

UNITED NATIONS REGIONAL WORKSHOP ON THE USE OF SPACE TECHNOLOGY FOR DISASTER MANAGEMENT FOR AFRICA

Organized jointly by

The United Nations Outer Space Affairs and the United Nations Economic Commission for
Africa,

Co-sponsored by

The Committee on Earth Observation Satellites and the European Space Agency

Addis Ababa, Ethiopia. 1-5 July 2002

Capacity Building for Space-based Resources Information Management Systems for Poverty-reduction Planning at Grass-roots Level: Possibilities at CERSGIS, Legon, Ghana.

Presented by

E. Amamoo-Otchere, Executive Director

Centre for Remote Sensing and Geographic Information Services (CERSGIS)

University of Ghana, Legon

eamamoo@ug.gh

ABSTRACT

The Centre for Remote Sensing and Geographic Information Services (CERSGIS) was transformed from the Remote Sensing Applications Unit (RSAU) within the Department of Geography and Resource Development of the University of Ghana. It was registered as a business organization limited by guarantee – the guarantors being the Environmental Protection Agency and the University of Ghana. It was given the financial and administrative autonomy to play a leading role in the development of remote sensing and geographic information systems as data management tools in the academia, research and business within governmental and non-governmental organizations.

Within the two years of its new status CERSGIS has built up a clientele which cut across the academia, the research institutions and the business sector. It is focusing on GIS as a practical tool for resource information management as decision support. This paper outlines the areas the Centre has operated and the resources, human and equipment that it has built for capacity building in the use of space images, GPS and GIS tools for providing the relevant geographic databases.

INTRODUCTION

The present regime of space-based information system is capable of near-real and real time monitoring and evaluation of land uses and land-use-related processes. These land uses serve partly as indicators of the level of resourcefulness of the people, mental attitudes and perception of development. Taking a critical look at the Ghanaian landscape, there is one obvious unfortunate impression – *Wastefulness*, which is very prevalent and almost endemic. There is the low productivity of land, waste of human resources through large unemployment and under-employment in all the sections of the active population, waste of equipment/facilities for production, and above all, waste of time.

The social, economic and political disasters, which are very common in the African landscape are the direct outcome of the culture of resource waste. We must be seeking for ways and means whereby the Information and Communication Technology (ICT) can be used to reduce the wastefulness. Already the electronic media is becoming a very powerful weapon for public awareness, and could be used to fight the waste virus, but there must be a complementary data on the resources and resource utilization.

UNDP-Ghana Capacity 21 Project

In the UNDP-Ghana Capacity 21 DERIS Project it was recognized that one of the most pressing needs in capacity development for enhanced environmental resource management relates to the inadequate information base for improving decision-making. It was also recognized that there was prevalent lack of comprehensive and current data on environmental variables, which has been hindering effective strategy for information and planning to integrate environmental concerns in socio-economic development. This constraint has been affecting the ability to meet reporting needs relating to national and international development targets. It was also recognized that adequate information base for improved decision-making will enhance sustainable use of natural resources and at the same time increase private sector investment in the development of natural resource-based enterprises in the rural areas. The last point was considered a key thrust of the poverty -oriented approach of Ghana's development framework. It was also recognized that a key constraint that underlies the weaknesses in development planning and environmental management is the weak culture of science and application of technology in many socio-economic activities.

The UNDP-Ghana Capacity 21 was partly to improve upon the culture of science within the society, improve funding of science and technology for poverty-alleviation projects, improve upon the availability of human resource base for science and technology application in the development of the District Assemblies (DAs). One of the specific projects was the development and promotion of Environmental Management Information System in the form of District Environmental Resource Information System (DERIS) by the DAs. Eight pilot DAs were selected by the CAP 21 to experiment with the DERIS. CERSGIS was given the contract to train the DERIS officers, offer advisory service for the procurement of the equipment, installation, overall operationalization of the system. Needs assessment survey of the eight DAs was carried out resulting in the selection of the District Planning Officers as the focal persons for the implementation of the DERIS.

CERSGIS packaged the existing digital environmental data sets of the Ghana Environmental Resource Project (GERMP) – the topographic maps, the land cover/land use, soil and soil suitability ratings, meteo data and land ownership. To these were added geology and population data of the 1984 Census. The digital maps were packaged electronically at 1/250,000 scale and installed on the system for management with ArcView software 3.2

Two packages of training were arranged for the focal persons, one for training on ArcView GIS, and the other for operationalization of the system. After the installation and commissioning CERSGIS continues to visit the DERIS desks of the eight pilot districts in order to encourage proper use of the systems. With the training given to the Planning Officers and the support provided by CERSGIS, the installed system have been effectively used to create some DA-level development-related maps for exhibition and reporting. Other DAs, which have no such facilities, have started asking for it for similar functions.

