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Three views of GIS

Many have characterized GIS as one of the most powerful of all information technologies because it focuses on integrating knowledge from multiple sources and creates a crosscutting environment for collaboration. In addition, GIS is attractive to most people who encounter it because it is both intuitive and cognitive. It combines a powerful visualization environment with a strong analytic and modeling framework that is rooted in the science of geography.

This combination has resulted in a technology that is science based; trusted; and easily communicated across cultures, social classes, languages, and disciplines.

To support this vision, GIS combines three fundamental aspects or views:

The geodatabase view: A GIS manages geographic information. One way to think of a GIS is as a spatial database containing datasets that represent geographic information in terms of a generic GIS data model— features, rasters, attributes, topologies, networks, and so forth.

GIS datasets are like map layers; they are geographically referenced so that they overlay onto the earth's surface. In many cases, the features (points, lines, and polygons) share spatial relationships with one another. For example, adjacent features share a common boundary. Many linear features connect at their endpoints. Many point locations fall along linear features (e.g., address locations along roads).

The map view: A GIS is a set of intelligent maps and other views that show features and feature relationships on the earth's surface. Various map views of

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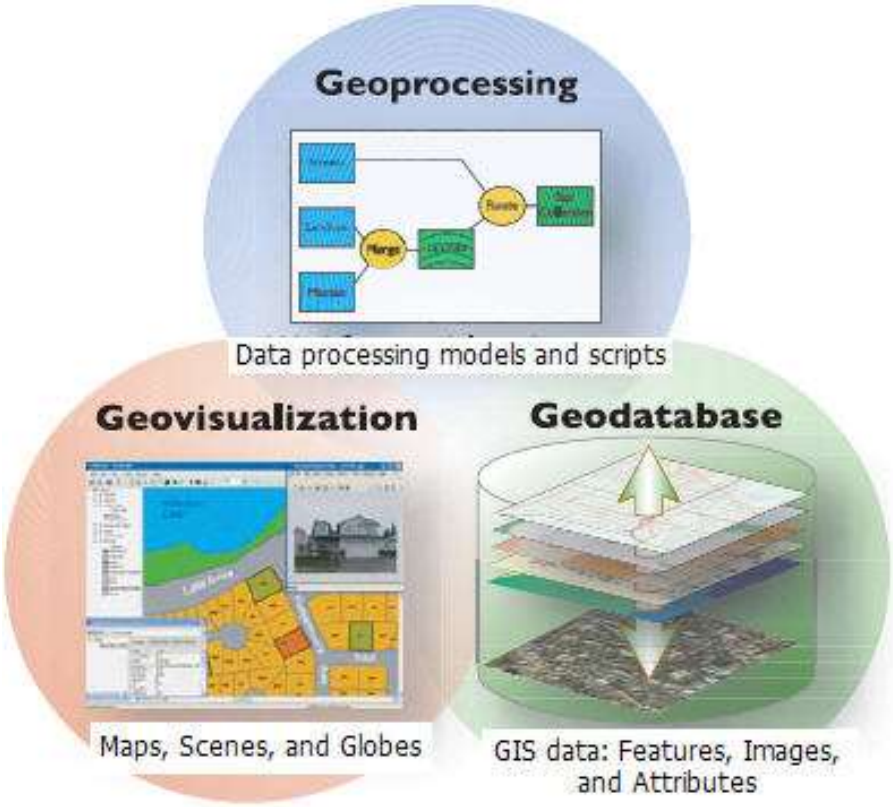
the underlying geographic information can be constructed and used as windows into the geographic database to support query, analysis, and editing of geographic information. Each GIS has a series of two-dimensional (2D) and three-dimensional (3D) map applications that provide rich tools for working with geographic information through these views.



