

Analysis of Land Information Maps Using Participatory Mapping Methods (Case Study: Mejoyolosari, Jombang)

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Abstract—Based on the regulation of the Minister agrarian and Space of the Republic Indonesia number 12 of 2017 and presidential instruction Number 2 of 2018 for accelerating Pendaftaran Tanah Sistematis Lengkap (PTSL). In order to mapping the land parcels, it is necessary to have the data of the subject and the object of the land so that the Land Map information will be developed. The identification and validation parcels of land parcels are carried out using participatory mapping method. The Participatory Mapping Method used is to delineate the boundary of the land parcels on the Work Map (Pleiades, high-resolution satellite imagery) The delineation result from the participative mapping is further validated in the field by taking 48 samples of the land parcels. In this research, the land map and land information (Land Record) are available, information on the distribution of registered and unregistered land parcels. And obtained the results of extensive accuracy of Delineation with direct measurements of the field according to BPN Standarization. Delineation of Pleiades high-resolution satellite images land parcels sample that meets the wide accuracy of 19 land parcels of soil, 11 fields of rice fields and 8 residential areas.

Keywords—

I. INTRODUCTION

Land is an economic value for the nation of Indonesia. Not a guarantee of legal certainty over land often trigger the occurrence of disputes and conflicts over land in various regions of Indonesia The slow process of land certificates has been the subject of government attention. To tackle these problems, the government through the Ministry of ATR / BPN has established a new program acceleration Pendaftaran Tanah Sistematis Lengkap (PTSL). The program is required in the Regulation of the Minister of Agrarian Affairs and Spatial / National Agency no. 12 of 2017 and Presidential Instruction No. 2 of 2018 on the Acceleration of Pendaftaran Tanah Sistematis Lengkap in the Entire Region of the Republic of Indonesia [1].

In order to mapping the land parcels, it is necessary to have the data of the subject and the object of the land so that the Land Map information will be developed. It is hoped that the production of PIBT can be used in Acceleration of Land Registry. However, the standards in this activity have not yet reached the standards of the Ministry of ATR / BPN, PIBT remains useful and can be used in the preparation of land and

spatial policies (Draft Juknis PIBT 2017) [2]. The collection of physical data in the manufacture of PIBT was carried out using a participatory mapping method. Participatory mapping method can also be used as a control tool of a land parcels with the other land parcels so that the potential for land conflicts due to border disputes or land ownership disputes may be minimized. The Participatory Mapping Method used to delineate above the high resolution satellite imagery.

In this research will be generated land parcels along with land information (Land Record) with Participatory Mapping method and Digitization on High Resolution Satellite Imagery. And evaluated the accuracy of the wide of land, and the size of the plot of digitization results in accordance with the accuracy of BPN standarization.

II. METHODOLOGY

A. Study Area and Data

This study was performed in Jombang, Gudo, precisely in Mejoyolosari village. Geographically Mejoyolosari is located in the North row Gudo District with the wide area is 208 hectares.

Here is the boundary of mejoyolosari village :

North : Gempollegundi Village

East : Tanggungan Village, Godong Village

West : Plumbangambang Village

South : Krembangan Village.

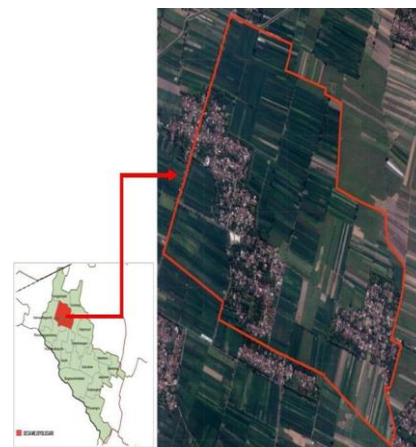


Figure 1. Mejoyolosari Village Area.

