Development of a web-accessible GIS database of sweetpotato germplasm for East Africa

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Abstract. Despite the potential of GIS systems to provide vital spatial and temporal information to target clientele, accessibility by users without direct access to these databases is often limited. Web-based delivery represents a method of delivering real-time or near real-time data to clientele. Although proprietary methods are available for delivering GIS data through web interfaces, these methods often require expensive licensing agreements. The availability of publicly available software that require minimal or flexible licensing costs provide a cost-effective alternative to institutions that are considering access to GIS databases via a web-accessible interface. We describe procedures, software, and other applications that we used to develop a publicly accessible web interface to a GIS database of sweetpotato germplasm collections in Kenya, Tanzania, and Uganda.

Introduction

Visual representation of information based on data stored in a spreadsheet format or computer databases represent the compelling advantage of using GIS systems to deliver pest surveillance, agrcolimatic data, germplasm accession, and other data to growers and other clientele. The use of GIS makes possible the integration of diverse spatial data into a comprehensive database (Rao *et al.*, 2000). Despite the potential of GIS systems to provide vital information to clientele, user access and knowledge are among the impediments to using such systems in real world applications (Zerger and Smith, 2003). Web-based methods represents a viable option to deliver GIS data to users. Although proprietary methods are available, these often require expensive licensing agreements. The availability of open specification and open source software that require minimal licensing agreements provide institutions with cost-effective tools in providing web access to GIS databases.

We describe procedures, software, and other applications that we used to develop a publicly accessible web interface to a GIS database of sweetpotato germplasm collections in Kenya, Tanzania, and Uganda.

Materials and Methods

Basemaps and other thematic maps were downloaded from publicly accessible web sites. DIVA-GIS (Hijmans *et al.*, 2002) was used to preview shapefiles as well as create shapefiles from DBF formats. We have previously registered a domain name, www.viazivitamu.org and established a corresponding web site. We used ALOV Map (www.alov.org), a free, portable Java® application for publishing vector and raster maps on the web. The files were initially configured and tested on the desktop by editing the 'sample.xml' file to pinpoint to the

shapefiles and html files. After previewing the html documents and testing the map outputs, all files were subsequently uploaded to the web site. Necessary updates were uploaded as needed.

Results and Conclusions

Figures 1-2 show the map user interface using five shapefiles depicting country administrative boundaries as well as representative sweetpotato accession data and a sample of georeferenced sample sites. This demonstrates desktop GIS-like capabilities of ALOV Map in panning, zooming, and identification of attributes. However, the Java-based applet does not support a number features associated with desktop-based GIS applications. For example, basic analysis features like measurement of

distances and statistical calculations are not currently supported. Despite the lack of analytical and other advanced features, the Java-based GIS mapping application represents an important step in making available GIS-based information on the web. Institutions that do not have adequate resources to license commercial Internet or Web GIS software can immediately offer web-based access to existing GIS files without spending for license fees or requiring existing personnel to undergo training in web development.