The geoprocessing view: A GIS is a set of information transformation tools that derive new information from existing datasets. These geoprocessing functions take information from existing datasets, apply analytic functions, and write results into new derived datasets. Geoprocessing involves the ability to string together a series of operations so that users can perform spatial analysis and automate data processing—all by assembling an ordered

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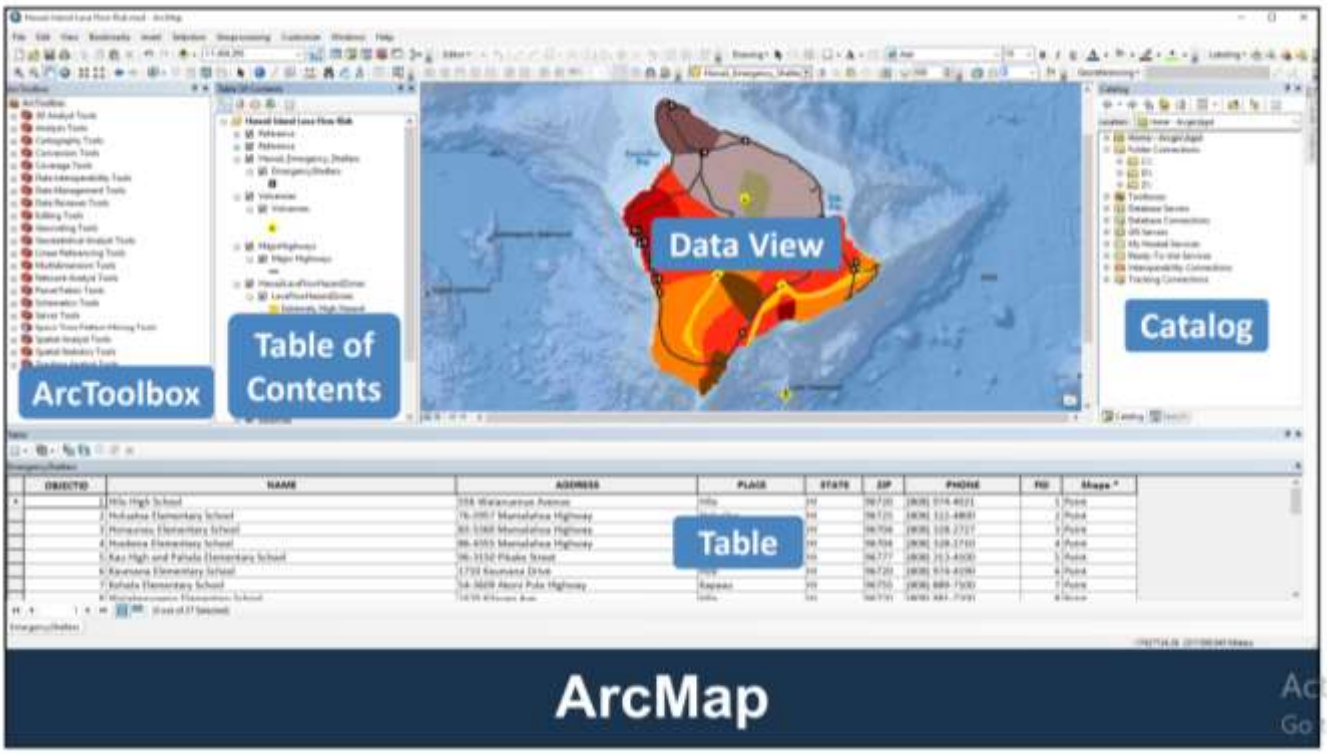
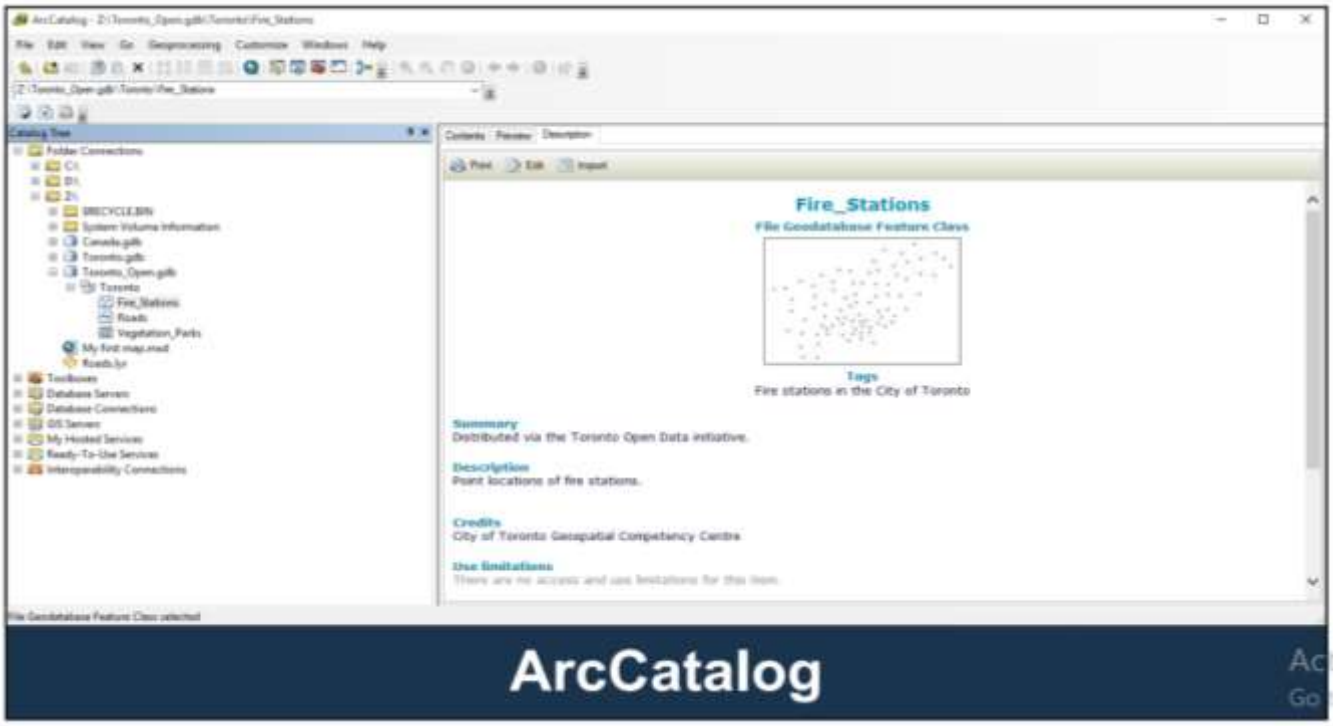
sequence of operations. There are numerous spatial operators that can be applied to GIS data. The ability to derive new information within a GIS analysis process is one of the fundamental capabilities in GIS.





