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GEOSPATIAL AND COMMUNITY PARTICIPATION COMBINATION IN COMPLETE SYSTEMATIC LAND REGISTRATION IMPLEMENTATION IN HULU SUNGAI TENGAH REGENCY

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Abstract: Land certification provides land legal certainty for every citizen of the Republic of Indonesia, especially, farmers, who constitute the majority of the population of Indonesia. The importance of the agricultural land has been explained in the Republic of Indonesia's Defense White Paper that the growing amount of agricultural land has a detrimental effect on the Indonesian nation which is agrarian. Decreasing agricultural land is the main factor causing reduced food security. Geospatial technologies such as remote sensing and terrestrial surveys are very helpful for Complete Systematic Land Registration (PTSL) activities. However, the implementation in the field of technology has not yet been optimized due to the lack of the support from Regional Government and the Community. By taking the PTSL implementation in two villages in BarabaiSubdistrict, Hulu Sungai Tengah Regency, it was found that problems related to the absence of certainty of village boundaries, accurate and scattered control points and community understanding of the importance of the legality of their land are inhibiting factors for PTSL activities. By combining this technology with community participation it will produce the right and ideal combination.
Keywords: Defense, Agriculture, Geospatial.

A. Introduction

Declining agricultural land as a result of rapid population growth and needs, as well as, reduced human resource management of agriculture are significant factors causing reduced food security. It is predicted that food dependency between countries will continue to grow as the population grows (Buku Putih Pertahanan RI 2015, 17). Our Defense System is universal in nature, involving all citizens. The food sector is one of the most vital in maintaining the stability of the country's defense.

Every citizen has the right to be guaranteed food in order to live and survive. Therefore, the fulfillment of the need for food is the most basic human right that is not negotiable. Moreover, lack of food and malnutrition that affects a person or family means human rights violations. It is the responsibility of the community, government and the country. In the Declaration of Human Rights in 1948 and the World Conference on Human Rights in 1993 it was agreed that every individual

has the right to obtain adequate food. Therefore, it must be available in every place in residential areas in sufficient quantities, appropriate quality, and medically safe for consumption, and at an affordable price (Jusuf Sutanto dan Tim 2006).

In developing countries such as Africa, Asia and Latin America there is rapid migration from the traditional agricultural sector to the modern urban sector due to population growth (Xiao and Zhao 2018). For farmers, agricultural land is the key to agricultural production and an important source of livelihood (Su *et al.* 2018).

It is stated in Law Number 26 of 2007 concerning Spatial Planning that space is a container which includes land space, sea space, and air space, including space in the earth as a unified territory, where humans and other creatures live, carry out activities, and maintain its survival. Space needs to be arranged because of the limited natural resources, while the needs of growing is getting more and more diverse. The shape of the space to be arranged results to an understanding known as spatial planning (Arnowo 2017, 39).

UUPA is an advanced agrarian law, with the UUPA, the government and post-colonial society carried out a reconstruction of agrarian political buildings to fulfill the objectives of establishing a nation state as stated in the basic documents of the state: Pancasila and the 1945 Constitution. In the colonial period the rights of farmers to agrarian resources (earth, water, space and natural resources contained in it) were guaranteed and the acquisition of results wereregulated so that people become prosperous. This effort is also called agrarian reform (agrarian reform). Agrarian reform in the narrow sense is land reform. The word land reform comes from English, meaning renewal in the field of ownership, control and use of land. (Rachman 1999).Implementation of land registration throughout the territory of the Republic of Indonesia is an obligation of the government and right holders in accordance with Article 19, 23, 32, and 38 of the UUPA (Mujiburohman 2018).

