Provincial Disaster Risk Reduction and Management Council Pangasinan State Government

Summary Report

Republic of the Philippines

Verification Survey with the Private Sector for Disseminating Japanese Technologies for Integrated Geographic Information System (Integrated GIS) for Improvement of Regional Disaster Risk Reduction and Management

October 2017

Japan International Cooperation Agency

Informatix Incorporated

Verification Survey with the Private Sector for Disseminating Japanese Technologies for Integrated Geographic Information System (Integrated GIS) for Improvement of Regional Disaster Risk Reduction and Management

Summary Report

Acronyms and Abbreviations

APEC : Asia-Pacific Economic Cooperation
CP : Counter Part
DICT : Department of Information and Communications Technology
DILG : Department of the Interior and Local Government
DOST : The Department of Science and Technology
DRRM : Disaster Risk Reduction and Management
GDP : Gross Domestic Product
GIS : Geographic Information System
GOP: Government of the Philippines
JICA : Japan International Cooperation Agency
LGU : Local Government Unit
NAMRIA : National Mapping and Resource Information Authority
NDRRMP : National Disaster Risk Reduction and Management Plan
O&M : Operation and Maintenance
OCD : Office of Civil Defense
ODA : Official Development Assistance
PAGASA : Philippine Atmospheric Geophysical and Astronomical Services Administration
PC : Personal Computer
PDP : Philippine Development Plan
PDRRMO : Provincial Disaster Risk Reduction and Management Office
PhilNITS : The Philippine National I.T. Standards Foundation, Inc.
RA10121: Disaster Risk Reduction and Management Act

1. BACKGROUND

Although the economic situation in the Philippines has been in a long-term slump since the 1960s to the 1990s, the growth rate of gross domestic product (GDP) has reached more than 6% in recent years, and economic growth is becoming more sustainable. Therefore, the economic growth rate since 2012 is higher in the ASEAN major countries. The Government of the Philippines has also developed projects for disaster risk reduction and management (DRRM) based on the policies stated in the medium-term development plan (PDP 2011-2016), and it has been increasing the budget for infrastructure development to solidify further economic growth. Recently, the Government of the Philippines (GOP) has established the Disaster Risk Reduction and Management Act (RA10121), which obliges the formulation of the National Disaster Risk Reduction and Management Plan (NDRRMP) in 2010, that contributed to share the information of their restoration and reconstruction experience from the Yolanda typhoon disaster or Sendai disaster prevention framework in APEC.

Also, in order to improve the disaster prevention level of the nation, the GOP has so far carried out the important activities such as legal and institutional arrangements, formulation of disaster reduction related plan, improvement of budget system and, capacity building of administrative agencies in the disaster prevention field. The disaster prevention related organizations are also supported by various donors, and the GOP's disaster risk reduction and management (DRRM) ability is steadily improving. To achieve the basic policy "Inclusive Growth" mentioned in the above PDP, it is considered that the GOP is adapting the policy and the legal system in DRRM sector, in order to cover the mutually influential factors of sustainable economic growth and improvement of the capability of DRRM.

However, it is difficult to say that the basic information sharing related to DRRM is enough between the relevant organizations from the viewpoint of accuracy and synchronization of information. In fact, there is still a strong sense of crisis against natural disasters from the viewpoints of damaged experience including many past typhoon damages in the target region after the formulation of PDP. The information that contributes to the evacuation activities in the event of disaster is stored in dissipate manner (although the data exists abundantly) and is not integrated or processed sufficiently for decision makings to response and command to related agencies.

In this circumstance, the Survey Team consisting of Informatix Inc., and the partners, was dispatched by Japan International Cooperation Agency (JICA) to conduct "the verification survey in the Province of Pangasinan, the Philippines concerning on the Informatix's Integrated Geographic Information System (GIS) products for Advancement of Regional Disaster Prevention (the Survey)" for about 20 months from the day of signing the contract between Informatix Inc. and JICA. JICA supervises the overall implementation of the Survey and own the products, equipment, and their incidental facilities, prepared by the survey team for the purpose of implementation of the Survey during the project. The Survey is formulated based on a new project scheme 'Verification Survey with Private Sector for Disseminating Japanese Technologies, which aims to demonstrate that Japanese technologies are highly effective in improving specific development challenges in the developing countries through actual installation and operation of products related to the technologies.

