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**Conference papers: Invited papers on achievements and developments in
Geographical information management in addressing national,
regional and global issues.**

Global perspectives on UN-GGIM vision*

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“UN-GGIM vision for Asia and the Pacific Region”

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I. Need For Global Geospatial information management

In recent years, there has been a rapid increase in the occurrence of natural disasters; for example, earthquake in Haiti and Hurricane Katrina. Taking 2005 Hurricane Katrina of New Orleans in the United States for example, approximately 150,000 human lives were endangered, despite efforts to evacuate residents to safe shelters. As a result, New Orleans was faced with the loss of 220 billion dollars in assets. The damages were even greater the second time around, when proper measures failed to take place.

Besides these natural disasters, there are a growing number of global issues including many cross-border problems like climate changes and natural disasters that not a single nation or region can be self-sufficient in dealing with it. The management of global geospatial information plays a key role in addressing and rapidly responding to such global challenges by consistently monitoring as well as being a tool to support a decision making in addressing the issues at hand.

So the UN and other related agencies have organized programs such as GDACS, UN-SPIDER that can inform about such natural disasters using geospatial data. During the earthquake of Haiti in 2010, the GIS was utilized to recognize the condition of situation as well as for its support operation. The well-structured geospatial information relating to damages became the grounds in establishing strategies that can be effective for recovery efforts alongside the delivery of relief goods.

Until now, any collection and production of geospatial information in dealing with globally challenging issues have been done independently by individual countries or by related organizations or departments under the UN. As such, the process mentioned above required a lot of time, funding and efforts. All the more, collected geospatial information was inconsistent and inadequate to make good and efficient use of it, even on a national level. In looking at the world as a whole, there are some nations that have already establish geospatial information and institution and legal framework. Nonetheless, there are also nations that have not yet established Geospatial information. In this way, the level of establishing GI and conditions of each country vary. For this reason, sharing and exchange of global geospatial information is very difficult. Thus, it is essential to establish a global mechanism to enable sharing and exchange of geographical information from varying countries possible.

II. The UN initiative on Global Geospatial Information Management

1. UN-GGIM past progress

1.1 Limits of existing efforts for global sharing of GI

In establishing geospatial information between nations and for globally sharing such information gathered, various strategies as well as technology, know-how, methods and so forth are necessary. For this, we have various international organizations, institutes, corporations, and professionals. In their own right, all have strived to establish global mechanism for sharing GI. A good example would be that of ISO and OGC for international

standardization of geospatial information. Even so, such a sole activities centered on a individual organization can not make sufficient effect.

1.2 The UN initiative on Global Geospatial Information Management as global cooperation mechanism

Therefore, a measure to further support related int'l organizations, institutes, corporations, and professionals to share not only information but also create new technologies and know-hows is essential and a systematic structure must take place to create synergy in its collaborative efforts. In addition, in establishing a global mechanism, we must find a collaborative cooperation system that incorporates such advanced technology, knowledge, and professionals to create group intelligence. For this, establishing a global geospatial information sharing mechanism, a continual and long-term investment must be made as well as setting up an organization to carry this main task and role positioning.

In consistent to a global geospatial information sharing mechanism, UN-GGIM was established under the leadership of the UN. UN-GGIM consists of a parallel structure of both committee of experts and high-level forum. As a formal UN Body Experts committee can provides global consultation mechanism of experts to UN-GGIM and makes the agenda of High Level Forum. High level Forum can inform the decision makers of the importance of global geospatial information management and to reflect the results of consultation of the forum to each of nation's policy.

1.3 1st High Level Forum on UN-GGIM

The First High-Level Forum on UN-GGIM took place for 3 days from Oct. 24 to 26 in 2011 where 350 members of 90 nations participated including 9 minister, UN representatives as well as 37 other int'l organizations and even private sectors. The forum was carried out in 4 sessions according to the following themes: Challenges in Geospatial Policy Formulation and Institutional Arrangement, Developing Common Frameworks and Methodologies, International Coordination and Cooperation in meeting Global Needs, Capacity Building and Knowledge Transfer. The outcome of 1st HLF on UN-GGIM is that it can inform decision maker including ministers of the importance of global geospatial information management and motivate them to implement the results of forum.

