

Exploring the Role of Librarians as Knowledge Intermediaries in the Adoption of Mechanised Farming Tools in Indigenous Farming Communities

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Abstract: *The adoption of mechanised farming tools is widely recognised as a means of improving agricultural productivity, yet uptake among indigenous farming communities remains low. This study examines the role of librarians as knowledge intermediaries in supporting the adoption of mechanised farming tools and addressing information-related barriers in these communities. The study adopts an exploratory approach based on a review of existing literature from agriculture, rural development, and library and information science. Findings indicate that although mechanised tools improve efficiency, productivity and labour use, adoption is constrained by economic, infrastructural, institutional and informational challenges. Limited access to clear and relevant agricultural information significantly affects farmers' awareness and willingness to adopt new technologies, while existing channels such as extension services remain inadequate. The study identifies librarians as underutilised actors who can bridge this gap through information organisation, literacy support, community engagement and digital platforms. It concludes that strengthening knowledge systems is essential and recommends integrating librarians into agricultural information frameworks to enhance access and support sustainable agricultural development.*

Keywords: mechanised farming tools, indigenous farming communities, technology adoption, librarians, knowledge intermediaries

INTRODUCTION

Agriculture remains central to economic development, food security and rural livelihoods in many developing countries. In Nigeria for instance, the sector is largely dominated by smallholder farmers who depend heavily on traditional farming practices and simple tools such as hoes, cutlasses, axes and hand-held implements. While these indigenous methods have sustained agricultural production over time, increasing population pressure, climate variability and rising food demand have exposed their limitations in meeting contemporary productivity needs. Consequently, improving agricultural efficiency and output has become a critical policy and development priority.

One of the most widely recognised ways for enhancing agricultural productivity is the adoption of mechanised farming tools. Agricultural mechanisation involves the use of machines and equipment to reduce human labour, improve efficiency as well as increase output in farming operations. Tools such as tractors, planters, harvesters, irrigation systems and threshing machines have been shown to significantly reduce labour intensity, save time and improve crop yields. Beyond productivity gains, mechanisation also contributes to cost efficiency and supports sustainable agricultural practices (Sims & Kienzle 2017; Kumari et al. 2023). As such, it is often described as a key driver of agricultural transformation across developing regions.

Despite these benefits, the adoption of mechanised farming tools among smallholder farmers remains uneven and generally low, particularly in Sub-Saharan Africa. Empirical studies consistently highlight a range of constraints, including limited financial capacity, inadequate infrastructure, lack of technical skills and restricted access to appropriate technologies (Sims & Kienzle 2017; Ahmed & Ahmed 2023; Kumar & Karmakar 2025). Beyond these structural challenges, limited access to timely and reliable agricultural information has emerged as a critical, yet often underestimated barrier to technology adoption. Farmers frequently rely on informal knowledge systems and traditional practices, which, although valuable, may not sufficiently support the understanding and effective use of modern agricultural technologies.

Access to relevant knowledge plays an essential role in shaping farmers' decisions to adopt innovations. In this regard, knowledge intermediaries have become increasingly important within agricultural knowledge systems. These actors, including extension agents, research institutions, non-governmental organisations and information professionals, serve as bridges between knowledge producers and end users. They facilitate the translation of scientific and technical information into accessible, context-specific formats that farmers can readily apply (Prajapati et

al. 2025). Effective knowledge intermediation not only improves awareness of innovations but also enhances farmers' capacity to evaluate, adapt and use new technologies within their local communities.

Globally, the integration of information services into agricultural development initiatives has yielded positive outcomes. For instance, extension systems in countries such as India and China have significantly improved farmers' adoption of mechanised technologies through structured training, demonstration programmes and information dissemination (Gulati & Juneja 2023). Similarly, evidence from Zimbabwe and Indonesia shows that information centres, libraries and communication platforms can enhance access to agricultural knowledge and promote the uptake of improved farming practices (Mugwisi 2013; Mariyono & Kuntariningsih 2026). These examples explain the importance of organised information systems in supporting agricultural innovation.

Within this evolving development, librarians and information professionals are increasingly recognised as key knowledge intermediaries. Through public libraries, they provide access to curated agricultural information resources, facilitate information literacy and support community learning. Librarians also organise training programmes, workshops and outreach activities that connect rural farmers with relevant knowledge sources. In addition, the growing provision of digital services, including internet access, online databases and mobile information platforms, has expanded opportunities for farmers to access timely information on weather patterns, market prices and modern farming techniques (Adio et al. 2021; Kamal and Bablu 2023). Collaboration between librarians and agricultural extension services further strengthens the dissemination of practical and contextually relevant information, which in-turn improves farmers' decision-making and productivity (Mapiye et al. 2023; Aliloo et al. 2026).