2. OUTLINE OF VERIFICATION AND DISSEMINATION

(1) Purpose

The overall goal of the Survey is to mitigate and minimize disaster damage in the Pangasinan Province as a result of capacity enhancement of CP LGUs on disaster management, by means of the information sharing regarding disaster prevention through the Integrated Geographical Information System (herein after referred to as "the GeoCloud Integrated GIS").

The Survey purpose is listed as follows:

- To study framework in which DRRM information is shared mutually and rapidly at the time of disaster.
- To craft DRRM information database using Integrated GIS in Province of Pangasinan and 3 LGUs in sustainable manners.
- To evaluate Integrated GIS by implementation of workshops on DRRM in which LGU officials (of Disaster Risk Reduction and Management Council) attend for improvement of DRRM activities of LGUs.
- To develop the plan to disseminate the technology in the Philippines.

(2) Activities

Based on the purposes of the Survey, the following activities is set and implemented:

(a) Activity-1: Discussion and examination for information sharing regarding disaster risk reduction between CP LGUs and the Central Government

- Explanation of outline of the Survey to Central Government
- Arrangement and management for information sharing meetings between CP LGUs and the Central Government
- Investigation for information to disaster risk reduction and management, relevant system, laws and policies.
- Examination of the information sharing mechanism and methodology

(b) Activity-2: Introduction and operation of the GeoCloud Integrated GIS in the Province of Pangasinan

- Implementation of preliminary survey
- Formulation of specification of the GeoCloud Integrated GIS and procurement of materials
- Modification works of the GeoCloud Integrated GIS
- Trainings on operation of the GeoCloud Integrated GIS for the development partner company(PhilNITS)
- Preparation for introduction of the GeoCloud Integrated GIS
- Trainings on operation of the GeoCloud Integrated GIS for CP LGUs
- Installation and setting-up of hardware of the GeoCloud Integrated GIS
- Setup and provisional operation of a prototype system
- Introduction and operation of the GeoCloud Integrated GIS
- Formulation of operational structure/system

(c) Activity-3: Implementation of workshops in the Province of Pangasinan

- Preparation of workshops
- Implementation of workshops for verification of the GeoCloud Integrated GIS
- Evaluation of the GeoCloud Integrated GIS based on the results of workshops

(d) Activity-4: Formulation of Business Plan for the dissemination of GeoCloud Integrated GIS

- Information collection for developing a business
- Implementation of seminars and observation tours
- Implementation of study tours in Japan
- Examination and Proposition for the dissemination of the GeoCloud Integrated GIS as a part of disaster risk reduction and management system in the Philippines
- Establishment of a plan to develop the business

(3) Information of Product/ Technology to be Provided

The provided products and technology in the Survey are as follows:

(a) Hardware

- Main servers in the Pangasinan Province with GeoCloud System
- Terminal PCs in the 3 LGUs to access and operate GIS system
- Surrounding Equipment (network system, Wi-Fi system, printers and scanners)
- Five (5) Radio Communication System for data transmissions between the LGUs

(b) Software:

- GeoCloud Integrated GIS
- Manuals and Guidelines for O&M of the GeoCloud Integrated System
- Training Manuals

(4) Counterpart Organization

The counterpart organization are the Pangasinan Province, one (1) city (Dagupan city) and two (2) towns (Binmaley and Lingayen towns) in the Province of Pangasinan.

(5) Target Area and Beneficiaries

Target areas are one (1) city (Dagupan city) and two (2) towns (Binmaley and Lingayen towns) in the Province of Pangasinan. Beneficiaries are all the residentiary of those areas.

(6) Duration

The Survey is implemented for about 22 months from March 2016 to December 2017.

