

**GLOWA Volta Project
(GVP)**

**United Nations University
Institute for Natural Resources in Africa
(UNU-INRA)**

**Report of the training workshop on
GLOWA Volta Geoportal and database users**



May 12-13, 2009 – DGRE Ouaga 2000

Ministère de l'Agriculture, de l'Hydraulique et des Ressources Halieutiques

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Acronyms and abbreviations

CREPA	: Centre Régional pour l'Eau Potable et l'Assainissement à moindre coût
DMN	: Direction de la Météorologie Nationale
SP/CONEDD	: Secrétariat Permanent du Conseil National pour l'Environnement et le Développement Durable
PAGEV/IUCN	: Programme d'Appui à la Gouvernance de l'Eau dans le bassin de la Volta/Union Mondiale pour la Nature
DGRE	: Direction Générale des Ressources en Eau
INERA	: Institut de l'Environnement et de Recherches Agricoles
Volta HYCOS	: Volta basin Hydrological Cycle Observation System
VBA	: Volta Basin Authority
UFR/SVT	: Unité de Formation et de Recherches/Sciences de la Vie et de la Terre
2iE	: Institut Internationale de l'Ingénierie de l'Eau et de l'Environnement
IGB	: Institut Géographique du Burkina
CIRAD	: Centre de coopération Internationale en Recherche Agronomique pour le Développement

Introduction

From May 12 to 13, 2009 in Ouagadougou, a training workshop on *Geoportal and database users* organized by the United Nations University – Institute for Natural Resources in Africa (UNU-INRA) with the support of the GLOWA Volta project (GVP), took place in the conference room of the Direction Générale des Ressources en eau (DGRE). It aimed to provide the participants with knowledge and comprehension on the GVP Geoportal, how it operates and how everyone can contribute to its functioning as well as reasons for its creation.

All the 11 invited institutions and the guests have attended the workshop for a total number of 30 participants. Before the presentations given by Antonio Rogmann and Peter Wittköetter from ZEF (university of Bonn, Germany), introductory speeches to the workshop were given by Dr Konrad on behalf Professor Karl Harmsen, Director of UNU-INRA and by Mr Thanou, Director General of Burkina Faso water resources; the DGRE. They mainly welcome the participants; wishing them to actively take part to the training activities along the workshop. A brief history of the workshop told by Dr Konrad showed that previous GLOWA/UNU-INRA workshops took place in Burkina Faso thanks to the DGRE. He thanked GLOWA partners in Burkina Faso for their collaboration in organizing the workshops and wished them to continue supporting the GVP for further activities. Mr Thanou, in the same way, thanked the participants for responding to the workshop invitation and acknowledged all the water ministry partners like GVP, UNU-INRA and INERA for their assistance in training workshops that aim to provide participants with enough knowledge on water resources management. He declared opened the 2-day training workshop session on the *GVP Geoportal and database users* in Ouagadougou from May 12 to 13, 2009. Following the speeches, participants made a group photograph before getting to the training workshop sessions. According to the provisional workshop program, 7 sessions of presentations complementary to 3 practical exercises sessions were planned for the two days.

Expected workshop outcomes

Provide the participants with an opportunity to become familiar to the:

- GVP approach of Data Management
- Architecture of the Geoportal, its technology and components
- GVP Geoportal and its functionalities, possibilities and advantages within a data exchange framework - seen from the users view

For the training communicators, the workshop expectations were to know the:

- participants' perception of data exchange, management needs and
- their motivation, potentials and demands to play a role in the Geoportal network.

The overall workshop expectations consisted of getting to:

- a strategic approach of how to accomplish an improved data management based on GVP-Geoportal
- a first draw of a web-based data and resources exchange network within the water sector of the Volta basin

Session 1: Data Management and Data Infrastructure in the GLOWA Volta Project – Best Practice?