FOLLOW-UP TO THE DERIS

The DERIS is not only to be used for production of maps for exhibition and reporting. The next stage is to introduce space images of the DAs to be interpreted for community level resource and resource utilization maps. From the interpretations specific resource maps could be developed by the District Planning Committees. These could include community forest/woodland areas, water bodies, agricultural soils, feeder roads network and conditions, settlements and degraded areas. Other non-image data sets could be collected and

be placed within the context of the image map; these will include, community-based public health, education and market facilities. All these are to be projected on the background of satellite image in order to relate the development to the landscape context. Interpretation of the images will focus on identifying investment possibilities in the natural resource sector. The present regime of satellite images have high resolution with spatial resolution improvement to 10m, but SPOT 5 is soon to make available super-high spatial resolution of 2.5m. The images are going to facilitate packaging for showcasing the forest and agricultural sub-sectors where investment should directed.

CERSGIS will embark upon Web-based information development for the forward-looking communities which want to sell to the outside world through the information super-highway, the investment opportunities of the community-land and people. This aspect of investment publicity is going to be CERSGIS major activity as from October 2002. It will involve visiting each DA, and showing image scenes from Landsat ETM, ASTER, SPOT 5 of year 2001/2002 and demonstrating the range of natural resource-based investment maps that could be derived from them.

The current regime of digital geographic and image intelligence offer enormous wealth of information for community level database development. Social geographic databases for modeling the underlying philosophy of the people is becoming possible with image and geographic intelligence. CERSGIS wants to look at that point of view - the geography of the land, the people and their resourcefulness as package in the database for the poverty-alleviation paradigm.

Attachments

- Table of clients CERSGIS has served in the last three years.
- Two maps of one of the CAP. 21 DAs

RANGE OF SERVICES CERSGIS HAS OFFERED FOR ADVANCING REMOTE SENSING AND GIS IN THE PUBLIC DOMAIN

Project Title	Type of Activity	Institution	Contact Person
Unesco/CIPSEG	<ul style="list-style-type: none"> • RS/GIS Database Development for Biodiversity Conservation 	Unesco-CIPSEG	Dr. B. Amoako-Atta Chief Project Co-ordinator, UNESCO-CIPSEG, Box 1345, Tamale
NPC Wworkshop Pilot Digital Base map for Census data management	<ul style="list-style-type: none"> • RS/GIS(Database) development of census base map • Advisory and support 	USAID - Ghana	Joanne Bennett Jeffers, USAID-Ghana Box 1630, Accra
Ghana Railway feasibility studies GPS survey of railway line cross-sections	<ul style="list-style-type: none"> • RS/GISDatabase development • Advisory and support 	DE Consult/ Samburg	
Project database development for Gt. Accra Region	<ul style="list-style-type: none"> • RS/GIS(Database) development • Training • Advisory and support 	Dept. of Feeder Roads	Mr. A. Twumasi-Boakye Head Office, Dept. of Feeder Roads Accra
NDVI-derived map for tsetsefly habitat identification	<ul style="list-style-type: none"> • Space Image processing for mapping • Advisory and support 	Noguchi Memorial Institute (Medical)	Dr. Wilson, Noguchi Memorial Institute Accra
Slave routes map production for historical tourism	<ul style="list-style-type: none"> • RS/GIS(Database) development • Advisory and support 	Ministry of Tourism	Mr. Edward Inskip, Chief Technical Advisor C/o Min. of Tourism Accra
Health District Maps Metropolitan Health facilities location maps (Digital)	<ul style="list-style-type: none"> • Advisory and support 	Disease Control Unit, Min. of Health	Mr. J.B. Aggrey Disease Control Unit Min. of Health Box 184, Accra
GPS survey of farm loctions for pilot study of Land Tenure and Forest Resource Management in South-western Ghana	<ul style="list-style-type: none"> • Support for Education and Research • Production of farm plans 	Land Administration Research Centre	Mr. J.B. Aidoo LARC, KNUST, Kumasi

