Development of National Spatial Data Infrastructure in Indonesia

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SUMMARY

The availability of and access to spatial data in Indonesia has been a complicated problem since 10 years ago. Duplication, inconsistency, poor management, and illegal uses of spatial data were the strong issues in the nineties. These boosted national authorities to take action to find a solution to these problems. In the Survey and Mapping National Coordination Meeting in 2000, ISDI, the Indonesian Spatial Data Infrastructure, was declared to become a primary solution to solve the problems of the availability of and access to spatial data. Since the declaration, concepts, programs, stakeholder meetings, system and data development related to the development of ISDI has been carried out.

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1. HISTORICAL BACKGROUND

As a result of long survey and mapping activities, Indonesia has enormous collection of spatial data consisting of geodetic control points, topographic database, bathymetric database, and thematic database covering most of the national territory. Such data is collected and managed by many government agencies at all levels : national, provincial, districts and municipal, and also stored at different local standards. Beside develop databases, some agencies also build its metadata which is also developed in local metadata standards

Understanding the importance of public access to this data, several activities related to the development of Spatial Data Infrastructure (SDI) was carried out through national initiative under the leadership of National Coordinating Agency for Surveys and Mapping (BAKOSURTANAL), an Indonesia government body.

As a result of this initiative effort, every year all spatial data stakeholder meet in National SDI Coordination Meeting. In this meeting several important issues relating to the ISDI development is discussed. In addition to that, a prototype of Indonesian Clearinghouse has been installed in BAKOSURTANAL website. For this purpose the FGDC metadata standards is adopted as a national metadata standard and a national metadata and data directory server applying Z39.50 protocol has been built. The application of Z39.50 protocol to metadata server ensures the access opened globally.

Several data standards and a draft of data management mechanism are also available at present. These are created for the agencies in order to develop and maintain their spatial database in such a way that the databases are of good quality, well maintained and nationally integrated. For this purpose a national technical committee of spatial data is established.

In order to authorize the implementation of ISDI development, efforts to pass a law and a presidential decree is being carried out. It is expected that with the present of the law and the decree the national support to the development of ISDI increased and the realisation of the ISDI can be fastened.

2. PRESENT STATUS

Although significant results from the national survey and mapping activities has been obtained since the first institutional meeting years ago, users still find it difficult to obtain and use of spatial data. Here are problems encountered to this difficulties.

In relation to obtaining spatial data, this can be explain follows. Firstly, Most spatial data produced by the agencies is developed for their own used so that there is no awareness to disseminating this to others. Secondly, data is not well managed which causes the data

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distribution time to user becomes lengthy and uncertain. Finding data is not also easier than obtaining it since there is not well data directory available, let alone the data directory covering the country. Finally, for any agency that has been prepared to distribute data feels inconvenience since there is no regulation or procedure to protect data from any misuses.

Dealing with using spatial data, data produced by the agencies are created in standards fitted only to their own needs. This disparate datasets create integration problems to those who will use several datasets combined. Even if there is a dataset comply to any standard, the users are not satisfy because standard used is not appropriate to user needs.

3. INDONESIAN SPATIAL DATA INFRASTRUCTURE DEVELOPMENT

Indonesian Spatial Data Infrastructure (ISDI) development was formally started in 1993 when eleven government institutions at national level met to discuss and exchange information relating the development of GIS within their own institutions. The discussion in this first meeting identified how GIS functions existed within each institutions and how this could be optimized in order to provide geographic information and to make it ready for use amongst the institutions involved in the meeting. In this discussion also arisen problems of the availability of data, equipment and personnel.

Understanding the important of the first meeting, the institutions agreed to host the next second meeting with more institutions invited.

In the second meeting, where more institutions attended including private companies, encountered that in the development of GIS in each institution there was a need of common spatial framework data and more involvement of institutions particularly the institutions at regional and local government level.

In the third meeting hosted in Jakarta in 1997, institutions representing national, regional and local level attended the meeting. In this meeting were discussed nationally sound issues of Institutional, National catalog, Data dictionary, Data distribution, and Database and Data Exchange.

Here, data provider and user institutions were initially identified, national catalog was introduced and copyrights needed to protect institution's products were inventoried. At that time several institutions have already had products digital format but at the same time they concerned of the security of their products. This meeting also published the first draft of a national standard exchange format, data dictionary and a web application prepared by BAKOSURTANAL.

The fourth meeting covered the discussion of Institutional Issues, Fundamental Data Sets issues, and Human Resources Development issues. The institutional issues focused on the development the structure of the spatial database networks as well as node institutions. While at the national level the determination of the node institution was a little simpler, the determination at the provincial level was more difficult. The meeting agreed to make public

the 1:1,000,000 topographical data and to implement a pilot project for producing geographical information on spatial management issues.

