



# The Application of Participatory Mapping to Support Boundary Conflict Solving in Indonesia (Study Case : Rambah Sub Districts, Riau Province, Indonesia)

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Article Info	Abstract
<p><b>Article history:</b></p> <p>Received : Dec 24, 2021 Revised : Jan 4, 2022 Accepted : Feb 10, 2022</p>	<p>Rambah is one of the sub-districts located in Riau Province that consists of 14 villages. Nowadays, the main issue for the government is related to the boundary that was occurred because of the overlapped boundary between the villages. This paper purposed was to determine the village's boundary in Rambah Sub-Districts using the use of remote sensing imagery (Quickbird imagery), Geographic Information System (GIS) and participatory mapping. The participatory mapping was conducted involving all related stakeholder such as the district's government to the village apparatus and local community. The guidance for the participatory mapping was oriented to the PERMENDAGRI (Minister of Home Affair Regulation) No. 45 the year of 2016. The results of this research were the comprehensive mapping of Rambah Sub Districts shown by the 1:5.000 map. This results can be used as a key for the spatial regulation to supports village development in term of village boundary and village funds.</p> <p><b>Keywords:</b> participatory mapping, village, boundary, GIS, village development.</p>

## 1. INTRODUCTION

Based on Act number 4 the year of 2014, a village is legal community unit that authorized a territory to regulate and manage the government affairs, local community based on initiative and rights under the Indonesian government authorization. The village is the smallest unit in development both in the flow of funds and law administration [1]. To support the village development, they have been requiring to produce the administrative boundaries map. One of the mandates on that law for each village should make boundaries mapping of their region based on consent between villages in the surrounding areas. That was an important tool for government and community as they get access to social services and natural resources.

Based on the preliminary study, there were some issues related to administrative boundaries mapping in Indonesia. Paradigm development in Indonesia has been running by using the top-down approach. That uses produces some problems because there were still many problems has been found in the form of boundary conflict between villages in Indonesia. On the other hand, the data about the village boundary has not fully spatially depicted. Recently, that data still in the form of a textual document without providing information about coordinates. So many villages were overlapped with each other.

In term of solving the problem and accommodate all the interests, the Indonesia government generally try to shift the paradigm from the top-bottom approach into a bottom-up approach. The using of participatory mapping has been introduced. Participatory mapping is a group-based qualitative research method that gives participants the freedom to shape the discussion on a given topic with minimal intervention from researchers (NJTPA). That well known as a well-established tool of development intervention [3]. Participatory mapping is the “bottom-up approach” that allows the masses to create maps for all, in contrast, the traditional approach “top-down approach”, relying on those with the power and resources to creates maps that will benefit the masses either directly or indirectly [4]. Participatory mapping allows as to updating the general picture of the region and describing all the potential and strategic issues as well as tools for sustainable villages [5].

Generally, Indonesia consists of three levels of spatial planning, there are National level, Province level and Districts/City level. At districts level, spatial planning policy contains the necessary local knowledge but has not yet adequately incorporated local community resources [6]. The integrating of participatory mapping and village boundary determination stated on PERMENDAGRI (Minister of Home Affair Regulation) No. 45 the year of 2016. The purposed of this paper is to demonstrate the using of participatory mapping to determine village boundary in Rambah Sub-districts referring to PERMENDAGRI (Minister of Home Affair Regulation) No. 45 the year of 2016 with a modification. By using that, we also collected all issues in the districts level related to village boundary. The sub-objective of this paper is :

1. Collecting the related documents
2. Determine the work map
3. Determine the border positions
4. Determine the boundary map

Rambah Sub-districts is one of sub districts that lied on Rokan Hulu regency. The administrative area of Rambah sub-districts is limited by :

- North : Bangun Purba Sub-districts
- East : Rambah Samo Sub-districts
- South : Rokan IV Koto Sub-districts
- West : West Sumatera Province and North Sumatera Province

Rambah sub-districts were consist of 14 villages, such as Pasir Pengaraian, Menaming, Rambah Tengah Hulu, Rambah Tengah Barat, Rambah Tengah Utara, Rambah Tengah Hilir, Pasir Baru, Tanjung Belit, Sialang Jaya, Koto Tinggi, Suka Maju, Pematang Berangan, Babussalam, Pasir Maju.

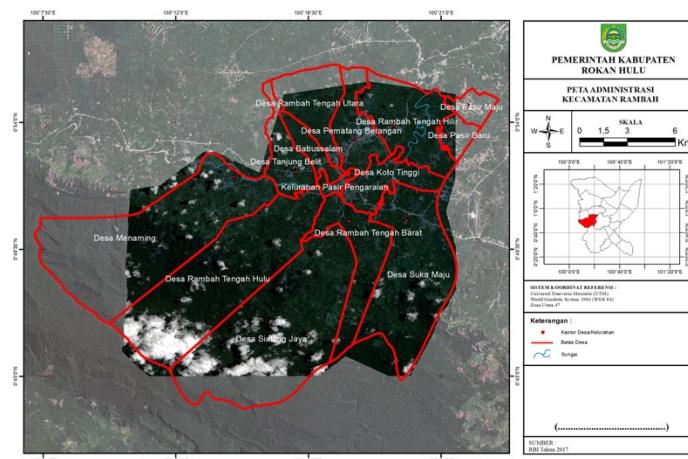


Figure. 1. The Administration Map of Rambah Sub-Districts

## 2. RESEARCH METHOD

The material and equipment that were used in this research were :