Table 1. Comparison of National Land Agency (BPN)/Sample Area Template (KSA) Version of Wetland Data from 2013 Data with 2018 Data by Regency/City

No	Regency / City	Land Area Data (Ha)		Difference in BPN 2018 (KSA) Against BPN 2013	
		BPN 2018 (KSA)	BPN 2013	Absolute (Ha)	(%)
1	Barito Kuala	61,526	100,840	(39,314)	(38.99)
2	Tapin	28,289	60,411	(32,132)	(53.19)
3	Tanah Laut	21,180	40,421	(19,241)	(47,60)
4	Balangan	6,202	26,206	(20,004)	(76.33)
5	Hulu Sungai Selatan	24,231	41,489	(17,258)	(41.60)
6	Banjar	48,117	57,133	(9,016)	(15.78)
7	Hulu Sungai Tengah	26,562	38,555	(11,993)	(31.11)
8	Tanah Bumbu	5,908	15,431	(9,523)	(61.71)
9	Hulu Sungai Utara	16,824	26,911	(10,087)	(37.48)
10	Kotabaru	3,276	10,627	(7,351)	(69.17)
11	Tabalong	8,648	31,119	(22,471)	(72.21)
12	Kota Banjarbaru	1,432	1,385	47	3.43
13	Kota Banjarmasin	1,747	3,019	(1,272)	(42.14)
Kalimantan Selatan		252,972	453,537	(200,575)	(44.22)

Source: Ministry of Agriculture, 2018

Table 2. Comparison of BPN / KSA Version of Wetland Data from 2013 Data with 2018 Data of Hulu Sungai Tengah Regency, South Kalimantan Province

No	**Sub-district**	**Land Area Data (Ha)**		**Difference in BPN 2018 (KSA) Against BPN 2013**	
		BPN 2018 (KSA)	BPN 2013	Absolute (Ha)	**(%)**
1	Haruyan	1,994	2,204	(210)	**(9.51)**
2	Labuan Amas Utara	4,451	12,401	(7,950)	**(64.11)**
3	Limpasu	1,656	2,269	(613)	**(27.00)**
4	Labuan Amas Selatan	4,710	5,121	(411)	**(8.02)**
5	Batang Alai Selatan	2,679	3,003	(324)	**(10.80)**
6	Barabai	1,944	2,215	(271)	**(12.23)**
7	BatuBenawa	1,322	1,534	(212)	**(13.84)**
8	Hantakan	84	196	(112)	**(57.18)**
9	Batang Alai Utara	2,318	3,274	(956)	**(29.21)**
10	Pandawan	5.374	6,241	(867)	**(13.89)**
11	Batang Alai Timur	30	97	(68)	**(69.57)**
Hulu Sungai Tengah		**26,562**	**38,555**	**(11,993)**	**(31.11)**

Source: Ministry of Agriculture, 2018

Comparing table 1 and table 2, it is shown that there is a difference in data of (44.22%) for districts / cities and the difference in data (31.11%) in the Hulu Sungai Tengah Regency. This reduction in paddy fields by more than 30 percent requires in-depth data analysis and direct checking in the field. Many factors cause a decline in agricultural production, one of which is a long drought. Global warming, environmental degradation, increasing population, and poverty will further increase the risk of drought faced by society (Maarif 2011). Another problem that causes differences in paddy area data is the use of different administrative boundaries or delineation boundaries. The determination of the boundary line of an area begins with the drawing of the

boundary lines on the map/drawing carried out independently by each party and bordering by meeting certain accuracy standards and technical specifications. Followed by field verification using GPS (Sutisna 2006).

Until now, the existence of farmers still needs serious attention given that younger people, nowadays, are not interested in working in this sector. Improving data related to the extent of paddy fields continues to be addressed by the Ministry Agency/Agency. The role of geospatial is increasingly important in improving data. Geospatial data is also able to provide better data accuracy from year to year. Agricultural land is a limited resource. Legal regulations are needed for selling agricultural land. One of the control systems is the National Land Administration System which is updated to determine which will be used to manage agriculture. This system effectively protects land from land use change that is not suitable for allotment (Klimach, Dawidowicz and Dudziñska 2019).

