

Breakout Session: Limits & Opportunities: GIS, Database Models, & Technology in Aiding the Community

September 9, 2003, 2:30pm
Facilitator: Stephen Goetz

What are some possible benefits to using GIS, database models, and technology?

- **Effectively allocate resources**
 - Locate facilities, such as national laboratories (cf. Torres presentation), so that all regions have access to a facility, yet no facility is overburdened.
 - Effectively ration limited resources based upon local conditions, such as rationing water for based upon the amount of precipitation a parcel of land has received.
- **Increase communication**
 - Routing of emergency vehicles using GPS navigation. We can find the shortest route for the emergency vehicle to take and have that information immediately conveyed to the driver. In cases when the shortest path is blocked we can find alternate routes.
 - Performing distance diagnostics (*e.g.*, identification of a poisonous mushroom that was ingested using digital photography and faxing/emailing an expert, allowing for quicker diagnosis and appropriate treatment.)
 - Wireless enabled PDAs (personal digital assistants) allow for a library of information to be available to practitioners out in the field.
 - Data can be collected remotely in situations where it would be dangerous, undesirable, or wasteful to have the data sampled by people. Use of remote underwater sampling stations to monitor water quality. (<http://www.cayugalake.cornell.edu>). Establishing robotic weather stations where it would be wasteful/dangerous to place manned weather stations.
 - List-servs (*e.g.* WestNileVirus-L) and forums allow for interaction with experts without needing to locate the experts ahead of time, and that might not be locally available.
 - Centralized databases (such as the EDEN resource database) can centralize information in one place.
- **Inventory tracking (radio tags & barcode scanners)**
 - We can monitor the movement of goods and livestock, which can be useful in tracing the origin in cases of contamination/outbreaks and in the identification of areas of potential exposure based upon travel.
 - Farmers can keep track of the amounts of product sold, and tailor harvesting to match for increased freshness and a decrease in the amount of product in storage.
- **Tracking & Prediction of Trends**
 - The use of robotic/autonomous sampling equipment allows for the tracking of data over time, and collecting information about trends.

- We can use accumulated data to make predictions, such as predicting the possibility of plant diseases based upon current conditions, and in cases where disease is present predict the spread of the disease.

What are some significant limitations to GIS, database models, & technology?

- **The Gee Whiz factors (ignorance of technology)**
 - People tend to overestimate the abilities/effectiveness of technology to solve their problems.
 - Technologies often have a high learning curve to use them effectively.
- **Availability**
 - Wireless signals often are not available in rural or remote areas. This circumscribes the usefulness of technologies dependent on wireless signals.
 - It may not be economically feasible to make the technology—cable and high-speed Internet access _available to rural America.
 - Even if the technology is potentially available, it might not be adopted.
- **Computability**
 - GIS and other large databases require high-powered computers to utilize the data effectively. These resources might not be available on a local level.
 - Even with more powerful computers the questions might not be computationally tractable, requiring alternate methodology.
- **Centralization leading to less flexibility**
 - Armed with the knowledge of “experts,” those in control of an emergency response might discount local knowledge.
 - Improved communication allows for more centralized command decisions; however, those decisions might be based on imperfect or incomplete data.
 - What to do if/when the technology is unavailable
- **Privacy issues (Big Brother)**
 - To effectively utilize database models, we must collect the data. Would providing data be voluntary or mandatory? If it is voluntary, how accurate would the model be without full participation? If it is mandatory, how do we deal with noncompliance?
 - How do we protect the privacy of individuals providing information?
- **Too much information**
 - The information might be available, but people might not know where to look.
 - There might be a huge body of information available, but how do we decide which piece of information to use, especially in cases of contradictory data/advice?

What roles can the land-grant system play with regards to technology?

- **Communication and Education**
 - Extension can provide classes in utilizing technology (e.g., farmer computer classes).
 - Extension can translate academic research into practical solutions.
- **Resources**
 - Extension can utilize resources (such as computational power and experts) that available at the institution that might not be locally available.

**Role and Responsibilities of the Land Grant System in Building Community Strengths to Address Biohazards
September 8-9, 2003, Cornell University, Ithaca, NY**

▪ **Research**

- Extension and the land-grant colleges can perform research in to alternatives/approximations to intractable computer problems.
- Extension affiliated institutions can direct their academic research in directions that benefit their community.