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The Land Acquisition of Inundated Land for The Toll Road Project of Semarang-Demak Sea Embankment

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Abstract

The land acquisition process has been viewed as the most challenging phase in developing road infrastructures in Indonesia. Since the northern coast serves as a vital road corridor to support efficient population mobility and goods transport, the government set to improve the connectivity infrastructure by constructing a toll road project in Semarang – Demak Sea embankment (TTLSD). However, the development of toll road infrastructure for public purposes is often complex because it needs the acquisition of a massive quantity of land. In contrast, land supply is minimal, especially in degraded coastal zones. The study aims to investigate the land acquisition process in the inundated land, which impacts economic and social aspects. The research uses a mixed-methods approach, incorporating quantitative and qualitative research methods and spatial-based analysis techniques that utilize geographical information systems and remote sensing. This analysis shows that the majority of land parcels (92%) in the TTLSD construction project site were inundated lands. This phenomenon resulted in a slow land acquisition process because there were no technical laws and regulations to determine the status of flooded land. There was no mechanism for the transfer of rights to land in Indonesia. Moreover, the land acquisition was hampered by inappropriate compensation, which could not meet the community's expectations, and there were no clear land boundaries due to the flood.

Keywords: inundated land; land acquisition; road infrastructure; TTLSD

1. Introduction

Over the past years, Indonesia has exerted efforts and resources to improve road infrastructures to support population mobility and goods transport. The northern coast of Semarang-Demak serves as a vital road corridor that is more attractive to development interests and land-use change. The need for land to implement road projects is rising due to the national focus on infrastructure development. According to Ministerial Decree of Public Works and Public Housing No. 355/KPTS/M/2017 (*Keputusan Menteri PUPR* No. 355/KPTS/M/2017) on Integration and Development of Semarang Sea Embankment with the Construction of Semarang-Demak Toll Road (TTLSD) stipulated, the alteration of Semarang-Demak toll road traces and integrated the construction of sea embankments in Semarang with the toll road development (Ministry of Public Works and Public Housing, 2017). However, improving road infrastructure in Indonesia is often complex and challenging since it needs a land acquisition process from private landowners. Also, TTLSD is located in the degraded coastal zones with high hazard risk, which requires a considerable quantity of land while land supply is very limited, especially in flood-prone areas. Past studies show that the presence of floods has harmed land value (Ismail et al., 2016), and it causes dilemmatic impacts on socioeconomic aspects, disruptions to public services, and loss of productive land uses (Merz et al., 2010; Meyer et al., 2007; Shrestha et al., 2019).

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A plan needs to consider many possibilities and aspirations from various stakeholders or parties to create a product that can be implemented and be accepted in society in a planning location (Tarigan, 2005). The first section was a form of government support, while the second section was a responsibility of Toll Road Enterprise/*Badan Usaha Jalan Tol (BUJT) PT Pembangunan Perumahan* Semarang Demak, with a total investment was 15.3 trillion. Nevertheless, it is reported that there was a crucial problem in implementing the project where the progress of the two sections was different. The section I was still in a land acquisition phase because there was a land conversion from the mainland to the ocean or this area was already flooded by seawater. Meanwhile, section II has moved ahead with the accurate construction development phase because the location is mainly covered with dry lands, and the land acquisition process is already finished. In addition, this issue occurs because there are still unclear regulations to define and validate the land inundated by flood. Dewi & Bijker (2020) stated a significant change in the coastline position following the huge land-use change from agricultural land into ponds, then ponds into water bodies. Those changes were mainly caused by land subsidence, abrasion, and flooding, which dissolved the land boundary. Although TTLSD has two functions to connect Semarang and Demak regions and control flooding caused by sea-level rise, the previous research reveals that the construction or mitigation measures in flood-prone areas were still insufficient to deal with flooding problems. It can even exacerbate the higher risk of flooding (Stevens & Berke, 2010). Also, the study shows that preserving the flood-prone vacant lands is more economically beneficial to their surroundings than stimulating developments in inundated areas (Atoba et al., 2021).