1. Quickbird image from Geospatial Agency of Indonesia (BIG)
2. The map Rupabumi Indonesia
3. The village boundary map from BPS
4. ArcGIS 10.1
5. GPS Handheld
6. Camera

The methodology to obtain the information of Rambah sub-districts border was participatory mapping. The steps of participatory mapping that have been done rely on PERMENDAGRI (Minister of Home Affairs Regulation) No. 45 the year of 2016 with a modification. In this paper, we excluded the step of setting up the border pillars. The steps of the villages boundary determination that was used were :

### 1. Documents Collecting and Observation

This is the first step of this research that were included all activities to collect the related data or documents about villages boundaries such as legal documents, historical documents and other related data. From this stage were obtained the indicative boundary that can be used for the next step.

### 2. Determine the Work Map

Based on the regulation, there were two types of work map that can be used. There were Peta Rupabumi Indonesia (Indonesian topographical map) with the scale is 1:5.000. The other one is the remote sensing imagery with the minimum spatial resolution is 4 m. In the research area, the topographical map with scale 1:5.000 are not available. So, we used the Quickbird image with the spatial resolution is 0.6 meters. That data we obtained from the Geospatial Agency of Indonesia (BIG).

### 3. The Tracing and Determine Border Positions

Before tracing the border positions, the participatory mapping in the form of Focus Group Discussions has been done by all related elements. After that, the next step is field observation to provide the coordinate informations.

### 4. Determine the final Boundary Map

This the final step of this research by collecting all data from previous analysis and describing it into the final boundary map.

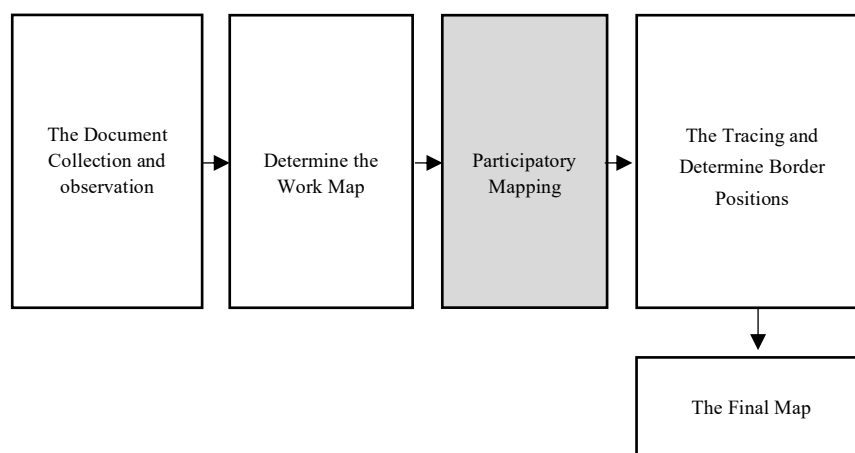


Figure 2. The Flow Chart of the Research (adopted from PERMENDAGRI (Minister of Home Affairs Regulation) No. 45 the year of 2016 with a modification

### 3. RESULTS AND ANALYSIS

#### 3.1. Documents Collecting and Observation

The purposed of this stage was to collecting all related data to provided information about indicative border. That can be used as early information and material to obtained definitive border. There were two type of data such as textual data and information from historical actors.

- Textual Data

Textual data is all related documents that described about village profiles. First of all, that data was historical document that stated about the history of the village establishment. There were three documents about that, there are :

1. Regional Regulation of Rokan Hulu Districts No. 7 year of 2003
2. Regional Regulation of Rokan Hulu Districts No. 14 year of 2003
3. Regional Regulation of Rokan Hulu Districts No. 14 year of 2007

- Information from Historical Actors.

Beside the textual documents, we also collecting all information from historical actors to bring the perspective regarding village boundary from each villages.



Figure 3. The Stage of Documents Collecting and Observation

#### 3.2. Determine the Work Map

The work map that we used in this research was Quickbird image with the spatial resolution is 0.6 meters. That data we obtained from the Geospatial Agency of Indonesia (BIG).

