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The Plotting Check of Land Parcels on Computerization of Land Activities (KKP) towards Complete Village in Medan City

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Abstract: The Plotting check serves as a strategic solution to address land-related issues where parcels are registered but remain unmapped due to the transition from analog to digital data systems. This necessitates the synchronization of both spatial and textual data through the implementation of KKP-Web and AutoCAD GeoKKP applications. This process is in alignment with the Ministry of Agrarian Affairs and Spatial Planning / National Land Agency's objectives to enhance electronic services. This research aims to map all land parcels within the Sitirejo II subdistrict as a decision-support tool for resolving land management challenges. The ultimate goal is to establish a harmonious integration between administrative functions, policy frameworks, and land information infrastructure, thereby contributing to the realization of sustainable development. The study employs a mixed-methods approach, combining quantitative techniques utilizing secondary data and spatial analysis, alongside qualitative methods through interviews. The analysis involves overlaying all registered land parcels onto the national coordinate system and validating land parcels, survey documents (SU), and land books (BT) using the KKP-Web application. The findings of this research resulted in a comprehensive land map of Sitirejo II, covering a total of 1,317 parcels, categorized into two distinct groups: (i) 1,013 parcels with complete data sets, including parcel details, SU, and BT, and (ii) 304 parcels with incomplete or missing data on parcels, SU, and BT. In conclusion, the plot-checking initiative for the Medan Land Office significantly enhances the quality of both spatial and textual land data, facilitating informed decision-making and policy development, and supporting the orderly management of land administration.

Keywords: Data Quality, Land Parcel, Plotting Check, Validation

INTRODUCTION

Various problems have occurred in this decade which have affected all human activities, including increasing population growth (Maulidah & Soejoto, 2017), the rapid development of urbanization which causes centralization in urban areas (Gultom & Harianto, 2022), and economic inequality due to uneven distribution of income and quality of human resources (Abram & Yeniwati, 2021). In addition, in the land sector there was a policy to control land in the archipelago during the colonial period such as the *Agrarische*

Wet (Agrarian Law) policy of 1870 in the Dutch East Indies (Amiludin, 2018;Pamungkas, 2021). The policy was intended for European companies to manage land with a concession system. However, the policy caused land previously owned by local communities to shift into the hands of the colonial government or private companies, resulting in structural inequality in land ownership that persists to this day (Kharisma, 2019). This colonial legacy is one of the obstacles to efforts to achieve fair agrarian reform. Weak law enforcement, changing regulations, and corruption cases in the agrarian sector also add to the low legal certainty. Uncertain laws or unfair law enforcement often prolong agrarian conflicts. The above problems have a dominant impact on the land aspect, namely the legalisation of unprotected land rights, unfair access to land reform, unsustainable land administration in the use and utilisation of land, and low legal certainty in handling disputes, conflicts, and land cases (Pinuji, 2020).

The provision of land services and management throughout the territory of the Unitary State of the Republic of Indonesia is a task carried out by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) as a government agency tasked with organising government affairs in the fields of agrarian/land and spatial planning. The Ministry of ATR/BPN has an electronic-based public service application, namely the computerisation of Land Activities (KKP) (Mujiburohman, 2021). Computerization of land services began with the Land Office Computerization (LOC) program in 1997, over time the name changed to KKP and experienced continuous system transformation from KKP-Desktop to Geo-KKP and finally a web-based application or known as KKP-Web (Mujiburohman, 2021). KKP-Web is the answer to the weaknesses of the previous application implemented by the Ministry of ATR/BPN.

The KKP-Web application scheme has a collaboration of database servers and application servers connected via a Local Area Network (LAN). This is achieved by web-based applications using one server as a data center in managing input and output processing of land services in all offices in the ATR/BPN environment (Mustofa, 2020). KKP-Web as an effort to improve technology-based performance in forming the quality of public services quickly, efficiently, modernly, transparently, and accountably in the implementation of the Ministry of ATR/BPN as good governance (Saraswathi et tal., 2017).

According to Pinuji (2020) mentioning the obstacles faced, namely the decline in land procedure management in providing services, which has an impact on increasing problems in land management and agrarian resources Pinuji (2020). The implementation of land administration systems and land policies due to the decline in the carrying capacity of land information infrastructure as decision-making tools is another obstacle that needs to be anticipated in the land management system.

The reality of the increasing number of land disputes, conflicts, and cases (SKP) in Indonesia is due to registered and unregistered land areas. This is triggered by problems

with the subject of rights holders, land area objects, overlapping, double certificates, and other problems from a social and practical perspective (Purba, 2020). In response to the above problems, the Ministry of ATR/BPN appealed to the Regency/City Land Office as the land implementer to implement a land plotting check system for every land activity. Plotting checks are carried out to validate land plots according to actual conditions in the field (Junarto & Suhattanto, 2022). There is a background to why plotting checks need to be carried out because there are still many old certificates whose land areas have not been mapped (Maslan, 2023). As is known, the Land Office has used KKP-Web and has been accommodated in the registration map, so that the migration of analog data to digital data certainly requires a process of why this plotting check is carried out. Then, to anticipate that there are no land areas that are not in their actual position, so that it will result in overlapping in the mapping system (Razak dkk., 2020). This means that the administration of the registration map at the Land Office is not good. In the implementation of the plotting check with the aim of a complete village/sub-district, all land areas are recorded for land rights. This greatly affects the identification of Based on the direction of the Jokowi-Ma'ruf government, by 2025 all land areas will be registered and have land title certificates which are the responsibility of the Ministry of ATR/BPN (Tadu, 2020). Plotting check activities are one of the steps in realizing this by accelerating the data collection of all land areas, both those that are certified and those that are not, so that the determination of land areas for agrarian reform will be quickly identified.

Land plots targeted by the PTSL (Complete Systematic Land Registration) program are grouped into four main categories, namely K1, K2, K3, and K4 (PTSL Technical Instructions, 2022). Category K1 includes land plots that have not been registered but meet the legal requirements for certification. Land plots in Category K2 cannot undergo certification processing due to ongoing legal disputes or unresolved conflicts. Category K3 consists of four subcategories. K3.1 is a land plot that has gone through the stages of collecting physical and legal data, announcements, and ratification, but the owner is not yet willing to make a statement of debt for BPHTB (Land and Building Acquisition Fee) and PPh (Income Tax). K3.2 includes land plots with special ownership statuses that prevent them from meeting the legal requirements for issuing certificates. Examples include customary land, sultanates, land owned by foreigners, or land plots with unresolved boundaries. K3.3 consists of land plots whose physical data has been collected, but certificates cannot be issued due to budget constraints or the owner's subject's ignorance. K3.4 is a land plot whose physical and legal data has been collected, but certificates have not been issued due to budget constraints or the subject's unwillingness. Finally, the K4 category includes land plots that already have certificates but have not been georeferenced or mapped digitally on the registration map (Junarto & Suhattanto, 2022).