Furthermore, obstacles such as inadequate human resources, lack of budget, and incompetent authority influence an inefficient practice of land acquisition (Joesoef et al., 2020). Therefore, if the government expected that land acquisition for the development of TTLSD section I can be undertaken well, this process needs to consider several things or key aspects to make landowners perceive a justice toward their land. The previous study believes that the lack of transparency potentially results in social injustice and reduced public participation, particularly for vulnerable households (Greer & Binder, 2017; Siders, 2019). Most affected people in the land acquisition are those whose livelihoods depend on land (Akib et al., 2020) and are indirectly the victims of land grabbing. Moreover, land acquisition can hardly be implemented when inhabitants prefer to stay in the flood zone (in the coastal area) and are able to adapt to the changing environment rather than leave their current place (Buchori et al., 2018). This study aims to investigate the land acquisition process for road infrastructure development in inundated land towards the local community land rights in Semarang – Demak Sea embankment.

2. Research Methods

The research uses data collected in the first stage to assure that all research activities can be conducted in a good direction and effective way concerning data/information processing to achieve the research purposes. The spatial data was gathered from the related institutions such as LAPAN, BIG, *Kantor Wilayah (Kanwil)* ATR/BPN of Jawa Tengah Province, and *Kantor Pertanahan (Kantah)* of Semarang City in either online or offline methods. The primary data (i.e., interview) was collected by interviewing all related and multi-level stakeholders such as the persons from Kanwil ATR/BPN of Jawa Tengah Province, Kantor Pertanahan (Kantah) of Semarang City, Setda of Jawa Tengah Province, and also the village apparatus. The respondents were chosen purposively based on their direct impact/interaction with the TTLSD project. We did a peer-to-peer interview with all stakeholders. The interview was based on semi-open questionnaires.

Generally, this study was conducted with mixed methods which systematically integrated qualitative and quantitative approaches. The research used primary and secondary data collected through in-depth interviews, surveys, and observations in the field study. Furthermore, this data was processed in various spatial-based analyses using Geographical Information System (GIS) and remote sensing as well as non-spatial analysis such as descriptive analysis. The GIS and remote sensing analysis were conducted by spatial analysis methods such as extraction of the data, super-imposed analysis (intersect overlay), and spatial calculator. We also used image interpretation to identify objects (land use) in the area of interest.

3. Results and Discussions

3.1. Identification of Land Parcels for the TTLSD Development

The identification of land parcels in the TTLSD project site section was divided into two parts. The first part was preparing image data from the stage of radiometric and geometric corrections and image cropping, which focused on the Area of Interest (AOI). Meanwhile, the second part was a data integration stage on the land use map with the AOI image. The integration was technically conducted with the overlay technique and proceeded with the analysis of image interpretation. Overlay analysis produces new spatial data from at least two spatial data as its input (Prahasta, 2002).

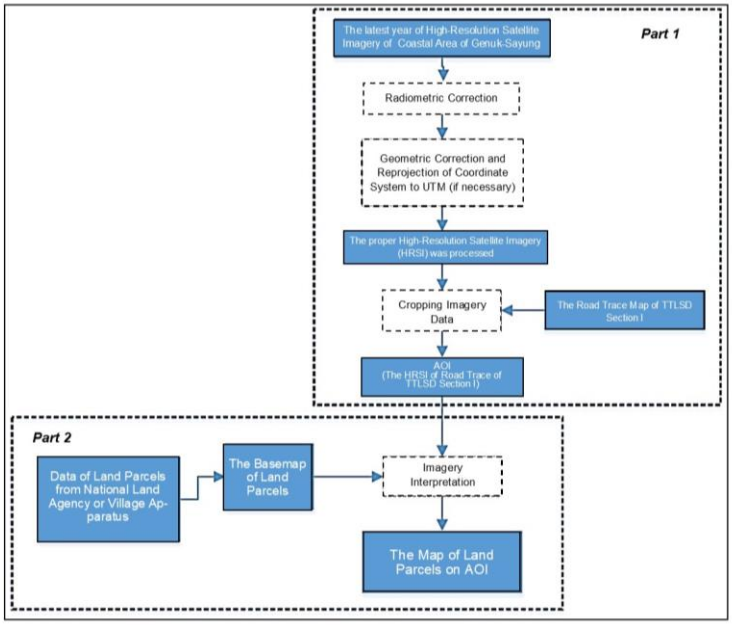

Figure 1. Flow Framework of Identification Land Parcels

The construction project of TTLSD passed through only very few plots of land that have been inventoried in section I, compared to total area of land parcels in each village (*kelurahan/desa*). The TTLSD project affected 41 out of 2.705 plots of land in Semarang, or approximately 1.5% of the total land in three villages, while the land area used for the construction in Demak Regency was 64 out of 3.220 plots of land, or around 2% of the entire land was in three villages. In the implementation process, the development of TTLSD (Tol Tanggul Laut Semarang-Demak) is divided into two sections. Section I was Semarang/Kaligawe – Demak/Sayung segments of 10,69 kilometers, and section II (Sayung – the city of Demak) with 16,31 kilometers.

