BIODATA

Name   :   **Y. BHG DATO' Sr DR. ABDUL KADIR BIN TAIB**
                             (DSDK, SDK, KMN, PPISM, FISM, FRICS)
Designation   :   Deputy Director General of Survey and Mapping Malaysia
Organisation :   Department of Survey and Mapping Malaysia (JUPEM)
                             Ministry of Natural Resources and Environment (NRE).

ACADEMIC AND PROFESSIONAL QUALIFICATION :

- Ph.D in Geomatic Engineering, University of New South Wales, Sydney, Australia - 1994.
- M.Sc. in Photogrammetry, ITC, Enschede, The Netherlands - 1985
- Postgraduate Diploma in Photogrammetric Engineering, ITC, Enschede, The Netherlands - 1981
- Bachelor of Surveying (Land), Hons, UTM, Kuala Lumpur - 1978
- Registered Land Surveyor with the Land Surveyors Board Peninsular, Malaysia.
- Fellow Institution of Surveyors Malaysia (F.I.S.M).

PROFESION EXPERIENCE :

- 1978 - Joined the Department of Survey and Mapping Malaysia as Land Surveyor
- 1978 - Photogrammetric Engineer, Photogrammetric Section
- 1980 - Assistant Director of Survey, Topographic Section
- 1985 - Deputy Director of Survey Johor State Survey Department (March 1985 – July 1990)
- 1986 - Acting Director of Survey Johor (Sept-Nov 1986 and March-April 1988).
- 1994 - Principal Assistant Director of Survey, Boundary Affairs Section, Geodetic Survey Division
- 1995 - Division Director of Survey, Map Production Division
- 2000 - Division Director of Survey, Management and Development Division
- 2002 - Division Director of Survey, Mapping Division
- 2004 - Deputy Director General of Survey Mapping Malaysia

OTHER EXPERIENCE :

- Chief Information Officer (CIO) for the Department of Survey and Mapping Malaysia (2000-present).
- Chairman, MyGDI Technical Framework Committee, Ministry of Land and Cooperative Development (1997-present).
- Chairman, Technical Committee TC2 on Geographic Information/Geodetic Standards, SIRIM (1997-present).
- Chairman, Land Surveying Division, Institution Surveyors Malaysia (1997-2004)
- Vice President, Institution of Surveyors Malaysia (June 2004-June 2005).
- Deputy Chairman, Land Surveyors Board Peninsular Malaysia (March 2004-present).

TITLE   :   Capacity Building for Sustainable Development of MyGDI

Spatial Data Infrastructure (SDI) such as MyGDI (Malaysian Geospatial Data Infrastructure) needs a design that requires people involved and the government to understand the concept, nature, the contributing components and the impact of national and global drivers. A lot of initiatives have been undertaken to describe and understand the components and the operation of different aspects of SDIs and their integration into geospatial data community. Internally, the organisation itself has responsibilities and tasks to develop and mature. Capacity building is a crucial component in the context of the organization for fundamental development to meet the objectives and maturity stage. According to United Nation Development Programme (UNDP), capacity means the ability (or power) of individuals and organizations or organizational units to perform functions effectively, efficiently and sustainability. Thus capacity building encompasses the development towards improvement in the ability of institution and (government and non-government) organization to carry out their functions and achieve desired results over time. It can be seen that consideration of capacity building for MyGDI and the acceptance of its wider concepts and levels can assist coordinating agencies to speed up the progress in the development of MyGDI initiatives. Additionally, capacity building should be addressed not only on staff development and organisational change but in a wider scale of developing and maintaining institutional infrastructure in a sustainable way. In this paper, ideas and concepts of capacity building in national, organisational and individual context are discussed focusing on MyGDI. The past capacity building initiatives are described and the prospective developments are suggested.

Capacity Building for SDI Development: Malaysian Context

Dato Dr Abdul Kadir Bin Taib (drkadir@jupem.gov.my)
Jabatan Ukur dan Pemetaan Malaysia

1.0   Introduction

The representation and viewing of geographic phenomena in a wider scale and across the nation within digital databases is one of the most central and fundamental issues in geographic information management in government sector. Geospatial information accessible and disseminated throughout the nation, states and local poses great resultant influences by building a seamless data infrastructure, such as the spatial data infrastructure (SDI) nationally. A strict meaning of SDI is that it is a people infrastructure which encompasses of strategic process of policy formulation and implementation carried out by governments to ensure that their geographic information assets are managed in the interests of the nation as a whole (Barr and Masser, 1997). This type of coordination is to result in digital databases that would be easily accessible and seamless across administrative and organizational boundaries and that would contribute social, environmental, and economic benefits to the involved communities.

