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Geo-Information Policy of Bhutan

Royal Government of Bhutan

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# 1. INTRODUCTION

Bhutan’s drive to value geo-information stems from its difficult and fragile geographical and environmental settings. The pursuit of gross national happiness as the development philosophy and the aspiration of harmonious existence with nature require mastery over the information of one’s own surrounding.

The information that has ‘spatial context’ is commonly regarded as geo-information. Since all human activities tend to confine within a space or surrounding, geo-information is indispensible for taking any decisions.

Most of the people of Bhutan depend on the income generated directly or indirectly from natural resources. Therefore, the intricate balance between socio-economic development and environmental conservation is crucial.

This is also the essence of most of the seventeen sustainable development goals of the United Nations.

Without clear understanding and knowledge of the symbiotic relationship between social, economic and environmental dimensions the pursuit of sustainable development goals remains farfetched. Thus, reliable geo-information with proper technology, legal and institutional framework becomes necessary.

If not managed systematically geo-information is sometimes considered as a “double-edged sword which gives power to access vast amounts of data and the opportunity to abuse, misinform and invade privacy”[[1]](#footnote-2) at the same time. While the Constitution of Bhutan and gamut of policies, acts and regulations advocate and acknowledge citizen’s right to information and the benefits of empowering them, the way geo-information is produced, managed and used must invariably be founded on sound policy.

In November 2003 the Royal Government of Bhutan established the National GIS Coordination Committee, for which the Centre for GIS Coordination was instituted under the National Land Commission Secretariat. This clearly indicates the importance attached to development of geo-information systems from the highest authority. Since then, considerable progress has been made, but in order to reap maximum benefits necessary legal and institutional framework need to be in place. This calls for envisioning an overarching geo-information policy. The concept was appreciated and approved by the Cabinet in December 2015.

The value of geo-information comes from its use[[2]](#footnote-3). Realizing this, Bhutan became early adopters of GIS technology; initially for land use mapping and cadastre application. Lack of updated and reliable information and institutional set up, technical capacity, data collection in silos, absence of data standards and sharing mechanism and myriad of issues affected the effective use of geo-information for years. Although projects and activities related to geo-information collection, processing and dissemination have hitherto been largely driven by donor assistance the financial burden on the national exchequer owing to duplication of efforts is significant. These challenges are now resolved, more or less. GIS has proliferated into many agencies and institutions. The geo-information technology itself has taken different dimension due to the advent of cloud, web and mobile technologies. Geo-information contributed by citizens through crowd sourcing forms a big part of the repository.

It is estimated that during the 10th and 11th Five Year Plans the Royal Government has invested over Nu.2 Billion in geo-information related activities, particularly cadastre, base mapping and urban planning. This is a significant investment by any comparison. While further investment will be required it is time to think beyond serving the purpose of a specific project or activity. There should be a point beyond which no major investments are necessary. This can only be realized with proper regulation and management of geo-information creation and dissemination.

Therefore, the rational for geo-information policy is conjured in the context of these changes and achieving a fine balance between socio-economic development, environment conservation and increasing demand for efficient service delivery and good governance. The policy underpins the very principle of GNH.

The policy formulation is initiated by NLC in collaboration with the members of CGISC and advisory support from the Netherlands. It is envisaged to streamline and enhance geo-information production, management and use; to reduce cost, enhance governance, increase capacity for natural resources management and create resilient communities in the wake of increasing natural disasters.

The policy is inclusive; in the sense that the roles of different sections of societies, including but not limited to, the burgeoning private sector and individual citizens are consciously considered.

# 2. PRINCIPLE

The policy is founded on the fundamental principles of **availability, reliability, accessibility and affordability;** by reducing duplication of efforts and cost and enhancing capacity to keep abreast with rapidly changing technology. The use of geo-information must transcend technical and procedural conveniences to empower every citizen and ensure national wellbeing.

# 3. VISION

# 4. OBJECTIVES

1. To ensure availability of reliable geo-information;
2. To institute inclusive institutional and legal framework;
3. To enhance data discovery, accessibility and sharing mechanism;
4. To avoid duplication of data creation and data management efforts and resources;
5. To promote sustainable and optimal use of geo-information and technologies.

