THE INTEGRATION SYSTEM OF CLASSIFICATION, MONITORING AND MAPPING FOR POOR FAMILIES USING INA-SDI SERVICE

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Abstract: Ina - SDI service utilization issued by the Geospatial Information Agency *(Badan Informasi Geospasial* or *BIG*) for integrating the mapping system of potential slum areas which is developed in this study uses the data in one area in Bantul Regency. Some integrated systems using the web are capable of displaying the information on the number and the distribution of the poor people, the monitoring of received aid, and showing the location as well as the image of the houses of the poor as the results of the classification system. This system greatly assists the local government in the framework of poverty alleviation efforts, so that poverty can be controlled less than 10 % as mandated by law.

Keywords: Ina-SDI, Integration, Mapping, ArcGIS, poor families.

I. INTRODUCTION

Based on data from the Central Statistics Bureau (BPS) in September 2015, there are about 28.51 million, or 11.13 % of the total population in Indonesia who are still living below the poverty line [12][14]. This figure is increasing up to approximately 780 thousand inhabitants in September 2014. This becomes the top priority for the government to find solutions in order to reduce the poverty rate below 10% [9]. Poverty is a multidimensional problem and sectors that are influenced by a variety of interrelated factors, among others : the level of income , health , education , access to goods and services , location, geography , gender, and environmental conditions [15], The number of poor people in Indonesia are mostly located in Java with a total of 57.8 % of the overall number of poor people in Indonesia and located in the province of Yogyakarta Special Region [12] .

Information and communication technology can improve economic policy and facilitate the policy-making process. An array of ICT tools is available to the policymaker and decision-maker. Foremost in this list of tools are poverty maps, which are made possible by geographic information systems (GIS) [4]. The Asian Development bank defines poverty maps as spatial descriptions of the distribution of poverty in any given country. Hence, they are important tools in guiding spending for governments [5]. Poverty mapping combines geographically-referenced survey and census data to generate poverty and inequality profiles at low levels of aggregation. Additionally, poverty maps based on highly disaggregated data, serve benchmarking, as well as monitoring and evaluation purposes [4].

According to the Act Number 25/2004 about the National Development Planning System [1], all of the development activities must be planned based on spatial or non spatial data and other information accurately and reliably. Other Act, Act Number 32 2004 about local governance [2] the development done by the local governments must be based on data and information, spatial or non spatial, and the local governments must develop local information system that can be integrated nationally. Furthermore, spatial aspect must be integrated into or within the development planning framework at all levels of government. Spatial or geospatial data and information is not only used for government activities like mandated by those Acts above, but also many applications such as for disaster management, natural resources management, and economic business development in general. Those have involved not only government but also private sectors as well as public [6].

Now, the data and geospatial information systems are developed and utilized to increase prosperity. Accordingly, the development of geospatial information and communication infrastructure has become imperative to provide the ease and speed of geoinformation access, as well as to reduce redundancy. In this vein, the Indonesian government (GoI) has established the Ina-SDI (Indonesian GeoSpatial Data Infrastructure) under the Presidential Regulation No. 85 year 2007, following which the BAKOSURTANAL (National Coordinating Agency for Surveying and Mapping) received a mandate from the GoI to coordinate the development of Ina-SDI operational model [6].

Bantul regency, which is one of the regencies in Yogyakarta Special Region, has a high poverty number above 14% [10]. The information regarding the poverty data in Bantul Regency has not been able to show the detail information about poor people. The present mapping only shows the global information of the number of the poor citizen which is categorized in each District.

From the conditions mentioned, this study is trying to develop the information geography systems which covers the mapping of potential slum area, classification system and conduct the integration using Ina-SDI service.

