Nkosinathi M. Dlamini* and Patrick Ngulube

Agricultural Information Needs and Resources of Smallholder Sugarcane Farmers in Swaziland

https://doi.org/10.1515/libri-2022-0062
Received July 7, 2022; accepted February 4, 2024;
published online May 10, 2024

Abstract: The sugar industry is the dominant agricultural sector in Swaziland's economy, contributing significantly to the gross domestic product. Provision of relevant and timely information to smallholder sugarcane farmers is crucial for them to have a competitive footing with large-scale counterparts and reduce poverty. However, there is limited literature on the information needs and the kind of information communication resources that could make the dissemination of information to farmers efficient and effective. This study thus aims to investigate the information needs and resources of smallholder sugarcane farmers in Swaziland to inform the provision of information services in the sugar industry. It was underpinned by a positivist paradigm and used the survey research method complemented by methodological triangulation to collect quantitative and qualitative data. Data was collected using survey questionnaires and face-to-face interviews, with 168 responses and six interviews conducted. The findings revealed that 71 % of information needs of farmers were primarily in legislative compliance, sugarcane crop husbandry, markets and transport, and financial advice information, however, there were no statistically significant differences between the three mill groups in information needs. The smallholder sugarcane farmers also mostly obtained agricultural information through extension officers, farmer groups, and mobile phones, indicating that required information was mainly accessed through face-to-face interactions. The empirical findings of the study have implications for practice, policy, and theory with respect to guiding the implementation of agricultural information services by information providers in the context of rural farmers in developing countries.

Keywords: developing countries; information needs; information resources; smallholder farmers; sugarcane farmers; Swaziland

1 Introduction and Background Information

Information and knowledge have become the major drivers for sustainable agricultural development in both developing and developed countries (Chen and Lu 2020; Krishna and Naik 2020; Lwoga, Stilwell, and Ngulube 2011). Information is described as "the sum total of the content (facts, knowledge, feelings, opinions, symbols, and context) conveyed through the communication between individuals or groups through any physical or virtual medium" (Jaeger and Burnett 2010). Information can be classified into technical, commercial, socio-cultural, and legal information (Agbamu 2006); it is a tool for communication, trends assessment, and shaping decisions by producers (Kalusopa 2005). Additionally, Raufu, Masuku, and Tijani (2015) view information as the most important currency for productivity, competitiveness, increased wealth, and prosperity. Thus, there is no field of human endeavour where information is not a component (Ogungbeni, Ogungbo, and Adeleke 2013), highlighting how access to information on all aspects of agricultural production becomes paramount for an effective agricultural sector (May, Kurugia, and Ndokweni 2007).

Agricultural information constitutes published or unpublished knowledge on all aspects of agriculture (Bello and Obinne 2012). As with other economic sectors, effective agricultural productivity requires access to information for proper programming of farming activities; farmers require information to program their agricultural activities such as land preparation, planting, and management of their agricultural enterprises (Elly and Silayo 2013). However, the situation and the context in which the information is required take precedence in view of the change in the global market economy. For instance, small-scale farmers require instant information on the global marketing of their produce, without which they remain at the mercy of global market forces (Richardson 1997). The competitiveness and relevance of farmers in the global economy is dependent on their ability to harness information for design, production, and marketing (May, Kurugia, and Ndokweni 2007).

1.1 Problem Statement

Information is critical at every level of sugarcane production, particularly in the growing phases where smallholder

***Corresponding author: Nkosinathi M. Dlamini**, University of Eswatini, Kwaluseni, Eswatini, E-mail: ndlamini@uniswa.sz. https://orcid.org/0000-0002-9859-7209
Patrick Ngulube, University of South Africa, Pretoria, South Africa, E-mail: ngulup@unisa.ac.za. https://orcid.org/0000-0002-7676-3931