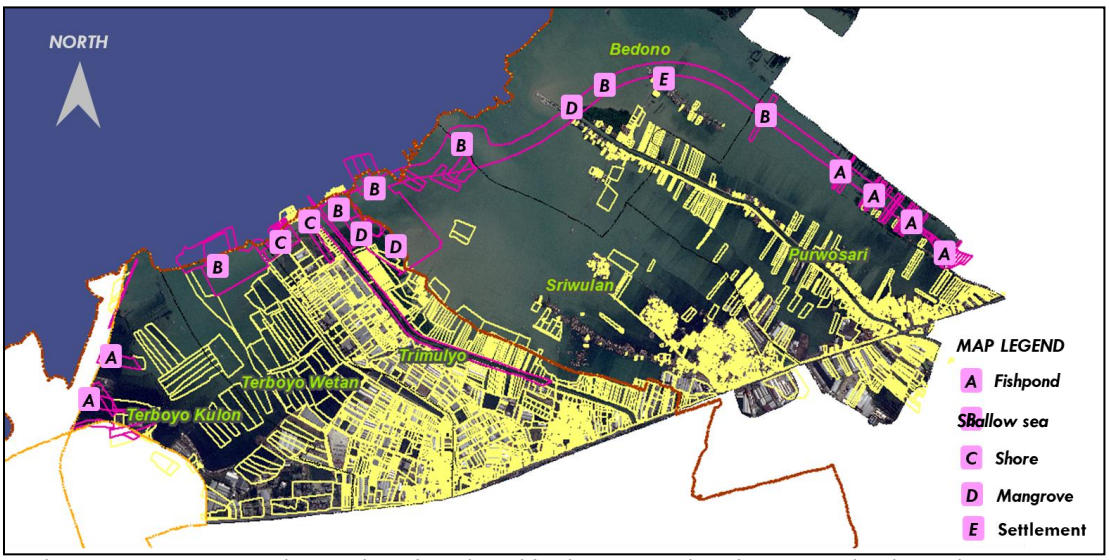

Figure 2. Image Interpretation on Plots of Land used for the Construction of TTLSD Project in Section I

Figure 2 represents the types of land uses in plots of land used to construct TTLSD in section I. These land uses were elucidated by analyzing some components of image interpretation (Lillesand et al., 1979; Sutanto, 1986), including hue/color, sizes, shapes, patterns, shadows, textures, sites, and association. Based on satellite imagery interpretation, plots of land were mostly used as fishponds and shallow waters, whereas few parcels of land were coastal land use and mangrove.

3.2. Identification of Land Ownership Status passed by The TTLSD Development

This analysis aims at identifying the status of land ownership or types of rights over the land. Plots of land with land ownership certificates will need further investigation. Local communities as landowners were interviewed to delve deeper into community perspectives on the land acquisition process and predicted

development impacts in the future. The identification was undertaken using land parcels data (cadastral data), classified based on types of status or rights over the land. The complexity in land identification appears from the dynamics of the project, diverse spatial data, and others, including the area of spatial units, ownership, location, and conflicting viewpoints of several stakeholders' groups (Kilić et al., 2018).

Table 1: Status/Types of Rights over the Land passed by TTLSD Development in Section I

Name of Village	Ownership Rights	Building Rights on Land	Rights of Use	Vacant Land (not registered yet)	Total
Bedono	-	-	-	1	1
Purwosari	17	-	-	37	54
Sriwulan	8	-	-	1	9
Terboyo Kulon	4	-	1	2	7
Terboyo Wetan	-	-	-	4	4
Trimulyo	22	5	-	3	30
Total	51	5	1	48	105

This research focuses on plots of land with status of land ownership certificates. The result reveals that although more plots of land in Demak Regency were taken during the construction of TTLSD project in section I, only 25 pieces of land have the certificate of land ownership compared to Semarang whose 26 pieces of land were evidenced by the land ownership certificate. There were plots of land that have a valid proof of land ownership certificate predominantly located in Kelurahan Trimulyo and Desa Purwosari by 22 and 17 pieces of land, respectively.

