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Digitizing Land Governance in Punjab: Challenges and Opportunities in the Implementation of Computerization of Land Record Management and Information System (CLRMIS)

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Keywords: CLRMIS, Land Governance, Digital Land Records, Punjab, E-Governance, Institutional Resistance, Legal Reform, Social Inclusion, Public Administration, Land Policy

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Keywords: [CLRMIS](#), [Land Governance](#), [Digital Land Records](#), [Punjab](#), [E-Governance](#), [Institutional Resistance](#), [Legal Reform](#), [Social Inclusion](#), [Public Administration](#), [Land Policy](#)

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Introduction

Land administration lies at the center of socio-economic stability, fair development, and environmental sustainability. Land administration in most low- and middle-income nations remains fragmented, non-transparent, and susceptible to elite capture (Koroso & Zevenbergen, 2024). Land conflicts represent a notable percentage of civil cases in Pakistan, where there are extensive informal tenure

transactions. Land record modernization in Pakistan is not simply an administrative overhauling but a root protection transformation. Nowhere has this need been more urgent than in Punjab, the nation's most populous and agriculturally dominant province, where land record-keeping has been held in the sway of a manual, discretionary, and highly personalized regime ruled by revenue officers called Patwaris.



Responding to these time-tested inefficiencies, the Punjab Government launched the Computerization of Land Record Management and Information System (CLRMIS) in 2007. CLRMIS, administered by the Punjab Land Records Authority (PLRA), is a strategic path towards a computerized, centralized system for increasing transparency, streamlining procedures, improving service delivery, and eliminating discretionary powers in land management (Ullah & Hussain, 2023). The reform is informed by international best practice in land reform and e-governance, and places Punjab at the vanguard of subnational public sector digital governance innovation. Yet, although the reform has registered quantifiable improvements in transparency and access, its implementation trajectory has been uneven and exposed deep institutional, infrastructural, legal, and social constraints.

This article critically examines the double-edged character of CLRMIS, both the systemic issues that have impeded its full implementation as well as its transformative possibilities for responsible and inclusive land governance. Based on current sectoral literature and policy analysis, the paper establishes seven primary barriers to successful implementation: institutional resistance, public digital illiteracy, infrastructural imbalance, non-integration with judicial and legal frameworks, exclusion of vulnerable groups, concerns regarding the accuracy of data, and insufficient cybersecurity controls. Aside from this, it also shows the ability of CLRMIS to ensure legal certainty, avoid corruption, empower the poor, enhance interdepartmental coordination, and support evidence-based planning.

This study adds to the wider debate on state capacity, digitalization, and progressive land reform in the Global South. This essay also provides policy lessons in the short term for policymakers, development practitioners, and students of the political economy of institutional change. By way of a discussion of the introduction of CLRMIS in its political and social context, the essay highlights the need for crafting reform processes that are technologically efficient but institutionally rooted, socially inclusive, and legally sustainable.

The Punjab experience is a vivid case study on subnational digital transformation in weak governance environments. CLRMIS's successes and failures carry lessons that can inform replicable, context-specific reforms in Pakistan and other countries undergoing similar shifts in land administration.

Research Question

What impact has CLRMIS had on land governance in

Punjab?

Literature Review

The study *“Spillovers in State Capacity Building: Evidence from the Digitization of Land Records in Pakistan”* (2024) by Aman-Rana and Minaudier offers a quasi-experimental assessment of the digitization of Punjab's land record reforms. Drawing on administrative and tax records, the authors demonstrate that digitization not only enhanced service delivery but had unforeseen spillover effects such as improved bureaucratic productivity and greater tax realization. The performance of the reform, nonetheless, was unequal, with outcomes depending on local administrative politics and capacity. This research offers empirical support to arguments that online governance technology possesses the potential to enhance state capacity under appropriate institutional arrangements (Aman-Rana & Minaudier, 2024).

The *World Bank's Gender Strategy Report* (2024) for the Punjab Urban Land Systems Enhancement Project (PULSE) outlines a model for the incorporation of gender-sensitive reforms into land record digitization. The report has a focus on women's access, equity, and protection, proposing grievance redressal mechanisms, women's service centers, and gender-sensitive monitoring indicators. It posits that women's access to safe land titles is critical to both household well-being and broader development outcomes (World Bank, 2024).