(7) Progress Schedule

All of the activities are completed in the October 2017 including the donation of equipment and

systems, and the Survey will be terminated in December 2017.

(8) Implementation System

The implementation system of the Survey as organized at the beginning of the Survey is shown in the Figure 1.

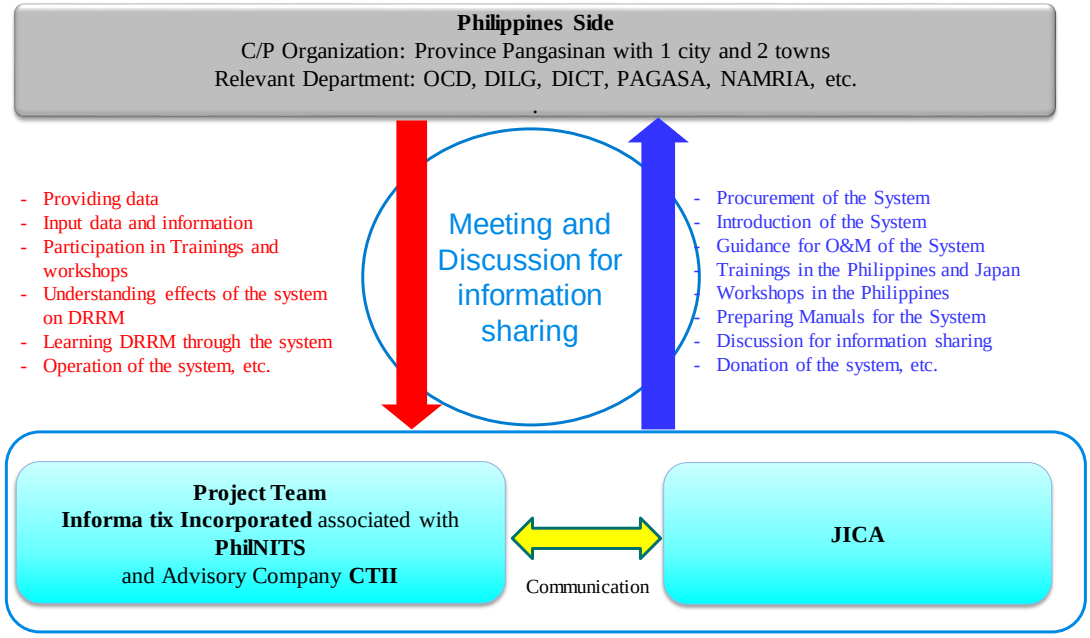


Figure 1 Implementation System of the Survey

3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey

(a) Activity 1: To study the method to share meteorological and disaster prevention information between governmental organizations and Province of Pangasinan

Activity Results

1-1: To discuss with governmental organizations, such as Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and Office of Civil Defense (OCD), to construct the framework to support the Survey.

The outline of the Survey was explained for the line ministries of DRRM such as PAGASA, OCD, DILG, NAMRIA, DICT in Manila on early April 2016.

1-2: To hold meetings with governmental organizations, the Provincial Government of Pangasinan and 3 LGUs to share meteorological and DRRM related information.

The first steering committee was held on July 2016 for explanation of the role of the meeting and the outline of the Survey. The second steering committee was held on November 2016 for updating the progress of the Survey and discussion about information sharing in the Philippines. The third steering committee was held on February 2017 for the explanation of the installation situation of hardware and software, operation situation of GeoCloud, the progress of the Survey and Japan visit. The forth steering committee was held on July 2017 for the explanation of the progress, training in Japan and Philippines, workshop contents and evaluation, LGU's activities and discussion.

1-3: To research on existing DRRM information and systems of governmental organizations.

The Survey was conducted for the condition and activities of DRRM information in each organization by interviewing to PAGASA, OCD, DILG, DICT, NAMRIA and urban LGUs (Pasig city and Marikina city) after October 2016.

1-4: To study information categories to be shared and the method to share between governmental organizations and Province of Pangasinan.

The information sharing method was surveyed considering the technical information from the activity 1-2/1-3, and conditions such as limitation and range of utilization.