3.3. Analysis of Plots of Inundated Land and Its Land Ownership Status

In this analysis, the object of land was a piece of land whose territory covers the TTLSD trace area, and this land has a type of ownership right (SHM). Meanwhile, an inundated land was previously described in this study. Based on the imagery interpretation, flooded areas were depicted as water bodies. Analysis flow in this sub chapter can be elaborated in Figure 3.

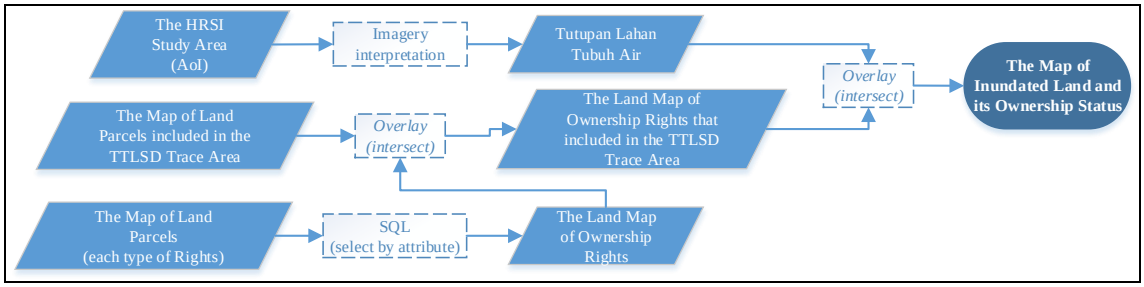

Figure 3. Analysis Flow Diagram of Flooded Land and Its Land Ownership Status

Analyzing an inundated land and its ownership status combines knowledge and application from remote sensing with geographical information systems. According to the data processing, it can be found that most of land parcels (92%) were flooded by approximately 47 pieces of land. The partial flooded land located in Kelurahan Terboyo Kulon and Kelurahan Trimulyo. On the contrary, the dry land is only located in Kelurahan Terboyo Kulon as the starting site for the toll road construction (the western part of the TTLSD trace). The half of land was a coastal area covered with sand, soil, and vegetation in the existing condition. The deployment of land parcels based on the condition level can be seen in Figure 4.

