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Addressing the challenges and unlocking opportunities of Land Administration Management System (LAMS)

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Abstract

The implementation of the Land Administration and Management System (LAMS) under Department Administration Order No. 2010-18 represents a significant innovation in land governance in the Philippines. This study aimed to address the challenges and explore the opportunities of LAMS at the Community Environment and Natural Resources Office (CENRO) in Lianga, Surigao del Sur, using a quantitative approach with survey data. The research identified key challenges, including technical constraints, inadequate training, insufficient technical support, and system performance issues, all of which hinder effective LAMS utilization. Furthermore, limited personnel training exacerbated these challenges, leaving staff underprepared to maximize the system's potential. The study found that LAMS contributed to more organized and accessible land records, reducing delays and improving service delivery. It concluded that addressing its technical limitations and investing in personnel training are essential for sustaining the system's benefits. By doing so, LAMS can better fulfill its objective of promoting sustainable development and equitable land management practices. These efforts will address existing gaps, enable smoother implementation, and ensure that LAMS meets its full potential in improving land administration services.

Keywords: Land Administration and Management System; CENRO Lianga; Lands; Land records; Management

1. Introduction

The physical nature of traditional land records presents numerous challenges. Over time, documents deteriorate, ink fades, and the structural integrity of the records declines, putting invaluable information at risk. Additionally, locating specific documents within extensive archives can be daunting, and logistical difficulties arise when attempting to share or duplicate these records. Furthermore, physical documents are vulnerable to unpredictable threats such as fires, floods, and pests, which can lead to irreparable loss of critical data. In response to these challenges, the Department of the Environment and Natural Resources (DENR) implemented the Land Administration and Management System (LAMS), which was established under Department Administrative Order (DAO) No. 2010-18. LAMS aims to enhance the efficiency, transparency, accountability, and integrity of land-related services by adopting automated land transactions and improving the management of land records information.

The Land Administration and Management System (LAMS) comprises four key components to streamline and enhance land administration processes. The Inspection, Verification, and Approval of Surveys (IVAS) system tracks the verification and approval of land surveys within DENR Regional Offices, utilizing Geographic Information System (GIS) tools for more accurate and efficient verifications. The Public Land Application (PLA) functions as a database application designed to monitor ongoing and pending public land applications across Provincial and Community Environment and Natural Resources Offices (PENROs and CENROs). Client Transaction Monitoring (CTM) allows clients to track the status of their land-related transactions without direct contact with DENR personnel, utilizing the Online LAMS Transaction Tracking System (TTS) through the Land Management Bureau (LMB) website, text message notifications, and LAMS

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Kiosks at regional offices Lastly, *eSurveyPlan* is a user-friendly Windows application for preparing digital survey plans, which facilitates the online submission of survey data and accelerates the verification and approval process. Together, these components improve the efficiency, transparency, and accessibility of land administration, significantly enhancing public service delivery within the Department of Environment and Natural Resources (DENR).

This initiative is expected to revolutionize land titling activities, making them more efficient and accessible for national agencies, local government units, and private individuals. Byamugisha (3) stated that the development of the land registration system opens new opportunities to establish necessary linkages between land-based economic development and conventional land management. Moreover, it highlights the importance of reforming strategies for improving the land registration process.

In particular, CENRO Lianga, which oversees eight municipalities – namely Barobo, Lianga, San Agustin, Marihatag, Cagwait, Bayabas, Tago, and San Miguel – all located in the Province of Surigao del Sur, is tasked with issuing permits for land titles and the maintenance of land records, including cadastral maps, approved land survey plans, and public land applications. For years, it has practiced traditional file-keeping methods, which have caused various issues such as the loss of files and disorganized file records. These problems have led to delays in permit processing, particularly in the regulating and permitting section. The goal of transitioning to LAMS in CENRO Lianga is to digitize the office's land records. The establishment of the Land Administration and Management System in the CENRO Lianga aligns with the DENR's overarching goals of enhancing land governance and ensuring sustainable development through improved land management practices.

The research gap of the study focused on several key areas. First, it aimed to identify the specific challenges encountered during the implementation of the Land Administration and Management System (LAMS) at the Community Environment and Natural Resources Office (CENRO) in Lianga. Second, the study sought to determine the opportunities created by the digitalization of land processes within the Department of Environment and Natural Resources (DENR) and how these impacted the public, particularly in processing their land transactions.

