

Patterns of Information Seeking and User Needs of Agricultural Scientists: A Case Study Based on Major Research Institutes in Sri Lanka's Plantation Sector

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ABSTRACT

Agricultural information plays a vital role in supporting agricultural education, research, development, and extension activities. This study aimed to explore the patterns of information seeking and the specific needs of agricultural scientists. A self-administered questionnaire was distributed among scientists at three main agricultural research institutes within Sri Lanka's plantation sector. The findings revealed that journal articles were the most frequently utilized information resource, with 100% of respondents indicating their use. Other sources such as interactions with professional colleagues (30%) and conference abstracts or proceedings (27.5%) held moderate significance. The primary motivations for seeking information were professional interest (85.71%) and agricultural promotional activities (72.73%). A significant majority (91.89%) of scientists preferred electronic information resources over printed materials (8.11%).

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Regarding library usage habits, most participants (85.71%) visited the library once or twice a month, while fewer visited more frequently, 2.38% more than twice a week and 4.76% once or twice a week. However, several challenges were identified in accessing scientific information, including the unavailability of subscribed online databases (51.35%), lack of current awareness sessions (40.54%), and infrequent updates of library materials (40.54%). Based on these findings, it is recommended that research institutes enhance their digital library systems by securing subscriptions to international agricultural research databases and improving internet connectivity. Additionally, regular workshops should be organized to boost digital literacy among scientists, focusing on search techniques and data management skills.

Keywords: *Agriculture-Scientist, Awareness, Online-Databases, Research-institutes, Sri Lanka*

Introduction

Agriculture continues to be an integral part of Sri Lanka's economy, contributing to national food security, employment generation, and rural development. Although its contribution to the Gross Domestic Product (GDP) has declined over time, the sector still provides livelihoods for nearly one-fourth of the country's population and remains an important source of foreign exchange through the export of tea, rubber, and coconut (Food and Agriculture Organization, 2022; Central Bank of Sri Lanka, 2023). Sri Lankan agriculture comprises two main sectors such as plantation and non-plantation sectors. Plantation agriculture which is mainly based on tea, rubber, and coconut cultivation is regarded as the backbone of the Sri Lankan economy as it generates 12.88% of export earnings and occupies nearly 10 per cent of employed persons of the country (Henegedara et al., 2024).

Mainly the agricultural research institutes and universities are the prime source of creation of agricultural knowledge and information in the country. The creation of information and knowledge management by these institutes begins with the identification of information and knowledge needs or gaps, and the capturing, storage, and sharing/dissemination of the knowledge to the users (UNDP, 2012).

Research and innovation are widely acknowledged as pivotal forces in the transformation of food and agriculture systems toward greater sustainability and productivity (Von Braun et al., 2023). Many institutions are involved in agricultural research, extension, and training activities in Sri Lanka. Apart from the universities, there are three main research institutes Tea research institute, Rubber research institute, and Coconut research institute. These institutions deal with research on these plantation crops in Sri Lanka (Weerarathne & Weerasinghe, 2009).

These institutes are mandatory to carry out relevant research on their production, processing, and marketing aspects. Agricultural research officers in these research institutions in Sri Lanka play a pivotal role in enhancing agricultural productivity and sustainability.

Different types of information are required by different kinds of users for different purposes. Scientists are likely to perform different work roles such as researcher, manager, administrator, educator, planner, supervisor, etc., simultaneously or at different stages of their careers.

In this context, understanding the information needs and seeking patterns of agriculture scientists working in Agriculture research institutes is crucial to ensure that they have access to the knowledge and resources required to drive progress in the field.

Agricultural scientists' main purpose in seeking information was to learn the latest developments in their fields and to support their current research work. Therefore, knowledge about the information seeking behavior and information use of individuals is crucial for effectively meeting their information needs. Agriculture scientists are professionals who are different in the sense that they are always conscious, and they are users of information as communicators to the agrarian society. Their information needs are vast and diversified as the work progresses and the time passes. For the satisfaction of their needs, they interact with many types of information systems and personal sources. This process is called information-seeking behavior (Majid et al., 1999).