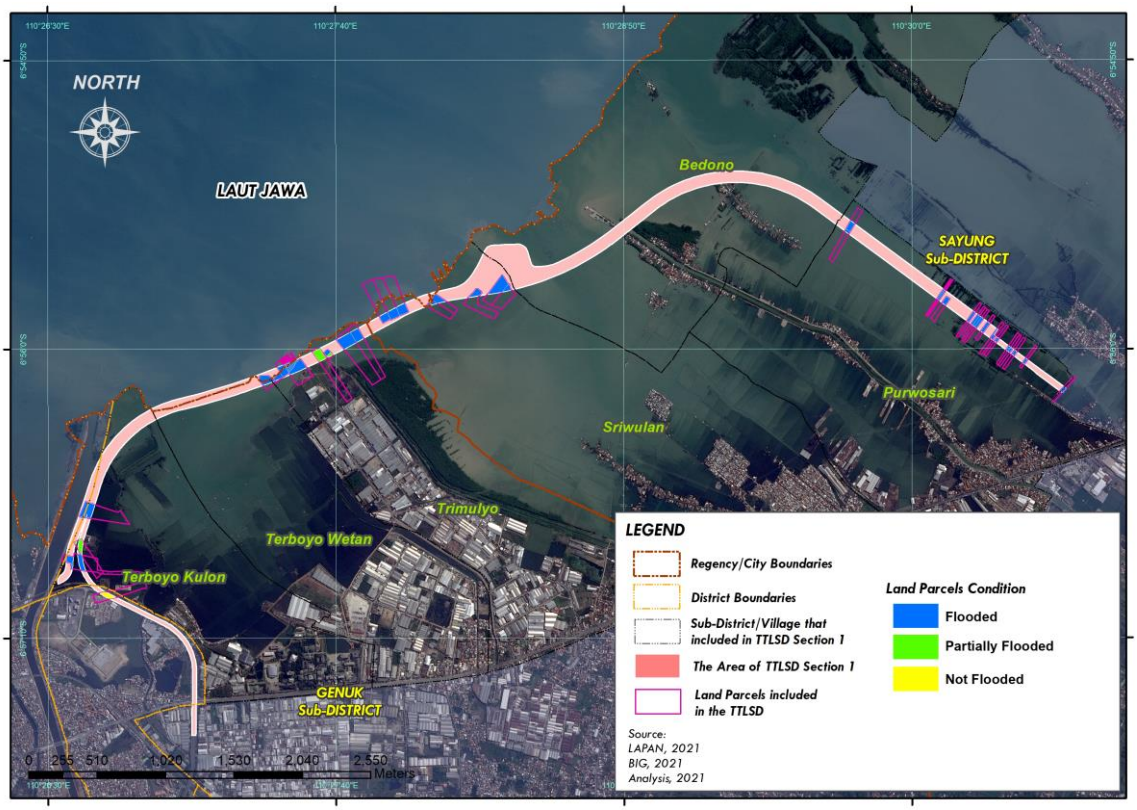

Figure 4. The Map of Flooded Land Parcels

3.4. Analysis of The Land Acquisition Process on an Inundated Land for TTLSD Development

3.4.1 Progress and Problems of the TTLSD Development

Analysis of the land clearing process fundamentally aims to explore the extent of the TTLSD development, particularly in the land acquisition stage. This analysis was carried out based on an interview with chosen stakeholders and an understanding of current literature related to the acquisition of land dynamics for the toll road development that frequently occurred in Indonesia. The respondents in this study were governmental stakeholders at provincial and local levels who were involved directly in the process of land clearing and the TTLSD development in section I, such as the National Land Agency in Central Java Province (Kanwil BPN Jawa Tengah), The Land Office of National Land Agency in Semarang (Kantah BPN Kota Semarang), Bureau of Infrastructure and Natural Resources in Central Java Province (Biro ISDA Setda Province Jawa Tengah), and village apparatus. The result indicates that the unfinished process of land acquisition caused delays in the progress of TTLSD construction project due to differences in the mechanism, land values, and policies in the two regions. In Demak, the land acquisition process is already finished, and the construction is about to start because most of the vacant land is covered by drylands. Conversely, some project sites in Semarang are still in the land identification and marking phase because land boundaries were disappeared by seawater. Loss of land delineations causes land acquisition to be more complex, and changes in decision-making result from sea-level rise (Johnson et al., 2020).

The toll road has elongated characteristics, and it may include different parts of the administrative area, with various types of the region's physical, social, and cultural conditions. The discussion about land acquisition for toll road construction is critical, especially regarding land acquisition. It is always the main problem (Sudirman, 2014). Based on the national regulation, degraded land affected by a natural disaster is legally considered land belonging to the state. However, the government at the local level was against the law and attempted to land rights to protect people against dispossession and stand for social justice. Also, there was no evident determination of land status at the TTLSD construction site, which influenced the land acquisition mechanism and the compensation fund provision to affected landowners. The compensation should be paid to the inhabitant's inappropriate value. Otherwise, their dissatisfaction will persist, causing a challenge to take over land (Elong et al., 2019; Rao et al., 2018). Both direct and indirect problems concerning the TTLSD development are: (1) the TTLSD project was stopped, (still) looking forward the regulation (*President Regulation*/Peraturan Presiden) related to the determination of vanished land; (2) the TTLSD projects are waiting for a preparation process of Raperpres document stipulated by Ministry of Economic Affairs, the draft of Presidential Regulation sets out the management of social impacts over vanished land in the context of development for the public interest; (3) much of the land owned by residents were submerged by seawater; (4) some areas are still in the stage of land identification (ownership status); (5) the compensation fund does not meet landowner's expectation; (6) the

physical problem of land parcels such as unclear land boundaries or object of land; and (7) furthermore, there was an ambiguity between the classification of the pond as an object of land and non-object of land.

3.4.2 The impact of the TTLSD Development

The land acquisition process, which was time-consuming, will have various impacts on the effectiveness and efficiency side of project implementation and the funding from the government and for residents living in the location of the TTLSD development project. The clearance process in developing cities often takes a relatively long time, and it is inclined to be a legal grabbing of land (Elong et al., 2019; Pedlowski, 2013; Said et al., 2019).

Also, there were direct and indirect impacts on the community's daily life. The analysis shows that most respondents "agreed" about the impact of the TTLSD project on their social-economic condition. Nevertheless, there were various opinions about the effects they perceived. The respondents' perspective (government stakeholders) regarding the level of impact can be seen in Figure 5.