The availability of sufficiently advanced technology facilitates the land office in improving its land mapping systems. The objective of the plot-check process for the Ministry of ATR/BPN is to serve as a foundational database for mapping purposes. This approach is in line with the statement made by the Head of Survey and Mapping at the Medan City Land Office during an interview with the author in 2021, which emphasised that the initiative aims to ensure legal certainty when assessed based on physical data. Clearly, well-managed physical data correlates directly with enhanced legal certainty for the public.

In the context of land management theory, this research plays a role as a driver for the development of an integrated and sustainable land management system. As stated by Putri & Amrullah (2024) that one of the important elements in land management is the quality of land data which is the basis for planning, management, and spatial-based decision-making. This study aims to examine the implementation of the plotting check stage in ensuring high quality land data, as well as analyzing the obstacles and solutions related to the implementation of plotting checks towards complete sub-districts. This writing also aims to fill the literature gap by focusing on the urgency of the initial stages of improving the quality of land data through the plotting check system, which has not been widely discussed in previous studies. Several studies have discussed various aspects of land data quality. For example, Handono et al. (2020) & The Promise (2021) highlights the acceleration of improving the quality of land data through optimizing processes at the land office. Research by Pinuji (2020) & Mustofa et al. (2018) emphasized on improving the quality of spatial data. Meanwhile, aspects of electronic land certificates, both in terms of urgency, archiving, and technical and legal aspects, have been discussed by The Greatest Showman (2021). Suhattanto (2021) also emphasized the importance of land data quality as a primary prerequisite for the implementation of electronic land certificates.

However, these studies have not specifically touched on the plotting check process as an initial stage in improving the quality of land data. Prakosa & Taftazani (2022) highlights the importance of digitizing unmapped land areas, especially cluster 4 (K4) areas, which are one of the challenges in achieving complete sub-districts. The implementation of check plotting in Indonesia still faces technical and administrative challenges, such as lack of cross-agency coordination and varying data quality. However, this step is an important effort to ensure the validity of land data which will ultimately support legal certainty, resource management, and more targeted regional development (A. I. E. Putri & Putri, 2024). This study places plotting checks as a strategic step that functions to verify the spatial position of land plots, ensure the conformity of physical data with administrative data, and identify potential errors or data conflicts. Thus, the main objective of this paper is to explain in detail the stages of implementing plotting checks, identify obstacles such as limited initial data, equipment, or experts, and offer practical solutions based on field experience and

technological approaches. We anticipate that this explanation will enhance the quality of land data and facilitate the successful completion of sub-districts.

METHODS

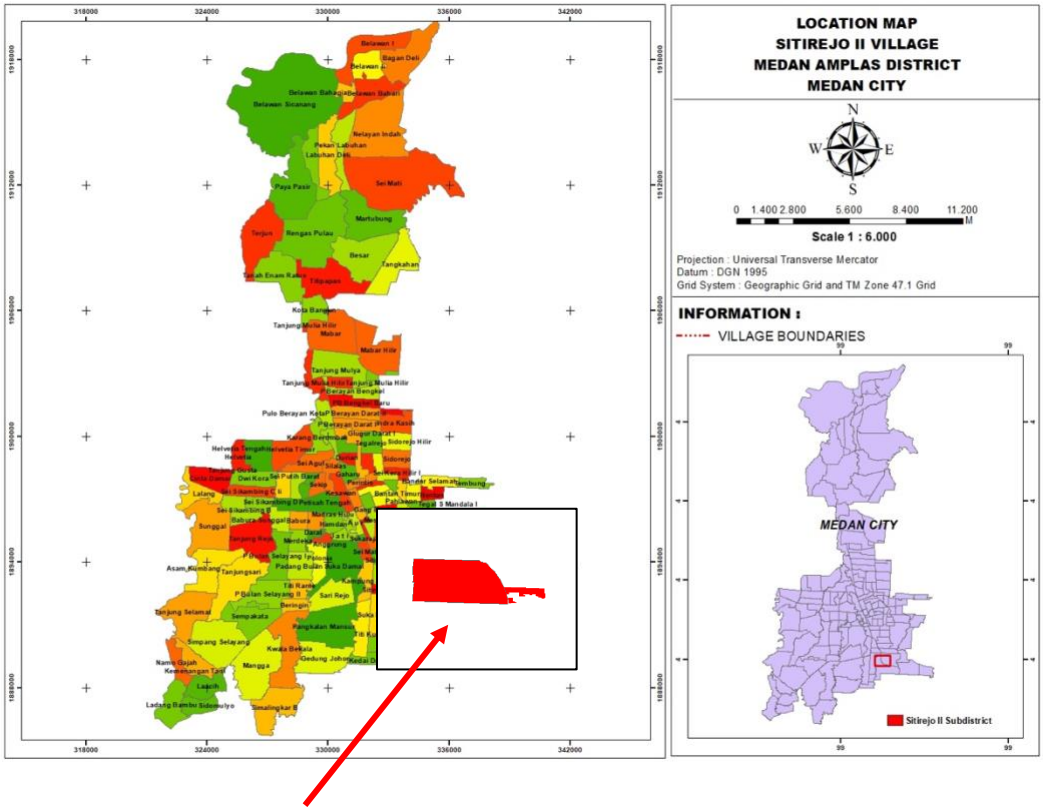
This study uses a mixed method with a quantitative approach in the form of secondary data and spatial approach analysis and a qualitative approach through interviews. We obtained secondary data by downloading land plots in Sitirejo II Village from the Registration Map on KKP-Web. The data includes digital documents such as shapefiles, Measurement Letters/Situation Drawings (SU/GS), Measurement Drawings (GU), and Land Books (BT), which were then improved based on spatial and textual standards. We conducted GIS analysis using ArcMap and AutoCAD GeoKKP software to overlay land plots against national coordinates and verify their validity.

