Map@Syst: Geospatial Solutions for Rural and Community Sustainability


Abstract

This online educational portal provides peer-reviewed FAQs, Ask The Expert, how-to guides and specific learning modules for the integration of geospatial technologies for rural and community problem solving. Geospatial experts have joined up across the nation to join a virtual format of producing specific content products through Wiki technology. The members interact regularly with online audio and video conferencing. Targeted audience includes state and local government and municipality officials, natural resource managers, agricultural producers, and youth to name a few. Specific topics addressed to support this issue will include 7 topics involving community planning and management, precision agriculture, natural resources and environment, homeland security, disaster management, public health and safety, and 4-H and youth development. This is a portal to the nation’s largest educational and information system called eXtension. It is branded with land-grant university Cooperative Extension identification, bringing the best of the best to Americans.

Introduction

Communities across the nation are facing many new challenges and opportunities for maintaining their livelihoods and identity. Rural areas in particular are facing issues related to agricultural sustainability, natural resource health, disasters, human health, disease management, business diversification, agriculture efficiency, and long term growth and planning. Many of the questions facing rural communities deal with long term land use. However, rural land use issues are no longer influenced by factors that can be controlled locally. Global economics, information technologies, food security, watershed integrity, and many other factors play an active role in the decision process of rural communities and citizens. For the most part, many decisions that are made for agriculture, natural resource and community planning have relevance to time and geography. Management at the local level is becoming increasingly complex with multiple local interests, state and federal regulations, as well as an increasing community interest. There is a drive towards finding and using the best available information to assist in the decision process.

Some of the most promising tools for supporting local decision making include geographic information systems (GIS), global positioning systems (GPS), remote sensing, and decision support systems. These tools are becoming increasingly important for communities and decision-makers to address the complex tasks of discovering, managing, maintaining, and improving rural lands and communities. The use of geospatial technologies for problem solving has continued to grow over the last 15 years. The following are a few examples of rural and community applications using geospatial technologies:

- State and local government technicians use satellite and aerial imagery combined with GIS and GPS technologies for land use planning, community and natural resource planning, economic development, disaster preparedness, public transportation, and disease management.
- Farmers and ranchers are increasingly incorporating geospatial technologies to manage agriculture production and livestock management regimes allowing them to increase efficiency while protecting the natural environment.
- Ecological planners use geospatial tools to track, manage, model, and build scenarios about ecological interactions that can be used to better manage and plan long-term ecological sustainability. In light of recent national events such as hurricanes, wildfire, and drought, the use of geospatial tools are in high demand to provide solutions to recover these areas based on the ecology, economics, and social merits. Economists use the information to model funding needs for restoration, government assistance, and meeting claim requirements.
- University extension youth workers use GIS, GPS and remote sensing technologies to interest youth in science and technology careers and to assist youth in community development projects such as volunteer stream water quality monitoring projects and community clean-up projects.
USDA Cooperative Extension County Agents use geospatial tools such as GIS and GPS to help support the decision making process for farm/ranch diversification (ie, wildlife enterprises, ecotourism, crop planning, risk management).

Geospatial technologies provide a best practice solution to organize and report timely science-based data and information that have an economic and social impact on the rural community. This is particularly important for government agencies moving towards eGovernment. Communities and stakeholders continue to drive the need for more expertise from training, data, tools, and access to experts in this area. With local and state budget constraints it has not allowed for necessary integration of this technology to benefit our current knowledge economy. This has also created a shortfall of information technology literacy between government and the user. Map@Syst has been designed to fulfill these voids by bringing online geospatial technology resources to the appropriate decision makers.

Map@Syst Community of Practice (CoP)

Map@Syst is a new CoP designed to provide online geospatial technology education and resources to local decision makers for addressing community, agricultural, and environmental issues. The first year objective is to work closely with state and local government and municipality officials. In the succeeding years we will target other groups including youth, natural resource managers, and agricultural producers to name a few. Specific topics addressed through online education efforts will focus on 7 areas including: community planning and management (land records, infrastructure maintenance, land use, business economic development, social dynamics), 4-H and youth development, public health and safety, natural resources and environment, homeland security, disaster management, and agricultural production and efficiency (precision agriculture).