This presentation done by Antonio Rogmann focused on data management situation at ZEF with its 3 disciplines; each one having its own and various data and in the GVP which led to the Geoportal creation. The presentation, first described how hard it was to find data sometimes at ZEF due to the varieties of the stored files formats and their location. This situation was ground for a database creation at ZEF following discussions with scientists using or providing data in order to know what could be their need or conception of a data management system. These discussions were mainly focused on:

- the current data management in GVP and its deficiencies
- comprehension of the main data flows in the project
- the data management needs
- a consensus on preparing standards and workflows for data to be fitted into a prospective GVP Data Information-System

Following such discussions two working teams with one composed of scientists for the data preparation according to some standards and another one made of ZEF departments members in close relation with the informatik III department of University of Bonn, were created. Their work has led to the GVP Geoportal website development; a Web-based database system for GVP, ZEF and their partners in the Volta river basin for a safe data management by exchange through data upload and download. The Geoportal is developed according to:

- standards (global from international norms and internal from consensus on data characteristics)
- workflows and process steps
- responsibilities
- technologies (hardware, software, interfaces, ...)

Session 2: Functional and technical Background of the Geoportal

This session was solely devoted to the Geoportal system presentation and its practical functioning using exercises to go step by step through the Geoportal with internet connection. From theoretical presentation, the Geoportal was described as a web-based information system built on internationally approved standards. It provides variety of services such as easy interactive remote access to the GLOWA Volta data, cataloguing and management of heterogeneous datasets, publishing services, access and share of data over the internet, interactive search tools, visualization and analysis of data which can be regrouped into:

- **catalogue services:** for *searching* and *filtering* of available datasets based on the attribute level. *Browsing* through a comprehensive data catalog and thematic maps;
- **portrayal services:** *interactive mapping* services for cartographic representation of spatially referenced data. Tools for *visual exploration* and *analysis* of data;
- **portal services:** for *downloading* selected data (metadata) and *interactive means* for creating, uploading and managing data (metadata) resources;
- **administrative services:** these services allow *users administration and security facilities*. They also facilitate *meetings planning* and *notifications* to enable communication and exchange of geoscientific information within defined groups.

The Geoportal architecture is using:

- Java script for data visualization, download and management;
- Dublin Core Metadata standard as ISO-compatible standard ensuring data compatibility with other catalogs;
- Open Geospatial Consortium (OGC) interface standard to ensure that the portal and the data catalog can communicate with other catalogs and clients;
- VMware* technique to make the web server virtual and improve thereby the Geoportal portability with significant simplicity in its installation;
- ESRI Arc Engine to access ESRI databases;
- free open access software for cost efficiency purpose.

After the theories on the Geoportal, participants were asked to log on the GLOWA website (www.glowa-volta.de) with their laptops and get access to the Geoportal. The various parts of the Geoportal were presented to the participants like how to search for data, documents, maps and download them or view them with particular details on maps in data viewer or map viewer, etc. With the two lecturers' assistance, they further proceeded to metadata download after registering with their names.

Session 3: Roles in the Geoportal

This session was developed between two exercises sessions in order to provide clear comprehension on the use of the Geoportal to the participants and let them choose between the types of users to log on the website. As user of the Geoportal people can choose to register differently according to their needs. They can log on as “consumer” with limited possibilities to the Geoportal for maps visualizations and download of data in public domain without registration or just registering as “guest” user. Geoportal users can also log on as “supplier” having rights to upload data and metadata, delete and upgrade them but cannot have access to other metadata uploaded without the uploader's consent. The last type of the Geoportal users is the “administrator” which is restricted to Geoportal manager with complete access to control, edit, delete and approve of all metadata sets, administrate user database and content of the Geoportal.

Session 4: Creation of maps for MapServer

This session was developed by Wittköetter and aimed to present the Maps tool in the Geoportal. The Geoportal maps services are provided by MapServer and Mapbender. Maps requests are sent to Mapbender which in turn sent them to MapServer to respond with maps. Every Web Map Service (WMS) is configured by a Map-file which defines the content and the behaviour of a map and contains spatial reference, web interface definition, map layout and the layer definitions.

This presentation ended the day 1 of the workshop. Along the whole day, especially after the first presentation on the Geoportal and during the practical exercises on the use of the Geoportal, questions arose from the participants for a better comprehension of the web based database information system. Among questions the followings were noted:

How are metadata stored in the database?

How the metadata quality control is done before storage in the database?

If data are paid, how will be their accessibility?

Which norm is used for the data quality control?

What happens to low quality data?

Who are the Geoportal data furnishers?

Why do low quality data exist in the GVP database? Is there any possibility of uploading only good quality data in the database?

