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THE ROLE OF LIBRARY AND INFORMATION SCIENCE IN FACILITATING A SUSTAINABLE GREEN REVOLUTION

JANE NGOZI EKWUEME Ph.D
Department Of General Studies Education
School Of Education
Yusuf Maitama Sule Federal University Of Education, Kano, Kano State
Janengozi@Gmail.Com
+234 8036374898

Abstract

As the world faces the twin challenges of feeding a growing population and protecting the environment, the idea of a sustainable green revolution has become urgent. Unlike the earlier green revolution, which focused on high-yield crops and chemical inputs, today's revolution must balance productivity with environmental responsibility. This paper highlights the role of Library and Information Science (LIS) in making that balance possible. Libraries are more than just book collections; they are engines of knowledge sharing, helping farmers, researchers, and policymakers access reliable information. From digital repositories and agricultural extension support to open-access resources and training in information literacy, libraries can bridge the gap between innovation and practice. The paper also addresses challenges such as infrastructure gaps, funding limitations, and digital divides, while recommending strategies to maximize the contributions of LIS to sustainable agriculture.

Keywords: Library and Information Science, Green Revolution, Sustainable Agriculture, Information Literacy, Knowledge Management

Introduction

Agriculture has always been central to human survival and development. In most parts of the world, particularly in developing countries, it remains the backbone of national economies and a vital source of livelihoods. Yet, agriculture today faces unprecedented challenges, including population growth, shrinking arable land, environmental degradation, and the escalating impact of climate change. To meet these challenges, experts increasingly argue for a sustainable green revolution-a reimagined approach to food production that emphasizes not only higher yields but also environmental conservation, social equity, and long-term resilience.

The term "green revolution" historically refers to the transformation of agriculture in the mid-20th century through the introduction of high-yield crop varieties, chemical fertilizers,

pesticides, and irrigation systems. While this movement significantly boosted global food supplies and helped avert famine in many regions, it also left behind critical ecological and social costs. Soil fertility loss, water pollution, biodiversity reduction, and the marginalization of smallholder farmers are some of the unintended consequences. Thus, the new focus is not just on producing more food but on doing so in ways that safeguard natural ecosystems and ensure inclusive benefits for communities.

Library and Information Science (LIS) enters this conversation as an often-overlooked yet essential player. Libraries are not simply archives of books and research materials; they are knowledge facilitators. They serve as bridges between scientific research and practical application, between policy frameworks and grassroots adoption. In agriculture, timely and accurate information is often the difference between successful harvests and devastating losses. Farmers, extension workers, and policymakers all rely on reliable data, whether on weather patterns, pest control, soil management, or market trends.

With the integration of Information and Communication Technologies (ICTs), LIS has evolved beyond physical spaces into powerful digital platforms. Libraries can now provide open access to agricultural research, disseminate innovations through mobile apps and community radios, and train farmers in information literacy. In resource-constrained environments, libraries also preserve and share indigenous knowledge-traditional farming practices that remain relevant for sustainable development. This positions LIS as both a guardian of heritage and a driver of innovation. Furthermore, LIS plays a role in shaping agricultural policy and advocacy. By managing institutional repositories, curating datasets, and synthesizing evidence, library professionals equip policymakers with the tools for evidence-based decision-making. In this sense, libraries are not just passive recipients of knowledge but active contributors to sustainable agricultural systems. They support a culture of informed participation where stakeholders-farmers, researchers, government agencies, and communities-can collaborate effectively.

The sustainable green revolution requires more than scientific breakthroughs; it requires systems for managing and sharing knowledge equitably. This is where Library and Information Science becomes indispensable. By enabling access to critical information, training communities in its use, and fostering collaboration, LIS has the potential to transform agriculture into a driver of sustainability. The following sections of this paper explore these contributions in depth, identifying both opportunities and challenges in harnessing LIS for sustainable agricultural development.

Conceptual Clarifications

Green Revolution and Sustainability

The green revolution of the 1960s marked a turning point in global food production. By introducing high-yield crop varieties, chemical fertilizers, pesticides, and irrigation systems, it helped many countries achieve food self-sufficiency and reduce the threat of famine. Nations such as India, Mexico, and parts of Asia benefited tremendously, as millions were lifted out of

hunger (Evenson & Gollin, 2003). However, this progress came with unintended consequences. The emphasis on intensive farming practices, while effective in the short term, gradually placed immense pressure on natural ecosystems. Issues such as soil degradation, excessive water use, and biodiversity loss soon became apparent (FAO, 2019). Over time, it became clear that while the first green revolution increased food supply, it did not adequately address long-term sustainability. Many smallholder farmers, especially in developing regions, were left behind due to the high costs of modern inputs. Moreover, environmental damage from the overuse of chemical fertilizers and pesticides has had lasting consequences, including groundwater contamination and greenhouse gas emissions (Pingali, 2012). These challenges highlight the need for a more holistic and inclusive approach to agricultural development.