The *World Bank Project Data Report* (2025) covering the Punjab Land Records Management and Information Systems Project details major outcomes achieved between July 2024 and June 2025. The report identifies 23,500 mauzas digitized, 13.3 million mutations processed, and more than 23.2 million fardats dispatched. It shows the pivotal role taken by the Punjab Land Records Authority (PLRA) in providing digital accessibility, reducing bureaucracy-induced delays, and providing public service transparency. The results indicate CLRMIS's coverage of operation and service throughput (World Bank, 2025).

A news article titled *“Easy Jamabandi to Tackle Land Record Typos...”* (2025), published by *The Times of India*, reports on Punjab's new “Easy Jamabandi” digital portal launched in June 2025. The system provides real-time alerts, distance updating, and grievance registration systems to rectify procedural mistakes in land records. Focusing on public trust building and fraud prevention, the system utilizes mobile integration and notice services to attempt to minimize the intermediaries' reliance. The

project demonstrates Punjab's ongoing innovation in electronic land management (Times of India, [2025](#)).

Methodology

This research uses a qualitative-descriptive research approach for the purpose of critically analyzing the implementation of Punjab's Computerization of Land Record Management and Information System (CLRMIS). The research is grounded on secondary data analysis, using government reports, policy documents, academic papers, project reviews, and 2024–2025 development agency briefings. The purpose is to study the structural issues and possibilities of governance from the digitization of land records at the provincial level.

The research employs a document analysis method using thematic coding to reveal patterns of recurrence, institutional barriers, and policy intervention that have been described in the chosen sources. Criteria for selecting literature were constructed from recency (2023–2025), relevance of policy to CLRMIS Punjab, and empirical or theoretical contribution towards the field of digital land governance discourse. Primary sources are World Bank PULSE progress reports, gender strategy reports, research studies like Aman-Rana & Minaudier (2024), and press releases regarding the "Easy Jamabandi" program.

The study is placed within the New Institutionalism theoretical school of thought that focuses on the application of institutions, both formal (laws, regulations, ICTs) and informal (habits, opposition by Patwaris), in shaping policy results. The theory is exceptionally effective in understanding how transmitted power relationships and bureaucratic norms affect the introduction of new governance reforms such as CLRMIS. Aside from that, concepts of E-Governance Theory are used in describing the digital transformation as an approach to increase transparency, accountability, and citizens' access to services.

Although this research is not based on primary data collection, it is analytical in nature through data source triangulation and the fact that findings are based on a wide and credible pool of evidence. The limitation of the method is the lack of end-use feedback during use or field-level interviews, which subsequent studies can supplement through mixed-method or survey-based study designs.

Through the interlacing of institutional theory and governance orientation, the research method allows one to grasp both the technical and socio-political aspects of CLRMIS implementation in an equally

balanced way. It helps one understand how the success of digital reform relies not just on technology infrastructure but also on the cooperation of institutions, coordination of legislation, and citizens' involvement.

Discussion

The Computerization of Land Record Management and Information System (CLRMIS) has brought important structural changes to land administration in Punjab. As discussed in earlier chapters, the above computerization was purposefully aimed at improving transparency, efficiency, and public access. However, even though quantifiable improvement has been achieved, the project still experiences various practical and institutional difficulties. While so, it also has potential for policy innovation, inclusive governance, and sustainable development. This chapter defines the root issues that continue to hamper the implementation of CLRMIS and gives some prominent opportunities that will direct future policy response.

Challenges Faced in CLRMIS Implementation

The Computerization of Land Record Management and Information System (CLRMIS) project for Punjab aimed at enhancing the efficiency, equity, and transparency of land administration. Though the project has progressed significantly, its complete implementation has faced a series of challenges. These are institutional resistance, inadequate infrastructure, legal constraints, low public awareness, and cybersecurity threats. The subsequent section offers a detailed description of the key issues that have derailed or made it difficult for CLRMIS to be successful in the province.

Institutional Resistance and Administrative Inertia

One of the most challenging problems faced while implementing CLRMIS was the resistance offered by the conventional land administration officials, prime among them being Patwaris and subordinate revenue officers (Shehata & Mkadmi, [2025](#)). For decades, Patwaris were lordly masters of rural land documents under minimal supervision. Not only did the profession give them authority over land transactions, but also unofficial revenue sources in the guise of bribery and exploitation.