To all these questions, lecturers have given satisfactory answers to the participants. Guided access to GVP Geoportal also provided participants with a better comprehension of the website functioning and requirements. The low quality of the internet connection was the only problem that slowed down the participants' progress during the practical exercise session on the use of the Geoportal.

Session 5: the Geoportal offline tool

This first session of the workshop day 2, was presented to the participants as a useful tool of the Geoportal for users that are out of connection for a long period but still need to have access or use the metadata from the Geoportal. The offline tool of the Geoportal is a Java application that enables the users to:

- enter metadata offline by *creating XML files on the local drive with metadata elements and entries*
- edit metadata offline from *previous generated XML files on the local drive*
- harvest existing metadata on local machine from:
 - Searching in the local drive for all metadata files*
 - Generating new XML file that contains all harvested metadata files*
 - Directly uploading harvested metadata into the Geoportal*
- upload the real data (together with metadata) by
 - Generating ZIP-file for every metadata set containing the real data related to the metadata file - ready to upload*
 - sending ZIP-File by email or post to the system administrator*

Following this presentation, a practical exercise on offline metadata file creation was launched from a CD distributed to the participants and containing the Java application program. From this exercise, participants learned how to create (or enter) metadata on their local hard disk, save, edit, harvest by searching and save the harvested files for later upload and finally how to upload the (meta) data to the Geoportal.

Session 6: Institutional Analysis

At this session, the lecturers came back to the roles that the Geoportal users can play. They explained that the Geoportal can be locally installed or in a network format like the GVP one hosted by ZEF in Germany. Depending on the type of Geoportal that institutions need, technical requirements vary. For hosting a Geoportal network, the following equipments and personal are minimally required:

- Hardware –
 - Pentium IV > 1Gh, 1 Gb RAM, 100Gb HDD (10Gb – System, 90 Gb data)*
- Software –
 - Windows OS or Linux OS (free), VMware Server (free)*
- Personal –
 - 1 technical employee for administration and maintenance of hardware and software (operational system, VM's, etc.)*
 - 1 scientific data manager for coordination of data assessment which will be made in cooperation with other domain scientists or data responsables/owners*

For an advanced Geoportal network installation, the followings are required:

- Hardware: 2 Systems -
 - Data server with RAID for data security: *Pentium IV > 1Gh, 1Gb RAM, RAID 5 or RAID 10*
 - Geoportal & Web Server: *Pentium IV >2Gh, 4 CPUs, 2Gb RAM*
- Software –
 - Windows OS or Linux OS (free), VMware Server (free)*
- Personal –
 - *1 technical employee for administration and maintenance of hardware and software (operational system, VM's, etc.)*
 - *1 programmer (Java) for extension of the Geoportal functionality (if required). It can be integrated in the previous technical position*
 - *1 scientific data manager for coordination of data assessment which will be made in cooperation with other domain scientists or data responsables/owner*

For a simple Geoportal user or local Geoportal installation, the requirements are restricted to:

- Hardware
 - *Common computer with web browser*
 - *Internet connection*
- Personal is made of one *data manager – responsible for:*
 - *data assessment which will be made in cooperation with other domain scientists or data responsible*
 - *coordination and supervising data and/or meta data upload to the Geoportal*
 - *data security and quality*

Following these explanations, lecturers introduced discussions with the participants on their need of data share, participation to Geoportal community, restructuring data organization in their institutions, data management situation in their institutions, etc... it appeared from that most of the institutions in the workshop (INERA, CREPA, SP/CONEDD) have no data sharing system or have embryonic database mostly personal and highly hidden from others accessibility. Only the National Meteorology office and DGRE are the exceptional services

having local databases with managers, responsible for the data organization and management. They also expressed needs of financial resources to improve data management in their institutions as well as qualified personal to be in charge of such data management restructuration. The need for software like the Geoportal was obvious from the participants point of view in order to manage their data in collaboration with other institutions and avoid duplication of data collection for loss of financial resources. Some institutions (National Meteorology office and IGB) explained their early implication in international database development for weather data or various maps sharing with all the country members and wished that the GVP Geoportal be linked, integrated to these database projects for a common data sharing.

One thing underlined by the participants was the Geoportal language. The actual version is in English, and if it is to be used by the Volta basin scientists mainly composed of francophone (5 countries over 6), it has to be converted into French. Other questions asked by the participants were about the effective date for the use of the Geoportal by the Volta basin scientists, which types of data should be first integrated and at which level should they be integrated in the basin Geoportal, when are all the 6 countries going to be part of the Geoportal users community.