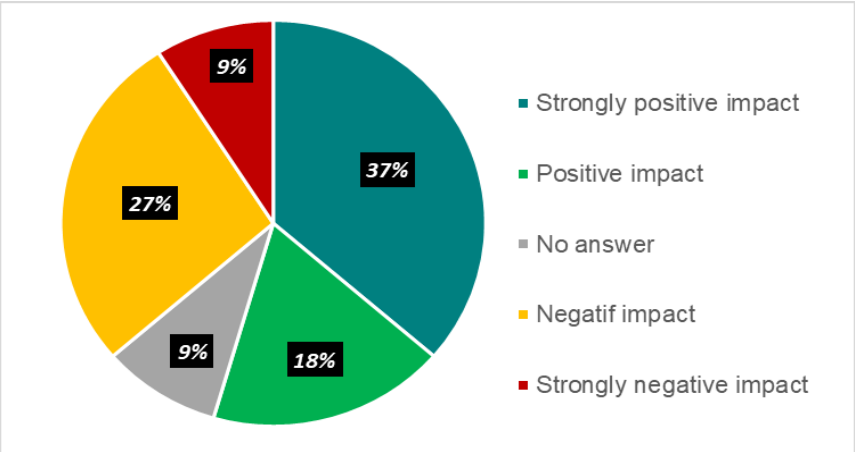

Figure 5. The Level of Impact from the TTLSD Development Project on Communities

The partial demolition of habitable houses in the City of Semarang and Demak Regency causes both negative and positive impacts on social-economic conditions. Delayed compensation payments might negatively impact the TTLSD project from landowner's opinion because they can hardly afford new accommodation in another place. Individuals face difficulties reconstructing their livelihood because of the loss of land, the loss of occupation, and the loss of business customers or relations they already built. When the compensation had not been paid to affected persons, this would negatively impact their social-economic condition (King & Sumbo, 2015). Meanwhile, the TTLSD project brings a positive side in providing them with new job opportunities which can enhance their financial situation. The TTLSD project is the manifestation of a sea dike constructed to protect low-lying hinterlands in coasts from flooding (Scheres & Schüttrumpf, 2019) and increase ecological values in the area. Sea dikes are commonly related to a nature-based coastal engineering approach that can bring environmental, economic, and social benefits (Van Wesenbeeck et al., 2016). The community perceived that the main impact of the TTLSD project is to create a better living environment that can support the community's subsistence. Furthermore, the affected inhabitants will eventually support the implementation of development because they already received fair and adequate compensation. They are still able to have social interaction and afford daily basic needs.

4. Conclusions

Land acquisition is the most challenging step in Indonesia's toll road construction process, especially at the local level. The problem of land acquisition is still the main obstacle in any infrastructure development, mainly when the project involves multiple stakeholders in a different region. Moreover, the land acquisition process is affected by the types of land. Land acquisition for drylands is much easier to do rather than plots of land inundated by seawater because land boundaries are defined. Most of the areas where the TTLSD project developed in section I were inundated land, which will eventually disappear. Those plots of land have no technical mechanism of land management by-laws, of which determination of land status and the mechanism of transfer of the ownership right over the land from inhabitants, especially for those who hold the right of land ownership. The absence of regulation leads to "irregularities of agraria" that influence the land clearing process and compensation fund (UGR) provision to the affected individuals. Those who owned the land did not receive a fair compensation value since their land was flooded by seawater with unclear boundaries. The complex scheme and amount of compensation cause public reluctance to give their land (Wahanisa et al., 2020). There was an ambiguity to define a pond as an object of land. Some areas are still in the process of land identification to ascertain ownership status. Therefore, the future regulation that stipulates the legal status of inundated land in flood-prone zones

should be made to solve problems in the process of land acquisition in TTLSD location section I and prevent further issues in the future. A data inventory of land parcels inundated by seawater or flooding should be conducted periodically to avoid conflicting interests. It is suggested to use technological application tools and spatial analysis to support land acquisition with unclear physical land boundaries. Synchronization of land policies at the central government level, related to categorizing ponds as an object of land or non-object of land, often causes ambiguity and is a severe impediment to land acquisition at the local governmental level.

Additionally, the provision of a compensation fund that was given to the affected landowner should consider the land market value in each region (both the City of Semarang and Demak Regency) with principles of justice to ensure public welfare. Furthermore, the vulnerability level of inhabitants towards the environmental change will dramatically increase. Inhabitants will struggle to the new livelihood after the loss of land. Moreover, those who often live in poverty with a non-mobile lifestyle imply financial inability to migrate (Buchori et al., 2020), requiring particular concern from the government in the future, particularly for affected residents whose land is located in the project site TTLSD.

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