The fifth meeting was hosted under the circumstances of the need to build the National Spatial Data Infrastructure (NSDI) as it was stated in the National Coordination Meeting for Surveys and Mapping 2000. The institution representative agreed that the meeting should focus on the building of Indonesian Spatial Data Infrastructure (ISDI). The institution also approved the naming of this forum as the Coordination Meeting of ISDI. This meeting also marked the implementation of internet technology in GIS in which implementation GIS activities had been posted in the internet. In addition the first on-line mapping of 1:1,000,000 spatial management datasets was introduced under Public Works Department website.

As the capability of few institutions in producing geographic information using GIS arose the need of the availability and access of the framework spatial data followed. The sixth national meeting which was held in the city of Bandung, West Java was concentrated of the development of standards on building Fundamental Data Sets and the development of GIS required to build GIS institutions. The concepts of global GIS, fundamental datasets and metadata were introduced in the meeting. At the same time, the Province of West Java, involving the District Government, declared the establishment of Provincial Spatial Data Infrastructure.

The seventh meeting was held in 2002 in Surabaya, East Java. The institution attendees simply questioned of the benefit of the meeting since there was little commitment to the meeting resolution performed by the institution. Although the proposal to establish a national committee was not approved yet, the meeting agreed upon the establishment of a secretariat as an organization to host all ISDI meetings and to implement meeting agreements, resolutions and recommendations.

The last meeting in Yogyakarta, Central Java in 2003, focused on discussion of the national clearinghouse, data standards, data custodianship and human resources development. National clearinghouse prototype should be developed soon involving three agencies. In this meeting was also introduced the involvement of marine and coastal institutions to discuss the role of marine and coastal data in the ISDI.

4. INDONESIAN SPATIAL DATA INFRASTRUCTURE

It is in the National Coordination Meeting on Survey and Mapping in 2000 that the development of spatial data infrastructure in Indonesia was formally commenced as it was stated in vision and mission of the meeting recommendations. This would officially form a new era in the survey and mapping implementations which information and communication technology would be involved besides of the Global Positioning System (GPS) technology.

Referring to the National Coordination Meeting on Survey and Mapping 2000 recommendation, the building of the ISDI should be based on five spatial data infrastructure aspects namely Institutional, Legal, Fundamental Datasets, Science and Technology, and Human Resources.

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The objective of the development of ISDI is to make fundamental datasets within the Indonesian territory at a national standard available and accessible to the data users.

Indonesia is a vast country that solving problem of making fundamental dataset available by only one national body becomes impossible. To cope with this problem, the idea of the development of ISDI is then implemented in the development of different ISDI level namely national ISDI, provincial ISDI and district ISDI. Among these levels, the spatial data infrastructure aspects are the same but the data accuracy standards are different.

As a part of a larger community, global and regional community, the development of ISDI should be integrated to the global and regional spatial infrastructure. Indonesia has been participating actively in Global Data Spatial Infrastructure (GSDI) and the Permanent Committee on GIS for Asia and the Pacific activities for years.

The development of ISDI is understood as a long term process. For this reason the development is then broken down into some phases. The phase one which, was designed three years ago dealt with the development of ISDI nodes, agency databases and metadata, a national clearinghouse and sets of mechanisms and standards. The phase one will end this year. The next phase planned to be implemented in year 2005 will deal with the same development as the phase one except for the target is different that is to complete the development.

Experiencing the success and fail from the phase one, the development of ISDI is a challenge. Although commitment of the participating agencies is still low but this participating agencies gain knowledge about spatial data infrastructure.

Nowadays, with more involvement of the private sector in of ISDI, the development of ISDI may be outsourced to private sector instead of implemented by government agencies,. There is an advantage of outsourcing to private sector that creates new economy and grows survey and mapping industry.

The development of ISDI involves the latest technology of information and communication. Unfortunately the technology changes rapidly. These constrains have impacts in human resources development. But in the other side, these can also be considered as a motivation to keep up with the latest technology.

5. FUTURE DIRECTION

The future direction of ISDI development that will be started in year 2005, will be focused the improvement of coordination mechanism, completion of spatial databases and national metadata developments, activation of national clearinghouse and development of Digital Indonesia.

The coordination meeting on ISDI will be organized in such a way that all agencies involved will be strongly committed to and implement all ISDI meeting resolutions and

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recommendations. The provincial and district SDI will be motivated in order to host their own meeting.

Agency's spatial databases will be completed and will be working under nationally and globally integrated distributed system. Agencies are also requested to build metadata of each database they develop.

The national clearinghouse prototype will be further developed to become fully operation. To support this, a metadata gateway will be developed and metadata servers will be installed in key agencies.

The development of Digital Indonesia is a future target of the development of ISDI since this aims at providing access to the user community in accessing information rather than just data.

6. CONCLUSION

The present status of the availability of spatial data and coordination and participation of survey and mapping institution in Indonesia forms a real asset for the development of ISDI. Most of survey and mapping institutions involved int the development of ISDI understand that ISDI is a useful tool for making spatial data available and accessible and hence will be continued in the future.

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