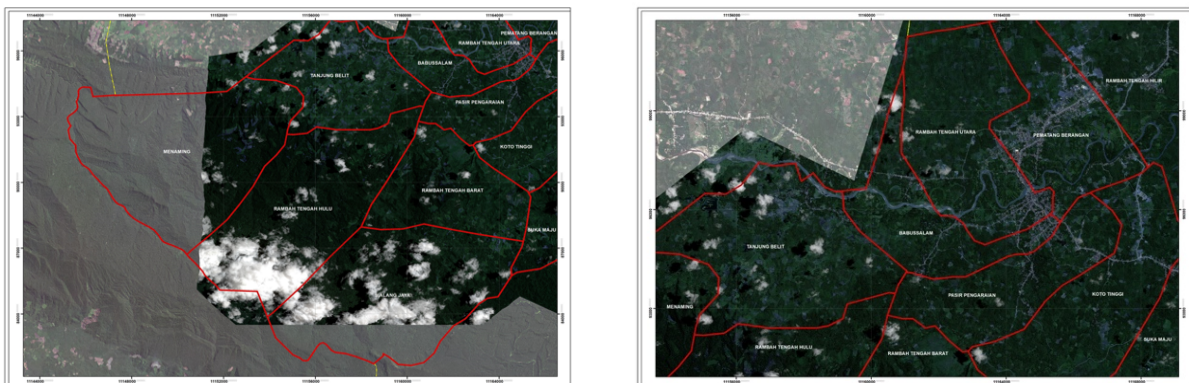


Figure 4. The Work Map

### 3.3. The Tracing and Determine Border Positions

The first step of this stage is Focus Group Discussion (FGD) by using data that were obtained from previous stage. FGD is the form of participatory mapping. FGD has been done by invited the related stakeholder such as the village apparatus and local community, the government of districts and sub-districts. By this stage, there were several issued has been concluded, such as :

1. The Lacking of Community Understanding.

The lacking of community understanding means there are group of people were worried that if the boundary has change it will affect their right of the land.

2. The Changes of Natural Boundary

In the past, the border between villages has been consent by using the natural appearances like river and topographical boundary. But in fact, that natural boundary have been changes because natural and anthropogenic activities. For example, the boundary issue between Menaming and Tanjung Belit was the location of the embouchure. Because the natural dynamics, the embouchure has been changes.



Figure 5. The Natural change issues between Menaming and Tanjung Belit; (a) The location of border from both view; (b) the version of Menaming; (c) The version of Tanjung Belit

3. The Different Perceptions

The different perception occurred because the difference toponymy that become the reference. For example, the boundary issues between Rambah Tengah Hulu and Pasir Pengaraian is they have been consent that the border is the river but they have their own version of the river. Pasir Pengaraian claimed the border is Lengkopan River, but Rambah Tengah Hulu claimed the border is Tunjang river.



Figure 6. The Different Perception related villages boundary between Pasir Pengaraian and Rambah Tengah Hulu; (a) The location of border from both view; (b) the version of Pasir Pengaraian; (c) The version of Rambah Tengah Hulu

#### 4. The Area Reorganization without Tight Boundary

The area reorganization is the common action in Indonesia, especially for the villages that has high density of population and has large areas. But administratively the border of the villages not spatially depicted. It will makes the conflict related villages boundary in the future. For example the case of Rambah Tengah Barat and Sialang Jaya.

The next step is the field observation to collect the coordinate data of boundary. This is the important part if this research, because the coordinate will be described into the village boundary map.



Figure. 7. The Field Observation

### 3.4 Determine the final Boundary Map

The final step was provided the final map of villages boundary. Based on the previous analysis we obtained the final map by using the application of ArcGIS 10.4.

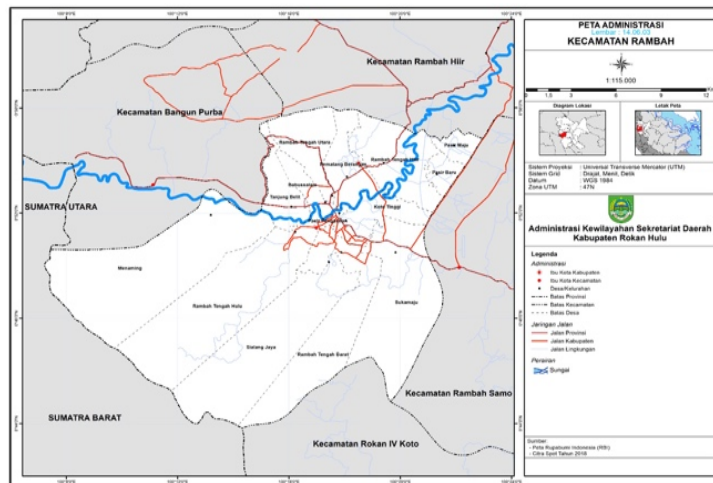


Figure 8. The Final Administration Map of Rambah Sub-Districts

### 3. CONCLUSION

1. There were two type of data such as textual data and information from historical actors.
2. The work map that we used in this research was Quickbird image with the spatial resolution is 0.6 meters.
3. FGD has been done by invited the related stakeholder such as the village apparatus and local community, the government of districts and sub-districts.
4. There were several issued has been concluded from FGD activity, such as :
  - a. The Lacking of Community Understanding
  - b. The Changes of Natural Boundary
  - c. The Different Perceptions
  - d. The Area Reorganization without Tight Boundary
5. The results of this paper were used by the government at Districts/City level (Rokan Hulu Districts) as an input to the their regulation in term of region administrations.

### ACKNOWLEDGEMENTS

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