

New Developments in the Establishment of the Botswana National Spatial Data Infrastructure

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SUMMARY

The coordination of spatial data is beginning to take shape with the recent establishment of the National Geographic Information Co-ordination Committee(NGCC). The government of Botswana with the support of Swedish International Development Agency has embarked on a project to establish a National Geographic Information System (NGIS) whose objective is to support the efficient use and coordination of spatial data. The NGIS, housed at the Government Computer Bureau, has established a website from which work regarding the establishment of a National GIS can be monitored.

This paper highlights the activities that have taken place thus far and outlines the proposed future activities of the NGCC.

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1. INTRODUCTION

It is a well-known fact that managing sustainable development requires different sets of information. There is need therefore to create “vertical information highways” to allow for transaction based information to be generated through administrative activities at local-national-regional and global level (FIG, 2002).

One way to create these vertical information highways is through the establishment of Spatial Data Infrastructures. Spatial Data Infrastructures (SDI) in the geomatics framework provide mechanisms for sharing georeferenced information(Grant,D. 1999). In setting up the SDI the idea would be to set up standards, attempt to rationalise technology, adapt access policies and create arrangement which cross jurisdictional borders (Grant 1999).

In Botswana different organisations have over the years collected all types of spatial data at different scales and in a non-standardised way. This naturally lead to lack of compatibility and data sharing became difficult. It became necessary to carry out a GIS study to establish among other things standards, policies, system technologies etc (Morebodi, 2001). Morebodi further highlights the activities undertaken by the Department of Surveys and Mapping (DSM), which is the main provider of spatial information in the country, in the area of spatial data integration. It is clear in this treatise by Morebodi that DSM has geared itself towards the establishment of an SDI.

The Botswana National Spatial Data Infrastructure was launched on the 31st of January 2003 by the Minister of Lands. The launch signifies the importance the Government of Botswana attaches to this initiative. There is recognition that collection and sharing of spatial data needs to be coordinated. The Government of Botswana and the Swedish International Development Agency are co-financing a project entitled “Establishment of a National Geographic Information System”. The essential aim of this project is the establishment of a centre within Government to co-ordinate all GIS data and information. This paper will highlight the activities carried out at the establishment of the National GIS Coordinating Committee and the activities envisaged for this committee.

2. ORGANISATION OF A NATIONAL GIS COORDINATION COMMITTEE

The NGIS committee was established in November 2002 with the mission to “support the development, implementation and maintenance of the National Spatial Data Infrastructure (NSDI) of Botswana.”

The components of an SDI include (FGDC, 1997)

- Institutional framework
- Standards

- Fundamental data sets
- Technological framework

The NGIS project objective therefore is to initially work on the institutional framework and the establishment of the committee is but one component in the drive to have a fully-fledged SDI in the country. Apart from the committee, which was established, there is recognition of the need of a GIS coordination Unit to be stationed at the Government Computer Bureau. It is envisaged that this unit will be responsible for:

- Administration of meetings, workshops and seminars
- Administration of documents
- Dissemination of information
- Co-ordination

This unit will offer administrative support to the permanent working groups of the NGCC.

2.1 Identification of Stakeholders

Clearly the establishment of the committee, which would be responsible for the coordination of GIS, was not going to be an easy one. The committee was formed from representatives of the following organisations. Government Computer Bureau (GCB), Department of Surveys and Mapping, Department of Water Affairs, Department of Crop production and forestry, Department of Lands, Central Statistical Office, Botswana Power Corporation (BPC), Department of Town and Country Planning, Botswana Telecommunication Corporation (BTC), Ministry of Local Government and the University of Botswana. It can be seen that apart from members of the academia from the University of Botswana and the members from the two parastatals i.e. BPC and BTC the committee is essentially a government committee. Undoubtedly it is within the government's interest to have a functional SDI as part of its good governance efforts. It will, therefore, be the natural driver in this initiative. There was, however, need to consider the inclusion of other private sector stakeholders. These stakeholders were included in the GIS user group. (See Figure 1 below)

2.2 Vision for NGCC

The NGCC has established a vision to guide its work and is guided by a number of principles to help it realise this vision.