Information needs and seeking activities are different from one profession to another. Thus, adequate knowledge of the information needs and seeking behavior of agricultural researchers was imperative for research institutes to support their research activity. Such an understanding would help agricultural research institutes to develop information systems and services that are more likely to satisfy users' information needs. Researchers and extension workers operate as facilitators and communicators helping farmers in their decision-making processes, ensuring that appropriate knowledge is applied in order to obtain the best results in terms of sustainable production and general rural development. The private sector (support and input services, traders) also helps harnessing knowledge and information from various sources for better farming and improved livelihoods (FAO, 2005).

In this regard, agriculture scientists from the three main research institutes in the plantation sector were selected to examine their information needs and seeking patterns for this study. This will help identify their needs and barriers when fulfilling their scientific information when they engage with research

work in these institutions. Finally, it would be productive, contributing to the development of the agriculture sector in Sri Lanka.

Problem Statement

In Sri Lanka, the Agriculture sector comprises two main sectors including plantation and non-plantation sector. The plantation sector is a significant contributor to the economy, requiring ongoing research and development to maintain productivity and sustainability. Agricultural research institutes are responsible for generating new knowledge and technologies to improve the productivity and sustainability of the agriculture sector. The role played by Agricultural scientists in these research institutes are pivotal in advancing sustainable practices and devising innovative solutions to overcome challenges in Sri Lanka's plantation sector. However, the information needs and seeking behaviors of agriculture scientists in this sector remain poorly understood. Further, Sidibé et al. (2021) revealed that limited access to agricultural information remains one of the serious barriers to sustainable agricultural development in developing countries. Despite the increasing availability of printed and digital information resources, gaps persist in accessing, utilizing, and sharing relevant information. These gaps can hinder effective decision-making, innovation, and dissemination of research findings critical to the sector's development. Furthermore, the lack of library services, awareness of relevant information sources and accessing methods of the scientist may affect the efficiency of information dissemination to the end users.

Therefore, this research seeks to explore the specific information needs and seeking patterns of agriculture scientists in major research institutes in Sri Lanka's plantation sector. Identifying these patterns will provide insights

into improving information systems and services, thereby enhancing the productivity and impact of research in this vital sector.

Objectives of the Study

- To assess the level of awareness on available information resources among agriculture scientists
- To assess the level of usage of information resources by the agriculture scientists
- To examine the methods and sources used by the agriculture scientists to acquire required information
- To explore the practical issues encountered by agriculture scientists when seeking information
- To recommend possible ways of improving the information seeking patterns among agriculture scientists

Literature Review

Information Needs of Agricultural Scientists

Agricultural scientists require diverse information to fulfill their multiple professional roles including research, education, management, and extension activities. Leckie, Pettigrew, and Sylvain (1996) argued that work roles prompt particular information needs, which then drive information-seeking processes. These information needs are not static but evolve as work progresses and professional requirements change (Majid et al., 1999). Zaman (2002) noted that agricultural information is an essential input to agricultural education, research and development, and extension activities. According to Gudeta et al. (2021), agricultural researchers primarily seek information on specialized topics such as climate change strategies, soil fertility, farming system characterization, horticulture, plant breeding, and

soil and water management. The Food and Agriculture Organization [FAO] (2005) mentioned that researchers operate as facilitators and communicators, requiring information that helps them support farmers in decision-making and sustainable production practices. In a section of a FAO manual focused on extension management, FAO underscores the need to enhance the linkages among research, extension, and farmers highlighting the informational and facilitative roles these actors play in support of agricultural outcomes.

Devadason and Lingam (1997) argued that understanding the information needs of various professional groups is essential for planning and implementing effective information systems in specific work settings. This understanding becomes particularly crucial in developing countries where resources are limited and must be optimally allocated.