Using freely available applications and tools, we were able to publish GIS data via a web interface with a minimum of coding. Although full desktop GIS functionality is not currently available via ALOV Map, this applet provides an option for making current GIS data web-accessible.
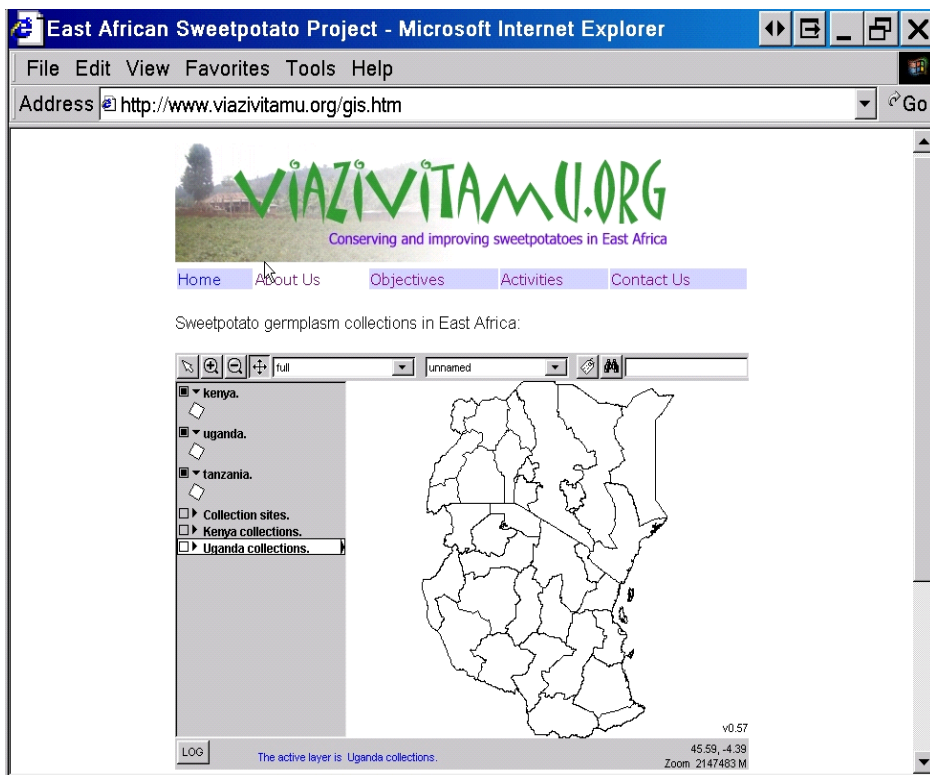

Figure 1: Map user interface for selecting layers, panning, zooming, and identification of attribute data.
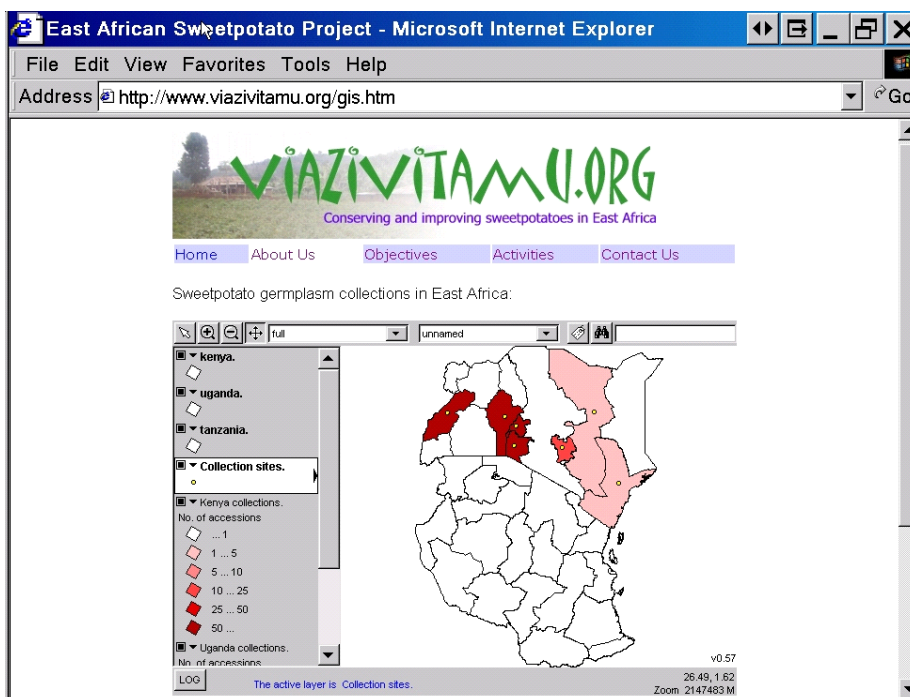
Figure 2:   Output after selecting additional layers showing rendering options depicting variation in accession number.

References

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