farmers are involved. The Swaziland[1] extension service initially provided agricultural information services to farmers, however, over the years, there has been a decline in the effectiveness of this service (Dlamini and Worth 2016). This resulted in the extension service losing enormous credibility with farmers (Food and Agriculture Organization 2011), yet access to adequate information is very important for increased agricultural productivity (Mgbada 2006). However, smallholder sugarcane farmers in Swaziland are inundated by a myriad of information deficiencies which results in the low adoption of new technologies, culminating in low yields (Dlamini and Dlamini 2012; Malaza and Myeni 2009; Samuel 2008; Sifundza and Ntuli 2001). To ensure efficient and effective information services, a better understanding of smallholder sugarcane farmers' information needs and the kind of communication resources they use to access agricultural information was required. Hence, the overarching purpose of this study was to examine the provision of agricultural information services to smallholder farmers in the sugar industry, as this has the potential to increase production and reduce poverty in line with the United Nations Sustainable Development Goals.

1.2 Overview of Swaziland's Agriculture

Swaziland is a small country landlocked by South Africa and Mozambique in the east with an area of 17,364 square kilometres. The country has a population of 1.1 million people with around 70 % of the population living in rural areas and relying on agriculture for their livelihoods. The Swaziland economy is characterized by high dependence on its membership to the South African Customs Union (SACU) and the Common Monetary Area (CMA), with the country's agricultural policies harmonized with that of the block (African Development Bank 2019). Swaziland's land tenure is dualistic in nature, comprising two major agricultural production systems, namely the Traditional Customary Tenure (TCT) and Title Deed Tenure (TDT), which respectively cover 46 % and 54 % of the country (Dlamini and Masuku 2011).

The World Bank and the Government of Swaziland (GOS) have been continuously engaged in reviewing means of improving the productivity of small-scale farmers and how best to integrate smallholder farmers to markets (World Bank 2011). The effort by the GOS to improve the productivity of smallholder farmers is illustrated in the Swaziland National Development Strategy (NDS) for the period 1997–2022 where agriculture was put as a key focus. One of the goals of the National Development Strategy (NDS) for agriculture is to enhance private sector involvement in the uplifting of Swazi Nation Land (SNL) farmers from subsistence to commercial farming, while maintaining economic efficiency in the production and promotion of sugarcane production by smallholder farmers (Government of Swaziland 1999).

1.3 Sugarcane Farming in Swaziland

The sugar industry is an important player in terms of its contribution to the economy of Swaziland, growing sugarcane in an area spanning approximately 59,000 ha of land (Eswatini Sugar Association (ESA) 2021). The country is amongst the largest sugarcane producers and was ranked twenty-seventh globally in 2007. Sugar dominates the country's agricultural production by value and is a crucial export to the European Union (EU) under special preferences (Sandrey and Vink 2009). In 2014–15, the Swaziland sugar industry was ranked fourth largest in Africa, although the country is relatively small (Terry and Ogg 2017, 585). The sugar industry consists of three mills, namely Mhlume, Simunye and Big Bend Mill, all located in the eastern lowveld of the country. The Sugar Act of 1967, together with the Sugar Industry Agreement and the constitution of the Swaziland Sugar Association (SSA), regulates all aspects of the industry, from the right to grow sugarcane to how sugar is marketed. The Swaziland Sugar Association is an umbrella body that comprises the sugarcane growers and millers (United Nations Conference on Trade and Development 2000).

The Swaziland sugar industry, which had largely been dominated by large-scale estates since its inception in 1957, has seen a rapid increase in the involvement of smallholder farmers, with efforts made to extend participation to small-scale growers, with the aim of reducing poverty in rural areas (Terry 1997). Presently, there is a substantial number of smallholder sugarcane farmers along the Komati and Great Usutu River in the Lowveld as well as some parts of the Middleveld, distinguishable by cane stands. These farmers operate as individuals and some in groups under the communal land arrangement administered by the chief, funded at varied levels by the European Union (EU) and state financial institutions (Samuel 2008).

1.4 Research Objectives

The objectives of the study were to:

- Determine the information needs of smallholder sugarcane farmers in Swaziland.

1 The name of the country, "Swaziland" was changed in 2018 to "Kingdom of Eswatini".

- Determine information needs differences between the milling groups of smallholder sugarcane farmers.
- Determine the preferred communication resources/ channels of agricultural information for the smallholder sugarcane farmers.

