



**Permanent Committee on GIS Infrastructure for Asia and the Pacific**

**Working Group 3**

**Cadastre**

***STATUS REPORT***

**FOR 11<sup>th</sup> PCGIAP MEETING  
18-21 May 2005, Bali, INDONESIA**

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## REPORT FOR WORKING GROUP 3: CADASTRE

### Key activities undertaken since 10th PCGIAP Meeting in Bangalore, India:

#### 1. GSDI-8 Conference and FIG Working Week 2005

The 8th International Conference of GSDI and FIG Working week were conducted jointly from 16 to 21 April 2005 in Cairo, Egypt. Prof Ian Williamson, Chair of Working Group 3 (Cadastre) and Dr Abbas Rajabifard, Research Coordinator WG3 attended and represented PCGIAP at this conference.

Both Dr Rajabifard and Prof Williamson attended the GSDI Board and Council meetings on behalf of PCGIAP, in which Dr Rajabifard gave a PCGIAP report. Dr Rajabifard also presented a joint paper titled "Making the SDI concept relevant to Asia-Pacific Countries – The PCGIAP Experience" outlining some of the experiences of the PCGIAP.

Around 900 people from almost 80 countries attended the event from 16-21 April including technical exhibit, sessions, councils and board meetings. A separate full report about the conference has been submitted to this 11th PCGIAP meeting.

#### 2. International Workshop on Administering the Marine Environment

As part of the WG3 Workplan (2002-2004), WG3 organised a four-day workshop (4th-7th May 2004) on Administering the Marine Environment – The Spatial Dimensions in Asia and Pacific region. The workshop was conducted in Kuala Lumpur, Malaysia and hosted by the Department of Survey and Mapping Malaysia.

The objective of the workshop was to better understand the spatial dimensions of administering marine environment in Asia and the Pacific region and particularly to facilitate:

- *an understanding of the needs of an SDI in the marine context;*
- *better understanding and appreciation of the administration of marine rights, restrictions and responsibilities; and*
- *the documentation of issues in establishing a marine dimension as a key component of National SDIs.*

The Workshop reviewed national administration of marine environments of countries in Asia and the Pacific region based on a common template to identify problems, issues, similarities and differences in spatial data infrastructures; institutional arrangements; the administration of rights, restrictions and responsibilities; technology and human resource and capacity building in the marine environment.

102 people from 11 countries (Malaysia, Australia, Fiji, India, Cambodia, Indonesia, Kiribati, Thailand, Brunei Darussalam, Canada, Ireland) attended the workshop.

The first day of the workshop (5th May) included the official opening and presentation of invited reports, papers and country reports. After the official opening ceremony, the workshop began with a keynote and welcome address by Prof Ian Williamson, the Chair of WG3 (Cadastre) and the Chair of the workshop. He highlighted the importance of the coastal zone to sustainable development, a critical policy issue that is increasingly recognised by most countries in the region.

Dr Abbas Rajabifard, the Research Coordinator of WG3, reviewed and presented the WG3-workplan and progress in the development of the marine country report template followed by future plans for all countries in the Asia and Pacific region to complete the template.

Two invited reports were then presented on the outcomes of related conferences and meetings held over the past year, being the International Conference on Sustainable Development of the Seas of East Asia held in Putrajaya, Malaysia on 8-12th December 2003 and the outcomes of the UNB-FIG meeting on Marine Cadastre in Fredericton Canada in September 2003.

Three further invited papers were presented contributing to an understanding of the spatial dimensions of the marine environment. Mr. Darius Bartlett, from the University College Cork, Ireland presented "Extending Spatial Data Infrastructures into Marine Environments: A Work in Progress", concentrating on the issues present within Ireland and Europe as a whole followed by an overview of the concept and history of SDI initiatives around the world and the importance of the marine dimension in any such initiative. Dr. Phillip Collier from the University of Melbourne, Australia then presented the "Current Status and Future Direction of Australian Marine Cadastre Research", focussing on current activities and research projects within University of Melbourne followed by some concluding issues for future activities on marine SDI and marine Cadastre research. The final invited presenter Ms. Jude Wallace, also from the University of Melbourne, talked about the Registration of Marine Interests and the ability of a marine register to become a tool to assist in the management of resources in the marine areas and the administration of interests in these resources.