Interviews were conducted with the Head of the Survey and Mapping Section of the Medan City Land Office, technical officers of plotting checks, and several landowners in Sitirejo II Village. The selection of respondents was based on their direct involvement in plotting check activities and land data management. The Head of Section was selected because he has authority in technical policies, while technical officers provide practical insights into field challenges. Landowners were involved to provide views on the physical condition of their land plots and the problems they frequently face. The interview instrument included a list of semi-structured questions designed to elicit information related to technical constraints, solutions implemented, and the effectiveness of plotting checks. We used thematic methods to analyze the interview data, identifying key patterns and comparing them with the quantitative analysis results.

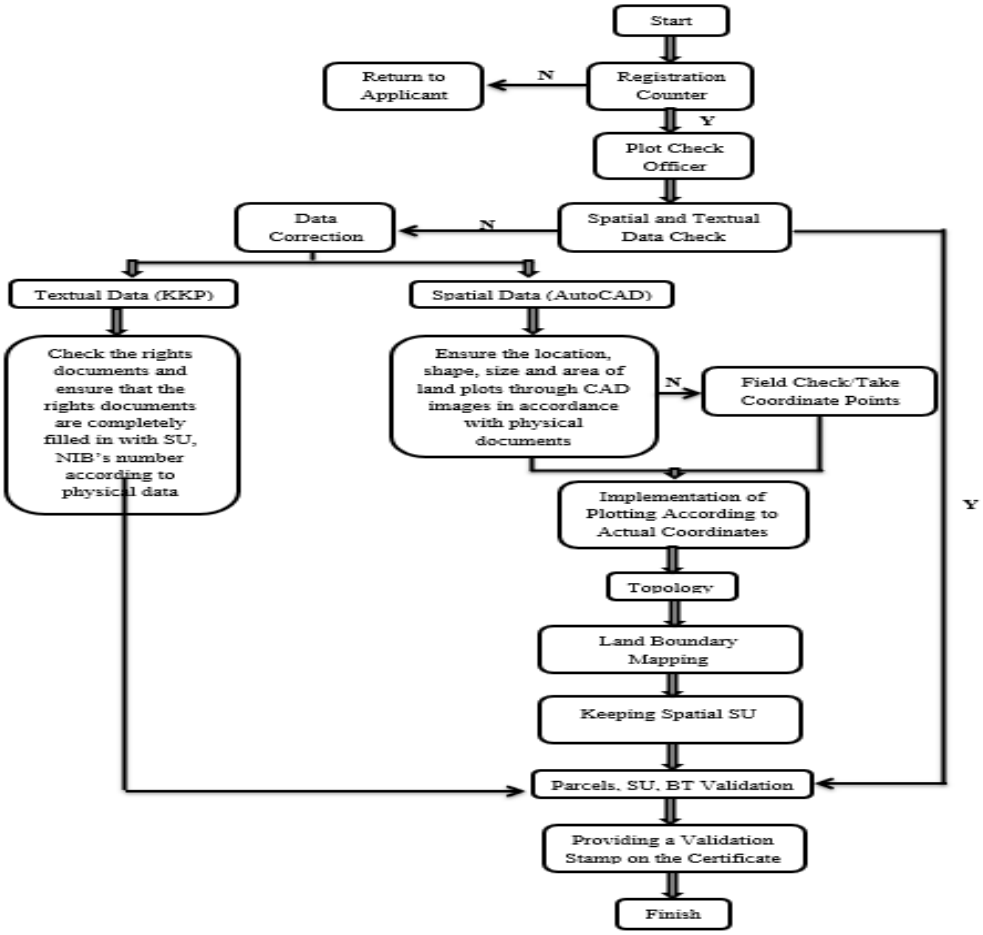
We conducted data analysis in two stages: quantitative analysis and qualitative analysis. In the quantitative analysis, we processed spatial data using ArcMap, overlaying all land areas against national coordinates. Improvements were made to ensure consistency in shape, size, and position based on supporting documents. In the meantime, the qualitative analysis compared the findings from interviews with quantitative data to assess the validity and limitations of the implementation of check plotting. This process ensures that any data anomalies are identified appropriately. Figure 2 clearly visualizes the research process by depicting the research workflow, including the data analysis stages. The results of this combination of methods produced a complete village map with a data validation rate of 98.07%, providing a strong basis for the declaration of a complete village in Sitirejo II.

The location targeted by the author for research is Sitirejo II Village in Medan City. This location was chosen as the research location because this area is close to the city center and is an area that is economically advanced. In addition, this area reflects problems that often occur in land data management, especially K4 land areas (which are already certified

but have not been digitally mapped). In addition, this area is one of the main targets in the acceleration program towards a complete village initiated by the Ministry of ATR/BPN. With a high level of urbanization and the complexity of land ownership, Sitirejo II is a strategic location for implementing check plotting as a method of validating spatial and textual data. Its geographical location is presented in Figure 1, which shows the position of Sitirejo II Village in Medan City, making it easier for readers to understand the context of the study area.



Picture 1. Sitirejo II Village Location Map
Source: Author's analysis results, 2021



Picture 2. Check Plotting Implementation Work Diagram
Source: Author's analysis results, 2021

The implementation of this land service activity is carried out by the community by re-registering their certificates at the Land Office to carry out other legal acts. The plotting check process begins with the applicant or landowner submitting a land registration file for which the right has been issued to carry out legal acts on the land to the service counter for file reception (Ardianto et al., 2023). The counter officer then checks the application file for completeness. The counter officer returns the incomplete application file to the applicant for completion. If it is complete, the file is given to the land plotting check officer to check the spatial and textual data according to the physical data on the attached certificate.

There are two distinct methods for implementing plotting checks and validating registered land plots. First, if the spatial and textual data match the physical details of the certificate provided by the applicant, then the plot validation process happens right away, following the rules set out in the Complete Land Registration Technical Instructions for Cities/Regencies Number 0003/JUKNIS-300.UK01.01/II/2019. The next stage is integration to combine textual spatial data and SU validation that is bound to the land plot through KKP-web so that the SU textual data matches the physical certificate. Furthermore, the BT

textual document must also be validated so that land data maintenance occurs. Second, if the textual and spatial data do not match the physical data of the certificate, then textual data correction is carried out through KKP-Web and spatial through AutoCAD GeoKKP. Textual data correction is carried out by checking or examining the rights documents in KKPWeb with the physical data of the land rights certificate attached by the applicant. Spatial data correction is carried out to ensure the conformity of the location, shape, size and area of the land plot with the physical data of the SU in the certificate. In its implementation, it is often found that land plots are not mapped at the actual coordinates, and the shape and area do not match the physical data of the certificate. We correct these anomalies by editing the KKP database. Spatial data editing is the editing/changing of the GeoKKP database for land plots so that it is in accordance with the physical documents of the registration map and standardization that have been determined by the Ministry of ATR/BPN.