1.4 Adoption of 'Seoul Declaration'

Based on the presentations and discussion of the forum, a 'Seoul Declaration' emphasizing the need of an increase in global collaboration in the field of global geospatial information was made. Through it, a vision and a firm conviction of continually developing geospatial information as well as its humanitarian support was shared. The contents of the 'Seoul Declaration' is as follows:

We, therefore resolve,

- to express our support for the initiative of the United Nations to foster geospatial information management among UN Member States, international organizations, and the private sector; and in this regard:
- to take actions to foster and strengthen national, regional and global cooperation with the aim of developing an interconnected global community of practice on geospatial information under the umbrella of the United Nations;
- to devise effective processes for jointly and collaboratively promoting common frameworks and standards, as well as harmonized definitions and methods for the treatment of national geospatial data in order to enhance geospatial information management at the national, regional and global level;
- to share experiences in policy-making, supporting legislation, and funding strategies, to encourage and develop best practices in the management (i.e. collection, storage, maintenance and dissemination) of geospatial information management at all levels and its integration with other data sources, and to facilitate and promote capacity development in the developing countries.

1.5 3 Working Group in Action: Rio+20, Inventory of Issues, and Vision Group

UN-GGIM The very first UNCE-GGIM (UN Committee of Experts on Global Geospatial Information Management) was held in Seoul, Korea on Oct. 26, 2011. Also, a resolution was made to form a 2 working group to prepare report as means of contributing to Rio+20 and to develop a roadmap and to list out realistic agendas for the next 5 years of UN-GGIM that will enable preparing of reports requested to evaluate the function of the UN-GGIM at the 2016 UN Economic and Social Council.

① Rio+20

The Task Force formed during the 1st UNCE-GGIM documented the committee of expert contributions for the Rio+20 Conference making a ‘Contribution of Geospatial Information to Rio+20 Processes’ report and submitted it to the Rio+20 Conference in June 2012. Inclusive was the claim that for the importance of an accurate and reliable geospatial information to monitor the implementation of conclusive results of Rio+20 providing users financial benefit and supporting a worldwide sustainable development of geospatial information that is both accurate and reliable, a side event of ‘Monitoring Sustainable Development – Why Location Matters’ (2012.6.20, Rio de Janeiro) should be held by UN-GGIM secretariat as well as England, Australia and Brazil. As a result, Rio+20 Outcomes document came to include article 187 - ‘reduction of dangers from disaster’ and article 274 – ‘definition of execution – technology’ emphasizing the importance of a reliable geospatial information.

② Inventory of issues

The 1st UNCE-GGIM in discussion formed a working group to make listings of agendas gathering agenda list from member nations and categorized it into 9 themes.

- Developing a national, regional and global strategic framework for geospatial information;
- Establishing institutional arrangements and legal and common frameworks;
- Building capability and capacity, especially in developing countries;
- Assuring the quality of geospatial information;
- Promoting data sharing, accessibility and dissemination;
- Embracing trends in information technology;
- Promoting geospatial advocacy and awareness;
- Working in partnership with civil society and the private sector;
- Linking geospatial information to statistics.

Agenda list from member nations reveal well the comprehensive perspective of each issues by the member nations, however, it is insufficient for concrete activities of UN-GGIM henceforth. Thus, the UN-GGIM secretariat chose 4 key themes that would bring forth tangible results within the next 5 years.

- **Agreement to and implementation of core global reference datasets by specific themes** ; With the need for a globally shared standardized datasets which the datasets must be formed and maintained with the world’s geodetic survey as the basis, such classified data must be shared between the nations so that it can be utilized as reference material for various activities such as environmental issues as well as humanitarian works of the UN and/or other int’l organizations.
- **Establishing a global geospatial information framework and operating platform** ; The ‘global geospatial information platform’, an authoritative and reliable mechanism for distributing the ‘global

datasets', will carry out the role as a window to geospatial information communication as well as distribution.