The sustainable green revolution builds on these lessons by emphasizing ecological balance and social equity. Instead of focusing solely on yield, it promotes eco-friendly practices such as crop rotation, organic farming, integrated pest management, renewable energy use, and biodiversity preservation (World Bank, 2020). This redefined revolution also recognizes the importance of indigenous knowledge and community-based approaches, valuing practices that have sustained farming communities for generations (Altieri & Nicholls, 2017). In essence, the sustainable green revolution seeks to strike a balance between productivity and environmental stewardship, ensuring that future generations can benefit from healthy ecosystems while meeting their food needs. Furthermore, sustainability in agriculture extends beyond farming practices to include social and economic dimensions. Equitable access to land, credit, and information ensures that marginalized groups, such as women and rural farmers, are not excluded from progress (UNESCO, 2019). By addressing both ecological and human concerns, the sustainable green revolution represents a vision of agriculture that is not only productive but also resilient, inclusive, and environmentally responsible.

Library and Information Science (LIS)

Library and Information Science (LIS) is often misunderstood as being limited to books and archives, but in reality, it is a dynamic discipline that underpins knowledge sharing in virtually every sector of society. At its core, LIS deals with the systematic collection, organization, preservation, and dissemination of information. In the agricultural sector, this means ensuring that farmers, researchers, extension workers, and policymakers have timely access to accurate and practical knowledge that can improve decision-making and productivity (Aina, 2017). One of the most important contributions of LIS is information literacy training. This involves teaching individuals how to find, evaluate, and apply information effectively. In agriculture, this skill is crucial: farmers need to distinguish between reliable data and misinformation, particularly when it comes to adopting new practices, choosing crop varieties, or applying fertilizers and pesticides. Librarians and information professionals are uniquely positioned to bridge this gap, helping farmers and stakeholders navigate both traditional and digital information sources (Popoola, 2021).

Another key role of LIS lies in curating agricultural databases and knowledge repositories. Universities, research institutes, and government agencies produce vast amounts of agricultural

research. Without proper management, much of this knowledge remains underutilized. LIS professionals ensure that these outputs are preserved in institutional repositories and made accessible to the wider public through open access initiatives. This democratization of information means that a farmer in a remote village can potentially access the same cutting-edge research as a scientist in a university laboratory (IFLA, 2020). In addition, the convergence of LIS with Information and Communication Technologies (ICTs) has greatly expanded the impact of libraries in agriculture. Digital libraries, mobile apps, SMS alerts, and online platforms now allow farmers to receive weather updates, market prices, and pest control advice in real time (UNESCO, 2019). This transformation makes libraries not just physical spaces but digital platforms for agricultural innovation and knowledge sharing. By integrating ICT with LIS, information professionals are turning libraries into active partners in agricultural development and sustainability, ensuring that knowledge flows smoothly from research centers to the fields where it can make the greatest impact (FAO, 2020).

The Role of LIS in Facilitating a Sustainable Green Revolution

- **Knowledge Management and Agricultural Research:** Libraries have long been recognized as custodians of knowledge, and in the context of agriculture, this role is even more significant. Agricultural research generates vast amounts of information-theses, journals, technical reports, datasets, and policy documents-that are essential for addressing the challenges of sustainable farming. Without effective management, much of this knowledge remains locked away, inaccessible to the very people who need it most. Libraries step in as organized repositories, collecting, cataloguing, and preserving these materials for use by farmers, researchers, and policymakers. The digitization of agricultural resources has revolutionized access. By creating open access repositories and digital libraries, LIS professionals ensure that research outputs are no longer confined to university shelves but can be accessed globally. For instance, a farmer can consult research on pest-resistant crop varieties, while policymakers can analyze reports on soil conservation to design better interventions. This democratization of knowledge is central to making agriculture both productive and sustainable. Importantly, libraries also preserve indigenous agricultural knowledge-traditional farming practices passed down through generations that are often overlooked in formal research. These practices, such as mixed cropping, organic fertilization, and water harvesting methods, are not only cost-effective but also ecologically sound. By documenting and archiving them in institutional repositories, libraries make indigenous wisdom available for adaptation and integration into modern farming systems, ensuring that sustainability is rooted in both scientific and cultural contexts.

