

# Spatial Analysis of Land Ownership on Spatial Patterns (Coastal Borders) from 2012-2032 in Aceh Besar Regency

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**Abstract:** This study aims to analyze land ownership in 2022, mainly in the area of *Mesjid Raya* District of Aceh Besar Regency. This study used a descriptive survey method. This study's results indicate that nine out of 4,208 Land Ownership Rights in the *Mesjid Raya* District (0.225%) have buildings on them. Therefore, the issuance of Land Ownership Certificates in Coastal Border Areas violates laws according to Government Regulation No. 16 of 2004 and Circular Letter No.4 SE-100.PG.01.01/II/2022 regarding Land Use Policy in Protected Areas. The nine types of Land Ownership Rights issued in the Coastal Border Areas are divided into four certificates of Ownership Rights and five certificates of Usage Rights, and they are located in several villages, such as two certificates in *Neuheun*, two certificates in *Ladong*, two certificates in *Ruyung*, one certificate in *Meunasah Keudee* and one certificate in *Lamreh*. The total area of the Ownership Rights Certificates issued in the Coastal Border Areas is 21,206 m<sup>2</sup>, and the total area of the Usage Rights Certificates is 145,302 m<sup>2</sup>.

**Keywords:** Land Certificate; Spatial Planning; Coastal Border Areas; Aceh Besar

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## INTRODUCTION

Government Regulation No. 24 of 1997 mandates that land registration is a series of continuous, consistent, and organized activities that are carried out by the government. This means the government has a crucial role in ensuring that land plots and apartment units are appropriately accounted for, and their ownership rights are legally recognized.

Land registration activities include the collection, processing, bookkeeping, presentation, and maintenance of physical and juridical data in the form of maps and lists (Arba, 2018), which are used to create a comprehensive record of all land plots and apartment units. These records are regularly updated to reflect ownership, usage, or other relevant information changes.

One of the key benefits of land registration is issuing certificates of land ownership rights (Ardani, 2020), which provide legal protection for owners of land plots and apartment units. This is particularly important when resolving disputes over land ownership, as it provides a clear and legally recognized record of who owns which land plot or apartment unit.

Furthermore, land registration also ensures that certain rights that burden the land are correctly documented (Agustina, 2021). For example, an easement on a piece of land, like a right-of-way or a land use restriction, will be recorded during the land registration process. Thus, it will provide an additional layer of protection for property owners, as it ensures that any potential disputes or legal issues related to these rights are clearly documented and can be resolved through legal means.

The establishment of coastal boundary limits in Aceh Besar Regency is regulated in Qanun No. 4 of 2013 concerning the Regional Spatial Planning of Aceh Besar Regency. The land boundary along the coastlines is determined by a minimum distance of 100 (one hundred) meters from the highest tide point towards the land. This boundary determination aims to preserve the coastal environment, prevent disasters, and have reasonable control regarding policies and implementation in the field. Furthermore, Presidential

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Decree of the R.I. No. 32 of 1990 concerning Protected Areas explains that coastal boundary areas are included in protected areas that must be preserved.

Land conflicts related to land ownership and control issues include conflicts due to differences in perceptions, values, or opinions, interests regarding the status of control over certain land that is not or has not yet been granted rights (state land), as well as those that have been granted rights by certain parties (Limbong, 2014). In addition, disputes over space and land are considered fundamental issues in development activities caused by overlapping and mismatched land/space use permits (Puspasari & Sutaryono, 2017).

Encroachments of the coastal border areas in Aceh Besar District have been increasing in recent years (Irham et al., 2022), mainly serving commercial purposes, such as coffee shops, culinary establishments, cafes, and residential areas. According to local online media, many coffee shops and cafes in the coastal border areas have been used as residential and sales areas. While the local government has regulated the utilization of this state land with related laws (Hidayanti et al., 2021), an immediate investigation conducted by researchers in one of the coastal border areas in Aceh Besar District found that there are still law violations (Irham et al., 2022; Kamalia et al., 2022; Sunawardi et al., 2018).

The issue of encroachments in coastal border areas is not unique to Aceh Besar District, as it is a problem that affects many coastal communities (Handayani et al., 2020; Hartanto & Rachmawati, 2017; Markum et al., 2022; Sarah et al., 2022). The problem arises from the high demand for coastal land for commercial and residential purposes, leading to a lack of regulation and enforcement. As a result, these land encroachments can negatively impact the environment and livelihoods of local communities that rely on coastal resources for their income and sustenance (Irham et al., 2022; Resosudarmo et al., 2019).