# 5. POINTS OF DEPARTURE

The policy is formulated based on the following policy and legal provisions promulgated by the Royal Government of Bhutan:

1. **Constitution of the Kingdom of Bhutan:**

**Article 7.3**

*A Bhutanese citizen shall have the right to information.*

**Article 9.23**

*The State shall encourage free participation in the cultural life of the community, promote arts and sciences and foster technological innovation.*

1. **Land Act of Bhutan 2007**

**Section 10(e)**

*...shall be responsible to constantly update and improve the mode of cadastral survey, land registration systems and land administration procedures under the purview of this Act*

1. **Bhutan e-Government Master Plan**

* *Develop common standards to enable sharing of data and interoperability of services.*
* *Establish a single source of truth through the development of common data hubs.*
* *All agencies generate and manage information in the course of government service delivery.  However, there are many sources of related and duplicate information which makes it challenging to obtain reliable information and value of this information is not maximized.*
* *Consider open source software over propriety software to address system incompatibility, low cost of maintenance and ease of procurement.*
* *Establish policy on ICT security.*

1. **Bhutan 2020 and Gross National Happiness**

*In seeking to achieve Balanced and Equitable Development, we must ensure equitable access to basic services and infrastructure.*

1. **Bhutan Standards Act 2010, Section 11(q)**

*Represent Bhutan in International and Regional Standardization and Accreditation Bodies such as ISO, IEC, SARSO and APLAC to formulate national view on issues affecting national interest.*

1. **National Framework for GIS Infrastructure in Bhutan**

* *A clear focus and direction has to be defined and pursued in order to provide the GIS community with a proper national perspective of GIS.*
* *There is a need for a well defined, conceptually clear and easy to follow policy guidelines.*

# 6. POLICY STATEMENTS

The Royal Government of Bhutan (RGoB) recognizes geo-information as an important aspect of realizing GNH goals. It is indispensible tool for proper planning. In order to realize the vision and objectives the following policy statements are adopted;