Despite these developments, the role of librarians in facilitating the adoption of mechanised farming tools remains underexplored, particularly within indigenous farming communities. These communities often depend on deeply rooted traditional knowledge systems and informal communication networks, which may limit their exposure to modern agricultural technologies. While existing studies have largely focused on extension services and policy interventions, limited attention has been given to how library and information services can complement these efforts by addressing information gaps and enhancing knowledge accessibility. Against this backdrop, this study explores the role of librarians as knowledge intermediaries in the adoption of mechanised farming tools in indigenous farming communities. To achieve this aim, the study examines the nature of mechanised farming tools used in indigenous farming communities, assesses the level of their adoption and analyses the sources of agricultural information available to farmers. It further evaluates the role of librarians as knowledge intermediaries, identifies the constraints affecting

technology adoption, and proposes strategies for enhancing knowledge dissemination and promoting the uptake of mechanised farming tools.

METHODOLOGY

This study adopts an exploratory research design based on a structured review of existing literature. The approach is suitable for examining emerging and interdisciplinary issues such as the role of librarians as knowledge intermediaries in the adoption of mechanised farming tools, where empirical studies remain limited. The review enables the combination of insights from diverse fields, including agriculture, rural development and library and information science. A narrative review method was employed to identify, select and analyse relevant scholarly literature. Literature were sourced from major academic databases and search platforms, including Google Scholar and institutional repositories. The search process was guided by key terms such as *mechanised farming, agricultural mechanisation, technology adoption in agriculture, indigenous farming communities, knowledge intermediaries, agricultural information services, libraries and rural development, and librarians in agriculture*. Boolean operators (AND, OR) were used to refine and combine search terms for improved relevance.

To ensure the quality and relevance of the literature, inclusion and exclusion criteria were applied. Studies included in the review were those published in peer-reviewed journals, conference proceedings and credible institutional reports, primarily between 2010 and 2026, to capture recent developments in agricultural mechanisation and information services. Earlier foundational studies were also considered where necessary. Only studies written in English and those directly related to mechanised farming, agricultural information dissemination or knowledge intermediation were included. Studies with limited relevance to the research focus or lacking sufficient methodological clarity were excluded. The selected literature was analysed thematically in line with the objectives of the study. Key themes identified include types of mechanised farming tools, levels of adoption among smallholder farmers, sources of agricultural information, the role of knowledge intermediaries, challenges to technology adoption and strategies for improving knowledge dissemination. To enhance the credibility of the study, multiple sources were consulted and cross-checked to ensure consistency of evidence. The narrative synthesis approach allowed for the integration of findings and the development of a clear discussion on how librarians can support agricultural knowledge systems and promote the adoption of mechanised farming tools.

Literature Review and Discussion

Mechanised Farming Tools in Indigenous Farming Communities

Literature shows that indigenous farming systems are largely characterised by the use of traditional implements, with limited integration of mechanised tools. Karthikeyan et al. (2009) noted that farmers rely on simple hand-operated or animal-drawn tools such as hoes, ploughs, seed drills,

sickles, threshers and winnowers across different stages of production. These tools remain relevant due to their affordability, accessibility and adaptability to local conditions. More recently, Yadav et al. (2025) observed that such tools are not only functional but also embedded in cultural practices, reflecting indigenous knowledge systems and community identity. Nonetheless, mechanised farming tools, including tractors and related machinery, offer clear productivity advantages.

Empirical evidence from Nigeria demonstrated that the use of tractors, for instance, enhances farm size, increases crop production and improves farmers' income and overall livelihoods (Umar et al. 2021). Mechanisation has also been linked to broader outcomes such as agribusiness development and economic diversification, which positions it as an essential component of agricultural transformation. However, despite these potential benefits, the adoption of mechanised tools in indigenous farming communities appears to remain limited. Umar et al. (2021) identified several constraints, including the high cost of machinery, inadequate access to spare parts, shortage of skilled operators and the inefficiency of government-supported mechanisation schemes. This suggests that while mechanisation has the power to transform farming, its integration into indigenous farming systems requires context-sensitive approaches. To facilitate adoption, it requires approaches that respect local traditions and cultural practices, while also providing the right support, like affordable access, training and reliable services. In this way, modern tools can strengthen farming without setting aside the traditional methods that communities value and depend on.

Level of Adoption of Mechanised Farming Tools

The adoption of mechanised farming tools among indigenous farmers remains generally low despite their recognised benefits. Mohammed et al. (2023) found that adoption is influenced by factors such as land security, access to credit, education and extension services, while high costs and poor infrastructure remain major constraints. Similarly, Sellers and Bilsborrow (2020) reported that indigenous farmers are less likely to adopt modern technologies compared to settlers, largely due to cultural and resource limitations. In Nigeria, Takeshima and Lawal (2018) and Solomon (2022) also highlighted low adoption levels, attributing this to limited awareness, high costs and weak institutional support systems.