The afternoon session was allocated to the presentation of Country Reports on marine administration activities by participant countries, based on the WG3 country report template. In this session, 7 countries reported on their marine activities (Australia, Malaysia, Canada, Cambodia, Fiji, Indonesia and Ireland) followed by questions and discussions. Each country identified and reported on the most important issues and challenges affecting their marine activities.

Day two of the Workshop (May 6th) was allocated to the discussion of the three main objectives of the workshop and the development of possible resolutions and recommendations to the PCGIAP on administering the marine environment.

A background paper discussing the "Issues in Developing Marine SDI" was presented by the Workshop Chair. As part of his presentation, Prof Williamson highlighted the key environmental, social and economic factors and issues driving the development of Marine SDI. He also pointed out that whilst access to spatial data aids in effective decision-making to achieve sustainable development, the majority of SDI initiatives stop at the land-sea interface. This encourages marine

data to be held in various formats, at various accuracies within 'data silos'. He concluded by stressing the need to assess current systems in order to identify technical, legal and institutional arrangements hindering coordination and effective management of the marine environment.

Delegates then broke into the following three Working Groups with each discussing different aims and objectives, and with each group led by a Chair, Vice Chair and Rapporteur as follows.

WG1: Issues in administering the marine environment

WG2: Definition of marine SDI and marine cadastre

WG3: Administration of marine rights, restrictions and responsibilities

Some of the major points highlighted during the WG discussion sessions included:

- Importance of including a marine component within the SDI policies as part of countries obligations to UNCLOS.
- SDI and cadastre are different and cadastral data can be a subsets of SDI as well as a process based on SDI.
- SDI should facilitate access, management and sharing of spatial data in both the marine and land environments at any jurisdictional/political levels.
- The marine cadastre can include components of the land-based cadastre and in addition it must take into consideration the fuzzy nature of boundaries as well as a 3D (volume) and sometimes 4D (temporal) nature of the interests in the marine environment.
- Importance of collaboration between FIG, Commission 4 and PCGIAP, Working Group 3 (Cadastre) on issues relating to marine SDI and marine cadastre.
- Lack of a single organisation capable of coordinating issues on marine environment.
- Importance of institutional reform and capacity building in administering marine rights, restrictions and responsibilities.
- The Marine SDI should relate to natural boundaries as well as administrative boundaries.

The afternoon session consisted of a technical visit to the Petroliam Nasional Berhad (PETRONAS) the national petroleum company of Malaysia which owns, manages and adds value to the petroleum resources of Malaysia. Briefings were given by PETRONAS personnel, including their gas and petroleum exploration and production activities in the sea.

The final day of the workshop (May 7th) was used to discuss and finalise the workshop outcomes, resolutions and the report to the PCGIAP. Each working group gave a final report based on the comments and feedback discussed during the plenary session on Thursday with resolutions prepared by the Resolution Working Group.

The participants discussed and made some suggestions and agreed on 5 Resolutions as listed below:

#### **Resolution 1 – Spatial Dimension of Administering the Marine Environment**

*Recommends* that all countries in the Asia-Pacific region with an extensive marine jurisdiction and administrative responsibilities be encouraged to include a marine dimension in their NSDI as part

of their obligation to meeting their responsibilities under the United Nations Convention on the Law of the Sea (UNCLOS),

*And further recommends* that they cooperate with other countries to ensure technical, operational and policy consistency in the marine elements of NSDIs developed in the Asia-Pacific region.

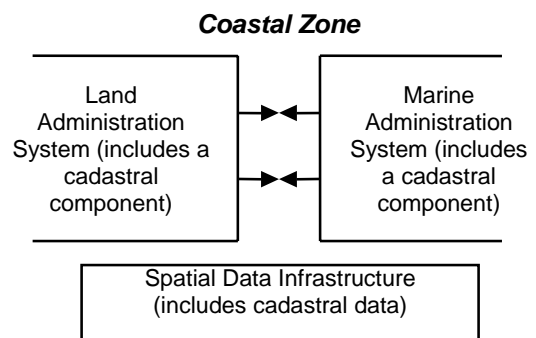
### **Resolution 2 – PCGIAP-FIG Collaboration**

*Recommends* that PCGIAP and FIG collaborate through their respective work plans on marine cadastre, marine SDI, marine administration systems and ocean governance and encourages the FIG to participate in the Marine Cadastre Template Project.