- **Increasing the global geospatial information base** ; Expanding the geospatial information concept which was mainly land to the oceans and even to the universe spatial scope, it will link between geospatial information and statistical information integrating and combining conclusive results in various fields such as IHO(hydrographic map), UN-SPIDER(disaster prevention, universe spatial basis), and GEOSS(entire earth observation).
- **Establishing best practices in institutional arrangements and frameworks** ; With the current situation that has vast differential gap in the standard basis of regulations and systems between the nations, it will present guidelines and indicators to the developing nations about the merits and demerits of already set up systems.

③ Vision group

A smaller group of committee was formed in providing vision as well as configuring trends in the field of geospatial information for the next 5 to 10 years which will be used for program planning and technical discussions of the committee of experts of the GGIM. Discussions over categorized themes were made at the Vision Conference, a side event to the Global Geospatial Information Forum held last April 2012 in Amsterdam where the 'future trend of GGIM for the next 5 to 10 years' was drafted. This draft report was again discussed over during the 2nd UNCE-GGIM and the following suggestions made by the member nations about the future plans will be submitted as a final report on the 2nd HLF on GGIM.

2. Future Action Plan

The 2nd UNCE-GGIM was held Aug. 13 to 15, 2012 at the UN headquarters in New York. 148 participants from 61 member nations including 34 UN delegations as well as non-governmental organizations and private corporate representatives attended the conference. During the 2nd UNCE-GGIM for 'Effective Development and Cooperation of Global Geospatial Information' had come up with the following resolution.

- Establish a global geodetic reference framework
- Gather global case studies that demonstrate the value proposition of Geospatial Information
- Communicate the efforts of UN-GGIM in supporting sustainable development agenda :
- Regional entities undertake an assessment of regional efforts and priorities :
- Consider issues related to standards setting in the international community :
- Consider a shared statement of principles for the GGIM community :
- Develop a global map for sustainable development :

Based on such conclusive result, the UN-GGIM plans to carry out the following actions.

2.1 Establish a platform for sustainable development of the global geospatial information

The principle body that acts as a mechanism for GGIM consists of individual member nations, regional consultative group, associated int'l organizations and corporations, and UN-GGIM - a key leader of future global mechanism. In order for the global mechanism to properly operate, there needs to be a global geospatial platform where the principle parties of these 4 categories can collaborate as well as exchange between each other. This global geospatial platform would be the basis where NSDI is established, global geospatial information is shared, knowledge exchange site for related professionals, and a cooperative as well as collaborative ground for globally sharing of geospatial information not to mention revision of actions. Moreover, it should include



physical aspects such as hardware, software, services, contents, architecture, as well as regulatory or consultative agreement aspects that of standardization, bylaws, policies and so forth. As part of establishing this global geospatial information platform UN-GGIM is in the process of following activities.

① Developing a GGIM portal as Knowledge base for managing the global geospatial information

To support the makings of geospatial information infrastructure in the developing nations, strategic framework, legal system, management models, technical standardization and so on should be sufficiently passed on to them. For this, UN-GGIM has plans to further develop its homepage www.ggim.un.org as an extension of various model case studies not to mention strategic guidelines and such as a knowledge exchange warehouse alongside being a portal. In order to be the foundational ground for knowledge base, preferential requirement would be to carry out research on model case studies of bylaws, systems and so on. Furthermore, continual efforts in the homepage contents as well as improvements in its function must be carried out. The portal's layout arrangement will be divided into 3 stages – global, regional, and each nation. On the nation's stage, SDI of each nation will be shown; in regional stage, INSPIRE (policies, governance, technical guidelines) of Europe for example; and in the global stage, One Geology (world's geological features), Global Map (map of the world), and GEOSS (earth observation system) etc. will be accessible providing integrated information. Also, educational resources will be posted alongside online forum corner set up to make the portal not merely an information sharing site but an educational and communicative hub.