In addressing the above objectives, the following research questions were asked:

- What are the types of information needs required by smallholder sugarcane farmers?
- What are the information needs differences between the milling groups of smallholder sugarcane farmers?
- What are the preferred communication resources/ channels of agricultural information for the smallholder sugarcane farmers?

2 Literature Review

2.1 Theoretical Framework

User studies interrogating information needs abound in literature, culminating into models of information behaviour (Ellis 1989; Kuhlthau 1991; Wilson 1981, 1997). According to Dervin (1998) information needs is a "gap" that which hinders movement, whether physically or cognitively. Later, Case (2012, 5) acknowledged the cognitive aspects in his overlapping definition of information needs, or simply put, as the "recognition that your knowledge is inadequate." In other words, an information need could just mean a lack of requisite information or knowledge to resolve a certain issue. Elsewhere, Wilson (1981) argued that information needs is interwoven in the concept of information behaviour and, therefore, the study adopted Wilson's 1996 model of general information behaviour (Figure 1) to investigate the information needs and resources of smallholder sugarcane farmers in Swaziland. The model is broad, comprehensive, and constitutes many important elements of information behavior concerned with how people seek and make use of information as well as the channels they use to get information (Wilson 1997). It qualifies to study different kinds of information users because it is interdisciplinary and general (Robson and Robinson 2013; Wilson 1999). The model pictures the cycle of information activities from the inception of an information need to the final phase where information is processed and used (Niedzwiedzka 2003). In the model, the person-in-context, in this case the smallholder sugarcane farmers, constitutes the focus of the information need. The model includes intervening variables, namely demographic variables, role related or interpersonal factors, environmental factors, and source characteristics that influence motivation to seek information. Wilson further integrated theories that explain why people pursue a goal more successfully than others, and the model further depicts information sources as communication channels in which information is sought or received through formal and informal sources/services. In the event information is not received, the search process is repeated (Wilson 1997). Equally, Kuhlthau (1991) averred that knowledge retained in the process of satisfying the information needs by the information seeker may invoke renewed information needs. Information needs are unstable and change over time (Bothma and Bergenholtz 2013); in the same vein, information needs identified a long time ago may not be applicable in the present period and may invariably become the present period's gap (Dervin 1998). In the sugar

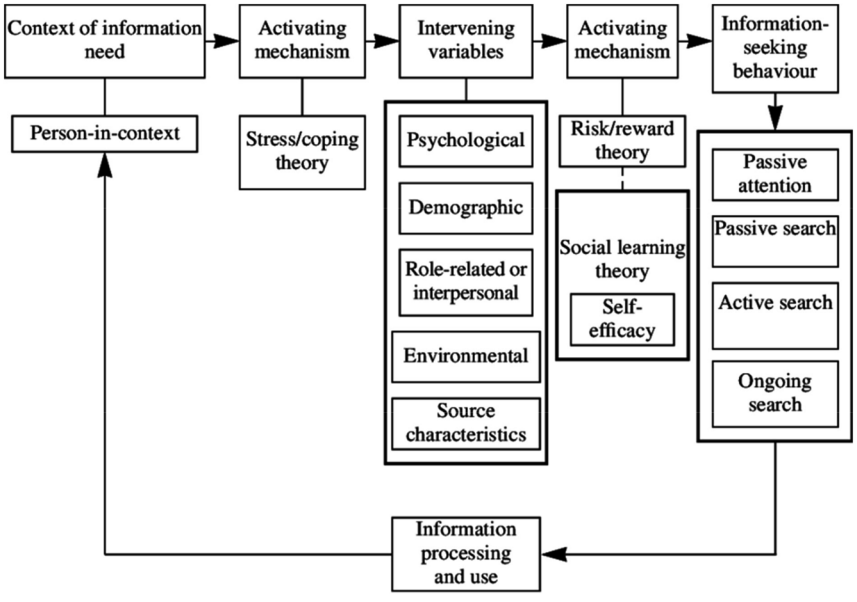

Figure 1: Wilson's 1996 model of information behaviour (Wilson 1999).

industry in Swaziland there have been changes in policies resulting in the involvement of subsistence farmers in the commercial growing of sugarcane. One can expect that changes in the farmers' environment relatively influence their information needs which are thus construed to be unstable and changing over time.