Land areas whose locations cannot be found by officers: a field check is carried out at the location by contacting the applicant or landowner to provide coordinate points on the land area requested. Furthermore, the land area is mapped through through *AutoCAD GeoKKP* according to the actual position. If the spatial data improvement process has been completed, then the next step is to check the rights documents on KKP-Web to ensure that the validation of the plot and SU on AutoCAD GeoKKP has been successful and the spatial data has been integrated with the textual data on KKP-Web. Then validate the plot, SU, and BT on KKP-Web. After the three variables have been validated, the next step is to provide a validation stamp on the physical certificate from the plot check officer as a sign that the plot check and validation have been carried out.

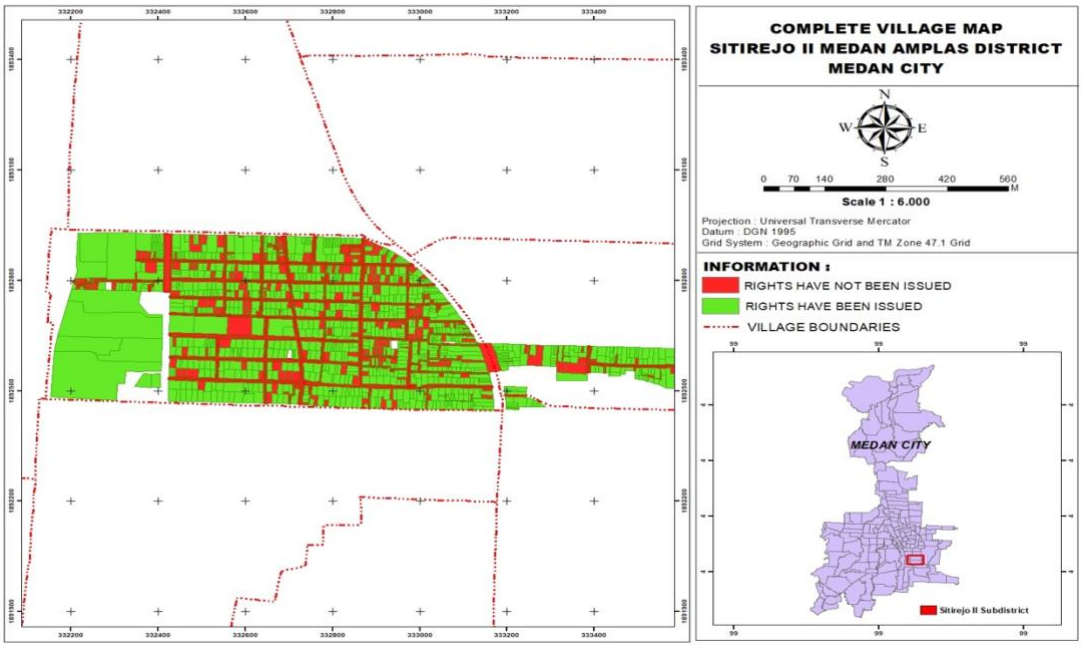
Cluster 4 (K4) is a land area whose subjects and objects have been registered and certified but have not been mapped (Parent, 2022). The stages of this activity are almost the same as those of checking, plotting and validating spatial and textual data on land plots through land service activities. The only differences lie in the methods of data collection and processing. Digital data in the KKP system consists of several levels of data quality, namely first quality (KW1), second quality (KW2), third quality (KW3), fourth quality (KW4), fifth quality (KW5), and sixth quality (KW6). Registered land plots that have been mapped on the registration map at the KKP are included in the categories KW1, KW2, and KW3, while registered land plots that have not been mapped on the registration map at the KKP are included in the categories KW4, KW5, and KW6 (Mawadah, 2021). Digital data is classified based on data availability into KW1 to KW6 data according to Table 1.

Table 1. Types of Land Area Data Quality

Data Availability	Data Quality (KW)					
	KW1	KW2	KW3	KW4	KW5	KW6
Plot	✓	✓	✓	×	×	×
Mapped						
GS/SU Spatial	✓	×	×	✓	×	×
GS/SU Textual	✓	✓	×	✓	✓	×
Land Book	✓	✓	✓	✓	✓	✓

Source: (PTSL Technical Instructions for Cities/Districts, 2019)

Table 1 shows data for KW4, KW5, and KW6, which are the targets of K4 activities in order to improve the quality of data on registered land areas.(Arianto & Gunarto, 2016). We carried out data analysis based on land quality classification by downloading spatial data from Sitirejo II Village's registration map in KKP-Web. The results of the spatial data download are in the form of shapefiles that can be processed using ArcMap. In line with that, this analysis also uses KKP-Web to check each land area one by one through the NIB on the measurement document menu. The things that are checked are related to the completeness of the data on the rights number and SU number on each land area. Additionally, we conducted an analysis to validate each plot, BT, and SU. At this stage, not only measurement documents were researched, but rights documents were also analyzed regarding the completeness of measurement data in each rights number. Furthermore, the land areas were grouped into several classifications based on data quality, the results of which can be seen in Picture 3.

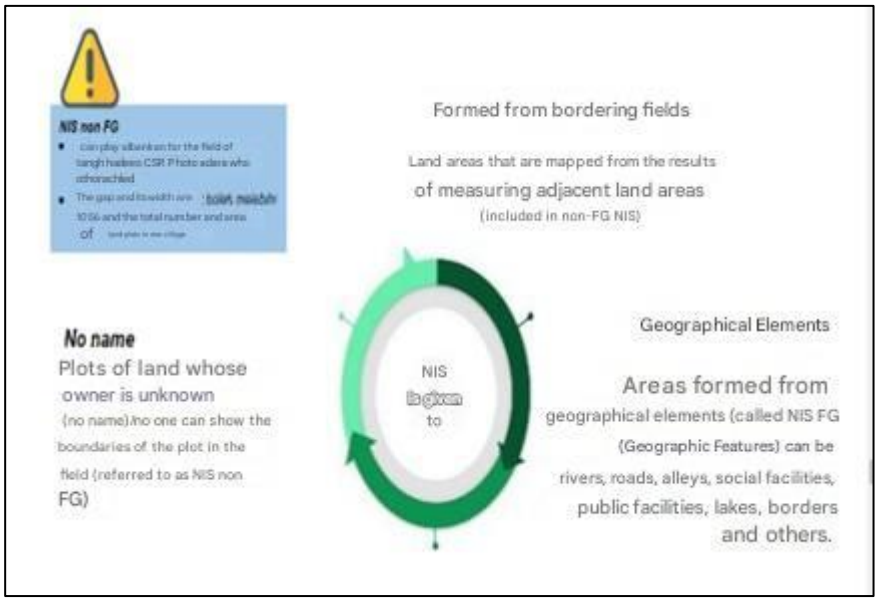


Picture 3. Classification Results Based on Data Quality
Source: Author's Analysis Results, 2021