Information Sources and Preferences

Gudeta et al. (2021) found that agricultural researchers in Ethiopia preferred electronic sources over print materials. Similarly, Donkor Acheampong and Dzandu (2015) highlighted that crop research scientists in Ghana favored electronic journal articles over print versions. However, preferences vary by region and available infrastructure. Singh and Satiga (2007) revealed that agricultural scientists in their study expressed significant dependence on their institutional library or information center. Similarly, Mostafizur Rahman and Binwal (2000) found that scientists and technologists do not depend solely on institutional libraries but use other libraries as well, suggesting that a single information center should serve as an access point to worldwide resources. According to Tinashe Mugwisi, Ocholla, and Mostert (2014) researchers rely on various information sources including libraries, the Internet, colleagues, workshops, and personal collections. The

interpersonal exchange of information appears particularly important, as Abune Gudeta (2021) noted that consulting with experts in the subject field and discussions with development agents and farmers were major ways agricultural researchers sought information. Zahed Bigdeli (2001) has found that engineers' information-seeking behavior was primarily motivated by the desire to develop knowledge and expertise, to use new job-related technologies, and to stay current in their specialty motivations likely shared by agricultural scientists.

Barriers to Information Access and Utilization

Inadequate information resources and infrastructure represent significant barriers across multiple studies. Mudannayake (1989), in a study specific to the Sri Lankan context, identified that the major problem faced by agricultural scientists was the inadequacy of information sources in the country, including incomplete periodical sets, outdated collections, and lack of adequate bibliographic tools. Rasouli Azad (2001) reported that more than fifty percent of Iranian agricultural specialists did not have access to computers, special databases, and computer networks in the libraries they referred to. Similarly, Abune Gudeta (2021) identified major problems including slow Internet connectivity, erratic electricity disruptions, and the absence of information and communication technology professionals. It also highlighted the lack of training on information literacy and limited use of available information sources among researchers. Renee Dutta (2009) emphasized that an individual's educational background significantly influences their ability to seek and utilize information, suggesting that both economic and educational factors must be addressed to improve information access.

Zahed Bigdeli (2001) found that distance appears to impact information use and information-seeking behavior, arguing that librarians must consider Zipf's "principle of least effort" when serving clients suggesting that ease of access significantly influences information source selection. Economic conditions profoundly affect the availability and accessibility of resources, particularly in developing countries (Dutta, 2009). These contextual factors shape both institutional capabilities and individual information-seeking behaviors.

According to Sam et al. (2017), study on information needs of agricultural policy makers and managers in Ghana evaluated the adequacy of library collections available to them. The study found that lending, periodicals, and reference collections were only "fairly adequate" in terms of quality, quantity, and availability highlighting the resource constraints common in developing countries.

Research Gap

Despite extensive research on information needs and seeking behaviors, several gaps remain, particularly in the Sri Lankan context. While Mudannayake's (1989) study provided valuable insights, significant technological and institutional changes have occurred in the decades since. The unique characteristics of Sri Lanka's plantation sector research institutes warrant contemporary investigation to understand current information needs, barriers, and opportunities. Additionally, most studies focus on general agricultural researchers rather than specifically examining scientists working in plantation crops like tea, rubber, and coconut who have distinct research requirements and information ecosystems. This gap justifies the current study's focus on major research institutes in Sri Lanka's plantation sector.

Methodology

Study Design

The research adopted a mixed-method research design, incorporating both quantitative and qualitative data collection methods. This data triangulation techniques were used with the aim of improving the overall quality and validity of the research findings. Accordingly, the study consisted of two major components as mentioned below.

Component I – Quantitative study

Component II – Qualitative study

Study Population

Tea Research Institute, Rubber Research Institute, and the Coconut Research Institute are the main state sector research institutes in Sri Lanka, which are responsible for carrying out research related to tea, rubber and coconut. Directors in research divisions, senior research officers and the research officers employed in these three research institutes were considered as Agriculture scientists and selected as the study population.