Vision

We will have a fully-fledged National Spatial Data Infrastructure for Botswana. It will be easy to find, access and integrate geographic from different sources in order to improve efficiency and effectiveness of governance and provide new business opportunities.

The guiding principles are:

- Data should be collected once and maintained at the level where this can be done most effectively;
- It should be possible to seamlessly combine spatial information from different sources across Botswana and share it between many users and applications;

- It should be possible for information collected at one level to be shared between all the different levels, detailed for detailed investigations, general for strategic purposes;
- Geographic information needed for good governance at all levels should be abundant under conditions that do not hinder its extensive use;
- It should be easy to discover which geographic information is available, fits the needs for a particular use and under which conditions it can be acquired and used;
- Geographic data should be easy to understand and interpret because it be visualised in a user-friendly way.

2.3 Organisation of NGCC

The convenor of the NGCC will be the GCB since the bureau is already coordinating all issues regarding IT in Government. The NGCC was structured to have 5 working groups

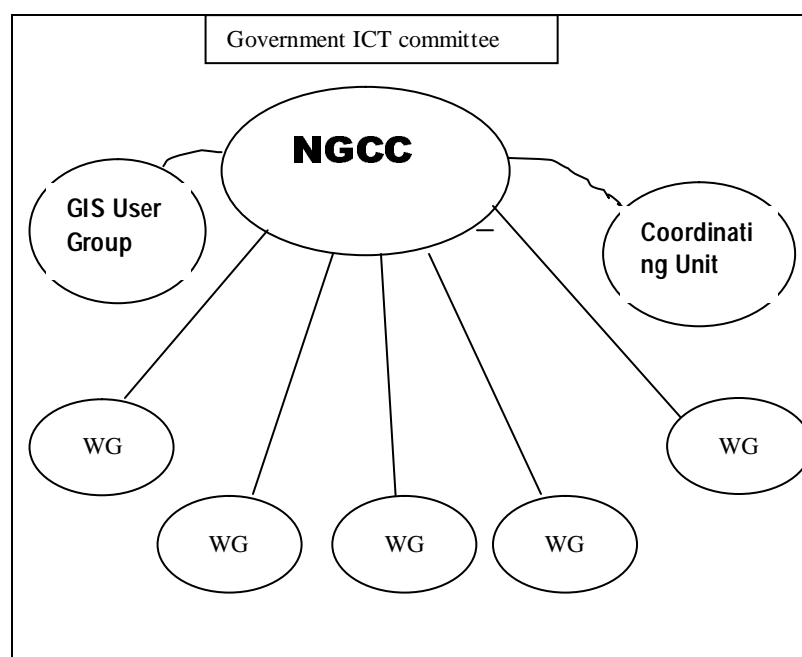


Figure 1: Structure of the NGCC

The five working groups with their basic responsibilities are

2.3.1 Working group on Fundamental Data

The responsibilities of this working group is to

- Analyse the need for fundamental datasets
- Make specifications for the datasets
- Put requirements on the production, maintenance and updating routines of the Fundamental datasets
- Dissemination of information on fundamental datasets

2.3.2 Working Group on Standards

The responsibilities of this working group are to

- Analyse in what areas standards are needed for the National GIS
- find suitable standards and seek agreement about these in the Geospatial Information (GI) community
- disseminate information about and promote the use of established standards
- review established standards and propose any necessary changes or additions.

2.3.3 Working Group on Metadata

The responsibilities of this working group are to;

- Establish the metadata services
- Monitor and support the development of the metadata services
- Promote and advertise the use of the metadata service.

2.3.4 Working group on Institutional Framework

The responsibilities of this working group are to;

- Analyse how GI stakeholders should cooperate with the Government of Botswana
- Analyse how responsibilities between the stakeholders should contain and be assigned
- Seek financing for the NGCC and its activities
- Review the general performance of the NGCC and the NGIS initiative

2.3.5 Working group on Architecture and Infrastructure

The responsibilities of this working group are to;

- Establish requirements on GI and GIS activities on institutional level
- Develop guidelines for establishing GI and GIS infrastructure at institutional level
- Develop guidelines for proper GI and GIS maintenance

Apart from the working groups there shall be a GIS user group, which shall be consulted on issues of Geospatial Information.

