

# **GIS Consortium Aceh: A Success Model to Support Local Government**

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## **Abstract**

GIS has played an important role in the rehabilitation and reconstruction of Aceh after the devastating effects of the 26 December 2004 Tsunami. The number of responding aid agencies both national and international have had a positive impact on the availability of spatial information in the region. However, this data will not be useful without the support of qualified staff who are able to continue operating, maintaining and analyzing this data in the future, after the aid community has left the area.

A GIS community in Aceh, named the GIS Consortium, was established 29 April 2006. This consortium is comprised of more than 20 different organizations, both local and international. The members are volunteers and have come together to share their knowledge with the local government in the province by developing GIS capacity building programs, enabling and enhancing GIS services to local communities, and supporting the implementation of a Spatial Data Infrastructure.

In this paper we will present a brief overview of the activities undertaken by the GIS Consortium as they support the local Aceh (Nanggroe Aceh Darussalam – NAD) provincial and district government recover from the disaster and rebuild for the future.

## **1 Emergency Effort**

The earthquake and the Tsunami on the 26<sup>th</sup> December 2004 destroyed large parts of Aceh. This disaster results in tens of thousands of deaths and the destruction of settlements, infrastructure and the environment.

The recovery effort across the province naturally faced huge challenges; land had to be cleared of millions of tons of debris and silt before it could be used again either for agriculture or to build houses; land ownership had to be established before houses could be rebuilt; large areas of land were no longer suitable for housing because of the impact of the Tsunami and earthquake.

The destruction impacted all levels of services; water, sewerage, and electricity had to be provided to communities while houses were being built to make them viable; even the transport of supplies and work force to affected areas was hampered; the single road along the west coast had been badly damaged or washed away in large sections, resulting in a logistical nightmare.

All this occurred in a region that had suffered decades of neglect and conflict and was ill-equipped to respond to even a minor emergency. Of course the Tsunami also sparked

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unprecedented world-wide support and the largest relief effort the world community had undertaken.

In its immediate response to the recovery effort the United Nations (UN) recognised the importance of the use of, and access to, information and spatial data. The UN set up a Humanitarian Information Centre in Banda Aceh (HIC Sumatra) which was deployed as a common service to the humanitarian community working in Sumatra and the surrounding countries. The HIC became established as a provider of information products and services and enabled the humanitarian community to deliver assistance more effectively; it also acted as a focal point for data collation, and in later stages data analysis, and data dissemination in support of the provision of humanitarian assistance.

In the management of data sets and the provision of spatial data products HIC-Sumatra also relied upon Geographic Information Systems (GIS) as a key operational tool, and facilitated access to a wide range of data sets including national base maps, custom map product, and high resolution satellite imagery. As the relief efforts transitioned into recovery and development, the focus of the HIC shifted as well. In September 2005 the HIC was re-named the United Nations Information Management System (UNIMS), concurrent with the establishment of the Office of the United Nations Recovery Coordinator for Aceh and Nias (UNORC).

## **2 Rehabilitation and Reconstruction Process**

In February 2006 as UNIMS reached towards the end of its mandate a successful transition of capacity was achieved between the UN and Government of Indonesia. The establishment of the Spatial Information & Mapping Centre (SIM-Centre) at Bureau of Rehabilitation and Reconstruction (Badan Rehabilitasi dan Rekonstruksi BRR) NAD-Nias was expedited by the migration of much of the GIS capacity, and spatial datasets and products, from the UNIMS to the SIM-Centre.

Located at BRR, with co funding from UN, Norwegian Government and BRR, the SIM-Centre has efficiently achieved and maintains its prime objective to operationally support the BRR and the recovery community with the provision of spatial information and products. The SIM-Centre's current focus is now on its secondary objective to build a sustainable GIS capacity at provincial government agencies. The activities supporting this secondary objective are demonstrated in a number of manners by the SIM-Centre: co-ordination of GIS activities within BRR; provision of on-line data catalog and online mapping tools; provision of training in GIS and GPS; the establishment and hosting of a cross community GIS user group; and in the initial promotion, support and development of Aceh Spatial Data Infrastructure (SDI).