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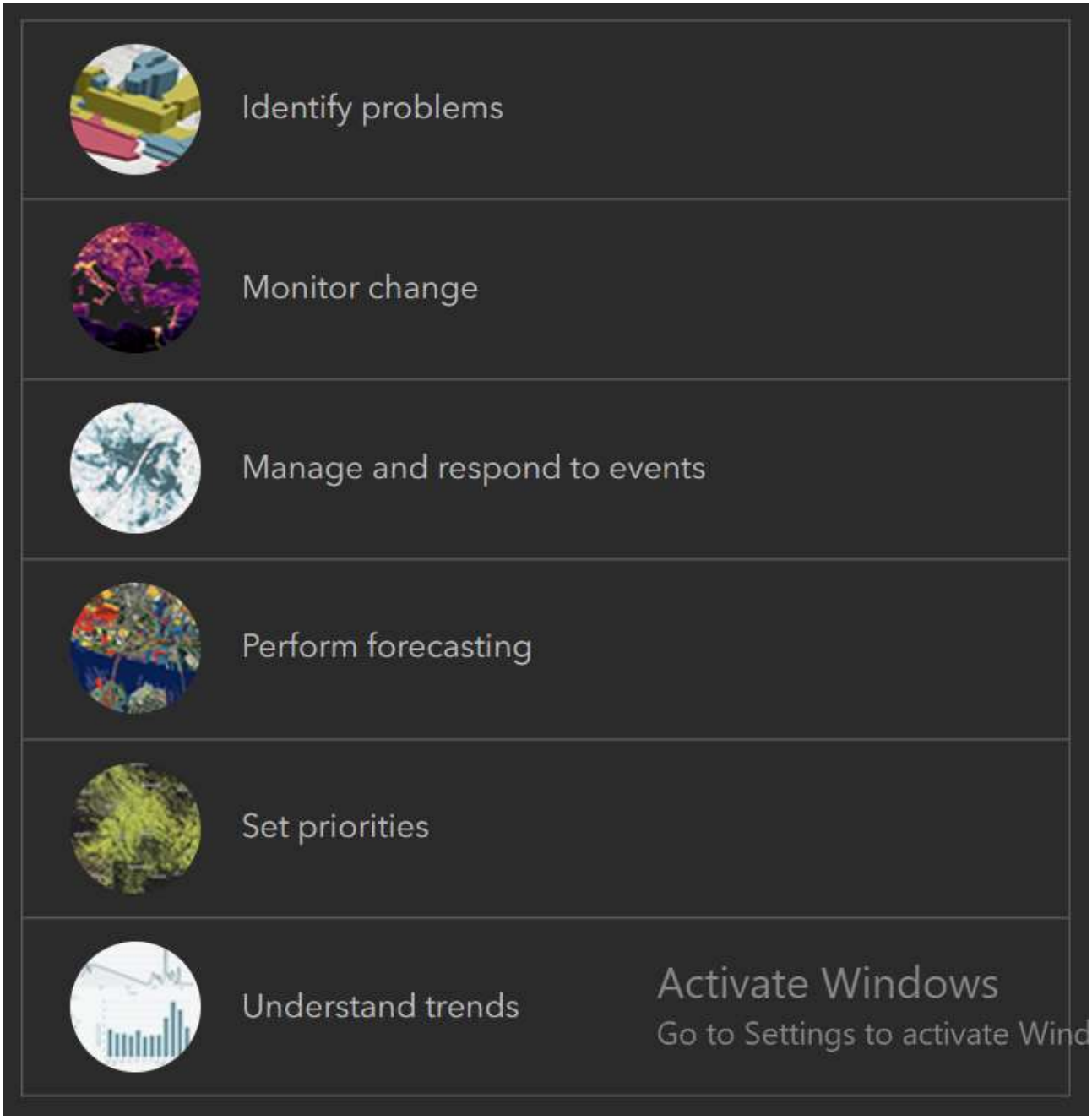
How is GIS used?