Achievement and Summary

The roles/function of the related organizations and necessary information to conduct activities of DRRM were revealed through series of discussions and meetings, which were held with CP organizations and the relevant central governments such as PAGASA, OCD, DILG, NAMRIA and DICT. As a result of the discussions and meetings, the related organizations understood the aims and the effects of the Survey from the aspect of contributions to DRRM, and the information was shared among them, in order to establish the GeoCloud Integrated GIS for the Province of Pangasinan.

Figure 2 Information Sharing Meetings (Left: First Meeting, Right: Forth Meeting)

(b) Activity 2: Introduction and operation of Integrated GIS for Province of Pangasinan

Activity Results

2-1: To implement a preparatory survey.

From the beginning of the Survey, preparation was conducted in Japan and the team meeting was held for confirmation of the role of persons in charge, and schedule of installation. Then, the Survey contents were announced to concerned persons and the activities were started.

2-2: To design the detailed specifications of Integrated GIS and hardware.

There was not a big change of hardware configuration as planned at the beginning. At the time of procurement, a standard high-performance type of equipment was selected.

2-3: To customize the system following the specifications in Japan.

There was not a big change of hardware configuration as planned at the beginning. At the time of procurement, a standard high-performance type of equipment was selected, following the specifications in Japan.

2-4: To hold a training session for engineers of the local partner.

The training for engineers of the local partner was conducted for three weeks. Although, the training was planned for one week at the beginning. This comprised of two parts; the basic training and the development training, which contributes to enhance the effectiveness and earlier capacity building for development.

2-5: To implement preparatory works for system installation in the Philippines.

The basic data which LGUs need was developed by PhilNITS GC operators who have capacity to develop GeoCloud data.

2-6: To hold training sessions for LGU officials in charge of the project.

The training for LGU officials in charge was conducted for developing capacity to operate and utilize GeoCloud GIS System. It was subcontracted to PhilNITS.

2-7: To install and setup hardware.

The setup work such as software/hardware installation and operation confirmation was subcontracted to PhilNITS and conducted for utilizing the procured hardware.

2-8: To install and test Integrated GIS.

The provisional operation period was set for one month using proto version for test and training before full operation of Integrated GIS. After that, connection and operation of all terminal equipment was confirmed.

2-9: To start full operation of Integrated GIS.

Through the activities of "2-6: To hold training sessions for LGU officials in charge of the project" and "2-8: To install and test Integrated GIS", the environment for starting the operation was prepared.

2-10: To establish operation and support structures of Integrated GIS.

Through "Activity 3: Implementation of workshops in the Province of Pangasinan", the operation structure was clarified. For the smooth operation by LGUs and assistance of system operation during the Survey, the support desk was established and started the support services such as response of questions about operation and bug report.

Achievement and Summary

The main server of GeoCloud Integrated GIS was completely installed in the PDRRMO of Pangasinan Province and terminal PCs with surrounding equipment in the target LGUs. The specification of system was set based on results of investigations as to the present conditions of (i) DRRM in the LGUs, (ii) existing and necessary information and (iii) existing data transmission system.

Figure 3 Introduced System (Left: Radio Communication System, Mid: Terminal PC with access silences, Right: Server Setup with GeoCloud GIS System)

During the Survey, the knowledge and skills to operate the system were enhanced through series of trainings and study tours, which were conducted twice in Japan by the Survey Team. In addition, training and operation manuals in English are provided to CP organization as a reference to effectively operate the system in consideration of sustainability of self-system operation. As of October 2017, the system and equipment are donated to CP organization and being well operated by them after the donation.

Figure 4 Trainings on Operation of the GeoCloud Integrated GIS for CP

(c) Activity 3: Implementation of workshops in the Province of Pangasinan

Activity Results

3-1: To prepare design and plan of workshops together with/ based upon consultation with the Provincial Government and 3 LGUs.