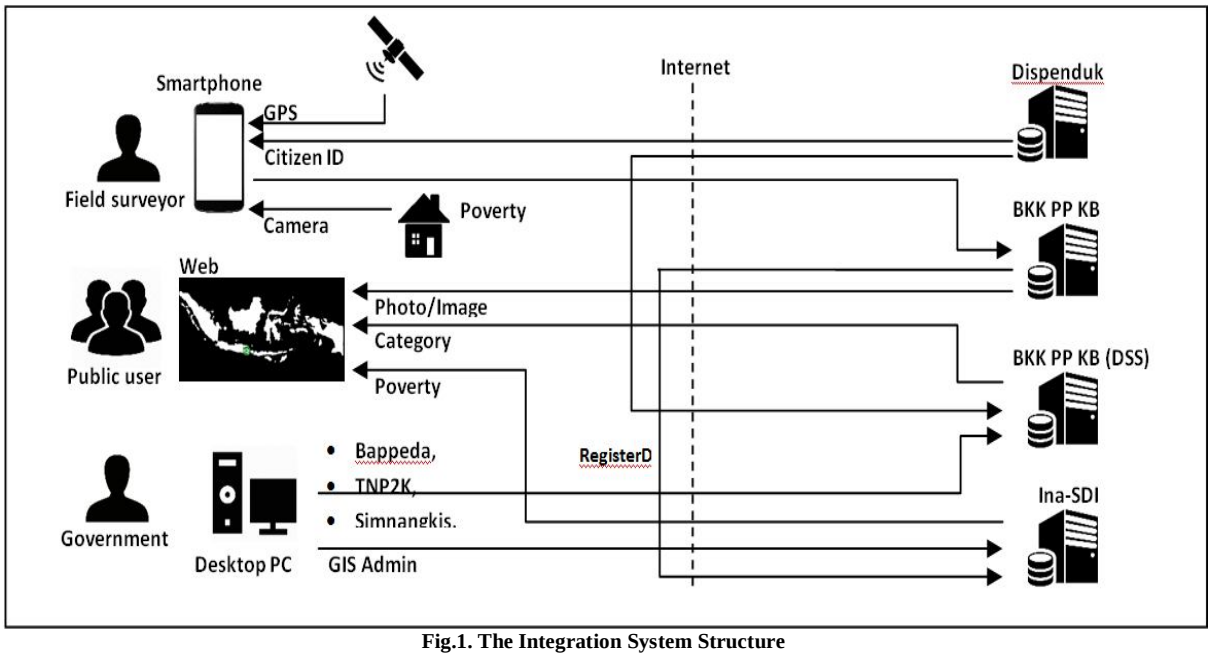


Fig.1. The Integration System Structure

II. DETAILS EXPERIMENTAL

2.1. Grand Design System

This study was designed to create a poverty reduction system in one area of the Special Region of Yogyakarta, namely Bantul Regency. For the testing phase, a prototype of the system was developed, which uses the data from slices of the three systems in different departments. Those departments are the Department of Population and Civil Registration (Dispendukcapil), Agency Coordinating Body for Family , Women and Family Planning (BKK PP KB) , as well as and Geospatial Information Agency (BIG) .

This system is an integration of several systems that have been defined in a previous study in the last two years time such as the data entry system based on the mobile-based ordinate of the poor families, the poor classification systems, the web-based monitoring systems of the aids in reducing poverty and the mapping system for poor families. The overall system structure is shown in Figure 1.

The field officer (field surveyor) had a duty to record poor families' data, such as the data location and the photos of the housing conditions (front view, floors, and walls). The data obtained is stored in a database at the Department of BKK PP KB , the data input is connected to a map service on the server in the BIG geographic information systems, and always updated if there are changes in the data location of the poor families

The shown mapping systems have implemented the Indonesian government's policy that is One Map One Solution in displaying the information about the spatial data to support the development of the country. This system is used to help the donors in selecting the beneficiaries, and this information can be used as the monitoring tool of delivering the aids and as the public audit of the poor families who have received the aids. In this system, the Regional Government serves as a supervisor and manager of the system.

The decision support systems which are integrated into the system use eleven criteria to determine the status of the poor, based on Bantul Regent Regulation No. 21A 2007 on Indicators of Poor Families Bantul [11] . The present systems have a weakness, so this study offers a method of determining the status of the poor with decision support system approach based on eleven criteria that have been set before.

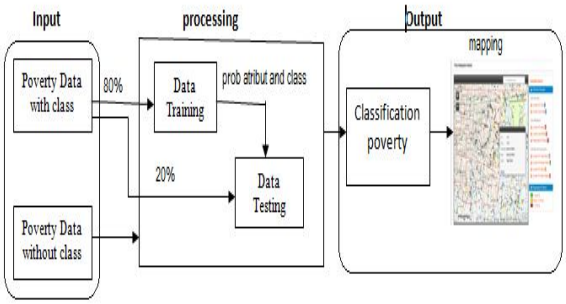


Fig. 2. Diagram Block System NBC

The method used to identify the classification of of the the poor families is using the Naive Bayes classifier (NBC). The discussion of this system has been discussed in the previous study [10] . The block diagram of the system is shown in Figure 2 with an accuracy of 93 % .

Poverty classes consist of *very poor, poor and vulnerable poor*. The number of parameters for classification was composed from 11 indicators as presented on Table 1. Hasil dari identifikasi yang berupa kategori akan menjadi input pada bagian web broser.