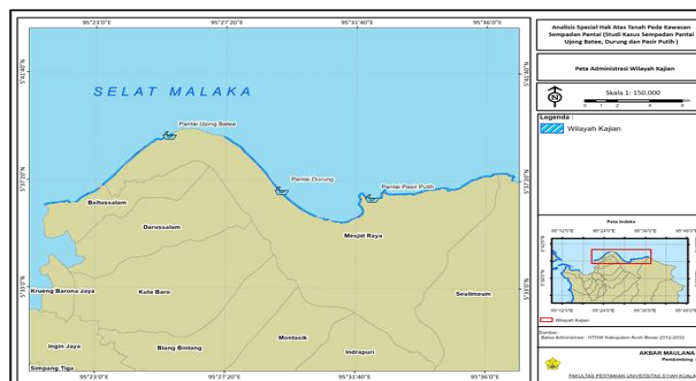
According to Law No. 27 of 2007, anyone carrying out activities in coastal areas must obtain permission. Furthermore, the stricter provisions are regulated in Article 11 paragraph (1) of Government Regulation No. 16 of 2004 concerning Land Use, which states that land in protected areas that do not have land rights may be granted land rights, except in forest areas. However, it is noted that the use and utilization of land in protected areas or cultivation areas must be in accordance with the function of the area in the RTRW and must not disrupt the natural function nor alter the natural fortifications and ecosystems. This is in accordance with the guidelines for coastal borders zone regulations in Article 57, Paragraph (5) of Aceh Qanun No. 19 of 2013, concerning the Aceh Regional Spatial Planning for the period of 2013-2023.

In this case, land ownership becomes important in utilizing and using the land. However, in its use, some rules limit the landowner's authority. The problem of coastal boundary misuse is often caused by a lack of understanding of land or agrarian issues (Aghazsi, 2015; Sam et al., 2020). As a result, in practice, some things are not in accordance with applicable provisions. A directed perspective and mindset are needed, especially for stakeholders. Therefore, research is needed on "Analysis of Land Certificate Issuance on Coastal Boundaries in the Mesjid Raya District".

**METHOD**

*Research location*

This research was conducted in 2022. Data analysis was carried out at the Land Office of Aceh Besar Regency. The research area includes three beaches: *Ujong Batee*, *Durung*, and *Pasir Putih*. More detailed information can be seen on the following map:



**Figure 1.** Study area map

### Materials and tools

Tools used in this study include (1) ArcGIS software, (2) camera, (3) printer, (4) Global Positioning System (GPS), (5) SAS Planet software, (6) Google Earth Pro software, Land Certificate Maps (source from the Ministry of ATR/BPN updated in 2022), and (7) Legion Y700 Laptop. In addition, materials used in this study are (1) Study Area Administrative Maps, (2) Land Certificate Maps along the *Ujung Batee, Durung, and Pasir Putih* coastlines, (3) Land Ownership, Possession, Usage, and Utilization Maps in Border Areas, and (4) Land Certificate Suitability Maps in Border Areas based on spatial patterns from 2012-2032.

This research aims to provide a thorough understanding of the physical conditions in the field by utilizing a descriptive method with survey techniques. The descriptive method effectively describes the existing conditions through writing, recording, and describing (Dewata & Achmad, 2015). In order to gain more insight into the data collected through the survey, various statistical tools, such as correlation and regression analyses, were used. Meanwhile, the data analysis was done to provide a deeper understanding of the relationship between different variables (Miles et al., 2014). Furthermore, it helped identify any patterns or trends within the data and highlight any areas that require further investigation.

According to Fotheringham and Rogerson (2014), spatial data analysis involves interpreting and manipulating geographic data to reveal patterns and relationships among different data sets. Thus, spatial data analysis is a crucial aspect of this research, which was carried out using ArcGIS software with the extract, overlay, and reclassify methods. Specifically, the extract method involved using the clip and selected methods to isolate relevant information from the larger dataset, while the overlay method involved using the union and dissolve methods to combine different data layers. Furthermore, the reclassify method was then utilized to assign different values to the data, which allows for a more nuanced analysis of geographical variables. By employing these methods, a more comprehensive analysis of the geographical data in the field was collected, which was essential for drawing meaningful conclusions from this research.

Apart from spatial data analysis, this research also used a statistical analysis that involves the application of mathematical models to the data to uncover relationships and patterns that might not be immediately apparent (Miles et al., 2014). By using both spatial and statistical analysis, a more detailed and nuanced analysis of the data can, in turn, inform decisions and policies related to the research area.