Hundreds of thousands of organizations in virtually every field are using GIS to make maps that communicate, perform analysis, share information, and solve complex problems around the world. This is changing the way the world works.



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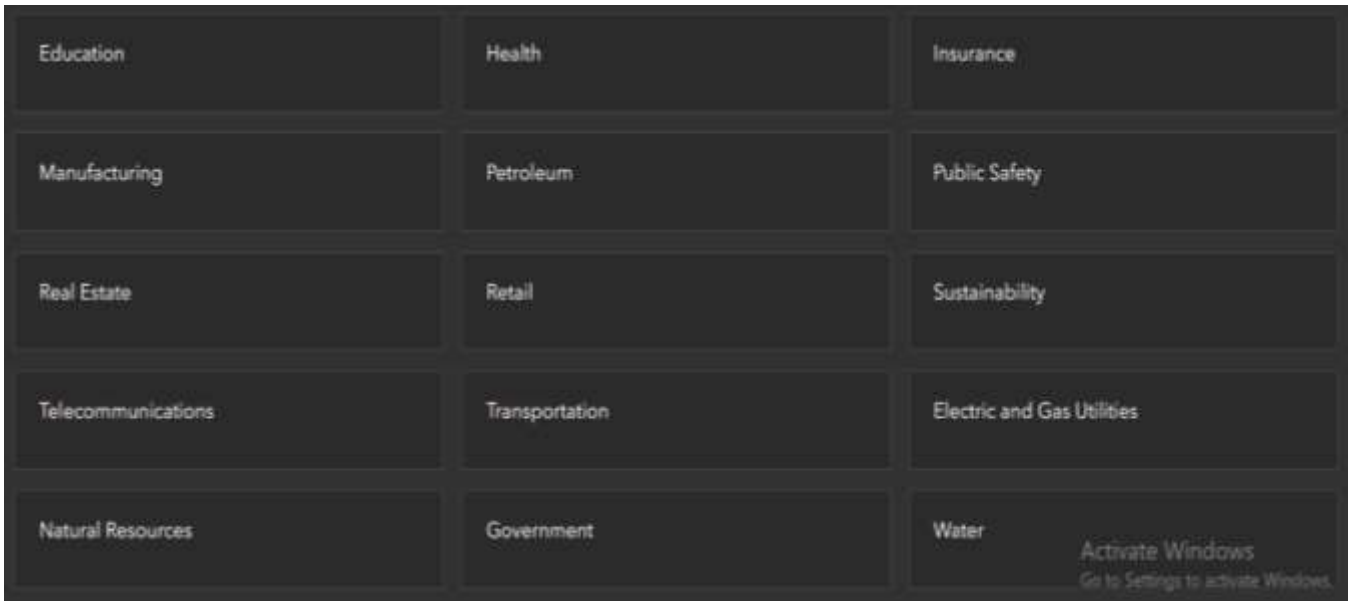
Who uses GIS?

Modern GIS is about participation, sharing, and collaboration. Discover how the technology is strengthening relationships, driving efficiencies, and opening communications channels in your community.



What Can You Do with GIS?

Mapping Where Things Are. Mapping where things are lets you find places that have the features you're looking for, and to see where to take action.

1. Find a feature--People use maps to see where or what an individual feature is.

2. Finding patterns--Looking at the distribution of features on the map instead of just an individual feature, you can see patterns emerge.

3. Mapping Quantities-- People map quantities, like where the most and least are, to find places that meet their criteria and take action, or to see the relationships between places. This gives an additional level of information

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beyond simply mapping the locations of features. For example, a catalog company selling children's clothes would want to find ZIP Codes not only around their store, but those ZIP Codes with many young families with relatively high income. Or, public health officials might not only want to map physicians, but also map the numbers of physicians per 1,000 people in each census tract to see which areas are adequately served, and which are not.

4. Mapping Densities-- While you can see concentrations by simply mapping the locations of features, in areas with many features it may be difficult to see which areas have a higher concentration than others. A density map lets you measure the number of features using a uniform areal unit, such as acres or square miles, so you can clearly see the distribution. Mapping density is especially useful when mapping areas, such as census tracts or counties, which vary greatly in size. On maps showing the number of people per census tract, the larger tracts might have more people than smaller ones. But some smaller tracts might have more people per square mile--a higher density.

5. Mapping Changes-- Map the change in an area to anticipate future conditions, decide on a course of action, or to evaluate the results of an action or policy.

1. By mapping where and how things move over a period of time, you can gain insight into how they behave. For example, a meteorologist might study the paths of cyclones to predict where and when they might occur in the future.