With the introduction of computerized systems, the previous record-keeping system was replaced by automated systems managed by the Punjab Land Records Authority (PLRA). The shift defied the

authority of Patwaris and shifted their primary responsibilities to a centralized agency (Wilson & Mergel, 2022). Consequently, most actively or passively resisted the reforms. Some delayed handing over correct records, while others dissuaded people from utilizing the new computer services by questioning their validity or legal validity.

The transformation was not only felt as a threat to their power but also as an interference with traditional practice. While some of these officials attempted to be trained or mainstreamed into the new arrangement, a number of others held onto their reluctance to adopt a reform that encroached on their familiar power. This hindered the process of verifying information and stifled free communication flow between new and old institutional environments.

Limited Digital Awareness Among Citizens

An effective digital transformation of land administration is impossible without the involvement of citizens. In Punjab, especially in rural and semi-rural towns, the vast majority of people are still unaware of digital tools and procedures (Nadji, 2024). Most landowners are either uninformed about what facilities CLRMIS has to offer or do not know how to acquire and make use of them effectively.

They are the elderly citizens, women, and those with low literacy levels. They dislike the computer system and fear using it, even though it is less efficient and slower than traditional methods. The digital divide has therefore established a gap between the individuals who are able to utilize the system to its full potential and those who still depend on the intermediaries in order to access the aid.

Moreover, government-arranged publicity for CLRMIS has been narrow in scope and impact. Posters, announcements, and educational videos were posted in a few districts but did not reach the most marginalized classes to an important degree (Bawa, Roushan, Kaushiki, Hansraj, & Singh, 2024). In a few districts, misinformation about the system, including misconceptions that computerization would nullify property rights or eliminate ancestral claims, discouraged people from making use of it even more.

Infrastructure Shortages and Technological Barriers

The uneven access to technical infrastructure in Punjab is another key impediment for CLRMIS. Major towns and cities have, on average, good internet connectivity and assured power supply, whereas most rural subdivisions are plagued with regular

power outages, weak connectivity, and obsolete hardware (Njoh et al., 2019). These constraints cause severe delays in service delivery at Arazi Record Centers (ARCs).

When the systems are unavailable, straightforward services such as delivering land ownership certificates or passing title become impossible or inconvenient. Citizens, in most cases, are forced to visit ARCs in sets of three to accomplish straightforward transactions, defeating the very essence of a speed-efficient digital system. The situation is compounded when ARCs do not have backup facilities like generators or offline computation centers. Consequently, the reliability of CLRMIS is highly inconsistent throughout the province, with rural citizens expected to encounter delays, inaccuracies, or total loss of service during technical failures.

Quality and Accuracy of Historical Records

Computerization of land records entailed the digitization of millions of pages of handwritten documents into electronic form. These happen to be legacy records, which were sometimes incomplete, outdated, or in bad condition. Some of the land records had missing data, ambiguous boundaries, or double claims, particularly where inheritance cases were pending or land had been transacted multiple times without registered deeds (Abubakari, Richter, & Zevenbergen, 2019). These discrepancies created issues when making correct digital records. Personnel entering the data had to deal with contradictory information that was required to be checked by hand. They sometimes needed to use local testimonies or field surveys to confirm ownership information.

This authentication process not only extended the project timeline but also increased the risk of errors. If an error were to occur during the digitization process, i.e., mistaken mapping or false claim of ownership, it would lead to grave disputes. These were eventually prosecuted through the law courts as legal issues, putting more pressure on a creaky and under-budgeted judicial process.

Weak Legal Embedding and Policy Contrasts

Another dilemma in CLRMIS use is the sluggish update of the judicial system to the digital medium (Goswami & Goswami, 2025). While the provincial government came out with legislation to provide legal acknowledgment of electronic records, outdated paperwork remains ubiquitous in institutions. It is not uncommon to see courts demanding original handwritten documents even in land disputes when authentic digital records exist.