### **Resolution 3 – Defining the Spatial Dimension of the Marine Environment**

*Recommends* that the term “marine administration system” is adopted for the administration of rights, restrictions and responsibilities in the marine environment, with the spatial dimension facilitated by the Marine SDI,

*And further recommends* that a marine cadastre is defined as a management tool which spatially describes, visualises and realises formally and informally defined boundaries and associated rights, restrictions and responsibilities in the marine environment as a data layer in a marine SDI, allowing them to be more effectively identified, administered and accessed.



### **Resolution 4 – Requirement for Further Development of Guidelines and Tools to Administer the Spatial Dimension of the Marine Environment**

*Recommends* that PCGIAP further investigates and develops guidelines and tools for administering the spatial dimension of the marine environment.

### **Resolution 5 – Expression of Gratitude to the Host Government**

The workshop was concluded by Prof Williamson who thanked the Malaysian Government and particularly the Department of Surveying and Mapping Malaysia for their contributions in organising such a successful Workshop. Mr Ahmad Fauzi bin Nordin officially concluded the workshop on behalf of the Department of Survey and Mapping, Malaysia by thanking all those who attended the workshop and who contributed to its success. The full Report of the workshop can be found from the WG3 website.

## **3. Marine Administration Website**

Marine Administration website ([www.marineadministration.org](http://www.marineadministration.org)) is a dedicated website designed and developed by PCGIAP-WG3 and Centre for SDIs and Land Administration, Department of Geomatics, The University of Melbourne. The website contains country reports on Marine Administration systems based on a jointly developed template. This activity has been established under UN mandate by Resolution 4 of the 16th UNRCC-AP in Okinawa, Japan in July 2003. All information presented at the International Workshop on "Administering Marine Environment - the

Spatial Dimensions", held in Kuala Lumpur May 2004 together with related materials can be found on this website.

Currently there are six country reports online. However, WG3 has aim to continue promoting Marine Administration Template for Country Report in order to have a wider view of the Asia-Pacific region. The WG3 research team will analyse the results of the workshop as well as publishing online, all country reports. Further, discussion has been held with FIG Commission 4 (Hydrography ...) to collaborate to further extend the number of countries participating in this project.

\* Any countries interested in being involved in this project or updating country data already submitted is more than welcome. Please complete the template which can be downloaded from the website and send to Dr. Abbas Rajabifard, Research Coordinator WG3 ([abbas.r@unimelb.edu.au](mailto:abbas.r@unimelb.edu.au)).

#### **4. Coastal Zone Asia and Pacific Conference-Brisbane, Australia**

The WG3-Research Coordinator, Dr Abbas Rajabifard will participate and present a report about WG3 activities and introduce PCGIAP to the Coastal Zone community at the International Coastal Zone Asia and Pacific (CZAP) Conference, in September in Brisbane, Australia. This will publicise the activities of WG3, in particular the activities on marine SDI and marine cadastre and identify the important organisations within our region which we can collaborate with.

The CZAP conference is organized as a response to an increasing need for sharing and adopting of good, practical and feasible integrated coastal management programs. The overall aim of the conference is to bring researchers, practitioners, educators, communities, industries, government and non-government groups to develop national and regional strategies for integrated coastal management that will improve the state of the coastal areas.

There will be a strong emphasis on building collaborative linkages between agencies, programs and professionals working in the region. This is the main point that we believe PCGIAP can contribute and facilitate their activities.

According to the conference organiser, nearly 300 researchers, coastal managers, educators, policy makers, tourism operators, community leaders, university students, government and non-government staff from more than 40 countries plan to attend the conference. Themes include poverty and sustainable livelihoods; ecosystem management; community participation; protected areas; resource economics; integrated management; and communities and cultures.

#### **5. Integration of Built (cadastral) and Natural (topographic) environmental datasets within National SDI Initiatives**

One of the projects that WG3 has aimed and proposed to work on for the next three years is the relationship between cadastres and SDIs and particularly the relationship and integration of cadastral and topographic datasets.

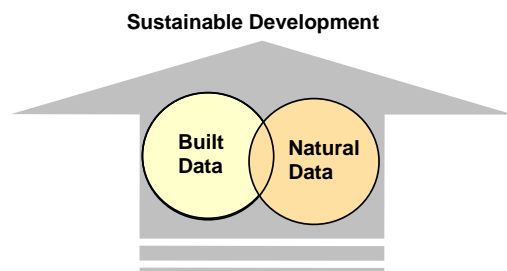
Amongst spatial data, cadastral and topographic datasets are the most important for describing the built and natural environment. These datasets are the 'foundation data' in modern market economies. Cadastral datasets are the accumulation of individual property boundary surveys undertaken by land surveyors. By nature, cadastral data is very different to topographic data which is produced at medium to small scales over large regions using various techniques.