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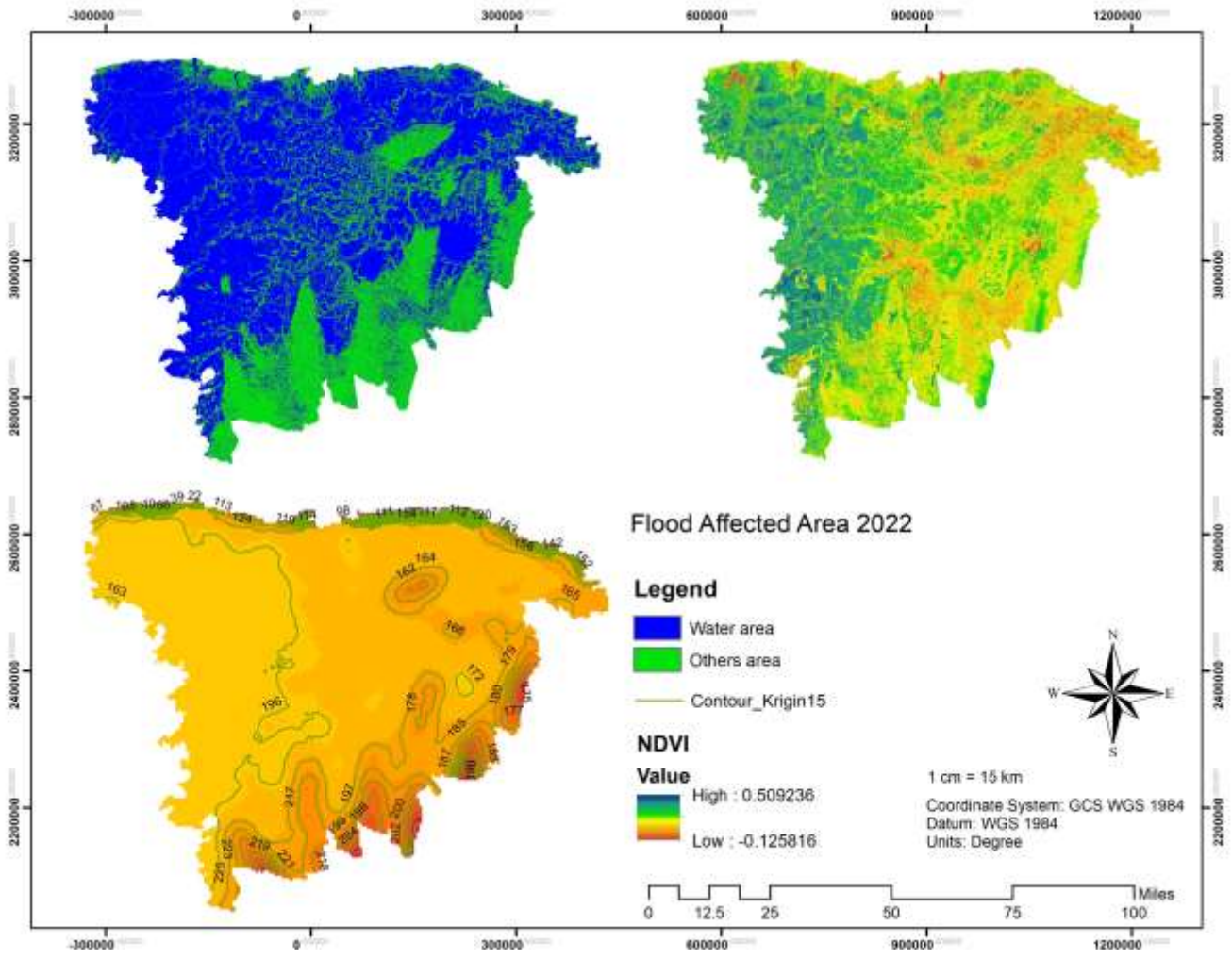
2. Map change to anticipate future needs. For example, a police chief might study how crime patterns change from month to month to help decide where officers should be assigned.

3. Map conditions before and after an action or event to see the impact. A retail analyst might map the change in store sales before and after a regional ad campaign to see where the ads were most effective.