Session 7: Filling the short questionnaire

The short questionnaire developed by lecturers was about 3 aspects of the data collection and sharing within the institutions, technical aspects of their database management and the political aspects of such data management. The main objective was know much about the data management aspects in the institutions for solutions in order to come to minimum conditions and arrangements for adequate data share within them in the Volta Basin Authority (VBA) database community. Summary of the questionnaire was outlined as followed:

- Data collect and exchange aspects
 - Collect of data
 - Share of these data with others
 - Data use
- Technical aspects
 - Technique used for data exchange (web server, email)
 - Existence of technical personal
 - Technical problems with the equipments

- Political aspects
 - Improvement of equipments for data management and exchange
 - Any financial or personal problems?
 - Any program or political initiatives for data management and exchange infrastructures?

The session ended with a presentation of a diagram for which participated institutions to the workshop were invited to indicate where they see their structure to be fitting well according to a Geoportal network based in the VBA regional office for managing country members institutions data. One pole of the diagram was made of VBA as Geoportal host and the two other poles were the data furnishers and data users.

At the end of the workshop, Dr Konrad on behalf Prof. Harmsen, gave a closing speech in which he expressed his gratitude to the workshop organizers and participants, the host office of the DGRE for the free use of its infrastructures. He expressed his hope to see the GLOWA extension phase accepted for further training workshops to the benefit of the partners.

Conclusion

The workshop has been successful according to the quality of the questions, discussions and various suggestions made by the participants. The interest in the Geoportal expressed by the participants through their implication to the various stages of the workshop presentations has showed the importance of the Geoportal for managing institutions data and the need to fill this big gap of lack of adequate tool for sharing data among scientists community within the Volta basin. Nevertheless, the road to a satisfactory data sharing among the community members appears to still be long as minimum trust and principles of data share have not yet been established for users to actively contribute to the database development.

Annex 1. Program of the workshop on

GVP Geoportal and database users – May 12-13, 2009 **Ouagadougou, Burkina Faso**

Day 1 (May 12, 2009): System Presentation and Exercises

- 08:00** Arrival of Guests, Registration, Distribution of Workshop Materials
- 09:00** Formal Opening of meeting: Prof. Dr. Karl Harmsen (Director, UNU-INRA) and Mr Thanou (Director General, DGRE)
- 09:15** **Data Management and Data Infrastructure in the GLOWA-Volta Project – Best Practice?** (60 min)
- Data Management in the GVP: standards and workflows
 - Data Infrastructure in the GVP: data exchange within an institutional framework
- 10:15 *Coffee break*
- 10:30 *Feedback and discussion (20 min)*
- 10:50** **Functional and technical Background of Geoportal** (40 min)
- Architecture and features of the GVP Geoportal
- 11:30 *Feedback and discussion (20 min)*
- 11:50** **Exercises: Use of GVP Geoportal** (on running system – 1,5 to 2 h)
- Portal and portrayal services
 - User management
 - Metadata management
- 13:00** **Lunch break**
- 14:30** **Exercises to be continued**
- 15:30** **Presentation: Geoportal Offline – Tool** (20 min)
- Metadata management in the field
- 15:50** **Coffee break**
- 16:10** **Presentation: Creation of Maps for Map-Server** (20 min)
- 16:30** **General Discussion** (30 min)
- 17:00** **End of day 1**

Day 2 (May 13, 2009): Institutional Analysis in order to be Part of a Geoportal User Network

08:30 Presentation: Demands on Participation in Geoportal Framework (20 mn)

- Roles
 - Geoportal host and service provider
 - data supplier
 - data consumer
- Data management framework
 - technical equipment
 - human resources

08:50 *Feedback and discussion (20 min)*

09:10 Exercises: Institutional Analysis (1,5 to 2 h)

- Data collection and exchange
- Technical aspects
- Political aspects

10:40 Coffee break

11:00 Exercises: Possible Roles of Organizations/Institutions within the Geoportal User Community” (host, supplier, consumer ...)(1h)

12: 00 Concluding Remarks and Next Steps (30 min)

12:30 *Closing remarks with questionnaire filling and closing words*

13:00 *Lunch and end of workshop*

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