The findings suggest that even though mechanised farming tools offer clear benefits, their adoption among indigenous farmers is still relatively low. This seems to be driven by a mix of practical and structural challenges. For example, lack of land security, limited access to credit, low levels of education and weak extension or support services can all reduce farmers' ability to try or sustain mechanisation. On top of that, high equipment costs and poor infrastructure make adoption even harder, especially where roads, storage, or service support are not reliable. In addition, differences

in cultural practices and limited resources can discourage indigenous farmers from adopting new technologies at the same rate as other groups. In essence, the findings point to the idea that improving access to finance, strengthening institutional support and reducing the cost and infrastructure barriers could significantly increase mechanisation adoption among indigenous farmers.

Sources of Agricultural Information on Mechanised Farming Tools

Farmers access agricultural information through a mix of formal and informal channels, though these sources are often fragmented and insufficient. Vezirov et al. (2025) highlighted the emerging role of digital tools in supporting decision-making on machinery use, while Asadullin et al. (2021) note that traditional channels such as extension services, cooperatives and government programmes are often weak and inconsistent. At the local level, farmers frequently depend on informal sources, including peers and community networks, due to limited access to structured information systems (Nicholase 2017). Adio et al. (2021) further disclosed that media platforms such as radio, mobile phones and television complement these sources, although their effectiveness varies.

These findings imply that although farmers draw from both formal and informal sources, the overall information environment remains loosely connected and insufficient to fully support effective decision-making, especially in relation to machinery use. While digital tools are beginning to make a positive contribution, their benefits are not yet evenly distributed. The observed weaknesses in formal channels help to explain why farmers tend to depend more on informal networks, where information is easier to obtain even if it is not always well organised or reliable. In addition, the role of media platforms suggests some potential for wider information dissemination, but their impact appears to depend on factors such as accessibility, relevance of content and farmers' ability to make practical use of the information provided.

Librarians as Knowledge Intermediaries in Agriculture

Librarians are increasingly positioned as knowledge intermediaries within agricultural knowledge systems, serving as a bridge between complex information sources and end users. Studies show that librarians in agricultural institutions do more than provide access to information; they actively support users in locating, interpreting, and applying specialised knowledge. For instance, Maharazu and Lawal (2022) found that librarians facilitate access to agricultural databases while also helping users make sense of technical content, thereby enhancing its usability. This intermediary role is further reflected in the capacity of libraries to connect users to relevant information resources, although their impact is often limited by low awareness, weak ICT infrastructure, and inadequate outreach efforts (Akidi and Igbinovia, 2025; Kiwelu and Ngulube, 2026). Despite these constraints, recent evidence points to an expanding role, with librarians

increasingly engaging in knowledge mediation through digital repositories, open access platforms, and information literacy initiatives that support both access and effective use of agricultural information (Ekwueme, 2025).

These findings suggest that librarians are not only custodians of information but also active facilitators of access and understanding within agricultural knowledge systems. By supporting users in navigating specialised databases and making technical information more usable, they contribute meaningfully to knowledge utilisation. However, the constraints identified, particularly those relating to infrastructure, staffing and limited outreach, help to explain why their impact is not yet fully realised, especially at the grassroots level. While the expanding use of digital platforms and information literacy initiatives points to a shift towards more dynamic service delivery, the effectiveness of these efforts depends largely on improved awareness, stronger ICT support and more deliberate engagement with end users.

Challenges Affecting Adoption of Mechanised Farming Tools

The adoption of mechanised farming tools is shaped by a range of interrelated constraints that limit farmers' ability to take up and sustain their use. Evidence consistently points to structural and economic barriers, particularly the high cost of machinery, limited access to credit, small landholdings, and inadequate infrastructure (Amfo and Baba, 2020; Kumar and Karmakar, 2025). Beyond these, informational factors also play a significant role. For example, Takeshima and Lawal (2018) highlight that limited awareness and knowledge gaps can prevent farmers from understanding the benefits and proper use of mechanised tools. These challenges are further compounded by broader conditions such as poverty, resource constraints, and weak information systems, which together restrict both access to and effective utilisation of mechanisation (Rohith et al., 2025).

This suggests that the low adoption of mechanised farming tools cannot be explained by a single factor but rather by the interaction of economic, structural, and informational limitations. While financial and infrastructural barriers directly affect access, gaps in knowledge and information systems influence farmers' ability to make informed decisions about mechanisation. As such, efforts to improve adoption need to address not only affordability and access but also awareness, capacity building, and the strengthening of information channels that support informed use.