Study Sample and the Sampling technique

According to the data published in the official websites of these research institutes, approximately 50 individuals are employed as senior research officers and the research officers. Therefore these 50 individuals were purposively selected as the study sample for the quantitative component of the study. Three directors in research divisions of selected three research institutes will be purposively selected for the qualitative component of the study.

Data Collection Methods and Tools

A self-administered semi structured questionnaire was developed to use as the data collection tool to gather quantitative information. Developed questionnaire was administered to the study sample after pretesting. Data collection process was facilitated through a combination of questionnaire and interview methods.

A key informant interview guide was prepared and pre-tested to use as the data collection tool to gather qualitative information.

Results

Socio Demographic Characteristics of the Study Sample

Basic Socio Demographic Characteristics of the Study Sample

The data presented in the Table 01 shows the basic socio demographic characteristics of the study sample. Majority of study sample represent the females with 67.5%. Most of the study participants are in the age between 31–40 years (40%) and a least proportion is below 30 years (12.5%). In terms of their educational background, 75% of participants hold either a Master's degree (30%) or a PhD (45%).

Table 01

Basic Socio Demographic Characteristics of the Study Sample

Basic Socio Demographic Characteristics	Percentage (%)
Gender	
Male	32.5%
Female	67.5%
Age Range	
Below 30 years	12.5%
31–40 years	40%
41–50 years	17.5%
51–60 years	30%
Educational Background	
Bachelor's Degree	25%
Master's Degree	30%
PhD	45%

Institutional affiliation of the participants

Table 02 shows that the majority of study participants are employed in the Coconut Research Institute (42.5%). Other 35% and 22.5% are employed in the Rubber Research Institute and Tea Research Institute respectively.

Table 02

Working Institute of the Participants

Institutional affiliation	Percentage (%)
Tea Research Institute	22.5%
Rubber Research Institute	35%
Coconut Research Institute	42.5%

Current job position of the study participants

Data indicated that majority of the study sample are employed as research officers in the selected three research institutes (70%) following 20% are employed as senior research officers and 10% as heads of their institutions.

Table 03

Current job position of the study participants

Current Job Position	Percentage (%)
Research Officer	70%
Senior Research Officer	20%
Head	10%

Years of Experience of Participants in Agriculture Research

Table 04 indicates the distribution of years of experience of study participants in Agriculture research field. A significant proportion of participants are early career researchers who have up to 5 years of experience in research (22.5%). Another 25% of participants are mid-career researchers with 6 to 10 years of experience. A majority of study participants has more than 15 years of experience in research (52.5%).

Table 04

Years of Experience of Participants in Agriculture Research

Years of Experience in Agriculture Research	Percentage (%)
0 – 5 years	22.5%
6 - 10 years	25%
11-15 years	0 %
16 – 20 years	15%
Over 20 years	37.5%

Information Seeking Patterns of the Agriculture Sector Researchers

Types of Information Resources use for Research Work

Table 05 depicts the distribution of usage of various types of information resources among study participants for their research work. Most referred information resources by the participants include, journal articles (100%), Theses/Dissertations (95%), and conference abstracts and proceedings (90%). Further, researchers are interested in exploring books (77.5%),

interacting with professional colleagues (75%), engaging with professional meetings/talks/workshops (75%), referring research reports/patents/fact books (75%), and exploring online research databases (70%) when they are engaging with research work. Usage of Newsletters (65%), Bibliographies (60%), and Sources of current contents (50%) are comparatively low among study participants when comparing with other information sources.

Table 05

Types of Information Resources used for research work

Information Resources used for research work	Percentage (%)
Journal articles	100%
Interaction with professional colleagues	75%
Conference abstracts and proceedings	90%
Professional meetings/talks/workshops	75%
Sources of current contents	50%
Research reports/patents/fact books	75%
Books	77.5%
Newsletters	65%
Bibliographies	60%
Theses/Dissertations	95%
Online Research Databases	70%

Relative importance of different information sources

Table 06 depicts the data on how study participants rate the relative importance of common information resources for their research work. Majority of study participants have claimed that journal articles are the most important source of information (85%) followed by the online research databases (37.5%) which serves as another key source of information. Although journal articles and online research databases were claimed as mostly important types of information resources, a gap of 47.5% can be identified in-between them, emphasizing the high relative importance of journal articles. Some sources, such as interaction with professional colleagues (30%) and conference abstracts/proceedings (27.5%), hold

moderate significance. Apart from that the claimed relative importance of all other information sources remains comparatively low.