2.4 **Plan of Work**

FGDC (1996) proposed issues that need to be considered for the successful development of an SDI as being;

1. Sharing data
2. sharing and formalising of responsibilities
3. sharing the cost of commitment
4. sharing of benefits and cost recovery
5. shared decision making

6. Incentives
7. Benefits to organisations
8. known quality of data being shared
9. Data stewardship
10. Commitment to supporting the on going program

The work plan therefore tries to capture some of these issues. To prepare a work plan the committee had to establish its goal which was to “establish a well-functioning NSDI that will provide all GI users in Botswana with qualitative geographic information.” To achieve this goal a set of objectives were made from which a work plan was developed. The general objectives and the activities to meet the objectives are given below;

1. To implement a shared vision on the NSDI concept and the main principles behind the vision
Activities
 - a) Formulate a shared vision
 - b) Disseminate information about this vision to all concerned bodies
 - c) Promote the use of this vision as a basis for more detailed regulations
2. To coordinate activities which are of importance for the development of the NSDI
 - a) Support the establishment and implementation of the Master plan and monitor the results being achieved
 - b) Set up working groups with the task to support actions of common interest
 - c) Arrange seminars, consultations and other actions aiming to establish an efficient interaction between the committee and the GI community
3. To encourage the development of fundamental geographic databases of importance as a reference for all kinds of geographic information
 - a) Identify fundamental data sets needed for the development of NSDI
 - b) Initiate the use of unique- standardised- identifiers for common features
 - c) Support the use of fundamental geographic databases with the aim to make use of investments being made
4. To improve knowledge about what GI currently exists and encourage easier access to it.
 - a) Facilitate the creation of a metadata infrastructure
 - b) Promote the metadata service to the existing and potential GI community
 - c) Identify, catalogue and evaluate sources of information
5. To enable easier integration of GI through the use of standards and guidelines
 - a) Establish a framework of NSDI supported standards and guidelines and encourage the use.
6. To encourage the use of Geospatial Information
 - a) Investigate the key issues surrounding the limited use of GI, analyse obstacles and propose solutions.

- b) Promote the benefits of GI through existing and potential applications of NSDI compliant information
 - c) Actively interface with other initiatives which support and extend work of NSDI
7. To provide users with assurance that the information is consistent and of a defined quality
- a) Coordinate the introduction of appropriate assurance mechanisms for both metadata and data
8. To provide advice to government on geospatial information
- a) Provide advice to government on policy and regulatory issues regarding management of geospatial information
 - b) Raise profile of NSDI by informing government and ensuring government support.

3. DEVELOPMENT OF FUNDAMENTAL DATA SETS (DSM WORK)

Through a number of projects co-sponsored by Government of Botswana and SIDA the DSM has developed a number of important systems which form part of the fundamental datasets required in an effective SDI. Some are listed below an

- A new zero-order geodetic reference system (BNGRS02) has now been adjusted based on the GRS80 ellipsoid. This will encourage the use of GPS and will require the transformation of mapping coordinate system
- Cadastre Management system: This is implemented with the computerisation of the survey records, diagrams and general plans
- National Mapping program: Continuous updating of topographic maps and the conversion to digital production.
- Open database solution for geographic information: this will form the background for sharing data from the DSM across departments and other users.
- National PC Atlas which was launched in January is an encyclopaedia of information about Botswana with maps in ArcView format. The website for the atlas is <http://www.atlas.gov.bw>

4. GIS DIFFUSION IN GOVERNMENT

To understand the use of fundamental spatial data in Government there will be a need to carry out a thorough survey of use GIS in government and private sector. However a preliminary study by the consultants indicates that the major source of spatial data for all government departments was the Department of Surveys and Mapping. It is therefore important that in the whole SDI matrix in Botswana the DSM is already focussed towards data sharing.

5. CONCLUSION

The formation of a committee to be responsible for the coordination of GIS is one of the first steps in the road to developing a National SDI. The launch by the Minister of Lands signifies the importance the government attaches to this initiative. The list of activities to be undertaken by the NGCC suggests that work has only just begun. It will require concerted volunteer effort to not only push these activities to their fruition but also realise the NSDI goals.

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