SESSION 6: TRAINING, EDUCATION AND CAPACITY BUILDING

Data management models for Disaster Risk Management

Toni Fisher, USP - fisher_t@usp.ac.fj

Theme: “Disaster Risk Management, Water Security and Climate Change-Integrating our efforts for a more resilient Pacific”

17 – 21 September, Noumea, New Caledonia

4th Session of the Pacific Platform for Disaster Risk Management & Pacific Regional Water and Sanitation Consultations

Why use Geographic Information Systems?

GIS does not belong to the realm of Geography
GIS is a platform for decision making
Focus on concepts not on the software for effective learning. Need to have a deep understanding of concepts to use the tool effectively. Cannot rely on others to do it for you!

GIS should be everyone’s tool, just as any software tool we commonly make use of, for analysis, visualization and data storage.
Country’s departments need:

Collaborative efforts and interdepartmental cooperation.

The abilities to analyze, synthesize and evaluate data are skills countries need for DRM.

GIS enables these outcomes.

Challenges for integrating GIS into a country’s decision making processes.

How to move towards storing data in a repository that will promote efficiency and collaboration.

Have one central data set.

Do not recreate data in many different sites.

How to develop capacity for regional GIS

How to find time to develop capacity to use GIS software

How to get data
Initially
Lack of data, of any kind
Lack of access to data from proprietary groups who hoard knowledge

Now
In some cases, in some places, there are floods of data

Still
Lack of access continues in some places
Lack of filtering methods for verifiability has become a concern
Replication of efforts remains an issue

Libraries
Low number
Books are separate entities
Need to be accessed in location

Internet
No geographic boundaries
Large number of assets
Authoritative sources problematic
Not everyone contributes

Wikipedia
Collaborative, one source, without geographic boundaries
Authoritative source problematic

Challenges for all countries are similar

Lack of knowledge in how to use GIS

Lack of data for GIS use
Background for the region's challenges

RMIT/USP workshop revealed current regional needs are not being met by USP or by SPC, the two chief purveyors of GIS education and training in the region.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental datasets as required for DRM and Land Administration are available</td>
<td>some</td>
</tr>
<tr>
<td>Digital data available for country wide sharing using a Relational Database Management System</td>
<td>no</td>
</tr>
<tr>
<td>Online GIS accessible for government and public</td>
<td>no</td>
</tr>
<tr>
<td>Human capacity and knowledge for creating, storing, maintaining and distributing GIS data is adequate</td>
<td>no</td>
</tr>
<tr>
<td>Evidence shows that model adopted for storage and sharing of GIS data supports needs for DRM and Land Administration</td>
<td>no</td>
</tr>
</tbody>
</table>

Models for data storage and use

### Models for Data Storage and Use

- **Model A**: Regional or Global Agency is the source of data, which is then stored in a Centralized Database. The Country Government, Regional Government, and Local Government access this data.
- **Model B**: Regional or Global Agency creates and stores the data in a Centralized Database. This database is then accessible by Regional Governments, Local Governments, and the Community.
- **Model C**: A Regional Agency creates and manages databases for each Government Department (Department Database). These databases are then accessible to the corresponding Department.
Region has a need for geospatial data, geospatial expertise

What follows

A methodology for how to do set up geospatial data

An outline of some choices that need to be made

But first, a review of why GIS can help with DRM.

Sustainable environment

Land Administration

Economic and social prosperity

Informed, operational policies

Knowledge of country’s needs

Trust of population

Better data collection, storage, maintenance, retrieval, analysis

Due to climate change and adaptation requirements

Changes in time management required

Meeting DRM

Disaster risk preparedness

Disaster risk reduction

Disaster risk recovery

Efficient government is ‘better, faster, cheaper’