RESULTS AND DISCUSSION

Realization of Stages and Analysis of Plotting Check

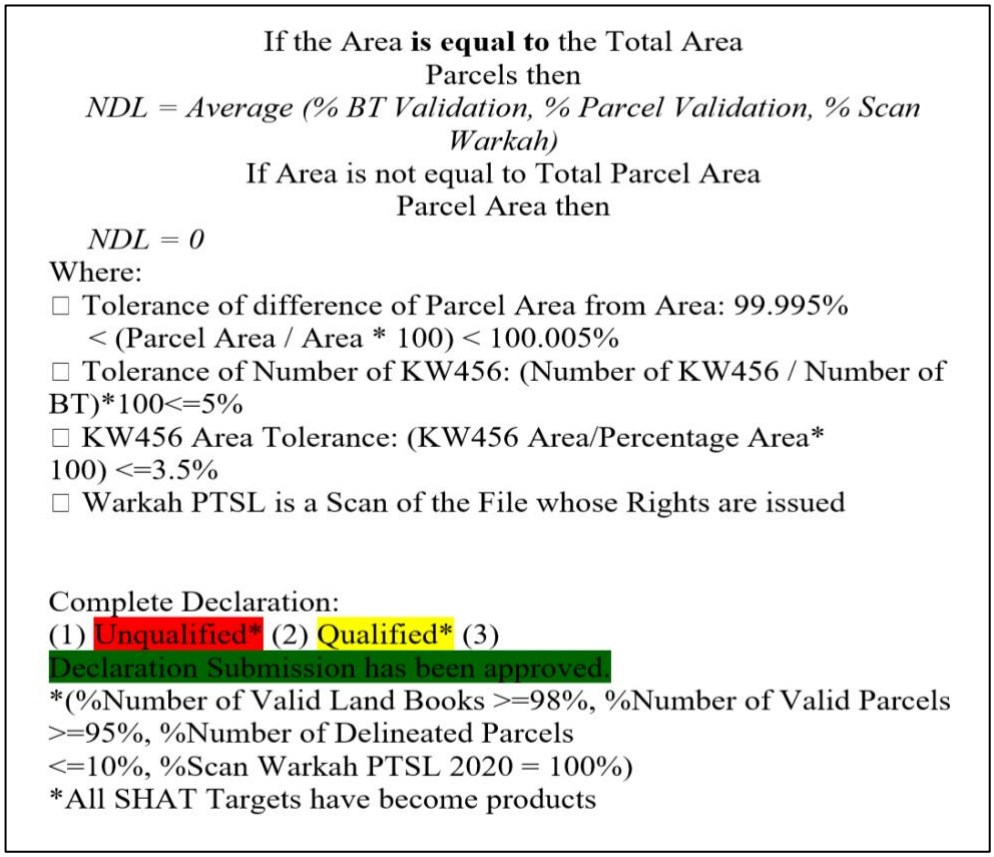
Complete Village Map in Sitirejo II is formed after all land areas are mapped. To meet the requirements of Complete Village, NIS (either for geographic features, or for non-geographic features) can be given for objects such as rivers, roads, alleys, social/public facilities, no names, directly adjacent fields and so on (Syaifullah, 2022). The provision of NIS is important to ensure that all objects in the area are registered in a structured manner, minimizing the potential for data conflicts and increasing transparency in land management. In addition, the existence of NIS facilitates the process of further analysis for spatial planning, regional asset management, and more targeted policy making. The determination of NIS is also a strategic step in realizing the "One Map Policy" concept promoted by the government, namely the integration of all map information in Indonesia into one centralized system. Thus, a complete village map not only supports administrative activities at the local level but also becomes an important component in the national information system that supports sustainable development. The picture below displays the diagram.



Picture 4. NIS Type Diagram on Complete Village Map
Source: (PTSL Technical Instructions for Cities/Districts, 2019)

The development of Complete Registered Villages is carried out by improving the quality of data in fields KW4, 5, and 6 and repositioning fields KW1, 2, and 3, as represented by the following formula: The implementation of complete village maps is carried out in Sitirejo II because it takes into account the value of complete villages which include several aspects, namely:

1. Data quality in Sitirejo II Subdistrict has reached almost 100%, which is approximately 98.07%.
2. The number of K4 is only a little left, which is 1.9%, and has entered the complete village tolerance, namely if added to the percentage of land book validation of around 98.45%, land area validation of 99.8% and validation of the deed. So the requirements for submitting a complete declaration are almost met.


If the Area **is equal to** the Total Area Parcels then

NDL = Average (% BT Validation, % Parcel Validation, % Scan Warkah)

If Area is not equal to Total Parcel Area Parcel Area then

NDL = 0

Where:

- Tolerance of difference of Parcel Area from Area: 99.995% < (Parcel Area / Area * 100) < 100.005%
- Tolerance of Number of KW456: (Number of KW456 / Number of BT)*100<=5%
- KW456 Area Tolerance: (KW456 Area/Percentage Area* 100) <=3.5%
- Warkah PTSL is a Scan of the File whose Rights are issued

Complete Declaration:

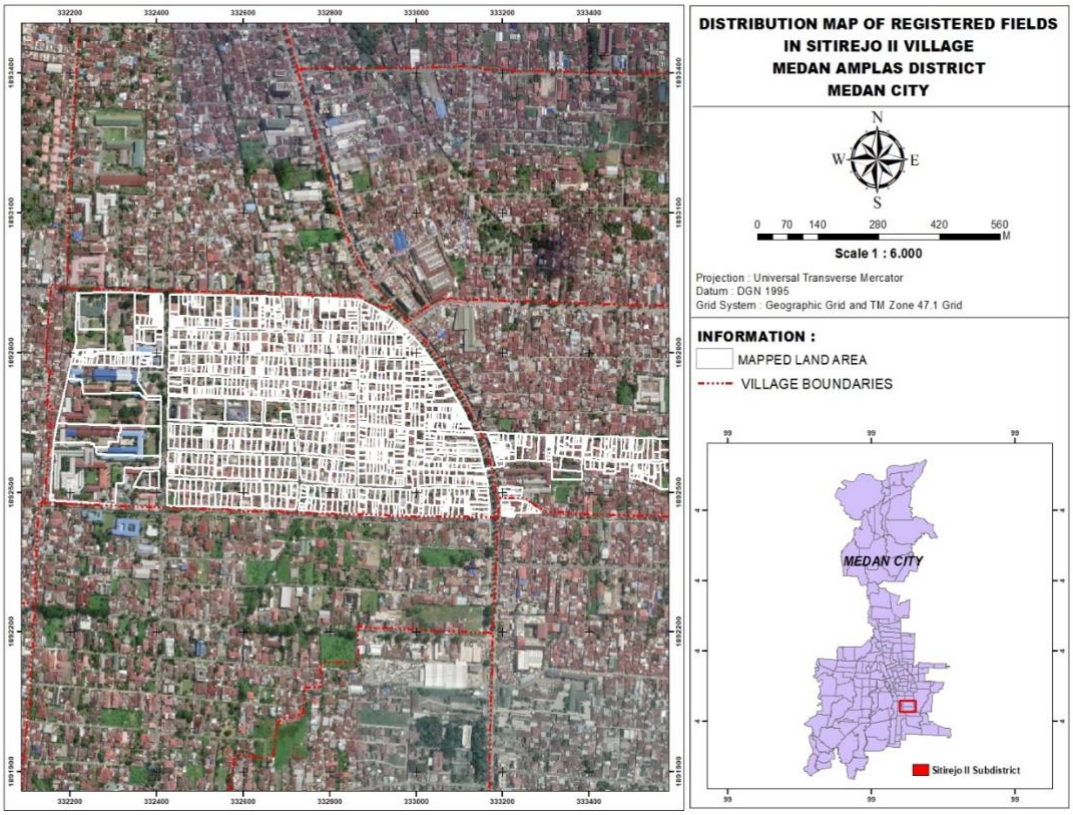
(1) Unqualified* (2) Qualified* (3) Declaration Submission has been approved.

*(%Number of Valid Land Books >=98%, %Number of Valid Parcels >=95%, %Number of Delineated Parcels <=10%, %Scan Warkah PTSL 2020 = 100%)

*All SHAT Targets have become products

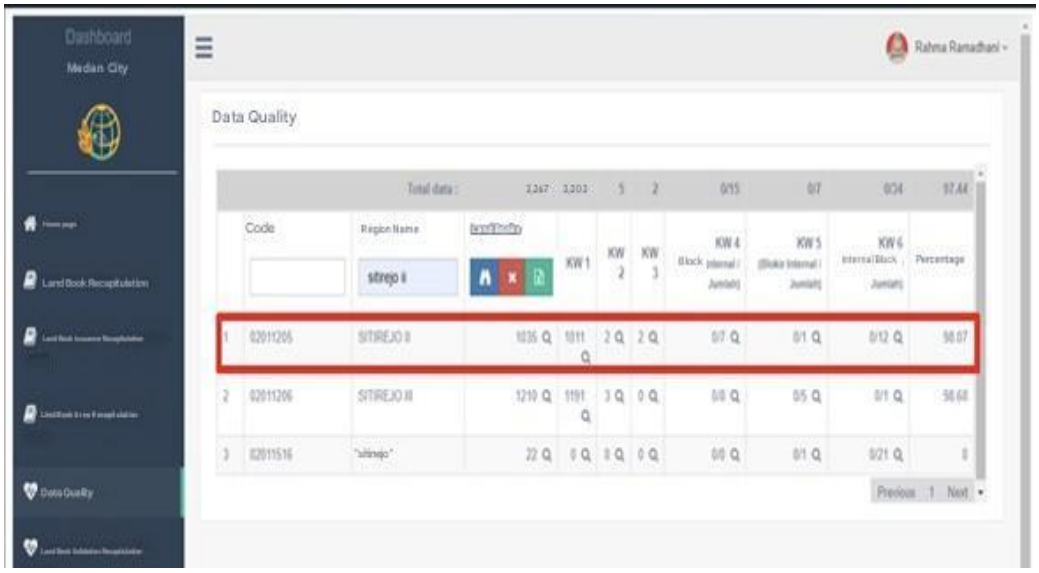
Picture 5. Complete Village Map Requirements
Source:(PTSL Technical Instructions for Cities/Districts, 2019)

The implementation of the plotting check and K4 data improvement resulted in a complete village map consisting of 1,317 plots, including settlements, vacant land, roads, public facilities, and social facilities. This complete village map can be used as a reference for the government in making policies related to land control, ownership, use, and utilization (P4T). The results of the complete village map can be seen in the Picture below.



Picture 6. The Final Result of Processing Complete Sub-district Map Data
Source: Author's analysis results, 2021

After enhancing data quality by improving the K4 PTSL land plots as described earlier, the condition of the registered land plot data in Sitirejo II Village changed. Initially, the land data quality percentage on the Medan City Land Office KKPWeb in 2020 was 67.05%, but after the improvements, it increased to 98.07% for 341 land plots. The Medan City Land Office KKP-Web's data quality dashboard provided this data.



Picture 7. Data Quality Visualization
Source: Author's Analysis Results, 2021

The picture above shows that there are 1,035 registered land plots included in the Land Book, with KW1 having 1,011 plots. These registered land plots have information in both text and spatial formats (GS/SU) and are mapped in the GeoKKP system. KW2 and KW3 have 2 plots each. There are also KW2 and KW3, which consist of two plots. The GeoKKP system has entered and mapped KW2, a registered land plot that contains both BT and textual GS/SU information. KW3 is a registered land plot that has been mapped containing BT information, but textual and spatial GS/SU have not been entered or integrated into the GeoKKP system.

Although the data quality condition of Sitirejo II Village after data improvement did not reach 100%, where there are still land areas with data quality KW4-KW6 that have not experienced an increase in data quality, namely KW4 as many as 7 areas, KW5 as many as 1 area, and KW6 as many as 12 areas. This is due to several constraints, both internal and external. However, by referring to the tolerance limit requirements to be able to become a complete village map, Sitirejo II has met the requirements for it, as seen from the data quality which has reached 98.07%.

