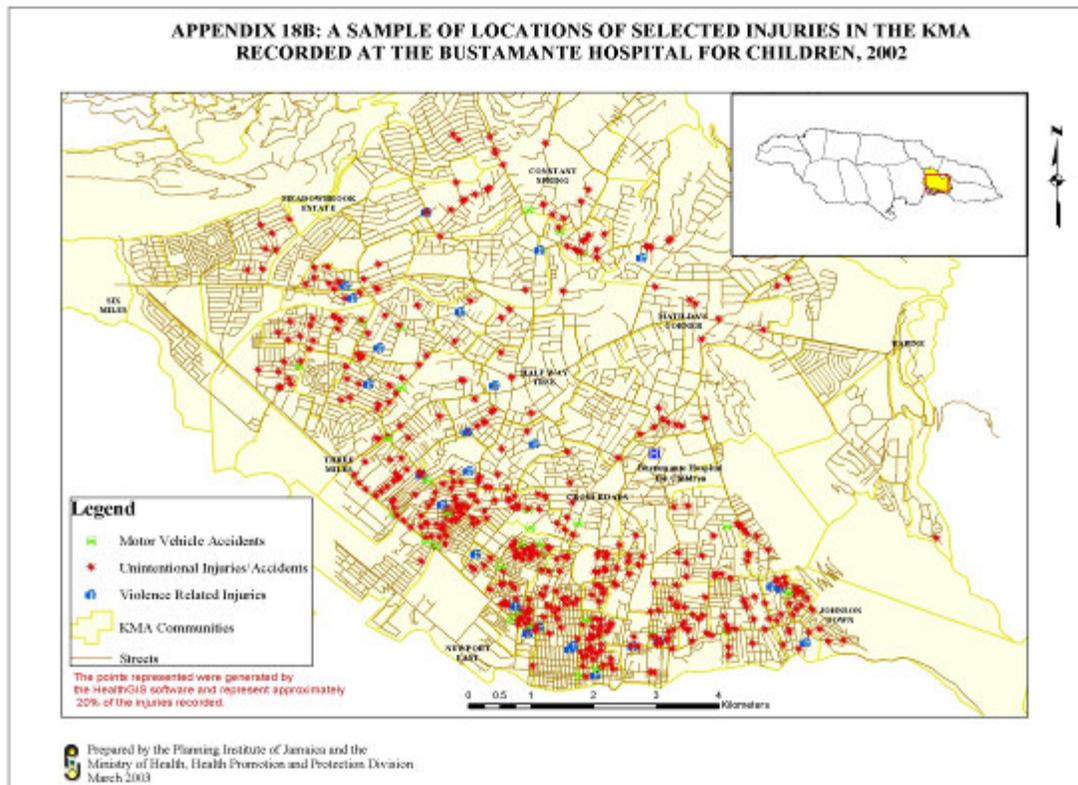


## **Geographic Information System (GIS), What is GIS?**

*contributed by the Spatial Data Management Division, secretariat of the Land Information Council of Jamaica (LICJ), Ministry of Agriculture. Contact Ms. Cecille Blake, National GIS Coordinator.*

### **What is GIS?**

GIS is a collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.



### **Why Geography?**

Geography is a serious discipline with multibillion dollar implications for businesses and governments. Choosing sites, targeting market segments, planning distribution networks, responding to emergencies, or redrawing country boundaries—all of these problems involve questions of geography.

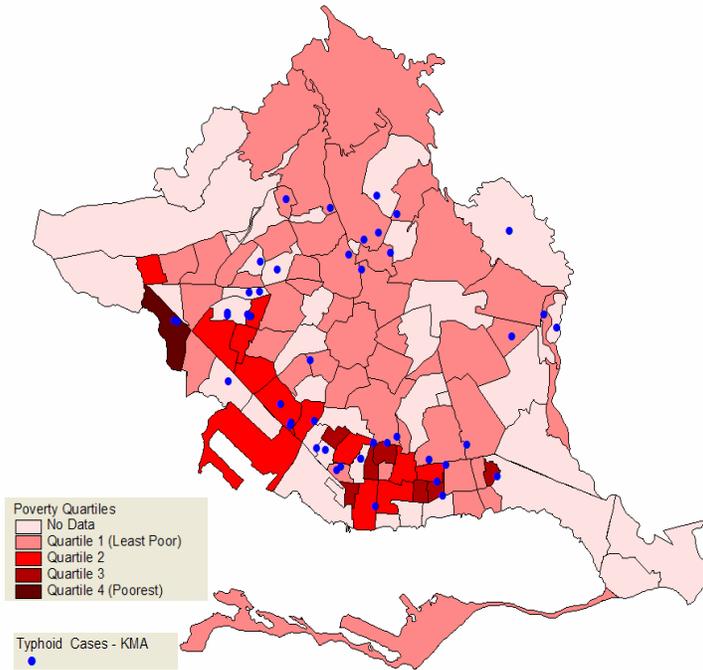
The following is an example of how the Ministry of Health and Environment Uses GIS

GIS allows for visual and statistical analysis of associations between disease patterns and socio-economic, environmental, and other factors

- GIS application, HealthGIS Jamaica.