Project Title	Type of Activity	Institution	Contact Person
Capacity and Infrastructure for Environmental Resource Management Sub-regional training of Natural Resource Managers in the use of GIS outfits.	<ul style="list-style-type: none"> • Management level Training 	UNEP / UNITAR	Mr. Marcel A. Boisard UNITAR, Palais de Nations, Ch-1211 GENEVE 10 / Mr. Bob Kakuyo UNEP, Box 30552 Nairobi, Kenya
Preparation of Ghana "Country at a Glance" from the GERMP data sets	<ul style="list-style-type: none"> • Digital geographic data sets for public awareness campaign 	World Bank	Yves Andre Prevost Room J3-140, Africa Region Environment Group The World Bank Box 1818H Street N.W. Washington DC 20433 USA
Map for Impact Assessment of Water Resources	<ul style="list-style-type: none"> • RS/GIS(Database) development • Advisory and Support 	Water Resource Research Institute (CSIR)	Dr. W.E.I. Andah Water Res. Research Inst. (CSIR), Box M.32 Accra
Development of GIS-layers for Coastal Zone of Ghana	<ul style="list-style-type: none"> • RS/GIS(Database) development • Training • Advisory and Support 	Food and Agric. Organization of the United Nations	Dr. Tolu Orekoya FAO/RAF P. O. Box 1628, Accra
Mangrove Forest monitoring using SPOT/Landsat TM map for the Lower Volta.	<ul style="list-style-type: none"> • RS/GIS(Database) development • Advisory and Support 	Lower Volta Mangrove Project (LVMP) Dept. for International Development (DFID)	Dr. Chris Gordon Dept. of Game & Wildlife P. O. Box M.239, Accra
National Feeder Roads Rehabilitation Project II Follow-up country-wide GPS-survey of feeder roads	<ul style="list-style-type: none"> • RS/GIS(Database) development • Training • Advisory and Support 	Dept. of Feeder Roads	Mr. A. Twumasi-Boakye Head Office, Dept. of Feeder Roads Accra
Settlement register/database	<ul style="list-style-type: none"> • RS/GIS(Database) development • Advisory and Support 	Min. of Food and Agriculture/Village Infrastructure Project	Mr. Serge Rey Burgeap, C/o V.I.P. Min. of Food & Agric. Box M.37, Accra

Project Title	Type of Activity	Institution	Contact Person
Sub-Regional Workshop on the BDM developed by CERSGIS	<ul style="list-style-type: none"> • Training 	MEST/WCMC, UK	Dr. Donald Gordon WCMC, 219 Huntingdon Road Cambridge CB ODL, UK
Production of Digital layers for observation of sea-level changes in Ghana	<ul style="list-style-type: none"> • RS/GIS(Database) development • Advisory and Support 	Environmental Protection Agency	Dr. Agyeman-Bonsu E.P.A. P. O. Box M. 326 Accra
GIS Database for the management of Ramsar sites in Ghana	<ul style="list-style-type: none"> • Training • Advisory and Support • RS/GIS(Database) development 	Dept. of Game and Wildlife	Mr. David Kpele Dept. of Game and Wildlife, Accra
Natural Resource Management Project Development of Regional and District Environmental Resource Data Sets (ERDS)	<ul style="list-style-type: none"> • Training • Advisory and Support • RS/GIS(Database) development 	Government of Ghana / World Bank	Mr. K.B. Boakye Boateng Technical Director Min. of Lands and Forestry Government of Ghana Gotz Schreiber Team Leader World Bank
LAND USE PLANNING Pilot Digital land-use data layers and integration	<ul style="list-style-type: none"> • RS/GIS(Database) development • 	Min. of Lands and Forestry	Mr. Sulley National Project Co-ordinator, Land Use Planning Project Min. of Lands and Forestry Accra
Capacity Building for Environmental Management Technical Assistance for the Government of Gambia's scientific officers	<ul style="list-style-type: none"> • Training 	National Environment Agency, The Gambia	The Executive Sirector National Environment Agency, 5 Fitzgerald Street, PB 48 Banjul, Gambia Atten: Stanley Sebja Adams
Training in Computer Applications to Natural Resource Management	<ul style="list-style-type: none"> • Training support to the UNU 	The United Nations University/INRA	Dr. Baidoo-Forson UNU/INRA, Univ. of Ghana, Legon
Database development and system installation for Conservation and Cultivation of Medicinal	<ul style="list-style-type: none"> • Advisory and Support 	UNEP-WCMC	Harriet Gillett Head, Plants Programme

Plants in Ghana	<ul style="list-style-type: none"> • RS/GIS(Database) development 		WCMC 219 Huntigdon Rd Cambridge CB3 0DL, UK
-----------------	--	--	---