In 2017, Hulu Sungai Tengah Regency was one of the districts that carried out PTSL activities. Cooperation between the regional leaders, in this case, the Hulu Sungai Tengah Regent and the Head of the Hulu Sungai Tengah Regency Defense Office in the form of a cooperation agreement. As an initial pilot, two villages were taken that would become the reference for implementation in other villages / kelurahan. The purpose of this study is to see the extent of collaboration between the District Government and the Land Office that has been able to carry out PTSL activities and the extent of the role of geospatial data in helping the implementation of PTSL. The benefits of this research are as an evaluation of the collaboration between the Regency Government and the Land Office as well as geospatial data support in supporting the success of the PTSL program.

With the PTSL activity that combines geospatial data in a terrestrial and photogrammetric manner, it is expected to provide more accurate data. Additional information is also expected to be obtained by communicating directly with farmers through socialization activities in villages affected by the PTSL program.

B. PTSL Program

The most essential function of a cadastral survey system is to provide reliable information and descriptions of land parcels. Land parcels are the basic spatial unit in the operation of a land administration system. A cadastral survey system targets societal requirements by implementing cadastral survey and mapping activities and then supplies spatial related information to users.

The Complete Systematic Land Registration (PTSL) activity itself is one of the elaborations of the government's vision and mission in the 2014 - 2019 RPJMN in supporting farmers' welfare. Giving certificates to the community will provide economic effects that can improve their welfare.

Land Office as the spearhead of PTSL activities. In practice, the number and speed of achievement of registered fields between one Land Office and other offices is different (Purbawa 2018).

C. Geospatial Technology

Remote sensing and allied technologies like Geographic Information System (GIS), Personal Digital Assistant (PDA), Global Positioning System (GPS), and internet technology collectively known as geospatial technologies, provide such information in timely and cost-effective manner (Dwivedi 2019).

The terms Geographic Information System (GIS) and Land Information System (LIS) are sometimes used interchangeably. They do have many similarities, but the different characteristic between the two is that a LIS has its focus directed primarily toward land records data. Information stored within a LIS for a given locality would include a spatial database of land parcel information derived from property description in the U.S. Public Land System, other types of legal descriptions such as metes and bounds or block and lot that apply to parcels in the area, and other cadastral data. It might include the actual deeds and other records linked to the spatial data. Information on improvements and parcel values

would also be included (Ghilani, Charles D, Wolf 2008).

Derived from two Latin words remotus, meaning far away or distant in time or place, and sensus meaning to detect a stimulus by means of any of the five senses—remote sensing refers to detecting an object/feature/phenomenon with an observation device that is not in intimate physical contact with it (Dwivedi 2019).

Engineering and scientific applications of surveying and mapping are needed in solving human problems in the social and economic fields, one of which is land administration. Survey and mapping activities are needed to determine the right location for development (Opaluwa *et al.*2014).

The study sites were in BanuaJingah Village and Banua Budi Village BarabaiSubdistrict, Hulu Sungai Tengah Regency, South Kalimantan Province. These two villages were chosen because they are close to the Regency capital. The two villages also have farmer groups and field agriculture officers who actively collect data on farmers' land ownership.

Land use in both villages can also be clearly identified through satellite imagery. Boundaries of settlements, rice fields, roads, gardens and buildings are clearly visible.

E. Research Method

1. Meeting/Socialization

Several meetings were held with residents from BanuaJingah Village and Banua Budi Village Barabai District to obtain preliminary data related to rice field ownership. PTSL team received input for the implementation of PTSL. The socialization activities can be seen in Figure 1.

Figure 1.(a) PTSL activities socialization in BanuaJingah Village e; (b) PTSL activities socialization in Banua Budi Village.