- **Dissemination of Agricultural Innovations:** Innovation in agriculture means little if it fails to reach the people who need it most. The challenge is not just creating solutions but ensuring their adoption at the grassroots level. Libraries act as crucial intermediaries in this process, transforming technical and often complex agricultural research into formats that farmers and extension workers can understand and apply. Through

brochures, leaflets, audiovisual tutorials, podcasts, and even farmer-focused workshops, LIS professionals translate knowledge into practice. In rural communities where internet penetration remains low, libraries rely on creative approaches to reach farmers. Mobile libraries-equipped with printed materials, digital tools, or portable projectors-bring knowledge directly to farming communities. Similarly, radio-based information services have proven highly effective in regions where radio remains the most accessible communication tool. By broadcasting farming tips, weather forecasts, and pest control advice, libraries ensure that innovations travel beyond urban centers to the fields where they matter most. By bridging the communication gap between research institutions and farming communities, LIS professionals accelerate the adoption of sustainable practices. Whether it is promoting organic fertilizers, water-efficient irrigation systems, or climate-smart agriculture, libraries make sure that information does not remain in research journals but becomes part of everyday farming practice.

- **Enhancing Information Literacy:** Information literacy is increasingly recognized as a critical skill for sustainable agriculture. With the flood of information available today-ranging from academic research to online blogs and informal advice-farmers and agricultural workers face the challenge of separating fact from misinformation. Libraries play a transformative role here by equipping communities with the skills to find, evaluate, and apply credible information in their farming practices. LIS professionals organize training sessions for farmers, students, and agricultural extension workers, showing them how to use research databases, interpret technical documents, and even fact-check agricultural claims circulating on social media. This reduces the risk of misinformation, such as the misuse of pesticides or false claims about "miracle" fertilizers, which can be harmful both to crops and the environment. By strengthening information literacy, libraries empower communities to make better decisions. Farmers learn to apply the right quantity of inputs, adopt eco-friendly practices, and respond appropriately to emerging threats such as climate variability or pest outbreaks. In the long run, this not only enhances productivity but also ensures that farming remains sustainable and aligned with ecological principles.

- **ICT Integration and Digital Libraries:** The integration of ICT has expanded the capacity of libraries to deliver agricultural knowledge in real time. Digital libraries and online platforms now host vast collections of agricultural e-journals, open access research papers, and government reports, making knowledge more accessible than ever before. Farmers and extension workers can now obtain real-time weather forecasts, soil management guidelines, and pest control strategies through platforms coordinated by LIS professionals. Mobile technology is particularly transformative in rural contexts. SMS-based services allow libraries to deliver quick updates on crop diseases, fertilizer application methods, and market prices. Mobile apps developed in partnership with libraries and agricultural agencies provide step-by-step guidance to farmers in remote areas. In this way, ICT-enabled LIS services reduce the barriers of distance, literacy,

and cost that often prevent farmers from accessing critical information. Digital libraries also enhance collaboration. Researchers in different parts of the world can share findings instantly, while policymakers can access databases of best practices for sustainable agriculture. This interconnectedness allows knowledge to flow freely across borders, contributing to a truly global effort toward a sustainable green revolution.

- **Policy Advocacy and Support:** Beyond serving individual farmers and researchers, libraries play an important role in shaping agricultural policy. Governments and international agencies increasingly rely on evidence-based policy, which requires access to reliable data and research. LIS professionals contribute by curating and synthesizing agricultural information, ensuring that policymakers have the evidence they need to make informed decisions about land use, subsidies, environmental regulations, and food security strategies. Libraries also serve as forums for dialogue, bringing together diverse stakeholders - farmers, scientists, NGOs, and government officials - to discuss pressing issues such as climate change, food insecurity, and agricultural innovation. By providing neutral spaces for knowledge exchange, libraries help align the interests of different actors toward sustainable solutions. Through advocacy, LIS professionals promote policies that prioritize open access to agricultural knowledge, investment in ICT for rural areas, and the inclusion of smallholder farmers in decision-making processes. In this way, libraries are not only service providers but also agents of change, influencing agricultural systems at structural and policy levels.

Challenges Facing LIS in Supporting the Green Revolution

While libraries have great potential to drive agricultural transformation, they also face a number of practical challenges, especially in developing nations. These barriers limit their ability to fully support a sustainable green revolution and highlight the need for greater attention from governments, development partners, and communities.