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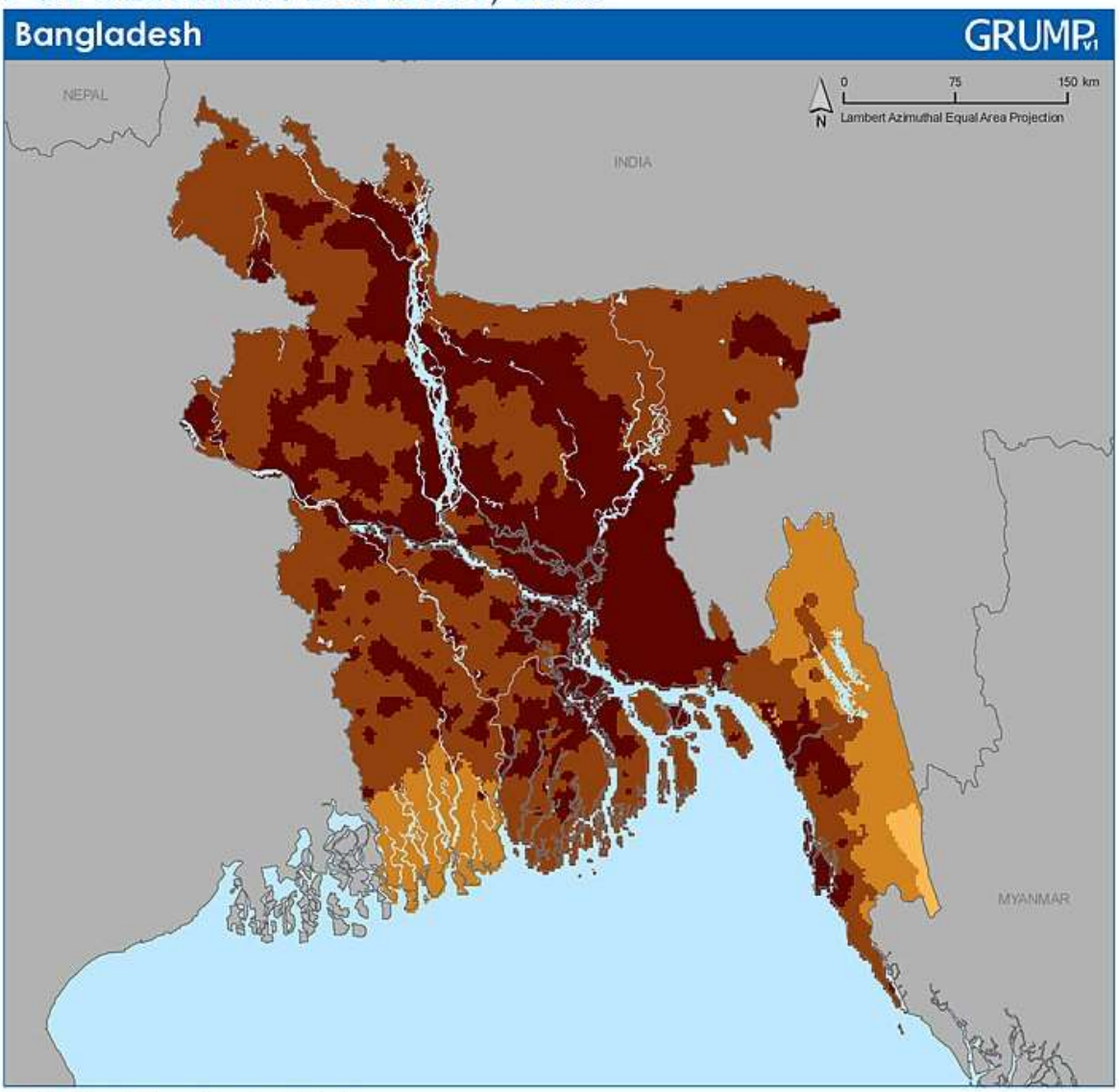
POPULATION DENSITY, 2000



Global Rural-Urban Mapping Project

Persons per km²	Boundaries
0	Country
1 - 5	Admin. 1
6 - 25	
26 - 250	
251 - 1,000	
1,001 +	

Population density measures the number of persons per square kilometer of land area. The data are gridded at a resolution of 30 arc-seconds.

Note: National boundaries are derived from the population grids and thus may appear coarse.

