GIS/Mapping

Introducing the Case Studies

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GIS (Graphical Information Systems) and Mapping technologies have grown in popularity in recent years, proportional to their decrease in cost. With the recent advent of GoogleMaps, YahooMaps and Microsoft's Virtual Earth API all available for free on the web, both advanced programmers and individuals with more rudimentary skills have taken on mapping projects in an effort to display complex data, catalyze activism and even merely show off and play around. Many of the people with whom I spoke over the course of this study acknowledged that they felt an initial outside push to adopt mapping technologies; rarely did an organization decide to undertake a mapping project purely based on internal needs or ideas. Rather, many organizations felt prodded by their board members, recognized desperate needs to gain attention or legitimacy, or simply wanted to keep up with the Jones', mainly other non-profits.

Central to the issue at hand is the distinction between GIS – a more complex, and frequently expensive tool to facilitate the mapping and manipulation of data sets, and mapping, which usually presents points on a map with little, if any, analysis or connection between them. Free tools like Google's mapping API allows a user to create and annotate a map, but little more. In contrast, GIS tools may create simple but informative static maps or scale to an exponential degree, mapping pages and pages of intricate data. The most popular GIS software, ArcView, and its family of related tools, may cost upwards of $5,000 for a license, and its complexity has inspired a host of companion movements. These include GISCorps, a set of volunteers deployed to assist in emergency GIS projects worldwide (Tsunami-ravaged Indonesia and post-Katrina New Orleans have hosted GISCorps volunteer experts), Quantum GIS, an Open Source version of ArcView, and MapServer, an Open Source spatial mapping development environment. Other tools like Wayfaring offer users the opportunity to create free maps without any programming required.

Recently, a number of these tools and efforts were brought together under a single roof, the Open Source GeoSpatial Foundation (http://osgeo.org). OSGeo gathers most of the leaders of the open source mapping and GIS movement; it also currently provides a home for seven major projects. These include GISCorps, a set of volunteers deployed to assist in emergency GIS projects worldwide (Tsunami-ravaged Indonesia and post-Katrina New Orleans have hosted GISCorps volunteer experts); Quantum GIS and uDig, open source equivalents of ArcView; along with MapServer and GeoServer, standards based web mapping servers. Other tools like Wayfaring offer users the opportunity to create maps online without any advanced GIS knowledge. The stated purpose of the foundation is to "to support and build the highest-quality open source geospatial software", as well as "to encourage the use and collaborative development of community-led projects." As of April 2006, OSGeo is still a young organization and is in the process of defining its method of operating and governance structure. The above website will provide more timely information on the foundation.

GIS and mapping projects, particularly in conjunction with the PGIS, or Participatory GIS movement, are quite popular, perhaps more widespread than expected, in the developing world, particularly in land tenure-oriented projects. According to Giacomo Rambaldi, an Italian academic currently working with the Technical Centre for Agricultural and Rural Cooperation in Wageningen, the Netherlands, GIS appears frequently in academic work, but in academia's

inherently "extractive" nature, the benefits of employing the technology are greater to the researcher than to the subject. PGIS[1], on the other hand, employs GIS almost secondarily, as a tool to facilitate and encourage participation in policy, resource allocation, or advocacy work. The technologies, say the PGIS movement, help to increase trust between communities and intermediaries or officials, which is the basis for sound policy and other public practices. Rambaldi and his colleagues have assembled a comprehensive, current website with articles, links and findings from September's PGIS conference in Nairobi. His most recent project is a checklist of ethics and non-negotiable issues for donor agencies interested in PGIS. A list of GIS tools from the IAPAD website is presented as an appendix to this document.

CASE STUDIES

The case studies selected for this project represent a cross-section of those surveyed. As mentioned above, most of the GIS projects undertaken in the Global South revolve around resource allocation and management, but in this study I aimed to seek out advocacy work employing GIS. Therefore, a majority of the ten case studies presented take place in North America. Although this is somewhat regrettable from a diversity-in-geography standpoint, the studies all vary in focus, technology, organizational goals and staffing.

Some of the more interesting case studies that did not make it into the survey as full examples are summarized below. As with the longer case studies, contact information and screen shots are included, but it should be noted that in many instances, the contact was either unwilling or unable to return calls and emails. Still, their notable nature begged inclusion, if only briefly.

CHICAGO CRIME MAPS

WashingtonPost.com web developer Adrian Holovaty's chicagocrime.org allows users to enter an address in the Chicago metro area and search for incidence of types of crime, combining current data from the Chicago Police Department's publicly available database of reported crime. The project was named "the most influential mashup" of 2005 by the New York Times and has also been recognized with a Batten Award for Innovations in Journalism. Although it is not affiliated with the CPD, by using the Department's Citizen ICAM Web Site data, chicagocrime.org offers Chicago residents to access and conceptualize the relative safety of their neighborhoods.