Obstacles and Solutions to Plotting Check Activities in Improving the Quality of Land Areas

Based on the results of the interview with the Head of the Survey and Mapping Section of the Medan City Land Office as the official supervising land activities in the Survey and Mapping Section, there were technical and non-technical obstacles that caused the implementation of data improvement not to reach 100% due to several things, as follows:

Technical Constraints

Data inventory stages

There are obstacles in making a complete village map, namely in making a complete village map, not only about the physical field, but validation is carried out on the BT and also the warkah. In this validation, there is the uploading of physical data of land books and warkah, which is one of the requirements to obtain a complete village map declaration. The warkah and BT have legal data obstacles not found in the warkah room. The Ministry of ATR/BPN has accommodated the provided solution, which involves including it in the internal block on KKP-Web.

Stages of Field Survey and Taking Coordinates of Land Plot Locations.

At this stage, obstacles were found in the field; namely, the owner did not know the location of the land plot he owned, and also, officers could not find the subject of the land rights. The subject of rights is the owner/controller of the land plot, and the object of rights is the physical land plot. In spatial and textual data improvement activities, information related to the subject and object of land rights in field survey activities is critical. This becomes an obstacle if the object and subject of rights cannot be found in the field. The solution is to make a report from the field check officer, which is known to the implementing and supervisory officials as a basis for making internal blocks in KKP-Web.

Land Area Mapping Stage

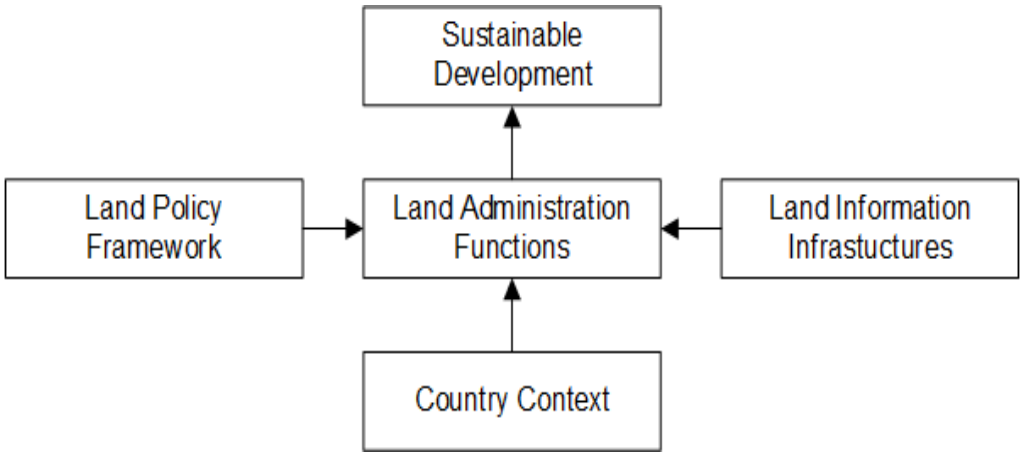
The obstacles faced when mapping land areas or repositioning areas according to actual coordinates are overlaps in the GeoKKP application that are not necessarily overlapping in the field. This requires checking the land areas on the analogue map. But the land office has many areas that can't be fixed in the analogue mapping system because the binding points can't be used to plot. The Ministry of ATR/BPN has accommodated the solution by incorporating it into the internal block on KKP-Online.

Non-Technical Constraints

Non-technical constraints found in the implementation of improving the quality of land data are limited human resources (HR) and the time for implementing data quality improvement. HR is one of the important factors when carrying out an activity in an organization. In essence, the quantity of HR must be comparable to the volume of work at the Medan City Land Office. The lack of qualified HR can cause constraints on a work system so that work cannot run according to the predetermined target.

The Role of Plotting Checks in Improving Land Data Quality

Land data is part of the land infrastructure used for land policy making within the framework of land management. According to Enemark (2005), land management is all activities related to the management of land and natural resources to achieve sustainable development. The land management paradigm is divided into 3 components, namely land policy framework, land administration functions, and land information infrastructures (Enemark et al., 2005).



Picture 8. Land Management Paradigm
Source: Enemark, 2005

A land policy framework is a law or regulation that regulates the management of land implementation. Land administration functions are institutions or organizations as land management implementers, and land information infrastructures function to present data and information for land management. These three components are interrelated and form an integrated land management system. If one of these components does not function properly, the entire land management system will be disrupted, which can ultimately lead to problems such as legal uncertainty, ownership conflicts, and inefficiencies in land management.

The plotting check carried out by the Medan City Land Office plays a role in improving the quality of spatial and textual data on land as land infrastructure, which will later assist in making various land policies. The implementation of the plotting check is in line with the Complete City policy of the Ministry of ATR/BPN. The term "Complete City" refers to land mapping that the National Land Agency (BPN) has officially registered in its entirety. Furthermore, the Complete City activity is carried out to fulfil the goal of achieving the One Map Policy concept, namely unifying all map information so that there is no more overlapping information between one institution and another.

The implementation of the three components, namely land policy framework, land administration functions, and land information infrastructures, in complete city

mapping activities is very important to ensure efficient, legal, and accurate land management (Danoedoro, 2019). Land Policy Framework in Complete City Mapping functions as a determinant of zoning policy, land management, and policy on the use of technology in mapping. Determination of zoning policy provides direction on how urban land should be used optimally to support sustainable growth and avoid inappropriate land use. Land management plays an important role in the governance of city mapping, which includes physical data and considers land use regulations, while policies on the use of technology in mapping are applied through mapping technology standards such as the use of GIS (Geographic Information Systems), remote sensing, or drone technology for data collection. During the initial stages of comprehensive city mapping in Medan City, the land policy framework must be consulted to create a spatial plan that aligns with the existing regulations and policies. The framework will determine how data collected through mapping is interpreted and used for city development planning.

Furthermore, the land administration function in Complete City Mapping coordinates institutions that are responsible for collecting land data, enforcing land boundaries, and managing the registration of land ownership rights. Additionally, the land administration function contributes to mapping and measuring land, as well as managing and updating land data. In its implementation, land institutions work together with the mapping team in collecting and verifying land data, boundaries, and property rights information. They also manage the legalization or land registration, process to ensure that all land in the city has a clear legal status and is well documented in the database.

In the end, city mapping uses GIS technology and digital mapping systems to create land information infrastructures, which help provide land data, make it easier to access, and ensure transparency to avoid land disputes and support better city planning and development. The purpose of this activity is to integrate mapping data with existing land databases. This system helps the government with urban planning and gives the public and developers access to information about land use and regulation. The use of technologies such as drones and satellites can also enrich information infrastructure with more detailed and accurate real-time data.