The main objective of developing a Spatial Data Infrastructure is to provide an appropriate environment in which all stakeholders, both users and producers, of geospatial information can collaborate to enable a cost-efficient and cost-effective way to better achieve their targets. Governments throughout the globe has acknowledged the need to focus on the objective to create national spatial data infrastructure (NSDI) to maximize the use of geographic information assets that are made up from local, states and national geospatial data providers. National Spatial Data Infrastructure can be defined as encompassing the policies, access network, standards and human resources necessary for the effective collection, management, access, delivery and utilization of geospatial data in a nation. Within these core components, two categories can be formed based on their interactions in the SDI framework. While people and data is one category that plays an important and fundamental role, the second category can be considered as

the access network, standards and policy which are the main technological and dynamics components. Within these categories, it can be considered that the implementation of an SDI is a process of organizational change and management. Parallel to these change and management process, the need for capacity building initiatives to be developed should not be underestimated.

In developing countries capacity building is increasingly acknowledged as a key component for implementing and developing over time projects and administrative bodies and organizations, including SDI project. However, the capacity building concept is often used within a limited meaning such as focusing on staff development through formal education and training program to meet the lack of qualified personnel in the short term. In fact, capacity building is often used as a synonym for human resource development. Even though the key focus may be on education and training to meet short and medium term needs, capacity building measures should be addressed in the wider context of developing institutional infrastructures for implementing land policies in a sustainable way.

This paper aims to develop the capacity building concept to provide some guidance in the area of introducing sustainable SDI such as in Malaysia, Malaysian Geospatial Data Infrastructure (MyGDI). Analysis is made to argue the complex and interdisciplinary nature of the SDI paradigm in order to identify the key issues to be addressed. Levels of capacity building to overcome composite issues in SDI development in the nations are highlighted. Additionally, three issues for capacity building, namely partnership, institutional development and, research and development are presented.

2.0   Capacity Building

The term capacity has many different meanings and interpretations depending on who uses it and in what context. To begin with, capacity building as a concept is closely related to education, training and human resource development. This conventional concept has changed over recent years towards a broader and more holistic view, covering both institutional and country base initiatives. Groot and van der Molen, 2000 adopted the following definition on capacity building: *"The development of knowledge, skills and attitudes in individuals and groups of people relevant in design, development,*

management and maintenance of institutional and operational infrastructures and processes that are locally meaningful". This is a broader approach while still focusing mainly on staff development.

It can be debated that the concept of capacity building should be examined in a wider context to include the ways and means by which the overall goals are achieved. In the case of SDI, education and staff development may certainly be one of these means. However, development of institutional infrastructures (including issues such as good governance, decentralisation, and public participation) may be even more important. Also, the adoption of an adequate land and geospatial data policy framework may be the key to get anywhere at all. It can be argued that even if the key focus is on education and training to meet short and medium term needs, capacity building measures should be assessed in a the wider context of implementing land policies in a sustainable way.

A recent UN publication on Capacity Assessment and Development (UNDP, 1998) offers this basic definition: *"Capacity can be defined as the ability of individuals and organizations or organizational units to perform functions effectively, efficiently and sustainably."* This definition has three important aspects: (i) it indicates that capacity is not a passive state but is part of a continuing process; (ii) ensures that human resources and the way in which they are utilized are central to capacity development; and (iii) it requires that the overall context within which organizations undertake their functions will also be a key consideration in strategies for capacity development. Capacity is the power of something – a nation's system, organization (entity), a person, to perform and produce properly. In this UNDP context, capacity is seen as two-dimensional: Capacity Assessment and Capacity Development (Enemark, 2003).

Capacity Assessment or diagnosis is an essential basis for the formulation of coherent strategies for capacity development. This is a structured and analytical process whereby the various dimensions of capacity are assessed within the broader systems context (national), as well as evaluated for specific entities (organization) and individuals within the system. Capacity Development is a concept which is broader than institutional development since it includes an emphasis on the overall system, environment and context within which individuals, organisations and societies operate and interact. Even

if the focus of concern is a specific capacity of an organization to perform a particular function, there must nevertheless always be a consideration of the overall policy environment and the coherence of specific actions with macro- level conditions. Capacity development does not, of course, imply that there is no capacity in existence; it also includes retaining and strengthening existing capacities of people and organisations to perform their tasks.