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[1] Rambaldi also identified Public Participation GIS (PPGIS) as more urban and tailored to US participants, spearheaded by URISA, the Urban and Regional Information Systems Association. In contrast, PGIS is more of a practice in developing countries and actively promotes the participation of indigenous or marginalized communities.

GREENPEACE INTERNATIONAL

Greenpeace's "Defending our Oceans" campaign charts a year-long course of the *Esperanza*, a tanker traveling throughout the world to identify and confront environmental violations and abuses. Employing both GoogleEarth and GoogleMaps' API, Brian Fitzgerald, Greenpeace International's Chief Web Editor, outlined the goals of the map project as:

- Helping visitors to visualize the route of the voyage;
- Highlighting the threats which the voyage would address;
- Positioning the voyage with the tech-savvy front edge of Internet users;
- Seeking the attention of the satellite tracking and image analysis community with the aim of gaining fleet location information.

Although the organization has yet to receive feedback on the map, internally Greenpeace has been pleased to interact, as they see it, on a more technologically advanced plane.

PHILIPPINE ASSOCIATION FOR INTERCULTURAL DEVELOPMENT

Prominently featured at IAPAD's PGIS conference, Dave DeVera represented a strong and powerful NGO sector in the Philippines, which has essentially garnered enough legitimacy to operate fundamentally within the government framework. After the Indigenous People's Rights Acts, accommodating the right of self-determination of indigenous peoples, many NGOs set forth the task of mapping boundaries and geographic areas according to the knowledge and expertise of indigenous groups. Yet as recently as four or five years ago, the Philippine government established a law stating that only official geodedic engineers were authorized to the use surveying instruments, therefore putting ad hoc and informal mappers out of practice and even criminalizing their activity.

With lobbying groups like DeVera's advocating on behalf of indigenous peoples and community mapping, eight percent of federal land has been awarded certificates or titles of ancestral domain to indigenous people. Participatory mapping projects, although undertaken principally by NGOs on behalf of indigenous rural groups, have emerged as the only negotiating tool for disenfranchised, previously landless peoples.

RED ROAD

The Red Road HIV/AIDS Network Society was established in 1999 as an offshoot of the British Columbia Aboriginal HIV/AIDS Task Force, designed to mobilize organizations and projects focused on the pandemic and its affected audiences. While the Task Force aimed to increase and

improve the network of those living with and working on HIV/AIDS, the Red Road, as a strategy, is "a pathway to increase the quality of life of all Aboriginal People."

In order to reach all Aboriginal people living with HIV/AIDS in British Columbia, Red Road understood that combining traditional and non-Aboriginal values, tactics and treatments would necessitate an innovative approach. Careful not to limit its focus to only care-giving, fundraising, training or information campaigns, Red Road instead opted to concentrate on all of these activities at once. The organization, along with GIS expert and Aboriginal activist Steven DeRoy, decided to look towards mapping as a solution to their multiple needs and endeavors.

DeRoy, a native Anishinabe (Ojibway) from the Ebb & Flow First Nation in Manitoba, came to Red Road after having spent nearly three years with the Aboriginal Mapping Network, a land management and conservation group based in Vancouver. Although his expertise ranged from technical training to map development for resource-based projects, Red Road signaled his first foray into health-related mapping. In order to ensure that Red Road's maps were truly interactive, DeRoy faced the challenge of educating nearly everyone in his world – from Red Road's staff to its elders and constituents – on the power and capabilities of the maps he had set out to create.

As a companion piece to Red Road's interactive maps, DeRoy developed an introductory GIS document, available both on the organization's website and in downloadable Powerpoint format. Defining GIS technology as "providing the ability to see spatial relationships between data layers that may not be apparent to us when we visually compare databases and maps," the introduction also explains the resources contained within Red Road's map, and the facility with which users can not only access local information on HIV/AIDS, but also recognize available resources in neighboring communities.

After conducting a user survey, DeRoy learned aware that simplified but robust web-based technology had its limitations with Red Road's stakeholders, and developed a printable map guide to Aboriginal, health and support services around Vancouver. Responding to additional user feedback, Red Road plans to create three new guides in 2005-6, highlighting heath and HIV/AIDS services in Vancouver Island, and in Interior and Northern British Columbia.

WASHINGTON KURDISH INSTITUTE
Mike Amitay, currently an OSI Senior Policy Analyst, oversaw an innovative GIS project during his tenure as Director of the Washington Kurdish Institute, a DC-based think-tank and advocacy group. Dedicated to raising awareness of Kurdish issues, WKI conducted a study to

examine the long-term effects of chemical weapons on civilian populations, chiefly the Kurds, a voiceless minority throughout the Middle East.