Preparation work for workshop to evaluate the effectiveness of GeoCloud Integrated GIS was conducted considering flood situation and local DRRM structure. After the consultation with the JICA expert, the training concept was arranged to have workshops, focusing on preparedness of DRRM activities which is appropriate for evaluation of the effectiveness of GeoCloud Integrated GIS.

3-2: To conduct workshops together with the Provincial Government and 3 LGUs.

The first workshop was held on October 2016 for data collection/preparation and understanding of data utilization for the activities on DRRM. The second workshop was held on February 2017 for studying utilization for DRRM by creating disaster risk graphs to evaluate the effectiveness of the Integrated GIS on DRRM. The third workshop was held on June 2017 for creating flood hazard map to evaluate the effectiveness of the Integrated GIS on DRRM.

3-3: To evaluate the effectiveness of Integrated GIS based upon the outcome of workshops activities.

The evaluation of the effectiveness of Integrated GIS was conducted based upon the evaluation indicators for DRRM and System which was set during workshop preparation.

Achievement and Summary

To evaluate and verify the introduced system, the workshops were systematically conducted three times in the Philippines for the purpose of (i) data collection/preparation and understanding of data utilization for the activities on DRRM, (ii) establishment of disaster risk graphs, (iii) elaboration of flood hazard map in consideration of conditions of refugee. Especially, workshops of (ii) and (iii) were conducted and outputs (see Figure 5) are made by CP through operating the GeoCloud Integrated System.

The products in the workshops and CP's enough operation capacity proved the contribution of the introduced system for activities on disaster preparedness. This success has mainly been brought by the activities of capacity enhancement during the Survey, and powerful and friendly operation function/system of the GeoCloud Integrated GIS.

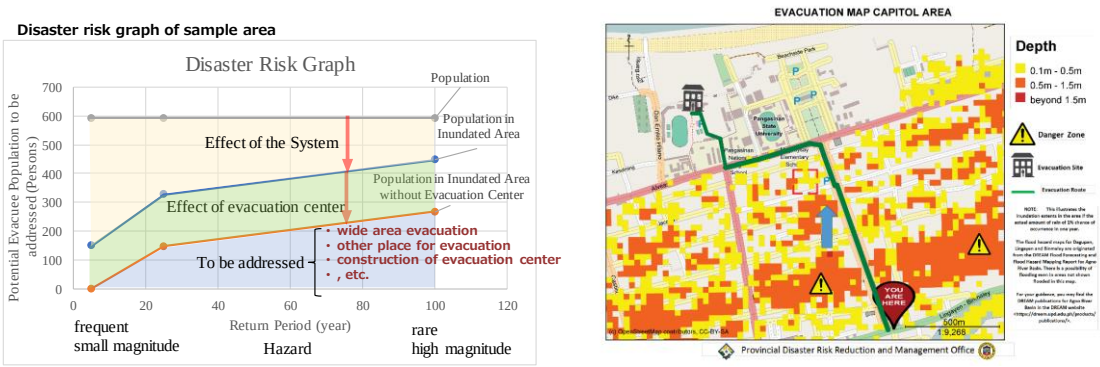


Figure 5 Outputs of Workshops (Left: Disaster Risk Graph, Right: Flood Hazard Map)

(d) Activity 4: To make a plan to disseminate Integrated GIS into all over the Philippines

Activity Results

4-1: To study for dissemination of Integrated GIS.

The study to ensure future dissemination of Integrated GIS was conducted considering the issues for dissemination clarified in "Activity 3: Implementation of workshops in the Province of Pangasinan".

4-2: To hold seminars and exhibitions with the cooperation of the Province of Pangasinan.

The seminar was held on August 2017 in order to introduce the Survey contents and results to line ministries and LGUs as a part of the dissemination activity of Integrated GIS.

4-3: To implement the study session in Japan.

The first Japan visit was conducted on November 2016 for LGU and line ministry officials in charge. Main objective was to learn the situation of Integrated GIS, data sharing among DRRM departments and data management of other departments, by visiting the local government which has Integrated GIS for contribution to a smooth operation start of Integrated GIS. The second Japan visit was conducted on May 2017 for decision makers such as the provincial governor and mayors, because it contributes to dissemination of Integrated GIS by understanding the situation of introduction of Integrated GIS in Japan and exchange of opinions.

