Developing National SDIs: Understanding the Main Challenges and Issues

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Spatial Data Challenges

- Majority of spatial data resides in government
- Large volumes and varieties of data
- Existing standards are forever evolving
- Supporting technical services/architecture missing
- Data and info often developed for one target
- Most of issues/needs are local
- Inefficiencies and duplication
- Inaccessible to potential users due to restrictive and competing policies
Getting a Rapid Return On “All” Your Information

Cost $

Total Cost of Data and Information

Using New Technologies

ICT Enabled Spatial Data Environment

Value

Cost

Time

SDI

Enabling Platform

Value of Information

(Modified from Jack Pellicci 2000)
Spatial Data Infrastructure

- **SDI** is an initiative necessary for the effective collection, management, access, delivery and utilisation of spatial data;

- **SDI** is all about facilitation and coordination of the exchange and **sharing** of spatial data;

- **SDIs** constitute a set of relationships and partnerships that **enable** data sharing, update and integration.
Without fully appreciating the role of government in providing an SDI in a modern society, it is almost impossible to grasp the potential of SI, its use by the wider community and opportunities for the private sector.
SDI is developed to enable the use and share of spatial information to support decision-making at different scales for multiple purposes.
SDI Components

Dynamic

People

Policy

Standards

Access Network

Data

Communication, Partnerships

Access, Distribution, Storage

Policy, Legislation

Data Models, Metadata, Transfer

Technological components
National SDI

• The National SDI is an initiative intended to create an enabling environment for a wide variety of users to access and retrieve complete and consistent datasets with national coverage in an easy and secure way.

• The establishment of a National SDI forms a fundamental framework to exchange data across many agencies and disciplines, and also links spatial data holdings across the nation.

• A National SDI can provide the institutional, political and technical basis to ensure the national consistency of content to meet user needs in the context of sustainable development.
National SDI

• A National SDI also provides support for improving existing or even establishing new bilateral and multilateral relationships and exchanges with other countries.

But what is needed,

the collaborative architecture and incentives to maximise the benefit to all participants.
Challenges Facing SDI Development

- Developing an SDI Vision
- SDI Partnerships
- SDIs and Privacy
- The Marine Dimension of SDIs
- Strengthening Institutional Arrangements for SDI
- Ensuring Capacity for SDI Development
- SDI Research and Development
Institutional Arrangements

• Where should the SDI sit in the government structure?
• Convincing government of the importance of SDI
• Role of government, private and academic sectors
• Advisory bodies
• Policies to support data flows in the SDI hierarchy
• Standards
• Custodianship of different data sets.
SDI Development

SDI Strategy

Success

Coordination Strategy

Collaboration Strategy

(Warnest 2005)
SDI Development

• Vision
• Mission
• Road Map

To make spatial information available and useful to all - at any time and in any place
Collaboration

The Key to Development of an SDI Initiative:

Understanding the Collaboration Continuum

Co-operation
- No formal rules
- Minimal resources
- Independent power
- Vague goals

Co-ordination
- Few rules
- Limited resources
- Some interdependency
- Agency goals

Collaboration
- High degree of formality
- High resource commitment
- Interagency control
- Collective goals

(McDougall et al 2004)
Vision is to Facilitate the Integration of Existing Government Spatial Data Initiatives for Access and Delivery of Data/Information

Enhancing the capability of government, the private sector and the general community to engage in systems based, integrated and holistic decision making about the future.
SDI Development Models

• **Product-Based Model:** (linked) database(s)

• **Process-Based Model:** strategy required to manage information assets

Both models are relevant to National SDIs depending on the political system of the country being **Federated** or **non-Federated** (centralised).

Non-Federated nations are able to take either model depending on their **national spatial data strategies**.
Generational Development of SDIs

- For the first generation, data was the key driver for SDI development and the focus of initiative development, and
- the value of SDIs was measured in terms of their productive output, the savings for producers/providers of spatial data, and from sharing.