Geospatial content experts across the US have joined together on a virtual format of producing specific content products through Wiki technology. Map@Syst is unique as it is working with one of the largest online Wiki platforms sponsored by land grant universities and USDA-CSREES (Cooperative State Research, Education, and Extension Service). It is an effort called the national eXtension Initiative (http://www.extension.org).

“eXtension is a portal to the nation’s largest educational and information system consisting of more than 70 universities to help you improve your life every day with access to objective, research-based information and educational opportunities.

- eXtension provides information to you any time, any place, any format and on any Internet-ready device.
- eXtension is available to you 24/7/365, whenever you need to make decisions to improve your life, to answer life questions, or to learn more about any topic available.
- eXtension has the national shared strength of the Land Grant University System customized to focus on your needs where you live.
- eXtension’s content is dynamic and evolving, offering you timely information on topics that matter to you.
- eXtension complements and enhances the community-based Cooperative Extension System of the land-grant universities, a resource you now have at your fingertips.” (eXtension, 2007)

The CoP started with geospatial extension programs from 15 states collaborating as the National Geospatial Technology Extension Network (NGTEN) (http://www.geospatialextension.org). These states include Ohio, North Dakota, Rhode Island, New Hampshire, Texas, Alabama, Missouri, Virginia, Louisiana, Arizona, Connecticut, Utah, Mississippi, Nebraska, and Oklahoma. The mission of NGTEN is to provide education and decision support on the practical use of earth systems science and technology to users and communities for solving problems and help meet the growing demands for a spatially literate workforce. This network facilitates geospatial technology and educational expertise among the CoP involving applications of GIS, GPS, satellite and aerial imagery and localized geographic information data and resources. NGTEN is an effort to foster communication, collaboration, and resource sharing among participating states and to encourage ties to research and development efforts in academia and federal agencies. NGTEN is essentially what eXtension calls a CoP- an informal network that helps share ideas,
leverage successful educational programs and geospatial applications, and ultimately identify the “best of the best” for implementation locally. The NGTEN members provide disciplines over 20 areas of interest. A few of these interest areas include precision agriculture, range management, coastal management, disaster management, disease management, wildlife, natural resources, 4-H and youth development, and land use planning.

The Map@Syst CoP is not just limited to NGTEN. New members have signed up this year from Pennsylvania and Tennessee. It has been designed to involve others who share similar interests and who are willing to adopt the CoP code of ethics. If you are interested in participating in the Map@Syst CoP you can obtain additional information and an application form at: http://collaborate.extension.org/wiki/Map@Syst_Potential_Members. There are many benefits to becoming a member, some of these include:

- Become nationally recognized through eXtension for content production and expert advice in the area of geospatial technologies.
- Be one of the first in history to collaborate on an online eXtension Wiki workspace for geospatial technologies.
- Reach a broader mass of users through a 24/7 online portal showcasing your work.
- Take advantage of eXtension’s mass marketing and evaluation methods for content development and dispersion of resources.
- Network with other geospatial technology specialists across the US.
- Learn about the latest greatest technology for conducting online collaboration projects.
- Gain knowledge on cutting edge technologies using geospatial technologies for rural and community sustainability.

We recognize the importance of leadership in organization and coordination particularly for the longevity and growth of the Map@Syst Program. A leadership team has been developed with sub-teams and leaders for each of the following entities: FAQ, Ask the Expert, Learning Lessons, Content (i.e., these will have co-leaders subdivided into 7 focus areas), Peer Review, Marketing, Membership (i.e., recruit/maintain members for the CoP), Partnership and Development (i.e., work with existing eXtension staff to attract partners and funding), Evaluation and Statistics, Professional Development (i.e., assist CoP for using tools such as web casting, Wikis, Podcasting, and other necessary software technologies for product development), and Spanish Translation. We are currently seeking leaders for evaluation/statistics and partnership development.

The leadership team has developed a logic model addressing specific inputs, outputs and outcomes over the next three years. The group meets up to 2 times monthly on 1-2 hour web-based meetings using Adobe Breeze web conferencing technology furnished by eXtension. The group also uses Skype and Festoon for small group communication and document sharing when working on specific content projects.