Capacity building measures can be addressed at three levels: the national level (policies, legal frameworks and accountability), the organisational level (institutional infrastructures and organisational effectiveness), and individual level (technical and professional competencies and responsibilities). Capacity building should be seen as a broad methodology aiming to provide a sustainable result through assessing and addressing a whole range of applicable issues and their interrelationships.

Taking this approach, capacity, as such, is seen as a development outcome in itself and distinct from other programmes outcomes such as technical and professional competence in certain fields. Measures such as education and training become a means to an end while the end itself is the capacity to achieve the identified development objectives over time, such as to establish and maintain national geospatial data infrastructures for sustainable development.

3.0   Three levels of capacity building

The three levels of capacity building (the national system, the organisational entity, and the individual/people level) can be considered in the context of SDI systems as follows.

SDI is about national system of infrastructure and processes of geospatial data – entire country or society, GIS systems, databases systems, planning systems and the embedded processes to carry out the tasks. The purpose of the systems is to build, identify and ensure data, policy and rights; to build efficient geospatial data markets; and to ensure effective and sustainable management of the use of land related information. SDI is embedded in an overall land policy and the connected legal framework. This is a broader system in a societal level. In short, the level of this broader dimension of capacity may

include areas such as policies, legal and regulatory framework, management and accountability perspectives, and the resources available.

Secondly, SDI is about building infrastructures in terms of efficient relations between and within the systems, and in terms of an efficient national spatial data infrastructure. Building infrastructures is also about developing administrative policies and good governance in an entity or entities of formal organization such as government of one of its departments or agencies. At this level, it is about building "capable governments", able to perform key functions effectively and based on trust and clearly defined responsibilities. Additionally, at this level, successful approaches to capacity building include the role of the entity within the nation's system, and the interaction with others entities, stakeholders and clients. The dimensions of capacity at the entity level may include areas such as mission and strategy, culture and competencies, processes, resources (human, financial and information resources) and infrastructure.

Thirdly, SDI is about people/individual – from politicians, senior professionals and managers, middle managers and administrators, to office and field personnel, - whether in public or private sector. At the senior level a broad vision and understanding is required. The need for people to function efficiently and effectively within the entity and within the broader system is critical in SDI. At the more practical level the players in the system need to have some understanding of the overall system but will have much more detailed and specific skills that need to be developed. The dimension of capacity at the individual level should include the design of educational and training programs and courses to meet the identified gaps within the skills base and to provide the appropriate number of qualified staff to operate the system.

SDI is a cross-sectoral and multi-disciplinary area. It includes technical, legal, managerial and institutional dimensions. An adequate response in terms of capacity building measures must reflect this basic characteristic. However, the relationship of humankind to land-related information and geospatial data determines the form of SDI responses and motivations. This relationship is dynamic and driven by global drivers such technology development, micro economic reform, urbanisation, globalisation, and sustainable development. The relationship of humankind to geospatial data varies in and

between countries and regions, and adequate responses in terms of capacity building must reflect these fundamental conditions. For example, if a country such as Malaysia wished to have a land administration and geospatial infrastructure system supported by a land title and cadastral surveying, local authority systems, state authority's geoinformation assets, national or ministerial land-related information administration enable accessing of geospatial data for decision making and more system which are similar to Denmark or Australia, this could possibly require 40,000 professional land surveyors and 30 or more university programs educating professional surveyors (Steudler et. al., 1997). Clearly this is not realistic even in a medium term perspective. As a result, there is a need to develop appropriate solutions matching the stage of development and specific characteristics and requirements of the individual country.

The need for SDI capacity in Malaysian context has been seen to be at the broader system and society level at both a state and national level. Malaysia has also recognised the need to support SDI capacity at the local authority. At the national level the needs are to support national database, economic development, geospatial data exploration for ministerial administration, land information systems, natural resources and environmental management. At the state level the needs are similar but are larger scale and focus more on human activity and resulting land-related information management and administration. As a result a range of policies, institutions, organisations, laws and strategies have been created or developed in order to provide the capacity for the jurisdiction to support SDI and related spatial information activities.

The need for SDI capacity at the entity or organisational level has again focussed on state and national levels as well as at a Federal Government level. There has been an ongoing review of the capacity of the entities or organisations which build and manage SDI at all these levels by many government reviews, committees and even ministerial coordinating committee monitoring and accepting reports on any need for the next few years before be able to achieve maturity. As result these organisations have a whole range of policies, data, standards, access arrangements and people to provide the capacity to deliver the SDI vision. The issue arises as whether to follow them in a constructive manner.