Table 3.Farmer Group Data Recapitulation

Village	Farmers Groups	Head of the Farmers Group	Number of Members	Land Ownership (Ha)	
				Rice Fields	Garden
BanuaJingah	SumberHidup	Muhammad	55	40,5	-
	Kusuma	Maliuni	60	33,17	0,42
	LembagaBakti	Baseri	40	30,17	-
	Usaha Maju	Yunianto	56	25,77	0,12
	HandayaniMuda	Tajudin Noor	40	17,83	-
	KWT Mutiara	Arbainah	12	-	-
		Rice Field Area		147,44	0,54
Banua Budi	Gundam	AchmadHusaini	32	7,49	-
	HarapanMasa	Muthawaslah	60	28,2	-
	BerkatBersama	Murni	37	18,76	-
	Usaha Bersama	Asphani	47	19,03	-
	BerkatMufakat	Ali Rahman	74	24,59	0,09
	WijayaKusuma	Awi	49	33,54	-
	KWT Nusa Indah	LisnaAriyani	38	13	-
		Rice Field Area		144,61	0,09

source: Departement of Agriculture, Hulu Sungai Tengah Regency 2017

In cross-socialization, a cross check related to the existence of data has been collected by the Department of Food Crops and Horticulture, Hulu Sungai Tengah Regency for data up to 2017. Recapitulation of data on farmer groups and land ownership is shown in table 3.

2. Field Survey

The field survey is divided into two stages. The first stage was carried out by village officials by collecting data on rice field ownership. The head of the farmers' groups in each village installed stakes in the rice fields. Initial data on rice field ownership was obtained from the Department of Agriculture in collaboration with farmer groups.

The second stage is carried out by measuring

rice fields. In the implementation,the measurements used GPS Geodetic. For the initial control point, the control point belongs to the Government of Hulu Sungai Tengah Regency, located in the village of Bakapas. This point is the closest control point from the PTSL location. Preliminary field checks and measurements using GPS Geodetic can be seen in Figure 2.

Figure 2.(a) Preliminary survey; (b) PTSL parcel measurement.

The measurement of teristris is very helpful in identifying and delineating which ones are paddy fields and which ones are not. In addition, the field survey makes it easy to collect boundary data between villages. Because, frequently, the village boundaries are only in the form of small rivers that have dried up, this will not be identified through satellite imagery.

3. Overlay Field Survey Data with Geospatial Data

Field measurement data using Geodetic GPS is then overlaid with 2013 and 2018 paddy field area data and SPOT 2016. Satellite image data shows that there are still many paddy fields that cannot be measured. The overlay results are shown in Figure 3.

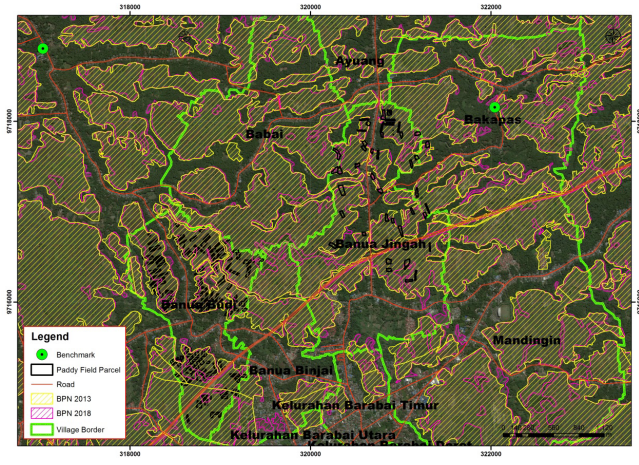

Figure 3. Overlay data : GPS Geodetic, paddy field area data and satellite imagery

The comparison of the data from the recapitulation of related services (table 3) with the results of satellite imagery delineation that has been carried out field checks can be seen in Figure 4.

