technology in geospatial mapping. In the case of the Geographic Information System,

1. Visualizing spatial information.
2. Mapping solution.
3. Better analysis and prediction.

Many researchers and geographers have benefited from geospatial mapping. This technology has been widely applied in academic research and professional fields. GIS is providing beneficial tools in this era. GIS has proven to be an indispensable tool.

ACKNOWLEDGEMENT

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1. Block Development Officer (Habibpur)
2. Ranaghat Municipality.
3. College library.
4. Internet and Google sites. (Tools: QGIS)

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