### Research stages

The research was conducted in several stages to achieve its objectives. These stages included preparation and data collection from the Ministry of ATR/BPN, pre-processing of data, fieldwork (ground check), data analysis, and drawing conclusions based on the results. The data preparation/collection stage began with obtaining permits for conducting the research, collecting data, and everything needed at the research location. In addition, secondary data such as journals, theses, literature, and other additional information from the internet and the Aceh Besar National Land Agency (BPN) related to the research title and location were collected to facilitate the survey. These secondary data were useful in conducting surveys.

Pre-processing of data was carried out by correcting errors in the Google Earth imagery data obtained from the SAS Planet software. These data were analyzed using ArcGIS and Google Earth Pro software. As a result, the research area was determined to limit the study area. Furthermore, pre-processing of Land Field Maps (PBT) data from the Ministry of ATR/BPN was carried out to determine the distribution of certified land fields in the study area. Fieldwork (ground check) activities include:

- a. Conducting orientation to obtain a general overview of the research location.
- b. Analyzing the amount of ownership, possession, use, and utilization of land at the research location.
- c. Taking coordinate points using the Global Positioning System (GPS) and taking photos as documentation material.

### Data Analysis

Data analysis techniques in Geographic Information Systems (GIS) can be divided into two categories namely spatial data analysis techniques and attribute data analysis techniques (Paramasivam & Venkatramanan, 2019). The technique for analyzing the existing land field map in 2022/2022 was carried out by performing on-screen visual classification on Google Earth Imagery data. The principle of object recognition in data is based on the recognition of its characteristics or attributes in the Imagery. Therefore, visual data interpretation is carried out to obtain land cover by looking at patterns, colors, sizes, shapes, textures, shadows, heights, sites, and associations combined with on-screen visual classification

techniques. Data corrected after fieldwork is then analyzed to obtain area, calculated in units of area (m), ownership, possession, utilization, and land use. Attribute analysis in this study is carried out in two stages:


- Analysis of attributes of the Land Field Map at the research location, namely analysis to obtain classes of Land Possession, Ownership, Use, and Utilization. The analysis results were calculated in units of area (m) along with their spatial distribution.
- Analysis of attributes of the Land Field Map at the research location based on spatial patterns (Coastal Border) 2012-2032, namely analysis to obtain information related to the Land Field Map in 2022 based on spatial patterns (Coastal Border of *Ujong Batee*, *Durung*, and *Pasir Putih*) 2012-2032, with the output producing distribution of Land Field Maps that violate the rules for issuing Land Certificate Rights. The analysis results were calculated in units of area (m).

**RESULT AND DISCUSSION**



*Interpretation of the 2022 Land Registration with the 2012-2032 Spatial Pattern*

Based on the Field Survey, data on land ownership registered on the Protected Area (Coastal Border) was obtained, with a total of nine land plots in the Mesjid Raya district along the Durung coastline. The Google Earth Imagery and land use view in the field is shown in Table 1. Interpretation of the Land Registration Map in 2022 and Field Surveys have produced data indicating that along the *Ujong Batee* to *Durung* coastlines, nine out of 4,208 land plots have been certified in the Protected Area (Coastal Border) and registered at the Aceh Besar Land Office

**Table 1.** Field Imagery Views

Field view	Description	Google Earth view
	Ponds and concrete castings 95° 24' 53.092" E 05° 38' 49.873" N	
	Fisherfolk housing complex 95° 25' 57.392" E 05° 38' 47.002" N	
	Batee Hill restaurant 95° 25' 11.79" E 05° 38' 54.486" N	

Field view	Description	Google Earth view
	<p>Tourist attraction</p> <p>95° 27' 41.868" E 05° 38' 46.849" N</p>	
	<p>Shrimp warehouse</p> <p>95° 27' 47.07" E 05° 38' 41.569" N</p>	
	<p>Vacant land</p> <p>95° 29' 50.555" E 05° 36' 13.956" N</p>	
	<p>Pond</p> <p>95° 29' 54.791" E 05° 36' 8.215" N</p>	
	<p>Pier and tourist attraction</p> <p>95° 41' 3.871" E 05° 20' 22.33" N</p>	

Field view	Description	Google Earth view
	<p>Chicken farm</p> <p>95° 31' 51.0611" E 05° 36' 19.57" N</p>	

*Analysis of Land Ownership Certificate based on Coastal Border Areas*

a. Land Ownership Certificate for Pond Use

Field survey results show a violation of Land Use Certificate No. 00002 with an area of 72,702 m<sup>2</sup> in *Neuheun Village*. This certificate was issued in 1985 by the *Aceh Besar District Land Office* for the Government of the Republic of Indonesia. Currently, the land is being used as a pond area but has been built with concrete and walls, which is not in accordance with the rules of certificate issuance based on PP 16 of 2004 concerning Land Arrangement and Circular Letter Number 4/SE-100.PG.01/II/2022.