Table 1: Indicators Poverty

No	Indicator	Indicator Score
1	Food	(0,12)
2	Clothing	(0,9)
3	Shelter	(0,9)
4	Income	(0,35)
5	Health	(0,6)
6	Education	(0,6)
7	Wealth (Rupiah)	(0,5)
8	Property (Land)	(0,6)
9	Water	(0,4)
10	Electricity	(0,3)

2.2. Detail of Integration Sistem

The integration of mapping systems conducted in this study used three databases, namely: mapping database system, SIMNANGKIS database system and database monitoring system. It is shown in Figure 3. The database contained the the data mapping ordinate of the position of the poor and the photo of the residence. SIMNANGKIS database contained the information of the poor people while monitoring database contained the data of the aid given to the poor people. The data gathered in each database will be integrated by using the primary key of Family Number or Nomor Induk Keluarga (NIK) as a liaison from 3 databases.

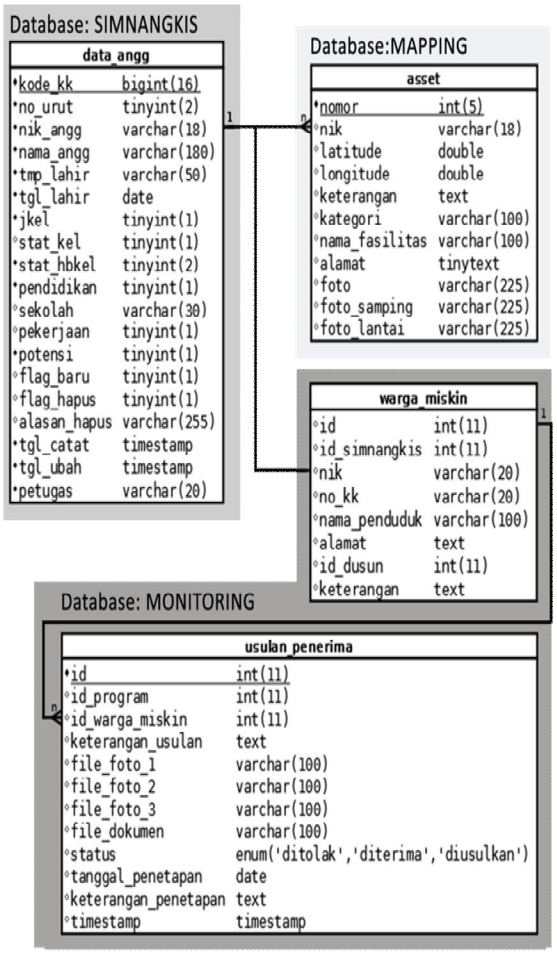


Fig. 3. Database Relation

III. RESULTS AND DISCUSSION

3.1. Data Collecting Online System

The structure of study system, shown in Figure 1, contained of 3 users with their respective roles in this mapping system integration. The first user of the system: a field surveyor tasked to perform data entry (collecting data) in order to complete the data out to poor people in the database SIMNANGKIS . The process of inputting was done using an online system based on mobile image Figure 4. The results recorded in the system will be sent to the database of poverty to complete the existing data on SIMNANGKIS BKK PP KB. Data recorded using a mobile application contained the data layout position (latitude and longitute) and 3 photos of poor houses . The identities used for inputting this process is the family number from poor families.

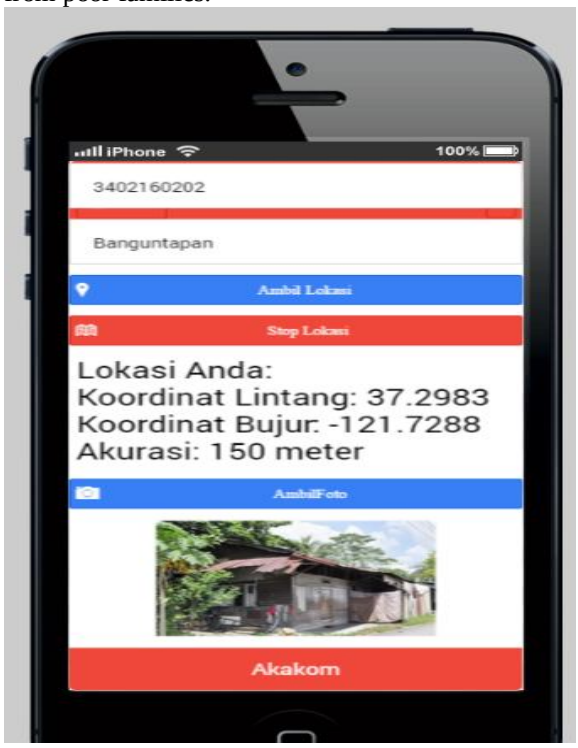


Fig.4. Data Mobile Application

3.2. Monitoring System

Monitoring system in figure 5 used to see assistance given to the poor families.