- It is used to capture, analyse and display health data. Injury and disease maps for the City of Kingston are created using data from the Patients Administration System. The Ministry and other agencies such as the Jamaica Constabulary Force use the analysis being done to direct the appropriate intervention.

Typhoid Cases (1990 - 2002) by Poverty Status of KMA Communities



The blue dots represent location of typhoid cases reported between 1990 - 2002 in the Kingston metropolitan area

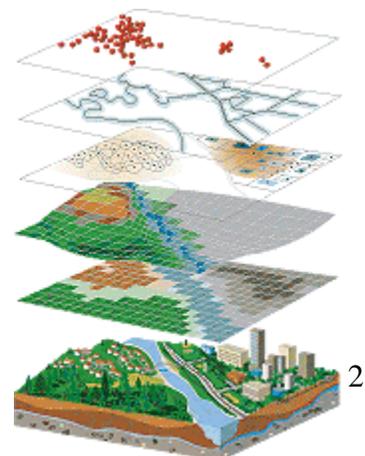
## How Does GIS Use Geography?

With a geographic information system (GIS), you can link information (attributes) to location data, such as people to addresses, buildings to parcels, or streets within a network. You can then layer that information to give you a better understanding of how it all works together. You choose what layers to combine based on what questions you need to answer.

## Why Use GIS?

Your organization has new and legacy data stored in a variety of formats in many locations. You need a way to integrate your data so that you can analyze it as a whole and leverage it to make critical business and planning decisions.

GIS can integrate and relate any data with a spatial component, regardless of the source of the data. For



example, you can combine the location of mobile workers, located in real-time by GPS devices, in relation to customers' homes, located by address and derived from your customer database. GIS maps this data, giving dispatchers a visual tool to plan the best routes for mobile staff or send the closest worker to a customer. This saves tremendous time and money.

## Answering Questions with GIS

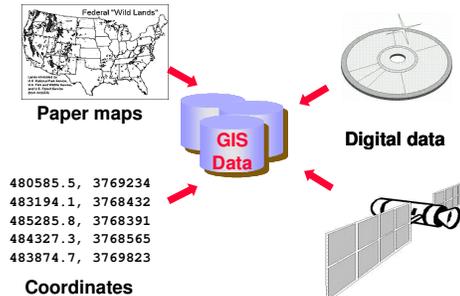
GIS is fundamentally used to answer questions and make decisions. To use GIS properly, it is important to know what you want to ask and follow a disciplined process for getting the answer.

### 1. Frame the question.

- Where were most of the burglaries last month?
- How much forest is in each watershed?
- Which parcels are within 500 feet of this liquor store?

### 2. Select your data.

The type of data and features you work with help determine the method you use. Data can come from any number of sources—databases within your organization, CAD files, the Internet, commercial data providers, government organizations, and so on.



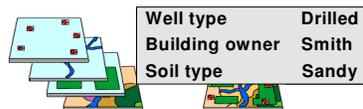
### 3. Choose an analysis method.

Decide which analysis method to use based on your original question and how the results of the analysis will be used.

#### ● Proximity



#### ● Overlay



#### ● Network



For example, if you are doing a quick study of burglaries in a Spanish Town to look for patterns, you might just map the individual crimes and look at the maps. If the information will be used as evidence in a trial, however, you might want a more precise measure of the locations and numbers of assaults for a given time period.

### 4. Process the data.

Once you've selected the analysis method, you'll need to process your data in a way that makes sense for your goal.

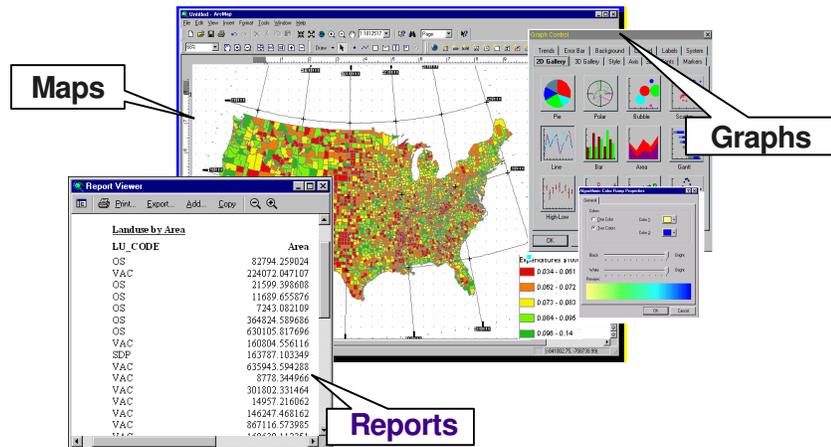
If you are mapping where things are located, you may need to assign geographic coordinates, such as latitude and longitude or address, to your data and assign category values to the data.

## 5. Look at the results.

The final step is to look at the results of your analysis and take action based on those results.

Your results can be displayed as a digital map, printed as a paper map, combined with spreadsheet-like tables or charts, or displayed as such.