② Developing a Global Map for sustainable development

A Steering committee where member states and related int'l organizations take part, is to be formed under the leadership of the UN-GGIM to establish a Global Map that would become the key base for global geospatial information management. UN-GGIM's global geospatial information platform is to provide not only map reference but also various references such as statistical index, video visuals etc. as to become the window to communication and outlet between member nations as well as int'l organization regarding geospatial information sharing and distribution. For this, any global map discussions of the promotion committee should be based not in any specific reference but by balanced utilization of already established various data from ISCGM global map, UN-Map, SALB and so on. Other resource considerations should be fully observed and whether any part of it can be effectively applied such as that of the UN Map and geospatial information portals of the United States and Spain etc.

③ Improvement of the Global Geodetic Reference Frame

All global geospatial information distributed via the Global Geospatial Platform should be based on Global Geodetic Reference Frame and in order to improve on the accuracy of the Global Geodetic Reference Frame the government of each nation plays a vital role as well as in figuring out the current situation. UN-GGIM has active plans to demand governments of each nation to establishing institutional framework and technology etc as basis for Global Geodetic Reference Frame For the developing nations, plans are made to support technologically as well as financially through assistance.

For this, the initial steps will be taken from PCGIAP working group of geodetics surveys will be carried out concerning the current situation relating to global geodetic reference frame from each nation and regional organizations. Plans are underway for an informal consultation inviting professionals of int'l organization such as IAG, GGOS during the UNRCC-AP Conference discussing technical problems of the global geodetic survey. February next year, during Doha HLF on GGIM, a regional road map for this purpose will be presented. Donor agencies will be invited and a conclusive and detailed action plans in carrying out the road map of methodology in supporting the developing nations to implement and be a part of this global geodetic survey is to take place.

2.2 Establishing the Road Map

Sharing the vision, after prioritizing the lists of agendas for the next 5 years and with it as basis, plans are underway to establishing action plans and GGIM Road Map.



① Sharing the Vision

Further developing the shared vision about the future trends of GGIM on the global, regional and national level must be done. GGIM committee has already begun its vision action plans for the future technological trends that will be further discussed during the next HLF on GGIM at Doha.

② Prioritizing the inventory of issues

Based on the priority of the list of agendas laid out and of the shared vision, a road map of GGIM's actions plans for the next 5 years will be set. However, even before following through, another prioritization needs to take place on the already decided agendas set out by the UN-GGIM. That is, prioritization assessment and diagnosis on a regional level with their own consultative mechanism will then enable the regions to decide on their own priority factors. Such conclusive regional prioritization should then be provided as feedback to be considered in the prioritized list of agendas.

2.3 Establishing the Code of Ethics

The need for developing a Code of Ethics for producing, sharing and utilizing of the geospatial information was first mentioned at the 1st HLF on GGIM (Inaugural Meeting held Oct. 2011, Seoul). It was then additionally discussed at the Kuala Lumpur Symposium (Feb. 2012) and Hangzhou Forum (May 2012). At present, a working group has been formed and has begun to work and provide presentation of its work on the 2nd HLF on GGIM (Feb. 2013, Doha) The Code of Ethics will be founded on the following principles:

- Being objective, science-based, and independent;
- Servicing the public good, societal development and user requirement
- Ensuring non-discriminatory and transparent processes;
- Maintaining confidentiality of data and appropriate access rules;
- Striving for quality; integrity; and cooperation at all levels

III. Regional Committee's Action for Global Geospatial Information Management

The UN-GGIM action plans must be carried out on the basis after considering regional committee's activities and conclusive results from it. It should combine all regional committee's action plans from a global perspective and thus provide adequate direction as well as guidelines for regional activities to take place. Therefore, regional consultative committee such as PCGIAP should provide issues specifically relating to regional factors as input to the UN-GGIM agendas as well as strive to find out how to best implement on a national and regional level some of the conclusive factors brought forth from UN-GGIM.

UN-GGIM supportive regional organizations and its activity results are as follows.