2. Legal Basis

The Department of Environment and Natural Resources (DENR) is primarily responsible for the conservation, management, development, and proper use of the country's environment and natural resources, as established under Executive Order No. 192. This mandate includes the survey, disposition, and administration of public alienable and disposable (A&D) lands.

Pursuant to DENR Administration Order No. 2010-18, dated June 23, 2010, which emphasizes "Improving Management of Land Information through the Adoption of the Land Administration and Management System (LAMS) Philippines," the scope of implementation encompasses the Land Management Bureau, the Land Management Section, as well as the Provincial Environment and Natural Resources Offices (PENROs) and Community Environment and Natural Resources Offices (CENROs).

The Land Administration and Management System (LAMS) is designed as a comprehensive information system aimed at enhancing the management of land records throughout the Philippines. Its primary objective is to improve the efficiency of land transaction services provided to the public, thereby facilitating a more streamlined and user-friendly experience. Furthermore, the system seeks to mitigate disputes arising from erroneous or missing land records, which have historically posed significant challenges within land administration.

By digitizing land records and integrating them into a centralized database, LAMS enhances the accuracy and accessibility of land information. This represents a critical advancement in land governance in the Philippines and underscores the DERN's commitment to adopting modern technologies in the management of land resources, thereby providing sustainable development and equitable land access.

3. Research Methodology

The study employed a quantitative research design to systematically assess the challenges and opportunities in the implementation of the Land Administration and Management System (LAMS) at the Community Environment and Natural Resources Office (CENRO) in Lianga, Surigao del Sur. A researcher-made survey questionnaire consisting of closed-ended questions was developed and tested for reliability, yielding a Cronbach's alpha of 0.718, which confirmed its internal consistency. The survey was structured into three sections: challenges faced during implementation,

opportunities for improvement, and feedback on system efficiency. This tool was distributed to 114 respondents, composed of both CENRO personnel and walk-in clients directly involved with or affected by the use of LAMS.

The research was conducted within CENRO Lianga, which services several municipalities, including Barobo, San Agustin, and Tago. Respondents included 57 government employees and 57 walk-in clients, such as business owners, farmers, and housewives, selected for their direct engagement with the system. Prior to data collection, appropriate permissions were secured from the Graduate School and CENRO management to ensure ethical compliance. Data were analyzed using quantitative methods, with findings used to identify gaps in LAMS implementation and to inform a responsive action plan for improving system performance and user satisfaction.

4. Results and discussion

4.1. Challenges during the Implementation of LAMS

This chapter presents the results and discussion of the study, providing an analysis of the findings in relation to the research objectives. Additionally, it contextualizes the results by offering a clear interpretation of their significance. The implementation of the Land Administrative Management System (LAMS) at CENRO Lianga encountered significant challenges (Table 1). The key issues identified include technical constraints, inadequate training, insufficient technical support, and problems related to system performance.

Table 1 Distribution of the Problems and Challenges during the Implementation of LAMS

Challenges encountered during the implementation of Land Administration Management System (LAMS) at CENRO Lianga.	**Weighted Mean**	**Verbal Description**
The implementation of LAMS at CENRO Lianga encountered challenges with user accessibility, which could impact its user-friendliness.	4.09	Challenging
The limited availability of technical support created challenges that hindered the overall efficiency of LAMS at CENRO Lianga.	4.64	Most Challenging
The insufficient training of staff hindered the efficiency of the LAMS at CENRO Lianga.	4.65	Most Challenging
The difficulties in the implementation of LAMS affected system performance during peak usage, thereby impacting the overall efficiency of the system.	4.60	Most Challenging
The challenges of high system usage negatively affected its performance.	4.42	Most Challenging
Addressing the issues in order to improve the overall performance of LAMS at CENRO Lianga presents a significant challenge.	4.53	Most Challenging
The lack of necessary hardware and software upgrades has hindered the full implementation and optimization of LAMS.	4.65	Most Challenging
Average Weighted Mean	4.65	Most Challenging

One of the most significant barriers identified was the insufficient training of staff, with a weighted mean of 4.65. This challenge is categorized as "Most Challenging." It has led to the suboptimal utilization of the system's features, as staff may not fully understand its complexities, thereby hindering efficiency. The study by Puhakainen and Siponen (4) underscores the importance of process-focused management strategies, including training programs for staff, to enhance the utilization of LAMS at CENRO Lianga.