B. Data and Equipment

1. Data

The data used in this research are as follows:

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TABLE I.
THE DATA USED

Primary Data	Secondary Data:
Land parcel size from direct measurement field	Satellite Images of Pleiades 2016, which have been geometrically corrected
Nominative Data of Mejoyolosari Village from participative mapping results	Administrative boundary of Mejoyolosari village

2. Equipment

Equipment used in this research are:

- a. Hardware Type: Tape Measure, GPS RTK, GPS Geodetic, HP Pavilion g series laptops Memory: 4GB RAM capacity up to 8GB I3 core processor, Windows 7 home basic operating system
- b. Software: GIS Processing Application, for Map Digitation, Map processing and Map Layout. Graphics Processing Software, for importing and plotting point. Word Processing Application, for report generation. Processing application Numbers, for calculation of results.

3. Data Processing

a. Preparation

Prepare a working map where the work maps use highresolution satellite image maps obtained from BIG which is a corrected image of the 2016 Pleiades satellite. The cutting of images or merging scenes is done using Arcgis 10.3 according to the scope of the study area is Mejoyolosari village of Gudo Jombang district.

b. Participatory mapping

Participatory mapping is conducted with the community with the aim of obtaining information on each land parcels along with its limits. The drawing is done on printed image on paper A0 for Rice Field and paper A3 for residential area. Delineation on participatory mapping is delineation of boundaries of residential areas, rice fields, hamlet boundaries, RT boundaries and village boundaries.

c. Processing

The delineation result from participative mapping so the next process is digitization on work map. The digitization is the boundary of the village boundaries, hamlet boundaries, digitization of rice field boundaries and boundaries of residential areas. Include land data from participatory mapping conducted with Mejoyolosari village community into the land database. The data included are the applicant's identity data, address, area, Rights Acquisition, Land Use, Classification, Building, Boundary of the land parcels, and Numb. SKB

d. Analysis

The width of the digitized ground plane in high resolution satellite imagery is calculated and then validated by the measurement area directly in the field. The difference shall be in accordance with the standard set out by BPN (PMNA / KBPN No.3 1997) [3]. The results of direct measurement in the field are used as a reference. Analyze the parcels of registered land and unregistered land in the Mejoyolosari village and analyze the calculation of the size and distance of

the parcels of land directly measured by the digitization results in high resolution satellite imagery, where the measurement data in the field is used as a reference.

III. RESULT AND DISCUSSION

A. Land Information Map Results

The result in this research is Land Information Map of Mejoyolosari village resulted from partisipatory mapping. The area in this study in zone 49 S with reference horizontal datum is WGS 84. It is known that Mejoyolosari village is divided into 4 hamlets namely Mejoyo, Losari, Siwalan, and Cangkringan. Here is a map layout from land information map with magnification scale is 1: 1000:



Figure 2. Land Map Information.

Based on the results of participatory mapping where the community as a source of data then obtained information on the status of ownership of the land parcels in mejoyolosari. the information presented on the land information map is the Owner's Name, Domicile, Address, Area of Field, Field Boundary, Classificationland use, Building, Acquisition Rights, and Number (NUB). The information can be seen from the example attribute table in this image.

NAMA	Desa
ALAMAT	RT 005, Dsn. Mejoyo, Ds. Mejoyolosari
DOMISILI	Desa Ini
LUAS	517,083132
BATAS UTARA	Jalan Aspal
BATAS SELATAN	Tanah milik Misbah
BATAS TIMUR	Tanah milik Sugito
BATAS BARAT	Mt
KLASIFIKASI	Masjid
PENGUNTAAN TANAH	Fasilitas Umum
BANGUNAN	Permanen
PEROLEHAN HAK	
NUB	0183
FOTO	

Figure 3. Atribut Table

B. Widespread Accuracy Test Results Based on Standards Defined

Wide accuracy test is done by calculating the wide difference of the width of the image with the actual area of the measurement data field using GPS RTK. the number of samples are 46 samples land parcels. Then the wide

difference is tested with wide error tolerance value = $\pm 0.5\sqrt{L}$. (L) is the actual area of field. The fault tolerance can be seen in Table :

TABLE 2.
WIDE ACCURACY TEST

Wide Accuracy	Land Parcels	Accepted	Rejected
$\pm 0.5\sqrt{L}$	Rice Field	11	16
	Residential Areas	9	10
	Total	20	26