2.2 Information Needs

Information needs studies are long-standing in the information science field, even though the concept is misunderstood (Cole 2011), with the confusion regarding the definition of information needs emerging from the confusing concepts of "information" and "need" (Wilson 1981). Sometimes information can mean a thing, a piece of knowledge, or a process at once (Byström and Järvelin 1995). The onus is on the researcher to contextualize the meaning of "information" in relation to his or her study (Bawden 2006, 673).

Shedding some light on the concept of information needs, Belkin, Oddy, and Brooks (1982) viewed it as an anomaly in the user's state of knowledge, dubbed as "Anomalous State of Knowledge" (ASK). This approach suggests that the user is in a dilemma regarding the specificity of the need, and how to resolve the anomaly, with the authors placing more emphasis on the role of the users' state of knowledge and their desires to recognize the problematic aspects, as well as to articulate specific information needs without the involvement of third parties, such as scholars' points of view. Unfortunately, in most cases, users cannot precisely specify the kind of information required to resolve their information needs (Belkin, Oddy, and Brooks 1982, 61). Therefore, the role of scholars becomes indispensable in the process, which perhaps suggests the reason why Wilson (1981) and Chowdhury and Chowdhury (1999) argue that examining information needs can be a challenge, since this involves cognitive phenomena typically performed beyond the consciousness of the individuals, which makes it difficult to observe let alone define their information needs. The difficulty in defining information needs could negatively impact on the output of those responsible for developing information services that would be helpful in meeting users' needs.

Krikelas (1983, 6) defined information needs as the recognition of the existence of an uncertainty in the personal or work-related life of an individual (person or an organization) that can be solved using information. In the same vein, Wilson (1981, 2000), Godbold (2006), and Järvelin and Wilson (2003) describe information needs as a gap that requires bridging using information.

The literature reveals that information needs of individuals are triggered by an interaction between personal and environmental factors (Du Preez 2015; Robson and Robinson 2013). The above assertions corroborate Wilson's 1996 model of general information behaviour which focuses on the information user depicting the events that take place before an information need arises until the time it is processed and used (Wilson 1999). Some of the antecedents in the case of the Swaziland sugarcane farmers that give rise to their information needs are environmental (context) related – events such as policy changes by the government that resulted in the transition of small farmers from maize growers to sugarcane growers of which they might have very little understanding, as well as the failure of the agriculture extension services in providing adequate information services to rural communities.

2.3 Importance of Studying Information Needs of Farmers

Regularly studying the information needs of farmers is vitally important because farmers' information needs change in response to changes in the agriculture industry and policy. As a result, farmers need to address issues related to strategic positioning, capacity building, performance monitoring, evaluating new technology, managing information, and accountability (Klair, Boggia, and Richardson 1998). Therefore, it is important for scholars and system developers to understand how people interact with information in their environments or in a sociological group (Choo and Auster 1993; Hepworth 2007). According to Babu et al. (2012), information needs of farmers are not static, an assertion echoed by Bothma and Bergenholtz (2013) who also stated that information needs change over time, implying that information needs are unstable in nature and may change from time to time in relation to a particular context, which can be personal, role-related, or environmental. For instance, the involvement of smallholder sugarcane farmers in the sugarcane growing sector in Swaziland exposed farmers to a new competitive agribusiness terrain which requires a high level of decision-making (Terry 1997), illustrating why studying their information needs cannot be overemphasized.

2.4 Information Resources Used by Farmers

Farmers use a variety of resources to obtain information. These include browsing the internet (e-learning, social media), excursions (field days), colleagues (other farmers), exhibitions (fairs), workshops, agricultural courses or