Additionally, this issue is compounded by the lack of adequate technical support, which has also been identified as a major problem affecting the overall efficiency of LAMS at CENRO Lianga. With a weighted mean of 4.64, the survey strongly suggests that the absence of immediate and consistent technical assistance has prevented the system from being fully utilized. This has resulted in delays and operational inefficiencies, as users are often unable to resolve problems promptly without the necessary guidance or support.

User accessibility also emerged as a notable challenge, with a weighted mean of 4.09, categorized as "Challenging." This indicates that users of LAMS at CENRO Lianga encountered difficulties in accessing the system efficiently. Accessibility issues are particularly concerning because they directly impact user experience and the operational effectiveness of the system. According to the study by Putri (5), there is a significant need for continuous efforts toward the development and enhancement of the technology to fully optimize the land management system.

The adoption of the Land Administration Management System (LAMS) at CENRO Lianga has brought about significant advancements in land administration, creating numerous opportunities for improving land processing in the Philippines. The system enhances the efficiency and accuracy of transactions, making it highly relevant in the digital age, where the government is increasingly incorporating technology to improve its operations. This digitalization not only streamlines processes but also ensures greater transparency and accessibility in land-related transactions, contributing to the overall modernization of government systems.

4.2. Opportunities of Land Administration Management System

The table below shows the responses on the Opportunities of Land Administration Management System to the DENR personnel.

Table 2 Distribution of the Opportunities of Land Administration Management System

	The Opportunities of Land Administration Management System	**Weighted Mean**	**Verbal Description**
1.	The Land Administration System (LAMS) has contributed to improvements in the efficiency and accuracy of land-related transactions at CENRO Lianga.	4.55	Strongly Agree
2.	LAMS has demonstrated significantly greater speed and efficiency in retrieving land record data when compared to traditional manual methods, thereby streamlining land management processes.	4.25	Strongly Agree
3.	The Land Administration Management System (LAMS) effectively tracks land records, contributing to a notable reduction in errors at CENRO Lianga, which enhances overall data accuracy and reliability.	4.20	Strongly Agree
4.	LAMS improves access to land-related information for local communities and stakeholders, fostering greater inclusivity and engagement in land management processes.	4.21	Strongly Agree
5.	LAMS enhances transparency and accountability in land administration, ensuring that land-related processes are more accessible, equitable, and subject to public oversight.	4.66	Strongly Agree
6.	LAMS provides the public with enhanced opportunities to participate in land surveys and engage in the land approval process, facilitating greater civic involvement and streamlining Administration procedures.	4.64	Strongly Agree
7.	The system employs strong encryption protocols to ensure the security and integrity of the data.	4.50	Strongly Agree
	Average Weighted Mean	4.43	Strongly Agree

In the study by Arfeen and Saranti (1), digitalization in government plays a strategic role in modernizing the public sector. The results indicate strong agreement among respondents regarding the positive impact of LAMS. The system's ability to streamline processes, enhance transparency, and promote community participation emerged as its key advantages. Respondents strongly agreed that LAMS has improved transparency and accountability in land administration, with a weighted mean score of 4.66. This enhancement ensures that land-related processes are more accessible and transparent to the public. According to the study by Alvarenga et al. (2), the integration of digital technologies and the transformation of processes in the public sector have proven to enhance service delivery and governance.

4.3. Intervention Program for the Land Administration Management System

Table 3 Distribution of Intervention Program for the Land Administration Management System

Intervention for the Improvement of LAMS	Weighted Mean	Verbal Description
Additional training programs and technological upgrades are essential for improving the implementation of LAMS.	4.64	Strongly Agree
The system should be upgraded to handle peak usage and meet the increasing demand for its services.	4.52	Strongly Agree
Regular community education and information campaigns should be conducted to distribute guides and raise awareness about LAMS.	4.53	Strongly Agree
A formal feedback mechanism should be established to gather user input for improvement of the system.	4.62	Strongly Agree
Posting a flowchart as a guide to facilitate the effective use of the system.	4.71	Strongly Agree
Average Weighted Mean	4.60	Strongly Agree