Requires knowledge and capacity

Requires time to develop

Changes in technology

Changes in time

Effective, efficient action

Informed, operational policies

Initiate centralized storage of one dataset

Maintain centralized storage of one dataset

Multiple uses

Multiple editors

Based on community data modelling

Collection method

Data collection

Type of data

Natural environment: Soil, slope, aspect, vegetation etc

Social/demographic

Man made environment: cadastral, infrastructure etc

Data analysis capabilities

Data required for effective, efficient actionable policies

Knowledge to manipulate data

Community capacity

Community input

Knowledge of capacity needed for operations

Fiscally responsible attention to social, economic, sustainable environment

Trust of population

Good Governance

Knowledge & capacity

Land Administration

Data

Management

Collection

Analysis

Maintenance

Storage

Efficient government

Good Governance

Knowledge & capacity

Land Administration

Data

Management

Collection

Analysis

Maintenance

Storage

Efficient government

Good Governance

Knowledge & capacity

Land Administration

Data

Management

Collection

Analysis

Maintenance

Storage

Efficient government

Good Governance

Knowledge & capacity

Land Administration

Data

Management

Collection

Analysis

Maintenance

Storage

Efficient government

Good Governance

Knowledge & capacity

Land Administration

Data

Management

Collection

Analysis

Maintenance

Storage

Efficient government

Good Governance

Knowledge & capacity

Land Administration

Data

Management

Collection

Analysis

Maintenance

Storage

Efficient government
Good Governance

Informed, operational policies

Effective, efficient action

Sustainable environment

Economic and social prosperity

Trust of population

Knowledge of country’s needs

Knowledge of capacity needed for operations

Community input
Fiscally responsible attention to social, economic, sustainable environment

Effective, efficient action

Data

Knowledge to manipulate data

Good Governance

Effective, efficient action

Fiscally responsible attention to social, economic, sustainable environment

Data

Collection

Storage

Maintenance

Analysis
Effective, efficient action

Maintain centralized storage of one dataset

Initiate centralized storage of one dataset

Multiple editors

Knowledge and capacity

Data collection

Type of data

Collection method

Knowledge and capacity
Good Governance

Based on community data modelling

Community input

Trust of population

Community capacity

Collection method

Data analysis capabilities

Data required for effective, efficient actionable policies

Natural environment: Soil, slope, aspect, vegetation etc

Social/demographic

Man made environment: cadastral, infrastructure etc

Type of data
Knowledge and capacity

Land Administration → Data analysis

Multiple uses

Disaster risk preparedness → Disaster risk reduction → Disaster risk recovery

Requires knowledge and capacity

Requires time to develop

Efficient government is ‘better, faster, cheaper’
Knowledge and capacity

Changes in technology

Better data collection, storage, maintenance, retrieval, analysis

Speed of change is accelerating

Changes in time management required

Due to climate change and adaptation requirements

Meeting DRM

- Better data collection, storage, maintenance, retrieval, analysis
- Speed of change is accelerating
- Changes in time management required
- Due to climate change and adaptation requirements
- Meeting DRM

Good Governance

- Efficient, effective action
- Sustainable environment
- Economic and social prosperity
- Fiscally responsible attention to social, economic, sustainable environment

Knowledge & capacity

- Knowledge and capacity
- Speed of change is accelerating
- Changes in technology
- Better data collection, storage, maintenance, retrieval, analysis
- Knowledge of capacity needed for operations
- Knowledge of country’s needs
- Community input
- Community capacity
- Data required for effective, efficient actionable policies
- Data analysis capabilities

Land Administration

- Disaster risk preparedness
- Disaster risk reduction
- Disaster risk recovery
- Multi-use
- Data analysis
- Based on community data modelling
- Collection method
- Data collection
- Type of data
- Natural environment: soil, slope, aspect, vegetation etc
- Social/demographic
- Man made environment: cadastral, infrastructure etc

Data

- Storage
- Analysis
- Knowledge to manipulate data
- Multiple editors
- Data demanded
- Data collection method
- Collection method
- Data analysis
- Multiple uses
Centralized storage

Efficiency, cost effectiveness...

Data currency, integrity...

GIS and Geodatabases

Logic

Behavior
Users who rely on and teach only Desktop GIS work in inefficient silos on their C drives.

Spatial Database Engine (SDE)

Store, maintain, retrieve

Security

Backup and recovery
The added benefits of SDE

Versioning

ArcGIS Server

Web GIS

Browser map with dashboard for application and user specific needs

ArcGIS Server

The added benefits of ArcGIS Server
Collaborative efforts

Some things to consider...
Central location
Multiple users

Spatial Database Engine

Geodatabase
Storage
Security
Backup
Recovery

Fast

If

One data repository
One source, vetted, read and write with permission.
Ease of access.

Then

How to support GIS
In the IT department?
As a GIS specific hub for the country?
In each department for specific purposes?
How to support geospatial data for region?

To move beyond Desktop GIS and to move towards current GIS trends, enterprise implementation and web GIS

To support GIS development, not regression

Funding models for GIS software in the region

Software is purchased with donor funds

BUT

maintenance costs are not funded and are just as expensive and are in perpetuity
For further consideration

How much cloud?

Should we encourage builders and creators, or move towards supporting users?

Benefits and disadvantages for both. Can mix and match, but need a philosophy to underpin the emphasis.