

GEOSPATIAL DATA HARMONIZATION AND INTEGRATION FOR THE MILLENNIUM CHALLENGE ACCOUNT (MCA) PROGRAMS IN GHANA.

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ABSTRACT

Ghana has benefited from the United States Government special grant "MILLENNIUM CHALLENGE ACCOUNT (MCA), which is basically for the implementation of rural-based agriculture, transportation and community-based agro-related social infrastructure. It is intended to benefit some of the poorest rural districts where poverty rates range between 40% and 90% of the national standard. It is supposed to raise the income potentials of farmers through increased production of high-value cash crops along side basic food crops, improve transportation network, produce export handling facilities and food processing industries. Twenty-three districts are to benefit from the programme.

One challenging task of the Project is the development of comprehensive, district-level geospatial datasets for effective project planning and monitoring. Available data sets on the Biophysical Environment, Land use, Community's Social, Economic and Cultural Profiles are yet to be generated, harmonized and integrated for ready use. There is therefore the need to develop a geo-harmonized database of all the spatial and non-spatial base data sets required for the Project.

A completely harmonized geospatial database on community-based social infrastructure facilities has been developed by the Centre for Remote Sensing and Geographic Information Services, for each administrative district. Biophysical and land use/land cover databases have also been established. This is expected to facilitate availability of essential quality –assured land and socio-economic related datasets in usable formats for use by project collaborators.

Classified remotely sensed images and GPS-based point-data acquisition formed part of the GIS-database building processes. The database has been geo-referenced to the 1/50,000 scale topographic base map of Ghana.

INTRODUCTION

In accordance with the Millennium Development Goals of reducing poverty and fostering growth, the Government of Ghana, since 2003, has put forward strategies for poverty reduction. Ghana Poverty Reduction Strategy I (GPRS I) (2003-2005), focused on poverty reduction among the rural poor while GPRSII (-2003- 2006) targets the modernization of the agricultural sector. The Ghana MILLENNIUM CHALLENGE ACCOUNT (MCA) Program, developed by a team of Ghanaian professionals, is an agricultural transformation initiative which will modernize and encourage business in agriculture and reduce poverty in rural communities. It will boost food production and enhance the quality of produce making them competitive on both local and international markets. Ghana is to benefit from United States Government special grant MILLENNIUM CHALLENGE ACCOUNT (MCA), which is basically for implementation of rural-based agriculture, transportation and community-based agro-related social infrastructure. It is intended to benefit some of the poorest rural districts where poverty rates range between 40 and 90% of the national standard. It is supposed to raise the income potentials of farmers through increased production of high-value cash crops along side basic food crops, improve transportation network and integrate food processing industries and produce export handling facilities. Twenty-three districts in the northern region, the central Afram Basin region and the southern horticultural belt in the southeastern region, are to benefit from the programme. The components include among other things enhancement of profitability of commercial agriculture among small-scale farmers, improvement of land tenure to facilitate security of small-scale holdings, improvement of the Volta Lake transport in order to open the Afram Basin at large to the outside market, and improvement of small-scale irrigation. The five-year, approximately \$54million Millennium Challenge Compact aims at reducing poverty by raising farmer incomes through private sector led agribusiness development. The program focuses on increasing the production and productivity of high value cash and food staple crops in certain areas of Ghana, and on enhancing the competitiveness of Ghana's export base in horticultural and other traditional crops. Agriculture is the backbone of Ghana's economy; it accounts for approximately 40 percent of the country's gross domestic product, directly employs approximately 60–70 percent of the labor force, and generates more than 55 percent of foreign exchange earnings. The program is an integrated one consisting of three sub-components namely: (i) Agriculture; (ii) Transportation; and (iii) Rural Services.

DATABASE DEVELOPMENT AND HARMONIZATION

One of the pre-project challenging tasks is the development of a comprehensive, community-level database for the management of the project. The current data sets on the Biophysical Environment, Land use/Land ownership, Community's Social, Economic and Cultural Profiles are not in good shape for ready use as and when. Collection and customisation of essential data for the project will take some considerable time. Timeliness will be essential in data provision for critical decision in the project planning stages. The biophysical and land use/land land tenure databases need to developed to complement the socio-economic datasets in an integrated manner. Robust

geographic databases on all the spatial and non-spatial data sets are basic requirements that the initial phase should give priority to. Some community-based social infrastructure facilities are being compiled for each administrative district. The land use data for 2000 will be updated with SPOT 10m XS and produced at a scale of 1:50,000. An indicative land ownership/tenure dataset will also be derived from the settlement distribution map classified by paramountcy.

Themes of spatial information such as cultural and demographic data, road network, soils, geology, land cover/land use (1990 and 2000), and digital elevation model have been organized on a regional/district or local basis, and have been georeferenced to the Ghana National Coordinate System (GNCS), making it much easier to utilize and share the spatial information.

Cultural and demographic data

A comprehensive questionnaire administered in the field was used to collect basic cultural attributes, administrative, political and traditional jurisdiction of all settlements within the District. The settlements were geolocated with a GPS receiver. Enumeration Area Maps produced by the Ghana Statistical Service was digitised, harmonised to fit the 1:50,000 digital topographic maps and linked to the 2000 Population Census data. Spatial data layers based on cultural and census attributes were produced for the District.

Transportation Infrastructure

Tremendous resources are being spent on revitalizing the nation's road transport infrastructure. Under the Ghana's Growth and Poverty Reduction (GPRS), the Feeder Roads System is one major growth/poverty level indicator to be used to assess the community's development. For this reason the Department for International Development (DFID) of the British Government has supported a GIS-based inventory of the feeder roads in each District. It is a geo-inventory which entails a method for which every kilometre of the feeder road is geo-located with GPS and the conditions including occurrence of bridges/culverts are systematically recorded.

Digital Elevation Model

A digital elevation model (DEM) has been derived from the 1:50,000 scale contours with a contour interval of 60 metres, produced by the Ghana Survey Department. The DEM data can be modelled to compute slope and aspect surfaces for a variety of agricultural applications

Land Use/Land Cover

Land cover and land use data has been derived from Landsat TM and ETM to produce land use/land cover maps for 1990 and 2000 respectively at a scale of 1:250,000 for environmental planning and management. This dataset could be a useful input for agricultural land use planning. The classification scheme for this dataset

identified four classification levels; the first two levels corresponding to land cover categories, and the third and fourth corresponding to the land use categories.

Stream sub-catchment areas have been delineated from the 1:50,000 stream layer produced by Survey Department for supporting district level sustainable water resource management. This dataset could be superimposed on classified satellite imagery for assessing landuse/land cover patterns within the stream sub-catchment areas.

Soils

A national geo-referenced soils database (GIS) has been derived from existing 1:250,000 scale analogue soil maps. The system consists of digital soil association map units and soil attribute data derived from the soil profile information documented by the Soil Research Institute. To follow the currently internationally most used soil classification system, the Ghana soil series have been correlated with the FAO classification system.

Conclusion

A completely harmonized geospatial database on community-based social infrastructure facilities has been developed by the Centre for Remote Sensing and Geographic Information Services, for each administrative district. Biophysical and land use/land cover databases have also been established. This is expected to facilitate availability of essential quality –assured land and socio-economic related datasets in usable formats for use by project collaborators.

REFERENCES

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