In all countries, the two foundation datasets were developed to serve different purposes and are usually managed separately. This separation is recognised as a barrier to implementation of sustainable development. Duplication imposes unjustifiable costs on data collection and maintenance. The datasets should adopt the same overarching philosophy and data model to achieve multi-purpose data integration, both vertically and horizontally.

Merging of these datasets at a local level has been achieved to some degree, however, attempts to integrate the datasets at a national level, even where SDIs are well developed, has been difficult and problematic internationally.

National SDI initiatives for better coordination cannot overcome the institutional or data incompatibility barriers despite needs to maximise benefits from investment in data collection and to better inform land management decisions. Technological opportunities for data sharing alone cannot facilitate holistic comprehension of land as a composite of its built and natural components.

Therefore, the aim of WG3 through this project is to better understand and describe the technical, jurisdictional, institutional, legal and land policy perspective surrounding the two foundation datasets (cadastral and topographic) in a National SDI. The project will investigate the justification for integrating these two forms of spatial data in support of sustainable development (Figure 1) and develop a model and framework capable of being used in diverse jurisdictions.



**Figure 1:** Integration of datasets to facilitate sustainable development

The work on this project began in April 2005 through an overview of the history and application of these two datasets as well as the overall relations within the context of National SDI initiatives. Work on the project will continue over the next 3 years and will contribute to meeting four main research aims which include:

- Investigate the problems and issues in integrating data in National SDIs within Asia and the Pacific case study countries through an analysis of;
  - History of integrating cadastral and topographic mapping initiatives
  - History and status of National SDI initiatives.
  - Capacity for and policies relating to data integration.
  - Institutional support for and barriers against data integration.
- Develop a framework model for the integration of built and natural environmental datasets at a national level, through the development of National SDIs;

- Investigate interoperability issues of national topographic datasets and state cadastral (and other relevant) datasets.
- Development of integration data model.
- Development of implementation strategy.
- Development of a methodology to prioritise SDI datasets.
- Identify the benefits of the integration framework model for developed and transitional countries in the Asia-Pacific region, with reference to case study countries; and
- Undertake a publication strategy.

6 Case studies will be undertaken within both developed and transitional countries in the Asia-Pacific region in order to gain a broad focus of research. These include New Zealand, Japan, Thailand, Malaysia and Australia. The progress of this project will be continuously monitored and results presented through the PCGIAP and in particular discussed within the WG3 meetings.

## **6. Cadastral Template Project**

As part of the WG3 workplan as an ongoing activities, WG3 continues its effort to promote the the project and responses to the Cadastral Template and collate the completed reports, and also maintain and update the Cadastral Template website. Currently there are 36 country reports online and a paper analysing the results is currently being finalised. This paper employs several indicators which have been used to analyse and benchmark countries cadastral systems, results of which will contribute to an improved understanding of the complex relationship between cadastral, land administration system and National SDI initiatives. This will also enable a worldwide comparison of cadastral systems, forming the basis for best practice and a tool to improve national cadastral systems. The results will also be presented to the PCGIAP and members will be updated through different channels.

## 7. Future Workplan

The work plan for the next 2 years is as follows:

No	Activities/Steps	Date
1	Work on relationship between cadastres and SDIs and particularly the relationship and integration of cadastral and topographic datasets.	2005-2007
2	Identifying issues confronting PCGIAP-Member Nations in building and maintaining cadastral layers in their National SDIs.	2006
3	Continue promoting the project and responses to the Cadastral Template and collate the completed reports	Ongoing
4	Maintain and update of the Cadastral Template and Marine Administration websites	Ongoing
5	Analysis of results of Cadastral Template (prepare report, draw the graphs, etc.) and report on outcomes of analysis	May 2005
6	Continue promoting Marine Administration Template for Country Report in order to have a wider view of the Asia-Pacific region	Ongoing
7	Analysing the results of the Marine Administration workshop and all country reports (prepare report, draw the graphs, etc.)	12th PCGIAP Meeting
8	Report on outcomes of WG3 activities (including analysis of cadastral template results and marine administration results, recommendations, future plan, etc.)	12th PCGIAP Meeting