Project Title	Type of Activity	Institution	Contact Person
GTZ/GHA Road Maintenance Project Development of GIS-database on Trunk road network for road maintenance information management	<ul style="list-style-type: none"> • RS/GIS(Database) development • Training • Support for Education and Research • Advisory and Support 	Ghana Highway Authority / GTZ	Mr. Hans Maunnchen GTZ Project Team Leader German Technical Co-operation GTZ Office P. O. Box 9698, K.I.A.
Min. of Health Serialized training in GIS for medical officers in the use of ArcView for medical application Min. of Health Min. of Health (Group 2)	<ul style="list-style-type: none"> • Training • Training • Training 	Min. of Health	Dr. C. Sagoe-Moses Reg. Director of Medical Services, Min. of Health Accra District Director Min. of Health Dangbe West District Dodowa The Metro Director of Health Services Accra Metropolis Min. of Health P. O. Box 184 Accra
GIS-base map development and production of Forest and Aquatic Ecosystem of West Africa	<ul style="list-style-type: none"> • Use of equipments • GIS support services 	Conservation International Foundation	Mr. Derck Byler Conservation International 2501 M St., NW Suite 200 Washington D.C. 20037 USA
Provision of facilities for training conducted by CWSA	<ul style="list-style-type: none"> • Use of Training Room 	CWSA	Head, Planning Dept. GWSC/CWSD Head Office Dzorwulu – Accra Atten: Mr. K. Asamoah
UNDP/Ghana Capacity 21 Programme For the development of the DERIS, system installation, training and support services	<ul style="list-style-type: none"> • Training • RS/GIS(Database) development 	Min. of Environment, Science &	Mr. S.O. Saaka National Program Coordinator, UNDP/Ghana Capacity 21

installation, training and support services	development	Science & Technology / UNDP	Programme, MEST, Accra
---	-------------	-----------------------------	------------------------

Project Title	Type of Activity	Institution	Contact Person
Development of a WEB-Page for Ghana Wildlife Society	<ul style="list-style-type: none"> • WEB-Page development 	Ghana Wildlife Society	<p>G. Ken Creighton, Ph D Co ordinator Biodiversity Planning Support Programme UNDP/GEF FF – 1606 304 East 45th Street New York, NY 10017 USA</p> <p>The Executive Director Ghana Wildlife Society P. O. Box 13252, Accra</p>
Min. of Health (Group 3) serialized GIS training for medical officers	<ul style="list-style-type: none"> • Training (GIS Database Development) • Training (Computer Appreciation) 	Min. of Health	<p>Dr. K.O. Adade Reg. Director of Health Services Gt. Accra Dr. Arde-Acquah The Metro Director of Health Services Min. of Health, Accra</p>
Tactical level training in RS/GIS for the Savannah Resource Management Project	<ul style="list-style-type: none"> • Training 	Savannah Resource Management Project	<p>Dr. David Millar Savanna Resource Management Project P. O. Box 54 Tamale</p>
Provision of facilities for training	<ul style="list-style-type: none"> • Use of the training room 	Environmental Protection Agency	<p>Dr. G.T. Agyepong NAFGIM Co-ordinator EPA, Accra</p>
Feeder Road naming and coding for Feeder Roads Database Development	<ul style="list-style-type: none"> • GIS Database Development for feeder roads 	Dept. of Feeder Roads	<p>Mr. Alex Twumasi-Boakye Dept. of Feeder Roads Accra</p>
Women's Health In The City of Accra Collaborative research	<ul style="list-style-type: none"> • GIS and Map-related Research 	University of Michigan	<p>Prof. Nancy Rose Hunt The Univ. of Michigan USA</p>