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| **Objective 1:**  ***To ensure availability of reliable geo-information.*** | Cognizant of numerous benefits of geo-information, the importance of NSDI and increasing use of geo-information and associated technology, and the growing aspirations of modern Bhutanese society; sustained efforts will be made to compile and create comprehensive and reliable geo-information; encompassing all aspects of topographical, environmental, social and economic realms.   1. There shall be three general categories of geospatial data. These are Fundamental data, Thematic data and Citizen's data. 2. The fundamental data sets on a nationwide scale shall be produced by the national mapping agency on periodic basis. For this, a dedicated budget shall be allocated by the Government. 3. The agencies shall create thematic data required for concerned purposes. 4. Information contributed by general citizens through different means shall also form part of geo-information repository. |
| **Objective 2:**  ***To institute inclusive institutional and legal framework*** | The CGISC which was instituted in 2003 does not have dedicated resource and proper institutional set up. Over the period, it has lost its relevancy due to drastic change of geo-information technology and procedure. Some of the common challenges and needs are not applicable any more.  However, the close cooperation of small GIS user community is exemplary and lauded in the region. This can be attributed to the efforts made by NLCS.  In order to keep abreast with the fast changing technology and reap maximum benefits it is important to strengthen and streamline the institutional and legal framework.  There should be an enabling environment for awareness, cooperation and exchange of technology, information and knowhow within the context of the changing environment.   1. The Geo-information Authority of Bhutan (GAB) shall be established to regulate, coordinate and promote the use and development of geo-information. This Authority shall be governed by an Executive Committee. 2. The GAB will be responsible for developing, promulgating and enforcing bylaws, regulations and standards covering all aspects of geo-information, including important roles of private sector. 3. The GAP shall spearhead the NSDI development. |
| **Objective 3:**  ***To enhance data discovery, accessibility and sharing mechanism;*** | Data sharing is generally limited to point-to-point contacts, commonly attributed to the lack of effective mechanism, proper pricing mechanism, inadequate copyright protection and absence of clear policy direction.[[3]](#footnote-4) Users are unaware of the existence of the data. Technical and institutional limitations often tend to impede data sharing.  With the advent of web and cloud technologies these are, but issues of bygone days.  Data standard is necessary to ensure conformity within the specific application domain. It provides a common platform for integration and analysis.   1. A guideline shall be developed by the GAB to categorize geo-information into restricted, common and open categories. Open data shall be openly and freely accessible, common data shall be shared among the government agencies without cost and with corporate and business entities with cost and the restricted data shall be used only by the authorized government agencies. However, GAP shall have the authority to decide on the data category proposed by the agencies.      1. Geo-information and allied services shall be facilitated through a common data portal, managed by the GAP. It shall be mandatory to submit metadata and data for integration by all agencies including private sector. Data and services must confirm to national and international standards. 2. National security and privacy are paramount. Therefore, data sharing and publication shall be done with due regard to national security and individual privacy. |
| **Objective 4:**  ***To avoid duplication of data creation and data management efforts and resources;*** | Investment in geo-information needs to be planned and coordinated to minimize redundancy of data and to avoid duplication of efforts and resources.  There is no legal provision that requires preparation of proper plan or assessment of existing infrastructure before starting any physical developments. This has lead to indiscriminate disruption of utility services and compromise of vital installations in some instances, with significant cost implications. Repeated digging along roads and footpaths is attributed to the lack of integrated data on infrastructure.   1. The geo-information creation and use must ascribe to the principle of “one time creation, multiple times use”. 2. It shall be mandatory to prepare detail map before embarking on any physical development and submit to the GAP for integration and assessment. 3. For any development projects, there shall be no cost for creation of geo-information that already exists. |
| **Objective 5:**  ***To promote sustainable and optimal use of geo-information and technologies.*** | The enabling power of geo-information and GIS are unlimited and necessary, but comes with significant cost. Keeping abreast with the fast changing technology is sometimes more of a fashion than necessity. Therefore, any investments in the technology should be rationalized and well thought. Sustainable and optimized utilization shall stand as cornerstones for the development of geo-information sector in Bhutan.     1. The Government shall support education, research and innovation in the field of geo-information and its optimum utilization. Educational institutions shall develop a standardized learning program for geo-information technologies. 2. Sustained effort shall be made to mainstream the use of geo-information and GIS for national planning, decision support systems and for dispensing citizen services effectively.      1. Agencies shall work closely on sharing expertise, technology and resources. Seeking technical assistance and hiring of exerts from outside shall be avoided and resorted only as a last option. 2. Outreach programs through conduct of regular conferences, workshops and trainings and citizen’s participation through incidences reporting and use of social media shall be encouraged. |

# DEFINITIONS

GIS- Geographic Information System is a system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data. [[4]](#footnote-5)

Geo-portal- is a type of web portal used to find and access geographic information (geospatial information) and associated geographic services (display, editing, analysis, etc.) via the Internet. 4

NSDI- National Spatial Data Infrastructure. It to denote a framework of technologies, policies, and institutional arrangements that together facilitate the creation, exchange, and use of geospatial data and related information resources across an information-sharing community. [[5]](#footnote-6)

Topographic Map- A map that represents the vertical and horizontal positions of features, showing relief in some measurable form, such as contour lines, hypsometric tints, and relief shading. 5

Thematic maps- a map designed to convey information about a single topic or theme, such as population density, agriculture or geology. 5

Standards- as defined by the International Organization for Standardization, are "documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, procedures, and services are fit for their purpose." Standards facilitate data sharing and increase interoperability among geographic information systems (GIS). 5

Interoperability - It is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged.

ICT- Information and Communication Technology

1. Cho, 1998 [↑](#footnote-ref-2)
2. Onsrud and Rushton, 1995 [↑](#footnote-ref-3)
3. National framework for GIS infrastructure in Bhutan, 2005 [↑](#footnote-ref-4)
4. Wikipedia, the free encyclopedia [↑](#footnote-ref-5)
5. ESRI [↑](#footnote-ref-6)