Table 06

Relative importance of different information sources

Information Resources use for research work	Percentage (%)
1 st - Journal articles	85%
2 nd - Online research databases	37.5%
3 rd - Interaction with professional colleagues	30%
4 th - Conference abstracts and proceedings	27.5%
5 th - Research reports/patents/fact books	22.5%
6 th - Newsletters	22.5%
7 th - Bibliographies	22.5%
8 th - Professional meetings/talks/workshops	17.5%
9 th - Books	15.0%
10 th - Sources of current contents	15.0%
11 th - Theses/dissertations	12.5%

Most preferred source of information

As per the data presented in Table 07, a majority of 91.89% of study participants prefer electronic information resources while only 8.11% preferably use printed information resources.

Table 07

Most preferred source of information

Preferred Source	Percentage (%)
Electronic	91.89%
Printed	8.11%

Primary purpose of the information seeking

Table 08 indicates the main purposes of the information seeking among agricultural scientists. A majority of agricultural scientists have claimed that they seek information mainly because of the professional interest (85.71%)

and for their agricultural promotional activities (72.73%). Apart from that, other reasons for seeking information include, to acquire general awareness on new knowledge (36.36%), to disseminate knowledge with relevant outreach communities (36.36%), and to write books and articles (24.24%).

Table 08

Primary purpose of the information seeking

Primary purpose	Percentage (%)
Professional interest	85.71%
General awareness on new knowledge	36.36%
Writing books/Articles	24.24%
To disseminate knowledge with relevant outreach communities	36.36%
Promotional activities	72.73%

Time spent weekly on seeking information for research

As depicted in the Table 09, majority of participants (65%) spend more than 6 hours per week on seeking information for their research and scholarly work. 22.5% of participants spend 4-6 hours, while 12.5% dedicate 1-3 hours weekly. Notably, all participants spend a minimum of one hour per week on seeking information.

Table 09

Time spent weekly on seeking information for research

Time Spent Weekly on Seeking Information for Research	Percentage (%)
Less than 1 hour	0 %
1-3 hours	12.5%
4-6 hours	22.5%
More than 6 hours	65%

Frequency of visiting the institutional library

Table 10 depicts the distribution of data on frequency of visiting the institutional library by study participants. As per the data, majority of study participants visit library once or twice a month (85.71%). A significantly low proportion of participants claimed regular visits to the library with frequencies such as more than twice a week (2.38%) and once or twice a week (4.76%). Notably another 7.14% have stated that they never visit their institutional library.

Table 10

Frequency of visiting the institutional library

Frequency	Percentage (%)
Once or twice a week	4.76%
More than twice a week	2.38%
Once or twice a month	85.71%
Never	7.14%

Perception about the institutional library

As per the data shows in the Table 11, majority of study participants (61.90%) perceive the library as effective, while another 11.90% consider it as very effective. However, 23.81% believe that the library is somewhat effective. A minimum percentage of participants (2.38%) view the library as ineffective. Overall, 73.80% of study participants perceived that their institutional library is effective or very effective, reflecting a positive perception towards the library.