Strategies for Enhancing Adoption through Librarian Interventions

Literature increasingly suggests that librarians can play a strategic and practical role in improving the adoption of mechanised farming tools, particularly in indigenous farming communities where access to reliable and usable information remains limited. At the core of this role is the ability of librarians to act as knowledge intermediaries, by translating, organising and delivering relevant

information in ways that align with the realities of local farmers. Rather than simply providing access to information, effective librarian interventions focus on ensuring that knowledge is understandable, accessible and applicable to farmers' everyday practices. One key strategy identified in literature is the provision of localised and context-sensitive information. Arundhathi et al. (2025) emphasised that information on mechanised tools must be adapted to local languages, literacy levels and farming conditions. This includes simplifying technical content, using visual and audio formats and presenting practical guidance that farmers can easily relate to. Such localisation helps to bridge the gap between complex agricultural innovations and the lived experiences of farmers, thereby improving comprehension and encouraging uptake.

In addition, the use of information and communication technologies (ICTs) has been highlighted as an important strategy for expanding access to agricultural knowledge. Through mobile platforms, digital libraries and online databases, librarians can provide real-time information on mechanised tools, including their use, maintenance and benefits. Arundhathi et al. (2025) noted that ICT-based services can help overcome geographical and infrastructural barriers, especially when designed to suit low-resource settings. However, the effectiveness of these tools depends on their accessibility and the digital competence of users, which reinforces the need for supportive training and guidance. Closely related to this is the organisation of training programmes and community-based learning initiatives. Librarians can facilitate workshops, demonstrations and knowledge-sharing sessions that bring farmers together to learn about mechanised tools in a practical and interactive manner. These initiatives not only improve awareness but also build confidence in the use of new technologies. By creating spaces for dialogue and shared learning, librarians help to address uncertainties and misconceptions that often hinder adoption.

Another important strategy lies in collaboration and partnership. Studies by Chennamadhava et al. (2024) and Melaku et al. (2024) emphasised the value of linking librarians with extension agents, agricultural researchers and other stakeholders. Such collaboration enables the integration of diverse knowledge sources, by ensuring that farmers receive accurate, timely and relevant information. Librarians, in this situation, serve as connectors that bring together scientific knowledge, policy information and local experiences in a way that supports informed decision-making. Furthermore, the development and promotion of digital repositories and farmer-focused content represent an expanding area of intervention. Muñoz et al. (2025) highlighted how repositories, open access platforms, and curated information resources can improve the visibility and availability of agricultural innovations. When combined with information literacy programmes, these resources empower farmers to independently seek, evaluate and apply information related to mechanised farming tools. This not only supports immediate adoption but also strengthens long-term capacity for continuous learning and adaptation.

CONCLUSION

This study has shown that the challenge of adopting mechanised farming tools in indigenous farming communities cannot be fully understood through economic and infrastructural factors alone. While issues such as cost, access to credit and inadequate infrastructure remain important, the findings point to a less visible but equally significant factor, which is the limited access to clear, relevant and usable agricultural information. In many cases, farmers are not only constrained by resources but also by gaps in knowledge that affect their awareness, understanding and confidence in using mechanised technologies. By bringing together insights from agriculture and library and information science, the study draws attention to the role of librarians as practical actors within agricultural knowledge systems. Rather than being confined to traditional information services, librarians have the potential to make agricultural knowledge more accessible, understandable and locally meaningful. This positions them as valuable intermediaries who can help bridge the gap between the development of agricultural innovations and their actual use by farmers. In practical terms, the study suggests that efforts to improve agricultural mechanisation should pay closer attention to how information is created, shared, and used within rural communities. Strengthening these knowledge pathways, alongside ongoing economic and policy interventions, offers a more balanced and sustainable approach to improving technology adoption and agricultural productivity

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Public libraries should be better equipped to provide targeted agricultural information services. This includes developing collections and resources specifically focused on mechanised farming tools, their use, maintenance and benefits.
2. Librarians should work closely with agricultural extension agents, research institutions and development organisations to ensure that farmers receive accurate, practical and locally relevant information. Such collaboration can enhance the reach and effectiveness of knowledge dissemination efforts.
3. Agricultural information should be simplified and presented in local languages and formats that are easily understood by farmers. Librarians can play a key role in translating technical knowledge into practical guidance that supports adoption.
4. Training programmes should be organised to enhance the capacity of librarians in agricultural information services, while also improving farmers' information literacy and ability to utilise available resources effectively.

5. Libraries should expand the use of digital platforms, including mobile technologies, online databases and community information systems, to provide farmers with timely information on mechanised tools, weather conditions and market opportunities.
6. Government and relevant stakeholders should recognise the role of libraries in agricultural development and provide adequate funding, infrastructure and policy support to strengthen their operations in rural communities.
7. Future studies should focus on empirically assessing the impact of librarian-led knowledge dissemination strategies on the adoption of mechanised farming tools, particularly within indigenous communities.

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