The survey results point to several key interventions that could improve the implementation of LAMS, directly addressing the challenges identified in the study. With an average weighted mean of 4.60, which falls in the "Strongly Agree" category, it is clear that stakeholders understand the significance of these changes in boosting the system's efficiency and overall success. One of the most strongly supported interventions is the need for additional training programs and technological upgrades, including both software and hardware. This highlights the importance of improving staff training and upgrading the technological infrastructure to address the system's current limitations and the lack of familiarity with its features. By focusing on these areas, the system's functionality and user experience would be greatly improved, leading to better utilization of LAMS at CENRO Lianga. Additionally, posting a flowchart to guide users through the system was suggested, with the highest weighted mean of 4.71. This practical suggestion could significantly enhance the user experience by making the system easier to navigate. A simple visual guide would help reduce confusion, allowing users to better understand how to use LAMS.

In conclusion, the proposed interventions directly target the main challenges related to system performance, user accessibility, and overall effectiveness. The respondents emphasize the need for better training, infrastructure upgrades, community education, user feedback systems, and visual guides to simplify the system. Implementing these interventions aims to enhance the functionality of LAMS, ensuring its full optimization and providing better services to the public, ultimately improving the efficiency of the land management process.

4.4. Land Administration Management System (LAMS) Roadmap

Table 4 outlines an action plan for the effective and efficient implementation of the Land Administration and Management System (LAMS) at CENRO Lianga, Surigao del Sur. The plan emphasizes systematic execution, resource efficiency, and alignment with the system's goals.

Table 4 Land Administration Management System (LAMS) Roadmap

Actions	Activities	Responsible Team	Resources Needed	Timeframe	Deliverables
Provision of High-End Equipment	Assess the current hardware to identify deficiencies. Allocate fund for hardware acquisition. Procure and install equipment Conduct testing to ensure compatibility with LAMS.	IT Department and Procurement Office	Budget Allocation	Complete within 6 months.	Functional, high-end hardware to support LAMS operations.

Capacity Building for Personnel	Conduct a needs assessment to identify skill gaps. Develop a training program focused on LAMS technical skills. Facilitate regular training sessions for relevant staff. Monitor and evaluate training effectiveness through staff performance reviews.	HR Department and IT Department	Budget for Training, training materials, external facilitators	Initial training of about 3 months, followed by quarterly sessions.	Trained staff capable of effectively using and managing LAMS.
Establishing LAMS Kiosk	Ensure equipment allocated for the KIOSK. Implement User Management and Access Control	HR Department and IT Department	Budget for the equipment, and training Materials, and guide materials	Every three months maintenance.	Easy Access of the LAMS system and increase of Clients Satisfaction.
System Upgrade	Schedule periodic system reviews to assess performance and identify upgrade needs. Implement necessary software updates and infrastructure upgrades. Develop and adhere to an upgrade and maintenance schedule. Allocate budget for on-going system enhancements.	IT Department	Maintenance budget, Technical Expert	Review every 6 month, implement upgrades as needed.	Updated LAMS capable of meeting performance and technological demands.
Creation of Plantilla Position to handle LAMS	Propose and justify the creation of plantilla positions. Define job roles for system maintenance and management. Coordinate with HR and relevant authorities for position approvals. Recruit and onboard qualified personnel. Monitor performance of new personnel in managing LAMS.	HR Department and Administrative Office	Approval from the authorities, budget for salaries.	Recruitment	Dedicated personnel to ensure consistent maintenance and management of LAMS.

Monitoring and Evaluation	Track progress through biannual reviews. Evaluate performance based on KPIs: system uptime, staff skill improvement, and data security. Adjust the action plan as needed based on evaluation results.	LAMS Management Team	Monitoring Tools and evaluation framework	Monitoring and evaluate every six months.	Regulars' updates and adjustments to ensure successful LAMS implementation.
Budgetary Requirements	Hiring of Plantilla Position to handle LAMS.	DENR LMB DBM	Salary for a government plantilla position will depend on the Salary Standardization Law (SSL) with	Immediately after the approval of the allocated budget for hiring of	The plantilla position hired for an LAMS Systems Officer or similar role will be responsible for managing the