The need for SDI capacity at the individual level has received considerable attention since 1997 but not nearly as much as at the organisational level. The result has been a wide range of education, training, collaborative learning venture and courses initiatives. Workshops, hands-on software courses and seminar have been the major activities sponsored by the SDI in-charge organisation, MaCGDI. In summary Malaysia can be reasonably satisfied of ongoing SDI capacity building across the broader system, organisation and individual levels.

4.0   Constructive Partnership

All agencies and stakeholders that are involved in the implementation of SDI is responsible for the success of the infrastructure. Importantly, they need to show positive involvement in the early stages of the development and participate in the process to form partnership to formulate SDI. Partnerships have existed in government and business for many years. In its simplest form a partnership may be described as: *The fact or condition of being a partner; association or participation especially of relationships in industry and politics* (Oxford English Dictionary). The clear definition of purpose of the partnership, the responsibilities of each party and expected outcomes is critical to the success of these arrangements. Although most formal agreements are a form of contractual obligation, evidence suggests that the legislation of these responsibilities may be counter-productive and in fact further limit co-operation.

In some cases a partnership may be as simple as an informal arrangement to share a resource, for example a building or to provide an incentive to data development. In the context of this work however, the partnerships under investigation will normally consist of an ongoing formal relationship between state and local government, and between federal agencies to which each makes a defined contribution and from which each expect to receive benefits. The clear definition of purpose of the partnership, the responsibilities of each party and expected outcomes is critical to the success of these arrangements. Although most formal agreements are a form of contractual obligation, evidence suggests that the legislation of these responsibilities may be counter-productive and in fact further limit co-operation.

Partnership in geospatial data management and initiatives is seen to have positive development of tackling the problems of upgrading and maintaining frameworks data layers in the Malaysian SDI. It can be acknowledged that the achievements has offer a coherent set of institutional and financial incentives to make it easier for all levels of government and the states as well as local authority to collaborate in the building of the modern generation of framework data. By aligning participants' needs and resources, the initiatives and activities will help all levels of government and the private sector to save money, migrate from existing legacy systems, make better use of existing resources and develop the business case for additional public and private resources.

People from the local authority, states level administration and federal level government have been gathered as members in the federal and state technical committee, clearing committee, framework data committee, state working group, vendor GIS experts group from private sector when outsourcing data collection, data standard committee and geographic names committee. There had been a tremendous roadshows and staff traveling to states being made to meet the wants and developments of statewise SDI. The feedback from local has been optimistic but negative attitude has impeded the development though. This is hoped that partnership be seen by all stakeholders as crucial for long term generation of SDI.

Cooperation between organisations is usually seen as the first stage in the development of more significant organisational relations. For example organisations may agree to cooperate with each other for the purposes of establishing some standards for collecting spatial data. Interorganisational cooperation can be defined as "the presence of deliberate relations between otherwise autonomous organisations for the joint accomplishment of individual operating goals". In the example given above the process may facilitate improved standardisation of data within each organisation, however they may well choose to continue to limit the data to their own business activities.

5.0   Institutional Development

The SDI management activities rely on some form of administration infrastructure that permits the complex range of rights, restrictions and responsibilities to be identified, mapped and managed as a basis for policy implementation. In this context there is a

whole range of capacity building and HRD principles and options to be considered. Institutional development in SDI should imply adoption of long-term strategic actions. This includes the need to:

- Establish a strategic approach to support projects and ensure that capacity building measures are addressed up front – not as an add-on.

- Develop in-country self assessment procedures to identify the capacity needs and thereby argue for the necessary measures of capacity development in terms of policies, legal framework, institutional infrastructures, and human resources and skills.

- Promote the creation and adoption of a comprehensive policy on land-related information development and establish a holistic approach to land management that combines the land administration/cadastre/land registration function with the topographic mapping function

- Establish a clear split of duties and responsibilities between national and local government (decentralisation). Ensure that the principles of good governance apply when dealing with rights, regulations and responsibilities with regard to land resources and land development.

- Promote the understanding of geospatial data management as highly interdisciplinary that includes a whole range of policy measures such as social, economic, environmental, judicial, and organisational.

- Promote the need for an interdisciplinary approach to 'surveying education' that combines both technical and social science and links the areas of measurement science and data management through a strong emphasis on spatial information management.

- Establish strong professional bodies such as a national institution of surveyors who are responsible for the development and control of professional land surveyor, standards and ethics, enhancement of professional competence, and interaction with governmental agencies to develop the optimal conditions and services.