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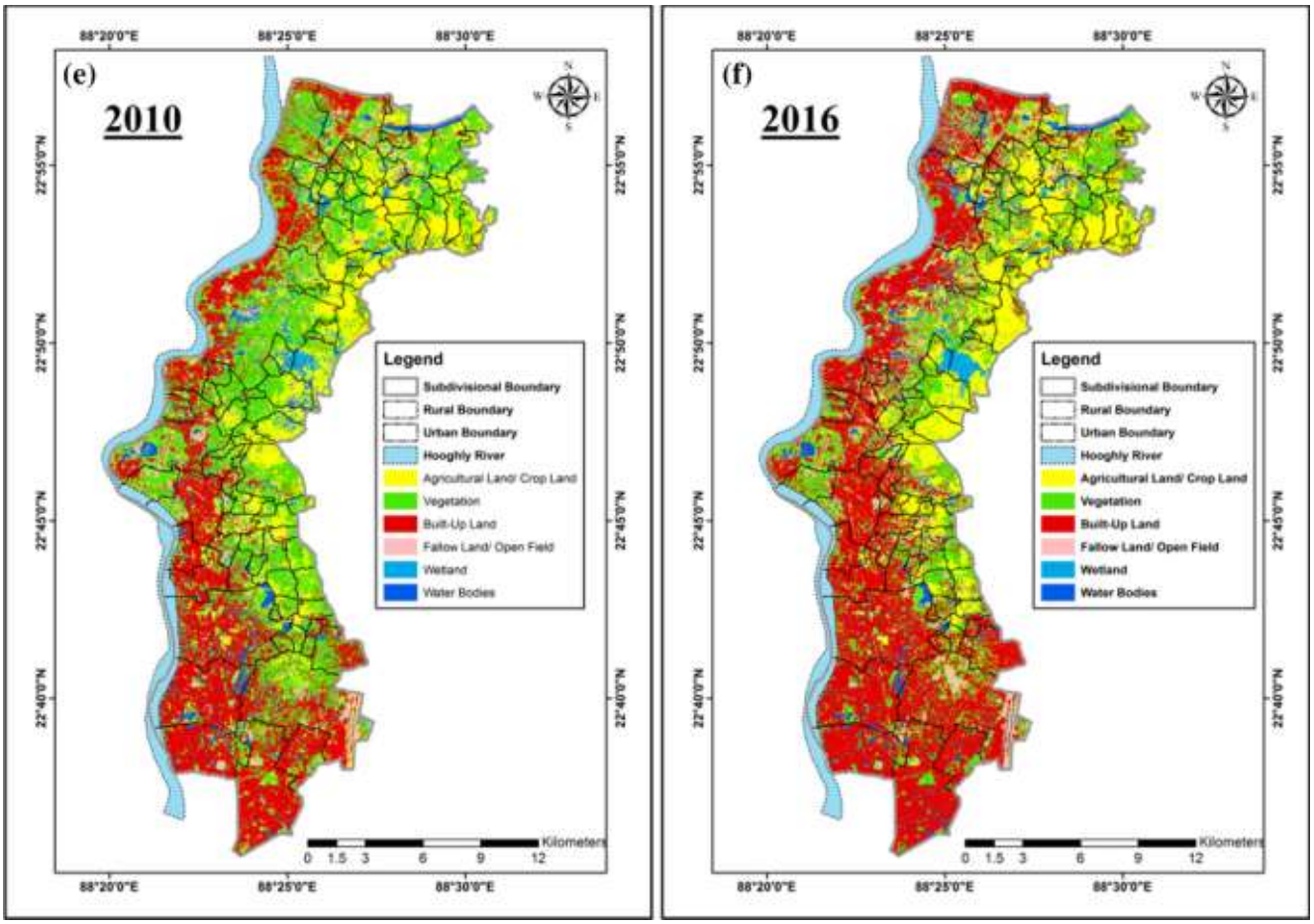

thank you