Project Title	Type of Activity	Institution	Contact Person
Production of illustrative Digital Maps of the Mole National Park for its development as a World Heritage	<ul style="list-style-type: none"> • GIS Database • Training 	UNESCO, Ghana	Dr. Bruno Lefèvre UNESCO Representative UNESCO, Ghana Contonments, Accra
GTZ Rural Health Services Support (Brong Ahafo Region)	<ul style="list-style-type: none"> • GIS Database • Training 	Ministry of Health – GTZ Rural Health Services Support (BAR)	Dr. Andreas Grub GTZ Rural Health Services Support Brong Ahafo Region
Production of Historical /Cultural Tourism map of Ghana	<ul style="list-style-type: none"> • GIS-related Map 	UNESCO, Min. of Tourism	Dr. Bruno Lefèvre UNESCO Representative UNESCO, Ghana Contonments, Accra
Fisheries Sub-sector Capacity Building Project	<ul style="list-style-type: none"> • GIS Database Development 	Ministry of Agriculture	Mr. George Hutchful Project Coordinator Fisheries Dept. FSCBP, Min. of Agric Accra
UNDP/Ghana Capacity 21 Project	<ul style="list-style-type: none"> • GIS Database Development • Training 	UNDP/Ghana	Mr. S.O. Saaka National Programme Coordinator, UNDP/Ghana, Accra
Densu River Basin Project	<ul style="list-style-type: none"> • GIS Database Development 	Nii Consult	Nii Boi Ayibotele Nii Consult P. O. Box OS 981, Osu, Accra
AMEHI Accra Metropolitan Environmental Health Initiatives capacity assessment for GIS-related public health information system	<ul style="list-style-type: none"> • Capacity Assessment Survey 	Accra Metropolitan Assembly	The Project Coordinator AMEHI, Metro Public Health Dept. AMA, Accra
Cocoa Handling Information System (CHIS)	<ul style="list-style-type: none"> • Depot Locations • GIS-related database from existing data on 	Ghana Cocoa Board	The Deputy Director R & D Department Ghana Cocoa Board Accra

	cocoa handling		
--	----------------	--	--

Project Title	Type of Activity	Institution	Contact Person
Biodiversity Data Management Strategy/Prototype development	<ul style="list-style-type: none"> • RS/GIS (Database) and workshop on it • Advisory and Support 	Min. of Environment, Science and Technology (MEST)	Mr. E. P. D. Barnes MEST, P. O. Box M. 232 Accra
Needs assessment survey of institutions for use of EIS data	<ul style="list-style-type: none"> • Management level Training 	United Nations Environment Program (UNEP)	Mr. Bob K. Kakuyo UNEP, P. O. Box 30552, Nairobi, Kenya
Cocoa Swollen shoot control programme	<ul style="list-style-type: none"> • Database development • Training • System installation • Technical Support 	Cocoa Services Division	Mr. Asamoah / Mr. Osei-Owusu Ghana Cocoa Board Accra
UNICEF's Community-based digital base map for GIS-related monitoring and evaluation of development projects	<ul style="list-style-type: none"> • Development of the digital base map • Training in the use of the map • Technical support for subsequent database development 	UNICEF Ghana	Mr. Thomas Nielson Madam Monique Kamphuis UNICEF (Ghana) UNICEF House Accra
Traditional Energy database development based on Savanna woodland inventory with space image; base map creation, database management	<ul style="list-style-type: none"> • Training in satellite image processing, interpretation, use for field demonstration • Plots planning database development 	Savanna Resources Management Project	Mr. Geogre Ortsin Traditional Energy Unit (Ministry of Mines & Energy) P. O. Box TL 1902 Tamale
Pharmacy service outlets database development and management	<ul style="list-style-type: none"> • Creation of urban-based pharmacy services base map • Classification of 	Pharmacy Council of Ghana	Secretariat of the Pharmacy Council

	service outlets and digital conversion of the classes		
Customized training of Scientific Information officers of Water Resources Commission in GIS for hydrological modelling	<ul style="list-style-type: none"> Tactical level training in ArcView GIS using Densu basin data sets 	DANIDA/WRC	Dr. Jan Lasse Whlstrom Water Resources Commission Cantonments - Accra

Project Title	Type of Activity	Institution	Contact Person
Promotion of District Capitals (PRODICAP) Plotting and designing for cartographic visualization of service facilities related to service capacity of the district administrative headquarters.	<ul style="list-style-type: none"> The field data of services developed, cartographic designing for visualization and printing 	GTZ	Dr. Hans Jurgen Schafer GTZ / Ministry of local Governement and Rural Development P. O. Box 9698 KIA, Accra
Development of Economic diplomacy maps for the trade missions of Ghana (proposed for the Ministry of Trade and Industries - Ghana)	<ul style="list-style-type: none"> Development of Regional and District Environmental Resources Land use and cultural maps integrated with space images for resources appraisal by political investors outside Ghana 	CERSGIS conceived project	For the Ministry of Trade and Industries
District Boundary Maps for geostatistical management of development data for District Development Planning	<ul style="list-style-type: none"> Use of space images for revision of settlements and boundary lines with the suport of auxiliary ancillary data and GPS surveys, and involvement 	CERSGIS conceived project	For the Ministry of Local Government and Rural Development