- Promote the need for CPD to maintain and develop professional skills and promote the interaction between education, research and professional practice.

- Adoption of a comprehensive policy on land management is crucial since this will drive the legislative reform which in turn results in institutional reform and finally implementation with all its technical and human requirements.

6.0   Research and Development

As in all technical disciplines, research and development is essential to the ongoing evolution of the technology and associated concepts. It is a critically important component of capacity building especially in an evolving discipline such as SDIs if it is to grow and reach its full potential. At this point in time, research in SDI in Malaysia is in its infancy with only a handful of agencies and academic instution around the nations actively pursuing SDI research. While much of the research which supports the development of SDIs can be considered as being undertaken under many related discipline areas in the spatial information and land administration area, such as in data collection, positioning and geographic information science, specific SDI related research has not been identified in Malaysia. In reality, R and D should be pursued in related to the following matters:

- understanding, identifying and promoting the nature of SDI
- developing conceptual models of SDI within the SDI hierarchy
- comparing SDI initiatives to identify best practices
- investigating differences between the various levels in the SDI hierarchy
- investigating technical issues in support of SDI development and implementation including testing and evaluating prototypes
- technical issues concerned with interoperability and access
- data issues of privacy, intellectual property and security
- pricing policies and funding models
- statutory control of spatial data
- cultural and indigenous issues concerned with the establishment and maintenance of SDI

While this is by no means a comprehensive coverage of the diverse range of challenges facing SDI development, it simply demonstrates some of the areas for research ranging from social and cultural dimensions, legal, policy and institutional considerations, through to technical issues and their intersection with the former. Nevertheless there is a whole range of issues which impact on the development of SDI which need to be researched if the SDI concept is going to deliver its potential.

SDI research does not fall within just one of the capacity building levels. Remembering capacity building is the power of something – a system, an organisation or a person to perform and produce properly, research should be undertaken into capacity building for SDI at the system or societal level at both the state and national levels in Malaysia as well as being undertaken at the entity or organisational level, again at state and national levels. These areas comprise the vast majority of SDI research. Very little research is done at the people or individual level concerned with the ability of people to design, build or manage SDI although this is a difficult area of research which would normally fall outside the skills of an SDI researcher, especially in Malaysia.

7.0   Conclusion

As a conclusion, it can be said that a SDI implementation in an organization or jurisdiction implies, by definition, changes in spatial information management, updating or maintenance methodologies, processes, technical knowledge and skills and guidance and information to others in the information marketplace. In a globalized world, geographic information technologies are beneficial, as far as having the financial resources available to acquire the equipment, however real technological modernization can be achieved if persons, organizations and developing countries acquire appropriate capabilities to assimilate and to incorporate new technologies to enable them to face the new challenges imposed by the information society. And truly, whatever the outcome, one thing is certain, and that is without a commitment to capacity building at all levels in support of SDI development, the SDI vision will remain unclear and unachievable, especially in developing nations. A challenge is for SDI coordinating agencies to apply these levels of capacity building framework to the development of SDI for any jurisdictions.

Development models for Spatial Data Infrastructures (SDI) differ from one country or region to another according to their own territorial characteristics, their priorities and conditions and relationship among their different actors. To assure the SDI's creation and maintenance, it is important to ensure governmental organizations have the capability to commence and continue such long-term projects, and that they are ideally isolated from external factors or changes of senior personnel or managers involved with the project. Much of the technological modernization in developing countries has been based on, and still is based on, acquisition of equipment, requiring large investment, whether by international credits or technical cooperation programs. Unfortunately many of these have failed as the necessary strategies have not been created, such as capacity building for organizations, to ensure a real understanding and integration of technologies, which would help guarantee a projects sustainability. On the other hand, many SDI projects have been initiated but they have come to a stop, disappeared or have not advanced as much as desired, due to the lack of awareness of the importance of geographic information to support decision making processes within a jurisdiction.

From the discussion, it can be summarized that in Malaysian context, as developing nation, partnership, institutional development, and research and development activities can played an important role for SDI's capacity building be deliverable. Three levels of capacity building should be accountable to hold as a methodology and guidelines to maintain and enhance the SDI development and implementation. Nevertheless, in the culture of Malaysian entity, human capital and resources has seen a lacking and shortfall because though awareness and training are imposed but issue on attitude and negative human behaviour seemed to be impeded the development of human capital for SDI. This is a second round capacity building development which may lead to mature SDI.