Infrastructural Limitations remain one of the most pressing concerns. Many libraries-particularly those in rural and semi-urban areas-struggle with unstable electricity supply, poor internet connectivity, and inadequate ICT facilities. A library cannot serve as a digital hub for agricultural information if it cannot reliably power its computers or connect to online databases. As a result, knowledge resources remain inaccessible to the very farmers and policymakers who need them most. Infrastructural gaps therefore widen the divide between potential and actual impact.

Another key issue is the digital divide. Even where libraries succeed in hosting digital platforms, many farmers in rural areas lack access to ICT devices such as smartphones, tablets, or computers. Moreover, digital literacy skills are often limited, making it difficult for farmers to take advantage of online agricultural resources. Without training and affordable technology, farmers risk being excluded from the knowledge economy, leaving them dependent on outdated practices. This perpetuates inequality between urban and rural communities.

A third challenge is low awareness of the role of LIS in agricultural development. In many cases, agricultural agencies and policymakers underestimate the contributions libraries can make in bridging the knowledge gap. As a result, collaboration between LIS professionals and agricultural stakeholders remains weak. Farmers often turn to informal networks for advice, while libraries remain underutilized despite their wealth of resources and expertise. Strengthening partnerships between libraries, research institutions, and agricultural extension services is therefore critical.

Finally, funding constraints continue to undermine LIS contributions. Developing and maintaining agricultural databases, setting up extension services, and digitizing indigenous knowledge all require sustained financial investment. Yet, in many countries, library budgets are limited, and agricultural information services are not prioritized. Without adequate funding, libraries are unable to scale up their services or invest in innovations that could transform agricultural knowledge sharing.

Strategies for Strengthening LIS Contribution

For libraries to fully realize their potential in advancing a sustainable green revolution, deliberate strategies must be put in place. These strategies should not only address existing challenges but also build long-term systems that position LIS as an integral part of agricultural development.

One critical step is the strengthening of ICT infrastructure in rural libraries. Without reliable electricity, internet connectivity, and up-to-date computer systems, libraries cannot provide digital agricultural services. Improving ICT facilities would allow rural libraries to serve as local innovation hubs, giving farmers access to online agricultural databases, e-learning modules, and real-time weather or market updates. In contexts where technology remains limited, hybrid solutions such as solar-powered systems and offline digital libraries can also ensure continuity.

Equally important is collaboration between LIS professionals and agricultural extension services. While libraries excel at information management, extension workers specialize in practical training and field demonstrations. By working together, they can create a stronger bridge between research outputs and actual farming practices. For example, libraries could provide scientific resources, while extension agents translate these into hands-on demonstrations in the field. This synergy ensures that farmers not only read about innovations but also see how to implement them effectively.

The promotion of open access initiatives is another vital strategy. Many agricultural research findings are locked behind paywalls, limiting their reach to wealthier institutions. By encouraging universities, research institutes, and governments to adopt open access policies, libraries can ensure that farmers, policymakers, and extension agents-regardless of location or financial capacity-benefit from the latest knowledge. Open repositories that preserve both scientific research and indigenous farming practices would also create a rich and inclusive knowledge base for sustainable agriculture.

Additionally, capacity building for LIS professionals must be prioritized. Many librarians have limited exposure to agricultural sciences, yet they are expected to support researchers and farmers with specialized information. Training programs, professional workshops, and interdisciplinary collaborations can help LIS staff build expertise in agricultural information systems, ICT applications, and sustainability issues. Skilled librarians can then act not just as custodians of books but as active partners in agricultural development.

Finally, sustainable progress will require government and donor funding. Libraries cannot expand services, digitize resources, or maintain infrastructure without financial support. Governments must recognize agricultural information services as a strategic investment in food security, while donor agencies and NGOs can provide grants for innovation in agricultural libraries. Targeted funding for rural and community libraries, in particular, would help bridge equity gaps and ensure that smallholder farmers have equal access to knowledge resources.

In essence, these strategies highlight that strengthening LIS contributions is not about libraries working in isolation but about embedding them in broader agricultural and policy ecosystems. By investing in infrastructure, partnerships, open access, professional capacity, and funding, libraries can become powerful agents of change in promoting a sustainable green revolution.

Conclusion

The sustainable green revolution requires more than agricultural technologies-it requires timely, accurate, and accessible information. Library and Information Science professionals occupy a unique position in bridging the knowledge gap between research institutions and end-users. By leveraging ICT, promoting information literacy, and collaborating with agricultural stakeholders, LIS can become a cornerstone in advancing sustainable agricultural practices. However, achieving this potential requires addressing infrastructural, financial, and awareness-related challenges. With strategic investments and partnerships, LIS can significantly contribute to achieving food security and environmental sustainability.

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