### **2.1 Data availability and Human Resources**

For the reconstruction of post Tsunami Aceh, the availability and the management of spatial data and information were needed. They were an important source for planning and decision making in the rehabilitation and reconstruction processes. Furthermore the

availability of human resources to support, handle and manage spatial information and data is essential.

National and international agencies concerned with the rehabilitation and reconstruction processes have had a very positive impact to the availability of spatial data and information in this region. Through a mandate from the BRR all spatial data and information acquired and used during the reconstruction process must be delivered to respective provincial government departments. But the data which have been obtained will return little benefit without the support of qualified human resources, who are able to operate, maintain and analyze this data in the future.

Good data is useless without the support of adequate human resources. The staff of the government departments should be able to operate the information system in order to support the sustainable development in Aceh region. So, a program to improve the capacities of human resources in GIS at the local and provincial was developed..

## 2.2 GIS Infrastructure

Across the province there has been a rapid development of data management systems and hardware. Since GIS is a unique tool for data entry, updating, managing, integrating and analyzing spatial data, it is seen of prime importance that the application of GIS follows alongside this rapid development.

GIS Infrastructure in Aceh developed over time with the support of project such as GTZ project Support for Local Government for Sustainable Reconstruction (SLGSR). This project currently supports three of the most heavily Tsunami damaged districts and supports the district government of Aceh Besar, Kota Banda Aceh and Pidie. At the request of the local government the project has established a GIS Center in each of these districts. Each GIS centre is based in the department of planning offices (Bappeda). Recently in collaboration with BRR and the SIM-Centre the project has supported the establishment of the provincial level Aceh Geodata Center

## 2.3 GIS Capacity Building



To make optimal use of the GIS Center a clear concept and program of work must be established.. SLGSR proposed the concept of creating a GIS Forum within each GIS Center. The Forum directly involves all local governmental stakeholders (local government department – local government department) at the district level and later on at provincial level. The forum is established with the imposition of new district legislation by the local district government..

The GIS Forum consists of local government staff from departments including spatial planning, environmental agency, forestry, mining, agriculture, public-works, land service, statistics and other interested governmental departments in the district. The major function and the role of the GIS Forum is to support the sustainable reconstruction and development of the region by sharing and processing geographical data between the different departments.

To achieve this aim, a series of GIS training courses for local district government staff were required. Without offering these training courses there would be insufficient high quality human resources to operate and manage data and the equipments of the GIS Center. The courses would also support the government staff to complete their daily tasks and directly supports the work program of GIS Forum.

Establishing a GIS Forum at each GIS centers is seen to offer the following direct advantages:

- The potential for continuous data exchange by the professional GIS staff within the GIS Forum
- No redundant work and sectoral duplication, because map publication is managed by the GIS Forum (one-stop shopping for spatial data)
- Ensures that at the district level all departments are using the same baseline data sets.
- Data quality control for legal aspect (i.e. land rights, taxes, EIA)
- Teamwork instead of sectoral competition

In order to fulfill the need for capacity building in GIS, to provide GIS staff within each government department participating in the GIS Forum, at the request of the district government SLGSR and the GIS Consortium developed and provided GIS Basic Training using ESRI ArcGIS.

## **2.4 GIS Consortium**

Many international and national agencies used GIS for their project planning for the rehabilitation and reconstruction of the province, which meant that there was a large influx of GIS professionals working in Aceh. Initially coordination between this large body of GIS professionals was managed by an informal GIS User Group, established by UNIMS and maintained by the SIM-Centre, with a prime objective to share information on GIS activities and enable access to data between agencies.

Within this user group there was a strong opinion promote improvement of local capacities for GIS. A number of agencies deployed their own programs for capacity building, but within the group it was seen that it would be more effective if the whole GIS community shared the joint task of capacity building for GIS. The decision was taken to form a GIS consortium with this objective.