This dual system is confusing and undermines the authenticity of CLRMIS. Citizens will be confused about which version of the record manual or digital is the definitive one. In other instances, the two systems show subtly different data because of the delay in updating or inputting errors, creating uncertainty and distrust (Mascagni, Dom, Santoro, & Mukama, 2023). Besides, coordination between departments is poor. CLRMIS is not coordinated with other departments like municipal planning, taxation offices, or inheritance registration offices. Lacking a centralized database and inter-institutional communication, many procedures are still slow and absurd.

Exclusion of Women and Vulnerable Groups

Although full of promise for equity and justice, the fruits of CLRMIS have not been equitably shared. Women, in fact, encounter cultural, legal, and social barriers to exercising their rights over land holdings. Most women lack knowledge of their inheritance law rights or are dissuaded from asserting rights over land by family members (Rubab, Rahat, & Yunus, 2023). The ARCs, in some districts, lack gender-sensitive amenities. If there is no female staff or private service areas in places where women are present, women may not be willing to go or access services. The system, being gender-neutral in approach, does not actively account for these gender-based distinctions.

Likewise, marginalized groups like poor families, landless farmers, and minorities can be discouraged from benefiting from the process of obtaining ownership or settling disputes. Without some support elements built into the implementation of the CLRMIS, these groups can be excluded from formal land recognition in general.

Cybersecurity and Data Protection Deficiencies

While the digitalization of the sensitive land data requires robust data security, in most of the CLRMIS infrastructure, neither sufficient priority nor good security has been accorded to this area. While the system employs rudimentary safety measures like login authentication and biometric verification, no comprehensive policy on risk management, incident reporting, or long-term data backup exists. The threat of cybercrime only worsens abroad, and land records having legal obligations are highly exposed (Atrey, 2023). In the event of access, modification, or destruction of records, it can produce overall legal uncertainty, economic loss, and a severe loss of public trust. No significant intrusions have been encountered to date, but since no measures are taken for prevention, they are that much more exposed.

Employees of ARCs and district offices are also given minimum computer security training. This is the risk of additional internal intrusions, either intentional or unintentional. Poor cybersecurity not only jeopardizes data security but also puts the credibility of the whole system to the test.

Opportunities in the Implementation of CLRMIS

Although the Computerization of Land Record Management and Information System (CLRMIS) of Punjab has encountered some implementation setbacks, it also holds transformational opportunities. Opportunities of CLRMIS go beyond administrative convenience and can bring revolutionary change in economic growth, social inclusion, legal empowerment, and governance reform as well. Below are the broad areas where CLRMIS has favourable long-term change potential.

More Transparency and Public Confidence

One of the key advantages of CLRMIS is that it makes land transactions transparent. Under the earlier manual system, land transactions were tampered with because they were not recorded in detail, and there was no monitoring, which was dependent on discretionary powers vested with revenue officers (Amadi-Echendu, 2023). CLRMIS has overcome this by providing a centralized, computerized, and tamper-free record of ownership of land and transaction history.

By enabling citizens to obtain their land information either from Arazi Record Centers (ARCs) or the web, the system minimizes the scope for corruption. The use of biometric identification and uniform service procedures also guarantees that the transactions take place securely and equitably. The transparency of the procedure raises the confidence of people in state institutions and minimizes the scope for fraud or misinformation-driven conflict.

The Increase in Land Investment and Economic Development

Secure and convenient land records are a prerequisite to economic development. The moment the ownership of land is established, people and businesses will invest in housing, agriculture, and infrastructure. CLRMIS has facilitated easier use of collateral by owners against bank loans for Punjab, leading to financial inclusion. Moreover, the provision of reliable land data enables more effective urban planning, real property development, and industrialization (Koroso, Lengoiboni, & Zevenbergen, 2021). Elsewhere in the world, it becomes apparent that nations with secure tenure on

land are also more attractive to domestic as well as foreign investment. Similarly, Punjab's improved land administration can enable increased productivity and employment generation, particularly in rural areas.

Expanding Marginalized Groups' Access

CLRMIS can close historical gaps in land ownership by making the registration and verification process as readily accessible and uniform for all as possible. Women, smallholder farmers, and socially disadvantaged groups who had hitherto not had easy access to land rights as a result of social or procedural barriers can now enjoy formal ownership rights (Anafo, Ayamga, & Domanban, 2023).