TABLE 3.
TOLERANCE FAULTS PMNA/NO.3/1997

Land Parcels	Accepted	Rejected	Tolerance (%)
Rice Field	27	0	10%
Residential Areas	13	6	10%
Total	39	7	

From the table rice fields that meet the tolerance of 40.7% while for residential areas that meet the tolerance of 47%. As for the widespread accuracy according to the Regulation of the Minister of Agrarian Affairs / Head of National Land Agency No. 3 of 1997 on Technical Guidance of Thoroughness The basic map of the registration of all samples of rice fields has fulfilled tolerance while for the residential areas of 68.4% [3].

C. Accuracy of Distance

Regulation of the Minister of Agrarian Affairs / Head of Agency National Land No. 3 of 1997 on Provisions Implementation of Government Regulation No.24 of 1997 on Land Registration mentions that for planimetric accuracy is the tolerance boundary for shifting each point of 0.3 mm on the map. So to scale the map is 1: 1,000 then the accuracy maximum image distance of 0.3 m, the map scale is 1: 2,500 accuracy maximum image distance of 0.75 m, and map scale 1: 5,000 accuracy of maximum image distance of 1.5m. (Table 4)

TABLE 4.
TOLERANCE ACCURACY OF DISTANCE

Accepted				Tolerance Accuracy of Distance
Rice Fields		Residential Fields		
Easting (X)	Northing (Y)	Easting (X)	Northing (Y)	
4	5	4	4	0.3

From the collection of 30 samples of the point of plot. can be concluded as much as 8 easting (X) and 9 northing (Y) are accepted (Figure 4).

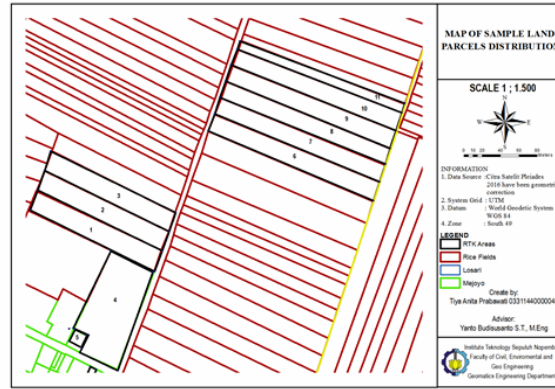


Figure 4. Map of sample land parcels distribution.

The total of land parcels to be sampled in this research is 46 fields. 27 fields of rice fields and 19 field are residential area, with a the spread that evenly for each grid. field sampling on each grid is 6 fields.

IV. CONCLUSION

Based on the results of participatory mapping in Mejoyolosari village there are 1204 land parcels with total identified rice field of 366 and 829 residential areas. Accuracy of land area KL = $0.5\sqrt{L}$ m2 rice fields that meet the tolerance of 40.7% while for residential areas that meet the tolerance of 47%. So the accuracy of distance from the collection of 30 samples of the point of plot. 8 easting (X) and 9 northing (Y) are accepted.

ACKNOWLEDGMENT

The authors would like to thank the Badan Information Geospacial (BIG) for providing high- resolution satellite image assistance, and to the Mejoyolosari villagers who have participated in participatory mapping of the Land Map Information.

REFERENCES

- [1] Badan Pertanahan Nasional, "Peraturan Menteri Agraria Dan Tata Ruang/ Kepala Badan Pertanahan Nasional Republik Indonesia Nomor 12 Tahun 2017 Tentang Percepatan Pendaftaran Tanah Sistematis Lengkap," Jakarta, 2017.
- [2] Badan Pertanahan Nasional, "Petunjuk Teknis Pengukuran dan Pemetaan Bidang Tanah Sistematis Lengkap. 03/JUKNIS-300/VII/2017," 2017.
- [3] Badan Pertanahan Nasional, "Peraturan Menteri Negara Agraria Kepala Badan Pertanahan Nasional No.3 tahun 1997," Jakarta, 1997.