However:

- For the second generation, the use of that data (and data applications) and the need of users are the driving force for SDI development. and
- the second generation has a more holistic understanding of the financial and socio-cultural benefits of SDI development, as well as support for spatial decision-making.
Relationship between the 1st and 2nd Generation of SDI and the Product and Process-based SDI Development Models

**1st Generation**
- Countries begin developing SDI anytime along the continuum

**2nd Generation**
- Product-Based SDI development model
  - Definition of data
  - Collection of data
  - Integration of data
  - Data Base Creation
  - More Implementation
- Process-Based SDI development model
  - Knowledge Infrastructure
  - Capacity Building
  - Communication
  - Coordination
Role of Government and the Private Sector in SDI Development over the Past Decade

- National Government
- State/Local Government
- Private Sector

Strategic & Operational Activity

Uncoordinate Activity

Influence on SDI development over past 10 years
Emerging SDI Development Trends and Initiatives

State/Local Government  →  Private Sector

National Government

Current Influence on SDI Development

Operational

Strategic
Continuum of SDI Development based on the 1st and 2nd Generations of SDI

1st Generation
- Developed Countries
- Emerging Economies
- Developing Countries

2nd Generation
- Developed, Emerging and Developing Countries

Towards the Next Generation
- Delivery of a Virtual Environment


Product-Based SDI development model
National/Federal Government Influence – Data Focus

Process Based SDI development model
National, Sub-national Govt. and Private Sector Influence – Process Focus

Sub-national Govt. and Private Sector Influence – Strategic National focus

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The key to successful SDI is **capacity building**

building the capacity of society, institutions and individuals.
Three Levels of Capacity Building

- People/individual level
- Entity/organisational level
- System/societal level
Administering the Land and Marine Environments

(Resolution 3 – PCGIAP Workshop on Administering the Marine Environment – Malaysia 2004)
SDI Benchmarking
based on LA Benchmarking
Why SDI Benchmarking and Evaluating?

- To facilitate **cross-country comparisons** in the performance and eventually also **identify categories** of processes and system;
- To provide a basis for comparisons **over time**;
- To demonstrate **strengths and weaknesses** of SDI development models and strategies;
- To justify why a country/jurisdiction should improve its SI strategy and identify areas/priorities for SI **reform** and better SDI strategy;
- To help to draw **links to other issues** and sectors (financial, governance, environmental, social, etc.);
- **To justify an investment to improve**;
- **To monitor improvement**.

(Adopted from Steudler, 2004)
Evaluation Elements

For analysing and comparing national spatial data initiative such as SDI or land administration, we need to establish an evaluation framework. To evaluate the initiatives/systems, **four basic evaluation elements** would have to be considered:

- well-defined **OBJECTIVES** (to know where to go to);
- clear **STRATEGY** (to know how to get there);
- **OUTCOMES** and monitorable **INDICATORS** (to know if on track);
- **EVALUATION OF RESULTS** (to gain input for improvements).

(Baird, 1998)
Evaluation Elements and Cycle of Assessment

(Adopted from Steudler and Kaufmann, 2000)
Evaluation Areas ➔ Evaluation Framework

SDI Evaluation Framework

- Policy Level
- Management Level
- Operational Level
- External Factors
- Review Process

(Arranged from Steudler 2004)

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<th>Area</th>
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<th>Possible Indicators</th>
<th>Good Practice</th>
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Evaluation Framework

Evaluation of Aspects and Indicators = Good Practices = Performance Gaps

Summary / SWOT-Matrix

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(Adopted from Steudler 2004)
Influencing Factors for SDI Development
Key Factors

- Communicate benefits to potential users by short term projects and demonstrations,
- Long-Term strategic vision and high level political support,
- Include the Marine Environment in the sphere of SDI initiatives,
- Need to understand link between the terrestrial and marine environments – they cannot be treated isolation,
- Understand the sustainable development factors driving the development of Land-based and Marine SDI’s,
- Importance of a lead/coordinate Agency to:
  - design and implement the SDI concept,
  - coordinate the development of standards and protocols,
  - building and sustaining foundation data sets,
  - providing online public access.
Influencing Factors for an SDI Development

- External Factors
  - Political
  - Development Issues
  - Cultural

- Environmental Factors
- Internal Factors
A Strategy for an SDI Development

- Increase the awareness and understanding of the vision, concepts, and benefits of SDIs,
- Demonstrate the benefits of participation in SDI to existing and prospective participants,
- Develop common solutions for discovery, access, and use of spatial data in response to the needs of diverse communities,
- Build relationships among organisations to support the continuing development of SDIs,
- Develop a web-based architecture to facilitate access and to speed the dissemination of data and services,
- Establish the infrastructure and business practices needed to sustain the changes.
Conclusions

• Collaborations in National SDI are complex relationships and often dynamic
• Collaboration is more than simply data sharing
• Long term sustainability of any collaboration must be considered at planning stages.
Thank you