By facilitating biometric identification and impartiality in delivering services at ARCs, CLRMIS minimizes the role of intermediaries and enables direct transactions between citizens and land administration. If well implemented, this results in more equitable results and enhances the level of involvement for individuals who were locked out of land ownership processes." But supporting the system with some particular outreach and legal assistance to these groups is necessary. Raising awareness campaigns, mobile registration units, and gender-sensitive ARC centers must be set up to make this possibility a reality.

Legal Protection and Dispute Resolution Strengthening

Digitization of land records provides legal certainty. The moment it is made certain and stored in a safe repository, land disputes easily get resolved and are less prone to occurring at all. CLRMIS offers a stable point of reference for the judiciary, legal experts, and citizens, which helps to enhance the quality of justice in land. The system also enables quicker delivery of service.

Digital fards, mutation certificates, and ownership details can be retrieved on time, enabling timely transactions and halting unauthorized transfers (Dondjio & Kazamias, 2024). In the long run, as legal and judicial authorities accept digital records as such, valid evidence will be accepted, and the use of aging and fictitious documents will be reduced. The ability to integrate CLRMIS with court registries, property registration authorities, and succession regimes would enable further reinforcement of the effectiveness and consistency of dispute resolution.

Facilitating E-Governance and Inter-Department Coordination

CLRMIS is the harbinger of big e-governance changes in Punjab. Land records, if computerized, will be

simpler to integrate with departmental services like municipal corporations, tax departments, and development departments. A single digital database of properties may be used to identify unauthorized buildings, monitor tax arrears, and schedule infrastructure schemes (Ahmad & Brosio, 2022). For example, integration with utility departments would provide for accurate billing of property owners for electricity and water usage.

Integration with agricultural departments could also enable real-time tracking of land use, farm planning, and subsidy distribution. Such integration would not only maximize government performance but also help reduce duplicate records and provide assurance that services are released based on accurate and up-to-date information.

Encouraging Research, Planning, and Environmental Management

In addition to verification of property ownership, digitized land records can also serve as an information source for planners, researchers, and policymakers. Geographic and demographic information contained in CLRMIS can be employed to forecast future land use patterns, analyze urban sprawl, and undertake development planning (Karimi & Sultana, 2024). Environmental planning also gains. To give an example, observation of farming or forest land encroachment is more convenient where satellite imagery is mapped onto digital records. Likewise, planners are able to determine flood, deforestation, and erosion risks through merging CLRMIS data with geographic information systems (GIS). It facilitates the advent of evidence-based decision-making and supports sustainable land management in Punjab, which is needed with the growing pressure on natural resources.

Replicability and Regional Reform Potential

The Punjab experience with CLRMIS provides a model for other Pakistani provinces. The problems that were faced and the interventions contemplated can be used for directing land governance policy in the country as a whole (Adekola, Krigsholm, & Riekkinen, 2023). The project also illustrates how foreign assistance, especially that of agencies like the World Bank, can actually support public sector reform. If well recorded and analysed, CLRMIS can be a best practice case study on South Asian land digitalization. This also makes Punjab the region's pioneer in land reform. The replicability potential nationwide can result in a more standardized, transparent, and streamlined land administration system for the whole country of Pakistan.

Conclusion

Computerization of land records under the Computerization of Land Record Management and Information System (CLRMIS) is a hallmark of governance reform in Punjab to raise transparency, service, and citizen confidence in government agencies. Although the project has brought in streamlined processes, curbed corruption, and enhanced access to land records, its rollout has been uneven and marred by institutional opposition, infrastructural weaknesses, restricted digital literacy, and poor legal integration.

This research points out that CLRMIS's success depends not just on technology deployment but on consistent institutional collaboration, law reform, and equitable access, particularly for women, the elderly,

and rural dwellers. Further, data protection and cyber resilience are critical to the confidence that the public will place in electronic government systems.

The findings reveal that while CLRMIS does possess transformative potential, its full impact can only be realized through a multi-dimensional policy response. It involves citizen outreach initiatives, gender-sensitive infrastructure, legal recognition of digital records, and integration of data among ministries. The Punjab experience can be used to offer a helpful case study for other provinces and countries intending to embark on land administration modernization. By having supportive policies and putting improvements into practice, CLRMIS can act as a model for open, fair, and efficient land administration in the Global South.

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