**Figure 2.** Ponds and concrete castings

b. Land Ownership Certificate for Pond Utilization

Field survey results indicate a violation of Land Use Certificate No. 00012 with an area of 12,960 m<sup>2</sup> in *Neuheun Village*. The certificate was issued in 2012 by the Land Office of *Aceh Besar Regency* to an individual owner named *Coco Kokarkin*. Currently, the land is being used for a fishpond area and also for the housing complex for the officer in the Ministry of Marine Affairs and Fisheries, which is not in accordance with the rules of certificate issuance based on PP 16 of 2004 concerning Land Arrangement and Circular Letter Number 4/SE-100.PG.01/II/2022.



**Figure 3.** Housing Area

c. Land Ownership Certificate for Restaurant Land Utilization

Field survey results indicate a violation against Land Use Certificate No. 00013 with an area of 34,793 m<sup>2</sup> in *Neuheun Village*, issued in 2013 by the Land Office of *Aceh Besar Regency* for the Government of

Aceh through the Department of Public Works and Spatial Planning. Currently, there are a Material Warehouse and Batee Hill Restaurant in the area, which is not in accordance with the rules for issuing certificates based on Government Regulation No. 16 of 2004 on Land Arrangement and Circular Letter No. 4/SE-100.PG.01/II/2022.



**Figure 4.** Restaurant Area and Wood Warehouse

Field survey results indicate violations of the Ownership Certificate No. 00406 with an area of 2264 m<sup>2</sup>, issued in 2011 by the Land Office of Aceh Besar Regency in the name of Nurismi. The land is currently being used as a café, kiosks for selling, and a tourist spot, which is not in accordance with the rules for issuing certificates based on Government Regulation No. 16 of 2004 on Land Arrangement and Circular Letter No. 4/SE-100.PG.01/II/2022.



**Figure 5.** Buildings

d. Land Ownership Certificate for Warehouse Land Utilization

Field survey results indicate violations against Land Use Certificate No.00018 with an area of 15000 m<sup>2</sup> in Ladong Village issued in 2019 by the Aceh Besar District Land Office on behalf of the Aceh Government. Currently, the land is being used as a warehouse and shrimp pond in an artificial pond, which is not in accordance with the rules for issuing certificates based on Government Regulation No. 16 of 2004 concerning Land Arrangement and Circular Letter Number 4/SE-100.PG.01/II/2022.



**Figure 6.** Warehouse

e. Land Ownership Certificate for Vacant Land Utilization

Field survey results indicate violations against Land Ownership Certificate No. 00018 with an area of 2286 m<sup>2</sup> in Ruyung Village, issued in 2007 by the Aceh Besar District Land Office in the name of Asmawati. Currently, the land is still vacant, but two semi-permanent buildings do not comply with the rules for issuing certificates based on Government Regulation No. 16 of 2004 concerning Land Arrangement and Circular Letter No. 4/SE-100.PG.01/II/2022.



**Figure 7.** Vacant land and semi-permanent buildings

f. Land Ownership Certificate for Pond Land Utilization

Field survey results show violations against Certificate of Land Ownership No.00115 issued in 2007 by the Aceh Besar District Land Office on behalf of Manuna Mahmud et al. The land area stated on the certificate is 14,788 m<sup>2</sup> in Ruyung Village. Currently, the land is being used for fishponds, and there are semi-permanent buildings that do not comply with the rules for issuing certificates based on Government Regulation No. 16 of 2004 concerning Land Use and Circular Letter No. 4/SE-100.PG.01/II/2022.



**Figure 7.** Vacant land and semi-permanent buildings

g. Land Ownership Certificate for Pier and Tourist Area Land Utilization

Field survey results indicate violations against Land Use Certificate No. 00003 with an area of 9,843 m<sup>2</sup> in Meunasah Keudee Village. The certificate was issued in 2012 by the Aceh Besar Land Office on behalf of the Aceh Provincial Government. Currently, the land is being used as a Pertamina ship dock and also a tourist spot with semi-permanent buildings. The Land Use Certificate not only covers the coastal area but also extends into the sea, which is not eligible for any land use certificate according to the laws in Government Regulation No. 16 of 2004 regarding Land Use and Circular Letter No. 4/SE-100.PG.01/II/2022.