This study supports the importance of textual and spatial data validation within the framework of land information infrastructures. This is consistent with the opinion Indrajit et al. (2020), that land data infrastructure plays a vital role in spatially based decision making, particularly for programs such as the One Map Policy in Indonesia. This study reinforces that check plotting, as part of the land administration function, enables accurate integration of physical and legal data through technologies such as KKP-Web and AutoCAD GeoKKP.

The Ministry of ATR/BPN is currently carrying out a digital transformation in the land sector by implementing electronic certificates. The transition process from analogue land certificates to electronic certificates is called media transfer, where physical documents are gradually transferred to digital format. This transformation is carried out to improve efficiency, transparency, and security in the management of land rights in Indonesia. One of the important steps in this media transfer process is the plotting check activity, which has been carried out by the Medan City Land Office. The plotting check activity plays a major role in ensuring the accuracy of spatial data (location and boundaries of land) and textual data (legal information related to land ownership and rights).

Land areas that have been validated through the plotting check process are confirmed to be spatially and textually correct, thus facilitating the media transfer process. This means that the existing data is already synchronised between the information on the map and the administrative information, so the land area is ready to be transferred to the electronic certificate format without requiring further adjustments. This technique certainly accelerates the transition to a digital land system, because validated data does not need to be rechecked or adjusted again.

On the other hand, land areas that have not undergone a plotting check require a data improvement process before media transfer can be carried out. These land areas often experience problems such as inconsistencies between spatial data and textual data, or they have not even been mapped at all in the GeoKKP (Computerised Geospatial Land Activities) system. GeoKKP is an important platform in land data management because it contains digital maps and information related to land areas throughout Indonesia. If land area data has not been registered or is not synchronised in GeoKKP, a data improvement process is needed to ensure that the information is in accordance with conditions in the field, both in terms of location, size, and ownership status.

Thus, the plotting check activity is a crucial initial step in supporting the media transfer process. Data validation through plotting checks ensures that the data to be transferred to electronic certificates is correct and accurate, both spatially and textually. Without plotting checks, media transfer will experience obstacles and take longer because the data must be corrected first before it can be entered into the digital system. The implementation of this plotting check is in line with the main goal of the digital transformation of the Ministry of ATR/BPN, namely to create a more modern, transparent, and efficient land system. Through the transfer of land certificates to digital format, it is hoped that land rights management will be faster, safer, and more accessible to all interested parties, including the community, government, and business actors. The transformation towards electronic certificates also has broader implications, such as increased data security, ease of data storage and retrieval, and reduced risk of loss of

physical certificates due to damage or natural disasters. Electronic certificates provide the same legal certainty as analogue certificates but with the advantages of digital technology that makes their management more efficient and secure.

Several previous studies, such as those conducted by Handono et al. (2020) And Pinuji (2020), have highlighted the importance of digitizing and improving the quality of spatial data. However, they do not explicitly discuss the urgency of plotting checks as an initial stage in remapping and validating problematic land plot data. For example, Handono emphasises an acceleration strategy involving the 5M approach (people, money, materials, machines, and methods) but does not specifically link it to spatial validation based on technology systems such as GeoKKP (Andrayani et al., 2015). This study criticises that previous approaches tend to be macro and do not detail the technical processes in the field. By highlighting the plotting check activity in Sitirejo II Village, this study indicates that the verification and validation process can improve data quality by up to 98%, much higher than the initial condition of 67%. This study provides practical guidance for implementation in other areas that still face similar challenges.

This study also responds to the theoretical and practical framework used in the implementation of PTSL. For example, the classification of land data quality (KW1 to KW6) introduced by ATR/BPN is often not technically relevant in the field, especially for KW4 to KW6 data. Obstacles such as lack of coordination between institutions and limited competent human resources are still major obstacles, as also found in the study Prakosa & Taftazani (2022) And Razak et al. (2020). Furthermore, transitioning to electronic land certificates presents an added challenge. Although this study shows that check plotting contributes greatly to data validation to support electronic certificates, there is an urgent need to improve data interoperability between different systems, such as GeoKKP and KKP-Web, to speed up workflows and reduce data duplication (Nugraha et al., 2021).

CONCLUSIONS

This study successfully achieved the objective of improving the quality of land data through the implementation of plotting checks on land plots in Sitirejo II Village, Medan City. With spatial and textual validation methods using the KKP-Web and AutoCAD GeoKKP applications, the results indicated that the quality of land data increased significantly from 67.05% to 98.07%. Of the total 1,317 land plots, there are two main categories: 1,013 plots with complete data and 304 plots with incomplete data. Plotting checks play an important role in ensuring the accuracy of spatial and textual data on land plots. This process supports the declaration of complete villages and increases data validity to support the digital land system, including the implementation of electronic certificates. Although there are technical and non-technical obstacles, such as limited

initial data and human resources, solutions have been implemented, such as the use of internal blocks in KKP-Web to handle incomplete data. The results of this study also provide significant contributions in supporting agrarian reform policies and sustainable development by increasing legal certainty, resource management, and more targeted regional development. This effort is made to ensure legal certainty for the community to obtain justice regarding ownership and legal certainty regarding the land they own and to realise the strategic plan of the Ministry of ATR/BPN to support electronic services.

RECOMMENDATIONS

There are several things that can be improved to optimise plotting checks. There needs to be coordination, collaboration and synergistic support between the Land Office and the city government agencies so that the implementation of the creation of complete village maps runs well, quickly, effectively and efficiently (whole of government). The division of main tasks and functions (Tupoksi) at the Land Office must be focused, and coordination of each section must run solidly in facing obstacles and barriers to implementation towards a complete village. Mapping of registered land areas must be in accordance with the measurement rules and the 2021 PTSL Technical Guidelines. The implementation of mapping of K4 fields and repositioning of KW1, KW2, and KW3 fields requires high accuracy and must refer to measurement drawings, measurement letters/situation drawings, analogue maps and documents.

This study also provides significant input to the literacy of land management theory in Indonesia. By exploring the check plotting process, this study bridges the gap between the theoretical framework of land management and practical implementation in the field. The approach used is not only relevant to solving land problems in Sitirejo II Village but can also be replicated in other areas with similar challenges. This technique provides a real contribution in supporting the government's strategic target to realize complete villages and electronic land certificates by 2025.

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