1. Activities of the Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP)

As a Committee established in 1995 by a UN resolution in representing the Asia and the Pacific region, PCGIAP has been undertaking various projects to develop a regional spatial data infrastructure by setting up working groups and managing them through annual plenary meetings and semi-annual executive board meetings. Currently through three working groups involved in the topics that have been identified as the outstanding issues for the region: Geodetic technologies and applications; Geospatial data management and services; and Spatially enabled government and society, the committee has been contributing to addressing a number of regional agenda, including regional geodetic reference framework, survey on the status of SDI of the Asia and the Pacific countries, Land administration forum, Management against natural disasters, and the study



on spatially enabled government and society. In addition, PCGIAP made an effort to identify the growing concern and challenges in the Asia-Pacific region on geospatial information management such as implementation of common geodetic framework; interagency data sharing; leadership of national geospatial information authorities; and knowledge transfer, based on its experiences in developing the regional spatial data infrastructure and on the results of the latest analysis of the questionnaire.

2. Activities of the Permanent Committee for Geospatial Data Infrastructure of the Americas (PC-IDEA)

As the Committee representing the region of the Americas in the area of geospatial information management, PC-IDEA was established to maximize the economic, social and environmental benefits derived from the use of geospatial information. Through the Working Group on Planning (GTplan) which has worked together with the Board, the Committee set up its work plan for the period of 2009-2013, covering seven themes: institutional capacity building; standards and technical specifications; best practices and guidelines for the development of Spatial Data Infrastructures (SDI); innovations in National Geospatial Information Authorities; knowledge gathering on topics relevant to SDI for the region (observatory on SDI); assessment of the status of SDI development in the Americas; and technological means for discussions related to SDI. In addition to the activities regarding seven themes, the Committee organized an event on prevention of disasters and risks focusing on SDI. In a part of the event, a survey on training, standards and specifications, best practices and a guide to SDI, National Institutes of Innovations in Mapping and Status of the implementation of SDI for Committee members of the Americas was conducted through the questionnaire, and some goals were developed based on the survey, such as implementation of assessment to the existing activities, Preparation of the cookbook, development of a new website, etc.

3. Activities of the Committee on Development Information, Science and Technology Subcommittee on Geoinformation (CODIST-Geo)

As a subcommittee on Geoinformation of CODIST, CODIST-Geo has carried out activities with regard to geospatial information management which are focusing on Policy issues; Technical Issues; Capacity building; and International cooperation and liaison. In policy issues, the Committee continues developing national policies and e-Strategies. Recognizing the importance on availability and use of information for spatially enabled e-government services, the Committee has developed several regional geospatial databases and guidelines as well as online applications and services, as the core of the African Regional Spatial Data Infrastructure, which are updated and accumulated to support regional initiatives. Furthermore, an African Reference Frame (AFREF) Project has been pursued for development of a unified geodetic reference frame for Africa. As part of Capacity building and outreach activities, the Committee has endeavoured to enhance national capacities for the utilization of geoinformation technologies by organizing educational programmes, several seminars and workshops. Some challenges have been come up through the activities in three sectors such as poor awareness and understanding among member countries and lack of resources, and future plans were set up as the need on emerging concepts.

4. Activities of EuroGeographics on Geospatial Information Management in Europe

EuroGeographics, as the membership association and voice of the European national mapping, cadaster and land registry authorities, has supported the national mapping, cadaster and land registry authorities (NMCAs) through relevant European legislation and initiatives, such as the Digital Agenda for Europe, INSPIRE Directive, the European Location Framework (E.L.F.), etc. According to one of relevant initiatives, the Committee has developed a technical infrastructure to deliver, as the European Location Framework, national reference data. Furthermore, the NMCAs are actively supporting the European Commission's disaster and emergency management service by providing access to their national reference data, as stipulated in an agreement signed with the European Environment Agency.