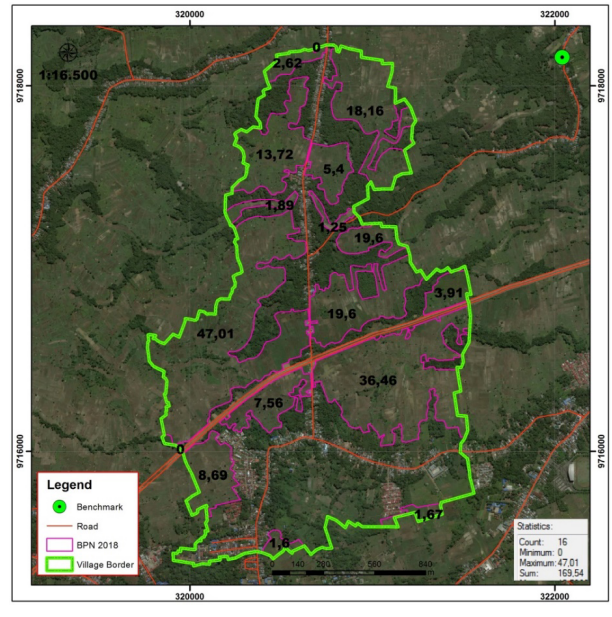

Figure 4. Rice fields in BanuaJingah Village

Based on the table of 147.44 hectares and satellite imagery deliniation of 169.54 hectares, there are differences in the data of rice fields for Banua Village Jingah of 22.1 hectares.

For comparison of the data on rice fields in Banua Budi Village from the recapitulation of the Department of Agriculture and delineation of satellite images that have been carried out, field checking is shown in Figure 5.

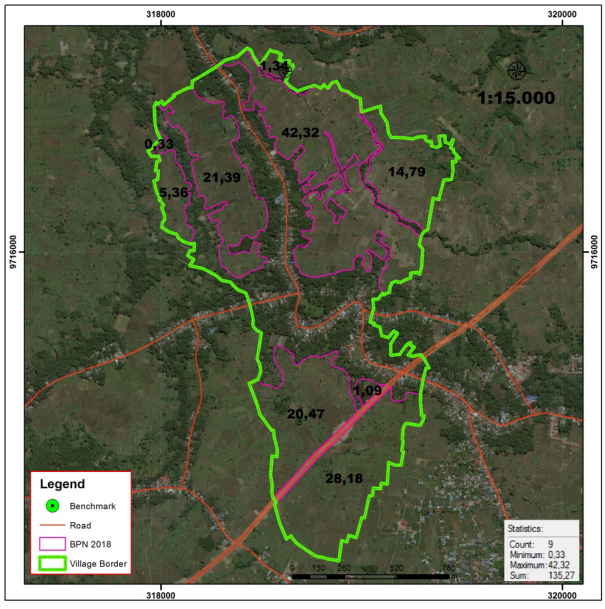

Figure 5.Rice fields in Banua Budi Village

Based on the table of 144.61 hectares and satellite imagery deliniation of 135.27 hectares, there are differences in the data of rice fields for Banua Village Jingah of 9.34 hectares.

The difference between the two data sources is possible due to delineation errors as well as differences in the reference boundaries. So, the area used as a model of PTSL activities includes areas where data is complete. However, errors in the delineation of satellite imagery or the determination of village boundaries that have not been determined by the Regent's decree are very likely to cause mistakes.

F. Conclusion

After conducting socialization and measurement in the field, several conclusions were obtained, including: (a) The data submitted by the Farmer Group that had been recapitulated by the Departement of Agriculture, Hulu Sungai Tengah Regency until 2017 did not reflect the actual situation on the ground; (b) After conducting a preliminary survey, many landowners began to work with areas of whichthe fields did not match the conditions in the field; (c) people are not willing to be certified because they are afraid of being taxed; (d) under-spread control points cause difficulty in binding in parcel measurements; (e) Of the two villages sampled there is still much to be evaluated, especially the socialization of the importance of land certification.

The use of geospatial data is absolutely necessary so before the measurement, team observes the field to make initial identification through satellite imagery or aerial photographs. Initial delineation of spatial data will facilitate the movement of tools and measuring teams.

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