Table 11

Perception about the institutional library

Perception	Percentage (%)
Library is very effective	11.90%
Library is effective	61.90%
Library is somewhat effective	23.81%
Library is ineffective	2.38%

Challenges faced during information seeking

Table 12 presents the data regarding the challenges faced by study participants when they seek scientific information from various sources. The most significant challenges include unavailability of subscribed online databases by the library (51.35%), Lack of current awareness sessions from the library (40.54%), and limited arrivals of new library materials (40.54%). Time constraints (39.47%), lack of training on information literacy (37.84%), and unavailability of a centralized information system (36.84%), lack of experience sharing among researchers (32.43%) and limited Internet availability (32.43%) also major concerns. Other notable challenges include lack of awareness of available information (21.62%), lack of skills in using ICT (18.92%), lack of technical support in searching library information (18.92%), and lack of essential textbooks in the library (16.22%), all pointing to gaps in user knowledge, technological proficiency, and resource availability. Lack of computer access (10.81%), lack of Internet searching skills (8.11%), and language barriers (5.26%) are less frequently cited issues but still affect some users.

Table 12

Challenges face during information seeking

Challenges Face When Seeking Information	Percentage (%)
Lack of Internet Searching Skills	8.11%
Lack of Essential Textbooks in the Library	16.22%
Lack of Awareness of Available Information	21.62%
Lack of Arrival of New Library Materials	40.54%
Lack of Current Awareness Sessions from the Library	40.54%
Unavailability of Subscribed Online Databases by the Library	51.35%
Lack of Experience Sharing Among Researchers	32.43%
Lack of Training on Information Literacy	37.84%
Low Internet Availability	32.43%
Lack of Computer Access	10.81%
Lack of Skill in Using ICT	18.92%
Lack of Technical Support in Searching Information from Library	18.92%
Unavailability of a Centralized Information System	36.84%
Time Constraints	39.47%
Language Barriers	5.26%

Suggestions to improve information seeking behavior of the agriculture scientists were obtained through the study participants qualitatively. Qualitative data were gathered using open ended questions in the self-administered questionnaire. All the collected qualitative data were pooled together, transcribed and analyzed using thematic analysis based on a manual coding system. As per the data analysis, the majority has raised main two solutions to improve information seeking behavior among agriculture scientists. First one is, conducting periodic awareness sessions on information resources including the digital information resources. Secondly,

providing institutional access to updated e-resources including e-research databases and establishing digital libraries in their institutions.

Additionally, participants have raised the need for improving the facilities of their libraries. These facilities include, establishing an uninterrupted Internet connection at the library and increasing the resource collections in the library. Furthermore, participants have highlighted the importance of improving budget allocations for the libraries in order to improve the libraries as a centralized unit for acquiring updated research related information.

In addition, participants have stated that providing enough training on online database searching techniques is also imperative to improve information seeking behavior of the Agriculture scientists.

Conclusion

Findings of the study depicts the patterns of information seeking and user needs among agricultural scientists in major research institutes within Sri Lanka's plantation sector. It reveals that agricultural scientists heavily rely on both formal and informal sources of information, including digital databases, research publications, and peer discussions being the most frequently used resources. However, challenges such as limited access to updated databases, inadequate digital literacy, and constraints in institutional support hinder the efficient acquisition of relevant information. Additionally, the study highlights a gap between available information services and the specific needs of scientists, emphasizing the necessity for tailored information dissemination strategies. The research also underscores the importance of user-friendly information retrieval systems that cater to the dynamic needs of

agricultural scientists. While technological advancements have improved access to scientific knowledge, persistent barriers indicate the need for structured interventions to enhance information accessibility and utilization. Overall, the study contributes to the broader discourse on agricultural information management, offering insights into how research institutes can optimize information services to support scientific productivity and innovation in the plantation sector.

Recommendations

Research institutes should enhance digital library systems by securing subscriptions to international agricultural research databases and improving Internet connectivity. Regular workshops should be conducted to improve digital literacy among agricultural scientists, focusing on search techniques and data management. Tailored information services, such as personalized alerts and AI-driven recommendations, should be established to meet researchers' needs. Encouraging interdisciplinary collaboration and international partnerships can enhance knowledge exchange. Institutions should prioritize access to information through dedicated funding, institutional repositories, and information specialists while maintaining a balance between digital and physical resources. Regular feedback mechanisms should be implemented to address scientists' information-related challenges. These measures will strengthen information dissemination and utilization, ultimately advancing agricultural research in Sri Lanka's plantation sector.

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