**Figure 7.** Vacant land and semi-permanent buildings

#### h. Land Ownership Certificate for Chicken Farming Land Utilization

Field survey results show violations against the Certificate of Land Ownership No.00523 with an area of 5,583 m<sup>2</sup> in Lamreh Village, issued in 2007 by the Aceh Besar District Land Office on behalf of Anif Kesumawan. Currently, the land is being used as a chicken farming area, which is not in accordance with the regulations for issuing certificates based on Government Regulation No. 16 of 2004 concerning Land Arrangement and Circular Letter Number 4/SE-100.PG.01/II/2022.



**Figure 7.** Vacant land and semi-permanent buildings

#### *Legal Certificate of Land Rights in Protected Areas Issued by the Land Office of Aceh Besar Regency*

Article 11 of Government Regulation No. 16 of 2004 and Circular Letter No.4/SE-100.PG.01/II/2022 regarding Land Utilization Policy in Protected Areas states that land within protected areas that do not yet have land rights can be granted land rights, except in forest areas. Land within cultural heritage sites that do not yet have land rights can be granted certain land rights in accordance with applicable laws and regulations, except at site locations.

Land registration, especially in protected areas, still raises differing opinions among land registration officials in the region as to whether land rights can be granted. Thus, to provide legal certainty in land services in the region, particularly in protected areas, a policy from the Minister of Agrarian and Spatial Planning/Head of the National Land Agency is needed as a guideline for implementing land utilization policies, including land registration activities in protected areas.

Land registration in protected areas is given with limitations and obligations in the form of Rights, Restriction, and Responsibility (RRR) which is recorded in the land book and certificate, including:

- Landowners are prohibited from building structures that reduce the conservation function of embankments, coastal conservation functions, or other conservation functions.
- Land use and utilization in protected areas must not disturb natural functions or alter natural landscapes and ecosystems.
- Landowners are prohibited from damaging natural resources and the sustainability of the environment.
- Landowners are required to maintain the land, including increasing its fertility, preventing damage, and preserving the environment.
- Landowners are required to maintain the conservation function of coastal areas or other conservation functions.

- f) Land use and utilization in protected areas must be in accordance with the functions of the area in regional spatial planning.
- g) Follows other provisions in accordance with legislation. The Right to Land Ownership can be revoked if the landowner fails to comply with the provisions and/or prohibitions based on RRR (Right, Restriction, and Responsibility) recorded in the land book and certificate.

Granting land rights in protected areas must comply with the applicable spatial planning plan. This study's results indicate that nine land plots violate the laws, so their ownership certificates must be reviewed. Based on the regulations, the certificate may be revoked because there are buildings on the land. The following is the data of landowners who violate the laws of the Land Rights Certificate in the Coastal Border Area:

**Table 2.** Owners of Land Rights Certificate in Coastal Border Areas

Area code	District	Village	Type of Rights	Surface area (m <sup>2</sup> )	Owner
1030905	Mesjid Raya	Lamreh	Ownership	5583	Anif Kesumawan
1030908	Mesjid Raya	Ruyung	Ownership	2286	Asmawati
1030908	Mesjid Raya	Ruyung	Ownership	14788	Manuna Mahmud
1030909	Mesjid Raya	Ladong	Ownership	2264	Nurismi
1030909	Mesjid Raya	Ladong	Usage	15000	Aceh Provincial Government
1030912	Mesjid Raya	Neuheun	Usage	34793	Bina Marga Cipta Karya Office
1030912	Mesjid Raya	Neuheun	Usage	12960	Coco Kokarkin
1030912	Mesjid Raya	Neuheun	Usage	72706	Ministry of Marine Affairs and Fisheries
1030904	Mesjid Raya	Meunasah Keudee	Usage	9843	Aceh Provincial Government
TOTAL				166508	

## CONCLUSION

Analysis of the Land Ownership Map along the *Ujong Batee*, *Durung*, and *Pasir Putih* coastal areas revealed that nine land plots out of 4,208 certificates (0.225%) had been certified in the Coastal Border Areas, and there are buildings on them. The Land Certificate issued in the Coastal Border Areas is located in *Neuheun* with two certificates, *Ladong* with two certificates, *Ruyung* with two certificates, *Meunasah Keudee* with one certificate, and *Lamreh* with one certificate. The types of Land Certificates issued in the Coastal Border Areas are four certificates of Ownership Rights and five certificates of Use Rights. The Ownership Rights certificate issued in the Coastal Border Areas has a total area of 21,206 m<sup>2</sup>, and the Use Rights Certificate has a total area of 145,302 m<sup>2</sup>.

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