4-4: To make a brief proposal for dissemination of the system for disaster prevention and its measures in the Philippines.

The dissemination concept of the system was studied with analysis about relevance and effectiveness of the dissemination of the system after workshops and interview to line ministries.

4-5: To make a future plan for dissemination of the Integrated GIS in the Philippines.

Based on the activity 4-4, the future activities and plan in the Philippines were formulated.

Achievement and Summary

Based on (i) the verification results of the introduced system as mentioned item (c), (ii) a research of market environment by 3C analysis and (iii) the level of potential capacity of local government staff to adapt to the System, a business plan was formulated to disseminate the GeoCloud Integrated GIS in governmental organizations in the Philippines in order to improve the condition of DRRM. In the Survey, the verification of the System was carried out from the viewpoint of disaster preparedness; however, the System was applied by Informatix Incorporated for the activities on other stages of DRRM such as response and rehabilitation in Japan.

Moreover, the System has a possibility to be applied for other business field such as asset management, land use management and traffic management etc. in accordance with the concept of i-government in the Philippines.

(2) Self-reliant and Continual Activities to be Conducted by Counterpart Organization

To keep sustainability on the O&M of the GeoCloud Integrated GIS by CP themselves, the Survey Team prepared tools and a scheme to support CP (particularly, LGUs) in order to smoothly conduct O&M of the System as follows:

- Training and operation manuals and guidelines in English were ready for users
- Technical transfer to the business partner (PhilNITS in the Philippines) from Informatix Incorporated successfully finished. After the contract between them, the business partner will support for not only operation but also maintenance and expansion of the System.
- According to the result of the interviews with the participating staff of LGUs, it was recognized that the System has friendly and visually arranged function to input, modify and analyze the information for the staffs of LGUs.
- The installation fee and cost of maintenance are kept in reasonable conditions compared with the DRRM budget of Provinces and LGUs.

4. FUTURE PROSPECTS

(1) Impact and Effect on the Concerned Development Issues through Business Development of the Product/ Technology in the Surveyed Country

The target country has suffered from natural disasters such as typhoon, severe storm, floods, landslide, etc. Normally, the risk of those disasters is analyzed based on the hazard degree, the vulnerability of people/assets and DRRM system, and the exposure condition in the target area. In this context, the products and technology transferred to CP organizations in this Survey will contribute to future reduction of vulnerability of the whole LGUs in their implementation capacity of DRRM, if the product will spread to other LGUs.

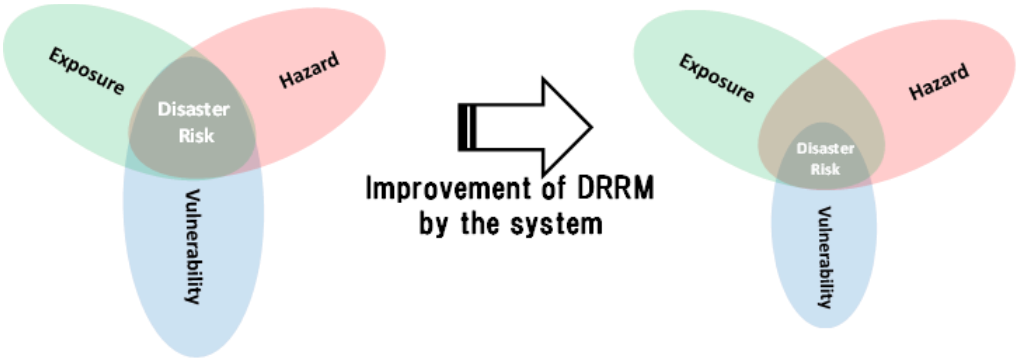


Figure 5 Impact and Effect on the Risk of Disasters in the Philippines

For example, during the Survey, quick impacts were happened in CP LGUs. The CP conducted making wide-areas road maps to clarify the vulnerable area to flood inundation and pasted the modified flood hazard maps on the news boards in the city and towns. As just described, the reduction of vulnerability by LGUs was immediately started after the completion of installation of the product and technical transfer for the operation of the System in the Survey.