The GIS Consortium, was established 29 April 2006. This consortium is comprised of more than 14 different organizations, both local and international. All the members are volunteers and come together to share their knowledge and experience with the local government in the province. The GIS Consortium develops GIS capacity building programs, enabling and enhancing GIS services to local communities, and supporting the implementation of a Spatial Data Infrastructure.

## **2.5 Activities of GIS Consortium**

The GIS Consortium supports SLGSR program to establish GIS Centers by training the local government staff in GIS, and to date 66 local government staff from the 3 districts have been trained. The GIS Consortium are also actively providing training for other activities using GIS such as training to village planners rebuilding the some of the 600 or so villages damaged by the Tsunami, and supporting grass roots up planning in the district capital of Banda Aceh. The GIS consortium has also hosted workshop focusing of integrated use of spatial data in collaboration with international bodies such as Conservation International, and national bodies such as the RSGIS Forum The GIS Consortium, supported by SLGSR, is currently contributing to the development of a Master Degree program for Spatial Development Planning, at the University of Syiahkuala in Banda Aceh.

## **3 Preparedness Post Rehabilitation and Reconstruction**

Although there still remains a lot of work to be completed to achieve the Indonesian's Prime Ministers vision of a province "built back better", the province is now in a situation where the focus for GIS activities can be shifted to the future of the province.

The preparation of human resources and the use of GIS to support local government have to be started from now, in this period when the BRR transitions and hands over all its activities to local government. This matter is of vital importance so that the local government is ready to use data and existing GIS facilities to support planning and policy to create a sustainable development program.

There are a number of issues that must be directly considered. These issued are highlighted in the following sections.

### **3.1 Capacity building**

The process to develop local government capacities through capacity building program and decision maker awareness is a long process. The program must include the complete local government, and must educate all about the importance of data and support for GIS at all level from technical staff to the policy maker.

### **3.2 Sustainable use of GIS**

The GIS Forum, legislated by District Governor, must be utilized effectively to support planning and development in the region.

### **3.3 Coordination**

The weakness of coordination between government departments cause inefficiency in many aspects, such as duplication of work and increased confusion for planning and development processes.

The GIS Forum, consisting of the members from the majority of government departments provides a solution to increase the cooperation among institutions for integrated planning and development.

### **3.4 Collaboration**

Collaboration is different to coordination as it involves the agreed working together of agencies to achieve mutual goals. Collaboration has been seen to be active at a grass roots level, and over time collaboration between all agencies and partners has improved.

### **3.5 Data Access**

Experiences from responding to the initial Tsunami disaster revealed that finding and obtaining spatial data and information about the province was very difficult; government policies, years of neglect, inaccessibility, and an initial unwillingness to share were all contributory factors.

Using the GIS forum and GIS Centre model data sharing and data access should become common practice between government agencies.

### **3.6 Implementation of SDI**

The vision for a provincial SDI within Aceh must be continued to be supported and implement. The GIS consortium continues to promote and the support a provincial SDI through its capacity building activities.

## **4 The Future and Vision**

The GIS consortium will continue to support the established GIS forums and GIS Centers by acting as an independent body to provide continued monitoring of activities and progress. Over the next months links between the three GIS Centers will be developed and facilitated by the GIS consortium including exchange of experiences, ideas and lessons learnt between the centers. The goal of the GIS consortium is to implement the GIS forum model within all districts in the province and at the provincial level.

Building upon the foundations laid by all GIS activities in the province, by the numerous agencies and GIS professionals, the future for GIS in Aceh is very promising. The vision for the future is clear: a future where planning and decision making in Nanggroe Aceh Darussalam (NAD) will be supported by an integrated and sustainable spatial information system, based on accurate and reliable base data that are common throughout all Provincial and District agencies, with information being maintained by the responsible agencies in a timely manner to agreed standards and exchanged freely