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INVITED PAPERS

DEVELOPMENT AND USE OF GEO-INFORMATION IN THAILAND

Submitted by Royal Thai Survey Department (RTSD) **

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**PCGIAP – Working Group 3
International Workshop
on
Integration of built and natural environmental datasets within a national SDI
Country report**

A. Country Context

Geographical and historical Context - Thailand is a country situated in the Southeast of Asian Continent. Its adjacent neighboring countries are Laos, Myanmar, Cambodia and Malaysia. Covering approximately five hundred thousand square kilometer of land, Thailand has current population around sixty million. With geographical location influenced by tropical weather, Thailand is considered as an agricultural country, whose major revenue comes from exporting agricultural and farming products. From history of the country development, Thailand has long been known as an independent country ruled by a democratic government.

Current political and administrative structures. By administrative structure of the country, Thailand is constituted of seventy-six provinces each of which ruled by a governor as a head of administrative structure. Led by a prime minister, Thai government is organized with various ministries, each of which has responsibility of assigned mission of the country, for instance land development, forestry, irrigation, Geo-spatial information, and etc. Each ministry, operated under supervision of a minister, serves function of the country according to the constitution of the country, also cooperate among other ministries, so that the country can fulfill its strategic plan, leading to further development of the country.

B. National SDI Context

History and status of national SDI initiative Description of the origins and the development of national SDI initiatives. Thailand SDI was initiated by an organization called Geo – Informatics and Space Technology Development Agency (GISTDA), which conducted the feasibility study in 2004, funded by U.S. Trade and Development agency. The objective of the Thailand SDI feasibility study was to develop a high level plan for national SDI implementation in Thailand. The goals of the Thailand SDI are to provide technology, policies and human capacity that promote the effective sharing of Geospatial information throughout government and ultimately private sector together with the public.

Have core datasets been defined within the SDI structure ? Thailand SDI's efforts are to identify selected basic data topics that are needed in common across the stakeholder community. These fundamental geographic datasets are a frame work for providing broad access to common themes of geographic data that are needed by the GIS user community.

Maintained are controlled with timely and accurate manner by their primary custodians, the fundamental geographical datasets within Thailand SDI has been defined as follows: -

- | | |
|-------------------------------------|-----------------------|
| - Administrative boundaries | - Aerial photographs |
| - Agricultural land use | - Building footprints |
| - Digital elevation models/contours | - Forest boundaries |
| - Geodetic control | - Hydrology |
| - Land parcels | - Ortho-photos |
| - Roads, transportation | - Satellite images |
| - Topographic maps | - Urban land use |

Describe the data acquisition and access mechanisms within the SDI. The access mechanism used for Thailand SDI is through NSDI portal, which provides a metadata catalog of geospatial information holding and services. The NSDI portal in Thailand will fulfill the same role as a library catalog. These are also national rules to govern data access.

Historical outline of built and natural environmental data development.

Department of lands (DOL) maintains national cadastral maps, presently in manual form. These maps will be converted to digital form in the near future. For the topographic data, Royal Thai Survey Department (RTSD) maintains topographic maps, which are 1: 50,000 and 1: 250,000 map series. Available in digital form, this data is an important source for base mapping information at medium and small scales.

Current administration of built and natural environmental data.

For cadastral maps at local level, subsidiary of DOL is responsible for cadastral maps of their administrative area. On the other hand, topographic maps, in particular base maps of nationwide area, are in charge of RTSD.

Other institutions who manage other built and natural environmental data in survey are: -

- Geo-Informatics and Space Technology Development Agency – Satellite imagery
- Department of public works and form & country planning – city maps
- Ministry of Agriculture and Cooperatives – nationwide Ortho-photos.

The metadata arrangements for built and natural datasets. The available metadata management tool allows users to search and discover geographic information and resources consistently. This metadata is capable of supporting catalog searches, providing simple, high level description of data and providing details for users to determine the usefulness of data for specific purposes.

RTSD, as a primary topographic maps custodian, has used WGS 84 as standard datum. However, DOL cadastral maps custodian, has use Indian 1975 Datum. Migration from the Indian 1975 to WGS 84 datum will impact current data and uses. For instance, migrating cadastral maps of DOL to WGS 84 are estimated to result in approximately 85 percent of parcels moving to adjacent map sheets. It is recommended that conversion should occur only once data is in digital form.

C. Institutional framework for integration – Data provider

At the current stage of Thailand SDI, private sector has not yet involved in the administration of built and natural environmental datasets. There are existing mandates for sharing and coordination of geographic data production and exchange at least among government agencies that currently are the heaviest users of this information. A framework to establish policies and regulations in support of this mandate has been put in place in the form of the National GIS Commission and its subcommittees and working groups.

Within the context of conceptual system design, technology components needed to support the NSDI implementation include hardware, data, and software infrastructure to support the central portal as well as agency nodes and can be summarized as follows:-

- Database servers. These will host the FGDS data components, as well as metadata. Hardware platforms can include Sun Microsystems, IBM and producers of PC platforms.

- Application servers host application software
- Web servers
- Firewall, Switching and Networking technologies
- Software components include: GIS software for spatial data processing, Middleware services, Web server software, RDBMS software.

As indicated in the framework concept of Thailand SDI, built and natural environmental datasets such as cadastre and topographic will be produced in various scales and formats and covering the entire country.

D. Institutional Framework for integration – Data user.

Major data users are mainly government agencies, which are from various sectors such as, map related organizations, public utility service organizations, academic institutions, natural resource organization, national security organizations and etc. Demands for data sets among these users are varied and depended on timely purposes.

According to the goals of Thailand SDI, it is to ensure that public investment made in geospatial data development is leveraged by maximizing the usability of the data among many applications. Use of one dataset among applications requires that data be developed under some level of standardization and compatibility. At the current stage, Thailand SDI supports customers in single dataset. With standards framework in place each dataset can be integrated to one another as efforts of the users. However, users of integrated products need to follow policy or intellectual property established by custodians.

E. Issues in the integration of built and natural environmental datasets.

Data standards, topical working groups that engage in data content definition and data development, and comprehensive metadata compilation will help ensure that data is compatible and that information about existing dataset is readily accessible. Benefits gained from integration of built and natural environment dataset are catastrophe mitigation management, environment protection, national security management, city planning and etc.

There is a need for establishing technical and administrative functions for integrating related data and in providing access to physical distribution of the information. Various models for accomplishing this range from completely centralized data centers that act as service bureaus for data compilation, integration, and dissemination to completely decentralized networks of data providers that must be approached by users on a one-by-one basis.

The organization of data custodianship for FGDS among key departments and ministries in Thailand and the potential of the Internet suggest a distributed model where data custodians become potential nodes in a distributed network. Current limitation in network infrastructure, replication of certain information needed for mission critical support at a central location with high availability should be considered. Besides, capability building that should be undertaken in Thailand SDI including:

- further strengthening of the communication infrastructure
- Improve hardware, software, and database infrastructure at the operational level
- Provide GIS workshops and training at various levels
- building of long – term institutional knowledge in GIS