(2) Lessons Learned and Recommendation through the Survey

(a) Lessons and Learnings

(i) Importance of Local Business Partner

The local business partner has covered and supported the activities of the Survey during the absence of Informatix Incorporated in the Philippines, particularly, in case of necessity of urgent negotiations and discussions, which often happen with sub-contractors to change design or spec-conditions, in order to procure and install the equipment and system on time as well as conduct inventory management for spare parts in the Philippines. Based on this experience, the Survey Team realized the importance of the local business partner to realize the formulated business plan.

(ii) Significance of Supports by In-house Staff

To promote and conduct a number of activities in the Survey on schedule, supports and assists by in-house engineer and administrative staff were essential and very effective. As a result of this experience, it can be said that the supportive structure should be established when the dissemination of the System starts in the Philippines based on the formulated business plan.

(iii) Effectiveness of Assistance by Consultant

Through the Survey, it is realized that the development consultant are conversant with the technical and administrative terminology, schemes of ODA project, mechanism and procedure of ODA projects very well, so that Informatix Incorporated can attain the goal and outputs of the Survey on schedule. In addition, it can be said that the consultants will effectively collaborate to promote the implementation of the formulated business plan

(b) Recommendation

The DRRM projects are largely divided into two portion such as structural measures (hard components) and non-structural measures (soft components). The introduced system is categorized into the non-structural measures and its cost and installation time are less than the structural measures. In the Sendai disaster prevention framework, the disaster risk reduction and mitigation by the non-structural measures are also recognized as an important method, with quick impact on the mitigation of disaster damage. In this context, it is recommended to incorporate the introduced

system (the GeoCloud Integrated GIS) with technical transfer into the ODA and DRRM projects as one of non-structural measures to reduce and mitigate the future risk and damage by disasters.

Attachment

The Philippines

Verification Survey with the Private Sector for Disseminating Japanese technologies for Integrated Geographic Information System (Integrated GIS) for Improvement of Regional Disaster Risk Reduction and Management

Informatix Inc., Kanagawa, Japan

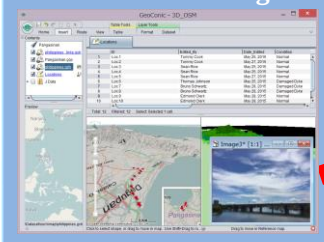
Concerned Development Issues in the Philippines

- Upgrade of bases for disaster risk reduction and management (DRRM) in participating LGUs.
- Upgrade of response capability in sharing DRRM information among LGUs, evacuation and the instructions.

Implemented Activities in the Survey

- To construct DRRM information database on Integrated GIS, and to train officials for updating data and the maintenance.
- To study the method and contents of information for sharing with related governmental organizations.
- Implementation of Disaster Imagination Games for officials.

Proposed Products/Technologies



Products/ Technologies

GeoCloud Integrated GIS (Geographic Information System)

- The technology to collect and link map information owned at multiple sections and organizations.

- Realization of information sharing and its maintenance easily with low cost exploiting the technology of cloud computing.

Survey Overview

Name of Counterpart:
The provincial government of Pangasinan
Survey duration: Mar/2015 – Dec/2017
Survey Area: Province of Pangasinan, 1 city and 2 municipalities.

Impact on the Concerned Development Issues in the Philippines

- Establishment of the framework in which DRRM information is shared mutually and rapidly, complying related policies of central governmental organizations.
- LGUs' communication and response ability for disaster risk reduction and management is strengthened.

Outputs and Outcomes of the Survey

Current

- GC Integrated GIS is used in lots of public institutions, but only in Japan.

Under & Post Project

- Practical use of the Integrated GIS other than DRRM matters, such as city planning and assets valuation.
- Pangasinan will be known as a model of practical use of Integrated GIS for DRRM, and it helps to disseminate the framework all over the Philippines.