WKI mapped sites of known chemical attacks and also conducted medical surveys in 2000 Kurdish households. On top of the static maps, WKI worked with ArcView to overlay the survey data, along with other health data and information on water supplies and other environmental samples. This multi-layered geographic representation "helped [WKI] to discern patterns that led to other queries," says Amitay. "We might not have been able to [draw conclusions], having information on different sheets of paper… Graphic representations are quite powerful. With maps, you're forcing people to deal with the *location* of the presence of things. It's a great medium."

As the organization has not had the ability to hire a full-time map developer, the maps themselves have not been completed, even one year after the project began. But WKI and Amitay are confident that the maps, when complete, will help clarify many issues and questions, and undoubtedly raise new ones as well.

APPENDIX: GIS TOOLS
(From http://ppgis.iapad.org/opensource_gis.htm)

GeoNetwork OpenSource is a web based Geographic Metadata Catalogue System developed by FAO-UN, WFP-UN and UNEP. The system implements the ISO19115 Geographic Metadata and ISO 23950 (Z39.50) standards. Furthermore it provides an OGC-WMS client application InterMap OpenSource and integrates the Degree OGC Web Map Server in its full installer version, including sample data.

SPRING an object-oriented GIS freely available on the Internet. Description: SPRING is a state-of-the-art GIS and remote sensing image processing system with an object-oriented data model which provides for the integration of raster and vector data representations in a single environment.

Map Maker is simple to use yet powerful map making and GIS software for Windows. It is available as the free program "Map Maker Gratis" and the more advanced "Map Maker Pro". Map Maker Pro is a low-cost system now in use in over 100 countries. It is used in a wide range of environmental work including forestry and fisheries. It supports, raster, vector, and DTM data and can import and export a wide range of formats including ArcView shape files and MapInfo mif/mid files. Map Maker Pro includes 3D features including perspective views, contouring, cross-sections etc.

DIVA-GIS is free geographic information system (GIS) software. DIVA-GIS was specifically developed for use with biological distribution data such as available from natural history museums and genebanks. With DIVA-GIS you can: (i) map the locations of sites where populations of plant or animal species were observed, and of different characters that may have been recorded for these populations. (ii) make grid maps of the distribution of biological diversity, and identify "hotspots" and areas that have complementary levels of diversity; and (iii) extract climate data for localities points, and predict the presence of species based on climate.

GRASS GIS(Geographic Resources Analysis Support System) is an open source, Free Software Geographical Information System (GIS) with raster, topological vector, image processing, and graphics production functionality that operates on various platforms through a graphical user interface and shell in X-Windows. It is released under GNU General Public License (GPL).

The unofficial ARC/INFO AND ARCVIEW symbol page contains useful symbols (markers and lines) and fill sets.

 The World Lanuguage Mapping System (WLMS) offers a set of worldwide language homeland areas (polygons) and point locations for use in Geographic Information Systems (GIS). Dataset developed jointly by SIL and GMI maps all languages of the 14th Edition Ethnologue, and includes substantially all of the data of the published Ethnologue as a GIS attribute table.

TUNEP's GRID-Arendal's Online GIS and Map and Graphics Database offers a free collection of maps, graphics and diagrams, illustrating environmental issues. These images are produced using desktop publication software such as Freehand, Adobe Illustrator, CorelDraw , etc.

MapCruzin is dedicated to providing the data, tools, knowledge, and expertise that will help tribes, governments, community groups, and businesses communicate the various facets of environmental, health and social problems, solutions, and achievements in such a way that they educate, raise community awareness, and facilitate networking. Free downloads.

VTP The goal of VTP is to foster the creation of tools for easily constructing any part of the real world in interactive, 3D digital form. This goal will require a synergetic convergence of the fields of CAD, GIS, visual simulation, surveying and remote sensing. VTP gathers information and tracks progress in areas such as procedural scene construction, feature extraction, and rendering algorithms. VTP writes and supports a set of software tools, including an interactive runtime environment (VTP Enviro). The tools and their source code are freely shared to help accelerate the adoption and development of the necessary technologies. To learn more about VTP and the field of virtual terrain, use the subject headings below. You can also request the VTP distribution as a CDROM or download.

AGIS for Windows: A simple mapping and GIS shareware package

Community Map Builder The Community Map Builder will provide an Open Source framework which will allow communities to jointly build geographic databases and share them over the web. It will be particularly useful where geographic knowledge is spread across a large group of people."

OpensourceGIS offers a Global index of Open Source / Free GIS related software