After inception of the UN initiative on Global Geospatial Information Management (GGIM), regional bodies have endeavoured to commit towards GGIM goals with the collaboration of related organizations. PCGIAP organized a forum to discuss priority issues for the regional implementation strategy of the UN GGIM initiative, and PC-IDEA also implemented the regional mechanism associated to the UNGGIM initiative. CODIST-Geo has elaborated an African Action Plan on Geospatial Information Management to reflect African issues into the UN



GGIM.

IV. Policy proposal for Global Geospatial Information Management

1. The building and strengthening capacity of developing countries

In the case for the developing countries, the inferior conditions to implement SDI is an element hampering distribution of global SDI. Due its difficult conditions, they are unable to implement NSDI and impedes the socioeconomic development. The low economic development level deteriorates the condition for implementing SDI for the emerging nations. It is utmost important for the emerging nations to improve conditions for adopting SDI to outgrow from the vicious cycle. The problem is, it expected to take a very long time to self improve on the conditions for implementation Therefore aid from developed nations, international organizations and agencies is required in order to improve the condition of implementing SDI for the developing countries.

1.1 Aid for SDI implementation funds

The acquisition of necessary budget for emerging nations are difficult due to its weak financial situation. In order improve they need financial aid for the implementation of SDI. It is important to establish a fund network referring to the donor funds and grants to supply necessary funds for implementing SDI by developing nations and international financial agencies.

1.2 SDI Strategy and Policy Aid

Emerging nations do not have appropriate policies or strategies to implement SDI. To make improvements they need support from the policy-legal system-plan-methodology (Law of SDI). The GSDI has presented with the SDI Cookbook to have reference for SDI provider and user to make assessment and implement SDI (GSDI 2004). For this, finding best practice of SDI implementation and by systemizing the case and providing it is yet another alternative.

1.3 SDI IT Aid

With low SDI IT level of emerging nations, they lack the independent IT that can be applicable to the implementation of SDI. In order to solve this problem, the basic IT must be provided and education training for the application of IT.

1.4 Aid for cultivating SDI experts human resource

There are also mass shortage of human resource of experts for implementing SDI. There is a need for a human resource of experts program in order to heighten the self utilization of SDI of emerging nations as well as systematically maintain and manage.

2. Global interoperability

In the case for developed nations and enterprises, implemented SDI does not uphold the international standards and the global interoperability is inadequate. Furthermore, the legal systems related to SDI are centered on individual nation becoming the stumbling block for the distribution of global SDI (UN ECOSOC, 2011; Glenn Hyman 2002; Prestige Makanga and Julian Smit, 2010; Danny Vandenbroucke, 2010). In order to overcome this, it required to obtain voluntary cooperation from each nation and/or enterprises to reinforce international standards and introduce open legal systems related to SDI.

2.1 Cooperation to apply international standards

The implementation of SDI for developed nation and enterprises that does not meet international standard lowers the global interoperability. Through the continuation of discussions with the international standard agencies, they must provide and supply unified international standards to implement information, coordinate use, share, disseminate and apply SDI.



2.2 Issues regarding legal systems pertaining to: where the responsibility lies/ Privacy/ ownership/ national security and safety

There are no legislatures to handle possible problems that may arise due to sharing of SDI, problems pertaining liability, privacy, ownership, national security and safety. For the maintenance of legal system in each nation, the cooperation, supervision, and system of support of international agency, organization, enterprise and experts must be provided.

V. Conclusion

UN-GGIM and its activities are based on national and regional activities structured with involvement of related organizations of its field for an in-depth discussion as well as activities from a profession. UN-GGIM is a representative and effective consultation mechanism striving to resolve globally challenging issues through utilization of the geospatial information and has a system that can implement directly to policies, factors relating to the global geospatial information with a professional knowledge basis. UN-GGIM pursuing factors are something that cannot be resolved in a short timeframe but through continuing efforts carried out on an extended term. For this, its member nations must cognitively and fully recognize the importance of UN-GGIM thus must actively implement to its policies any important issues concurred from it and pass on exemplary model cases for further establishing of the global geospatial information, maximizing its utilization for the bettering all human lives.

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