			Government-mandated benefits (e.g., PAG-IBIG, PhilHealth, GSIS, and other allowances) would be included in the budget, approximately 30% of the annual salary. Annual Benefits: PHP 126,000-162,000	LAMS Personnel.	LAMS operations, overseeing its functionality, troubleshooting issues, coordinating with other departments, and ensuring smooth implementation at CENRO Lianga.
	Additional Training to capacitate all the personnel using LAMS.	DENR LMB DBM	3 to 5-day training for all relevant staff. Follow-up sessions for continuous learning and troubleshooting.	1 month after the approval of proposed budget for the Training and capability building of Personnel using LAMS.	Expected outputs: CENRO Lianga Personnel will be equipped to manage LAMS Effectively and improved land administration services to the public part of is the Completion of training sessions for all relevant personnel. Evaluation forms and feedback from participants.
					Post-training report with measurable improvements in LAMS usage. Continuous monitoring and follow-up sessions to ensure sustained capacity building.
Specific Training to be conducted for LAMS.	Training Topics: In-depth understanding of LAMS features and functions. Advanced troubleshooting techniques for common system glitches. How to use system tools for better workflow management and document processing. Resource management techniques to balance system usage, especially during high-demand periods.				

	Understanding the hardware requirements and capacity needed to run LAMS efficiently. Coordinating with external IT service providers for regular maintenance and upgrades. Refresher courses and monthly updates on new features, patches, and system changes. Real-time troubleshooting and support workshops. Creating user manuals and guides for staff to access during everyday operations.
Sources of Fund for Hiring of Personnel and Additional Training for Land Administration and Management System (LAMS).	The Department of Environment and Natural Resources (DENR) is responsible for allocating funds for the hiring of plantilla positions and training through the General Appropriations Act (GAA), which is the primary funding mechanism for government agencies. The DENR, through its Finance and Administrative Division, will be responsible for ensuring the necessary budget is included in its annual budget proposal. For training funding, the DENR Training and Development Fund (or other relevant funds under the agency) could be tapped, as well as additional funding support from the Civil Service Commission (CSC) or other government training initiatives. Additional CENRO Lianga can works closely with LGUs in land administration, funds may be sourced from joint partnerships or allocations for training and capacity-building under Memorandum of Agreements (MOAs).

Key components include the procurement of modern equipment, such as powerful servers, PCs, and network infrastructure, to ensure reliable system performance and accurate land management.

Additionally, a comprehensive training and capacity-building program will equip CENRO staff with the necessary skills to operate and maintain the system, ensuring a competent workforce. The establishment of a specialized LAMS kiosk will improve public accessibility and streamline land-related processes, such as titling and record retrieval.

Regular system updates are crucial to maintaining LAMS' alignment with the latest technological and legal developments, ensuring its ongoing relevance. The action plan also recommends the creation of plantilla positions for long-term, committed staff to oversee daily operations and decision-making, ensuring continuity and effective system management.

Monitoring and evaluation mechanisms will track progress, identify issues, and ensure accountability. Finally, adequate budget allocation for technical support, system upgrades, and training will guarantee smooth operations and timely implementation.

In summary, the action plan serves as a comprehensive guide to optimize LAMS at CENRO Lianga, fostering a reliable, user-centered system that supports efficient and sustainable land administration.

5. Conclusion

The study concluded that the implementation of the Land Administration Management System (LAMS) at CENRO Lianga identified several challenges hindering the system's efficiency. Key issues included technical constraints, inadequate training, insufficient technical support, and system performance problems. Notably, the lack of trained technical personnel and the absence of regular system updates hindered the full optimization of LAMS. These findings underscore the importance of capacity-building initiatives to ensure that staff are adequately equipped to maximize the system's potential and effectively address implementation challenges.

Despite these challenges, the study revealed new opportunities for improving the Land Administration Management System. Results indicated that LAMS has positively influenced land administration by streamlining processes, enhancing transparency, and encouraging community participation. Respondents strongly agreed that LAMS has significantly improved transparency and accountability, with a high weighted mean score of 4.66. This improvement ensures that land-related processes remain accessible and transparent to the public, fostering trust and operational efficiency.

To fully realize the system's potential, investments in technical support, continuous software upgrades, and comprehensive training programs are essential. These efforts will help address existing gaps, facilitate smoother implementation, and ensure that LAMS can achieve its objectives of improving land administration services. Embracing innovation, addressing challenges, and leveraging opportunities in the modernization of e-government services will equip policymakers to navigate complexities and drive sustainable development.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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