All the content development is done through a Wiki. In simple terms, a Wiki consists of an online content management system to allow multiple collaborators to organize information to develop specific published web sites. You have to become a member of the CoP to use the Wiki as it is not a public site. The CoP Wiki also has a peer review process to publish content prior to the release of the material to the public.

**Map@Syst Resources**

We are planning several outputs to help deliver content to the end users. This includes frequently asked questions, ask the expert, a beginners guide, basic information pages, how-to’s, learning lessons, and other delivery methods. The project started in October 2006 and is currently in content development mode. The site will be launching to the public in early 2008 at http://www.extension.org/Map@Syst. Current examples of other eXtension CoP topics focusing on horses, imported fire ants, personal finance, and wildlife damage management can be seen at http://www.extension.org.

**Frequently Asked Questions (FAQs)**
The system will consist of several hundred FAQs focusing on specific geospatial technology related questions. They are peer-reviewed and searchable. Users will be able to add their own questions and a panel of experts will answer them within 48 hours. You can expect any kind of question. Here are a few examples:

- Can I use my cell phone as a GPS?
- What GIS software package should I use?
- What GPS should I purchase?
- Why is metadata important and how do I report it?
- What is a digital soil survey or SSURGO?
- What is the USDA National Agriculture Imagery Program (NAIP)?
- How do I construct an enterprise GIS for my county?
- What is LiDAR and how is it used?
- How do I serve my GIS maps on the Internet?

**Ask The Expert**

Ask the expert is a customized online communication component of the eXtension content management system. It allows users to post questions online and receive an email answer within 48 hours. The questions are directed to CoP members who have expertise in one or several of the 7 focus areas. The answer is posted as a reply in the FAQ section, peer reviewed and then submitted via email to the person who posted the question.

**Beginners Guide**

The beginners guide is designed to provide basic information about geospatial technologies and how to use the Map@Syst web site for obtaining resources about the 7 focus areas. It is designed for those who need just enough knowledge to get them started.

**Basic Information Pages**

This resource will consist of various fact sheets on topics addressing GIS, GPS, remote sensing, web mapping, and geo-data (ie, obtaining data, data types, and metadata). It also includes a section called Geospatial Technologies in the Real World, a set of information pages that address how geospatial applications are used to solve problems in each of the 7 focus areas.

**How-to's**

How-to guides are available for learning about how geospatial technologies can be applied to specific applications through use of appropriate software and mapping techniques. These provide step-by-step examples using software, data, and decision support systems for solving specific problems. Various how-to's will be developed using predominantly ESRI Arc products as a basis for the examples. Some examples include: reclaiming disaster and environmentally degraded areas (ie, saltwater intrusion, floods, tornados, hurricanes), mapping community demographics for urban expansion and rural sprawl, identifying and preserving prime farm ground for agriculture, developing a county disaster plan, and use of GPS for EPA storm water Phase 2 outfall mapping. FAQs will be used as a guide for developing future needed how-to guides.

**Learning Lessons**

Learning lessons are step-by-step online learning modules. The first year’s learning lesson is designed for state and local government and municipality officials. It is focused on incorporating geospatial technologies into local government workflows. This involves various resources from GIS planning to implementation.

**Other Delivery Methods**
Other methods of content delivery will be explored. This includes converting priority content resources into the Spanish language and audio conversion to PodCast technology depending on the audience needs.

**Developing Partnerships**

Due to the overarching-based technologies (GIS, GPS, remote sensing), it is imperative to identify partners within all sectors of society as well as all levels of government to make Map@Syst work for your interests. Our primary community of interest (CoI) include federal, state and local governments, farmers and ranchers, community developers, natural resources and land use managers, and youth. These partners assist in driving the adoption of geospatial information and will also serve to expedite, broaden, and provide additional depth to education and resources provided through this program. We realize that CoPs are derived from end users and will use the current structure to further enhance CoP membership and fine tune content to meet CoI needs for given topics. We are interested in working with additional partners who share similar interests and have specific needs. Contact one of the authors for more information on how to collaborate with Map@Syst.

**References**


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