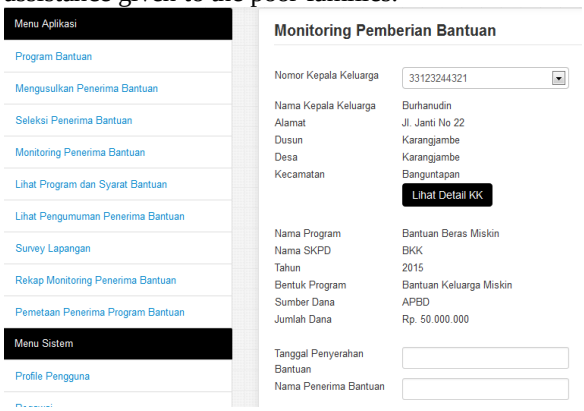


Fig.5. Monitoring System

Monitoring the aids for poverty was done to see how successful the program has been given to the poor. Some menus have functions to provide detailed information on the results of the poor , including the percentage of aids so that the program can give significant impact to reduce poverty . The data on the monitoring system was integrated with the data on the system that contains the master data of SIMNANGKIS.

3.3. Mapping System

The mapping system is the final stage for displaying the data of poor families with the information about is the types of the poor, the location of the poor, the photo of the poor house, the aids received by the poor. This data will be able to provide the information on the potential areas of poor using Ina-SDI services. Ina-SDI Service is a service provided by BIG to make the service of a map in Indonesia. Data for mapping sampled District of Banguntapan which is part of the district of Bantul . Figure 6 the viewer to see the map of the poor . When one point on the map Figure 7 clicked it will display the detailed data of the poor information that includes the location, photos of the house (floor, roof and walls of the house) and the assistance received.

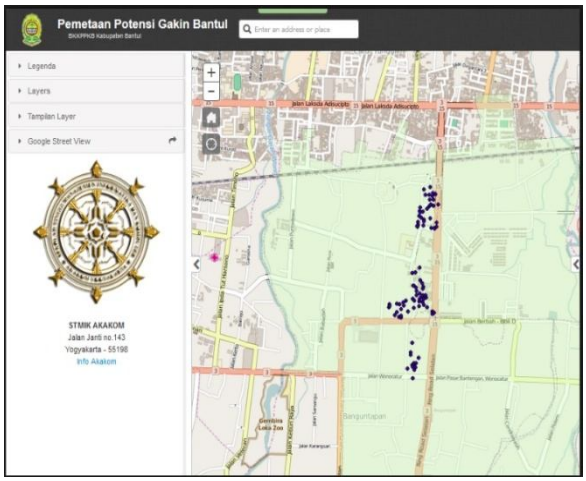


Fig. 6. Mapping System Poor FamiliesLocation

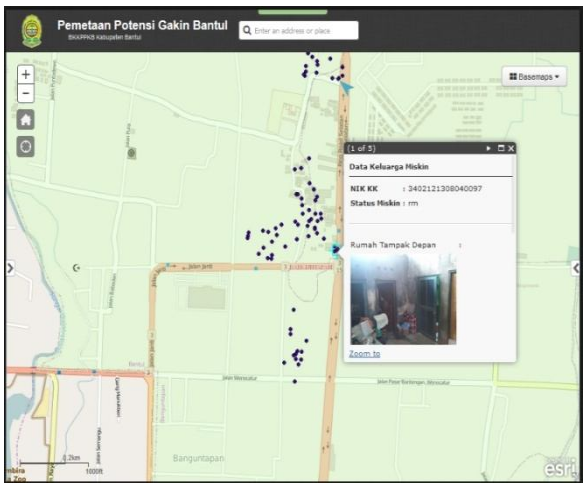


Fig. 7. Mapping System Poor FamiliesLocation (detail)

Display viewer, a web-based application that is installed on a separate server from Ina - SDI services. A web application that uses this scripting language, supports HTML5 and geo-location in full. The detailed information of each marker, representing the position of poor families and appear in a pop - up window.

CONCLUSIONS

1. Integration between systems of classification and mapping using Ina-SDI service cloud-based map server technology has been successfully implemented. After the integration of the two systems, the data that has been obtained poor families, to show:
   a. Position detail from poor families along with aid obtained.
   b. Featuring recap gakin per administrative area to the village.
2. Data poor families that has been integrated with the service Ina-SDI can be used for:
   a. Poverty data sharing between relevant agencies.
   b. Adding the data on the economic condition of the national data center.
   c. Supporting national thematic mapping in the working group of social, economic, and cultural.
   d. Help implement open government data is Synchronization of data with national and regional policy
3. Service Ina-SDI, still has drawbacks, namely :
   a. Still slow in displaying a map of the base Indonesia, needed a more stable network infrastructure.
   b. Have not been able to show clustering marker of poor families in real time.

ACKNOWLEDGMENTS

The poverty rate in Indonesia is still high government a top priority both at regional and at the center to reduce the poverty rate to below 10 % . This research was conducted jointly with the local authorities to monitor the program Bantul poverty and the poor through the system mapping the location of the position of the poor.

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