Though a lot of emphasis in GIS is in making maps, the software is flexible enough to allow you to display your results in the format that best suits your needs.



## The Need for Geographical Information Systems (GIS)

Ninety percent of all information has a geographic location. Simply put, most of the information that exists can be placed on a map. Because this information has a location, it can be stored in a GIS.

A GIS is a system that stores, analyzes and displays location based information. Globally GIS is being utilized in almost all industries. For instance, emergency planners utilize it to determine flood prone areas, first responders utilize it to find the best route to an emergency, businesses utilize it to find suitable locations for their stores, insurance companies utilize it for risk management and reinsurance purposes, banks utilize GIS to find suitable locations for ATM machines and the police use it to analyze and determine crime hotspots.

Globally, there are more than 2 million users of GIS. However most people are still unaware of how the technologies impacts upon their daily lives. A GIS is essentially a tool for decision making. Its powerful analytical and visualization capabilities provides the answers to important questions that must be answered in order to make sound and informed decisions. A GIS allows us to develop models, create scenarios and ultimately provide solutions for various environmental and socio-economic problems that exist.

Geographical Information Systems is helping to create revolutionary new applications and possibilities. Google Earth, online vehicle tracking and internet mapping applications are types of technologies that have significantly altered the way we exist and perceive reality. The future of GIS looks brighter now than ever before and with the continuous improvements in technology, it is evident that GIS is here to stay.

## **Spatial problems require spatial solutions**

### **GIS in Jamaica**

We are living in a dynamic global environment where the demand for and access to information is critical and Jamaica is by no means an exception. GIS provides us with a mechanism for addressing the information poverty that exists within the country. Therefore, the proper use of this tool is not only beneficial to the development of the country but also to the Caribbean region. GIS In Jamaica is facilitated by a small group of hard working and dedicated individuals. Education programmes and ongoing efforts by individual agencies have seen the number of users of GIS increase over the years. This is also being reflected in the number of organizations that have begun adopting this technology and the various types of applications being created.

One cannot speak about GIS in Jamaica without highlighting the work of the **Land Information Council of Jamaica (LICJ)** which has the arduous task of promoting the use and benefits of GIS. Indeed, it has been a challenging road for the LICJ however, the persistence and continuous efforts of its members has created a framework that will allow for the accessibility and availability of the island's spatial data, products and services to all users.

Many government organizations have been increasing their use of GIS not only for improving their operations but also, for the development of the country. This is especially commendable considering that many have had to accomplish these tasks with limited financial resources.

**The National Land Agency** has the country's largest GIS infrastructure and must be applauded for its significant strides in GIS development and its flagship 'eLand' application. Other institutions have made strides in the use of GIS are Spatial Innovision, the Ministry of Health, the National Works Agency and Mona GeoInformatics. Their contributions have continued to spread the importance of GIS technology by emphasizing its use and benefits.

The Ministry of Agriculture/LICJ is currently implementing many programmes and activities to address the challenges being faced. **The GIS in schools education programme** is being redesigned to meet the dynamics of today's environment. Several programmes centered on infusing geography and GIS into the curriculum

of both primary and secondary institutions are being initiated. The school's mentorship programme is being re-launched and an entire new set of promotional activities is being developed. In addition a **Geospatial portal** is currently being designed for the country. This portal will make geospatial data and its associated metadata readily available to everyone via the internet. This will help to improve the development approval process, as well as disaster planning, emergency management and other related activities by providing the decisions makers with accurate, up-to-date and timely information. There are numerous other programmes that are underway to strengthen geospatial use in the country. This includes the development of a **GPS/Virtual Reference Station network for the country**, the development of legislation to create a national spatial data centre and the development of concrete standards to govern the creation, use and dissemination of geospatial data.

### **GIS In Agriculture**

More recently a new programme has been initiated which will focus entirely on the Agricultural Industry. Agriculture, with its many horizontal and vertical linkages has the potential to be one of largest earners of foreign exchange for the country. The Planning Institute of Jamaica has launched vision 2030 which will aim to make Jamaica a developed country by that year. Of utmost importance to this development process will be the agricultural sector

The Ministry of Agriculture/LICJ is therefore initiating programmes that will involve the integration of GIS into agriculture. This will occur at every level, from the planning of crops to their eventual sale and distribution. Because all agriculture is linked to geography, agricultural information can be stored, analyzed and displayed in a GIS. A GIS supports Farmers that utilize precision agricultural techniques to produce the higher yields and net profits. GIS combines agricultural features on a map to demonstrate how various conditions can affect productivity. For example a farmer can utilize geographic layers to examine how the relationships between soil type, water and fertilizer will influence crop yield on a given acre of land. A map that depicts how soil conditions affect crop yields can assist in finding soil management solutions. A GIS can also be utilized in the distribution of produce from field to market. A GIS can help plan the best distribution routes and can assist with tracing produce from the supermarket back to its original location on a farm. The use of Geographical Information Systems is one of many technologies that if utilized properly will ultimately help to improve the agricultural industry.