trainings, seminars or conferences, and consulting farmers' journals (Zondag et al. 2015). According to Chen and Lu (2020), information access channels for farmers can be categorized into traditional media channels, modern media channels, interpersonal communication, and organizational communication. In their study of farmers from rural Tanzania, Msoffe and Ngulube (2016) reported that farmers mostly preferred sourcing of information from family, friends, neighbours, extension officers, researchers, and the radio. Similarly, Al Musawi (2013) cited that farmers have a propensity to use sources of information they are familiar with or rely on sources used by their neighbours. Similarly, in Pakistan, most small-scale sugarcane farmers obtain information about sugarcane production technologies from fellow farmers and progressive farmers (Abbas et al. 2003). Elsewhere, Sifundza and Ntuli (2001) detailed how smallholder sugarcane farmers in Swaziland obtained the latest sugarcane production information from newsletters and bulletins published by the Swaziland Sugar Association (SSA), millers, SSA extension officers, smallholder administrators, and the Ministry of Agriculture. The literature above reveal that farmers have a variety of information resources/channels that farmers use to obtain information, hence it is important for information service providers to determine the most effective ones to ensure effective delivery of information packages.

3 Methodology

The study was underpinned by a positivist paradigm and used the survey method complemented by methodological triangulation to collect quantitative and qualitative data. Data was collected using survey questionnaires and interviews between July and October 2018. Data triangulation entailed the comparison of quantitative data from questionnaires administered to smallholder sugarcane farmers and qualitative data obtained from semi-structured interviews, which were administered to agricultural support organizations to compare different views and perceptions regarding the information needs of farmers.

This study adopted a list-based sampling frame (N = 437). The list was made up of all smallholder sugarcane farmers in Swaziland who were registered with the Swaziland Sugar Association (N = 437) (Swaziland Sugar Association 2016), which was considered complete because sugarcane farmers are bound by legislation to apply for a sucrose quota (licence) with the association before sugarcane is grown to ensure the control of pests and diseases (United Nations Conference on Trade and Development 2000). For the purposes of this study, a sample of 209 was found to be an adequate size to represent the population of smallholder sugarcane farmers using the following formula by Israel (1992, 3): $n = N/1 + N(e)^2$, where was the sample size, "N," was the total number of smallholder sugarcane farmers and "e" was the maximum allowed error. The sample size was based on the population size, a 5 % level of precision, and a 95 % confidence level (Ary et al. 2006; Ngoepe 2012; Ngulube 2005). A type of information needs scale with 11 items used included financial advice, market information, weather information, agronomic information, sources of agricultural inputs, disease and pest control, transport, training information, policy/farmer development information, regulations/standards, and any other information. Data was collected using a four-point Likert scale (1 – not at all required to 4 – highly required) to determine the levels at which a particular type of information was required. Since the population under investigation was large, and classified geographically into mill groups, this study employed a stratified random sampling method. The mill groups where farmers send their cane for processing include Mhlume, Simunye, and Big Bend.

The sampling process entailed capturing the names of farmers from each mill group on a spreadsheet, sorting them in alphabetical order, and thereafter numbering them. A random sample was then taken from each mill group in direct proportion to the number of smallholder farmers in the population; the website www.random.org was used to generate random numbers for isolating individual participants to be included in the sample by matching the numbered spreadsheet (Baker 1999; Christensen, Johnson, and Turner 2001), after which the sample subsets from each mill group were combined to create a stratified random sample. The number of questionnaires distributed to Mhlume, Simunye, and Big Bend mills were 110, 16, and 83 respectively, and a total of 168 usable survey responses were returned which represented 80.38 % of smallholder sugarcane farmers. The study also included agricultural support organizations (N = 6) who were involved in the development of smallholder sugarcane farmers, which included financial institutions, commercial banks, and government agencies. Agricultural experts within these organizations were interviewed; these individuals had worked as extension officers or credit officers and are responsible for evaluating the farmer operations or advising the farmers before any assistance is offered. The involvement of the support agricultural organizations in the study is in line with the suggestion by Munyua and Stilwell (2010) that in research cases that involve development matters, the researcher ought not only to rely on information from the subjects of the inquiry, but also involve stakeholders.

4 Findings and Discussion

4.1 Respondents' Characteristics

Findings revealed that most of the smallholder sugarcane farmers surveyed were males (63 %), with 37 % being females. The disparities between male and female respondents confirm the male dominance in the smallholder cane growing sector as reported by Dlamini and Worth (2018) and Ndlovu, Dlamini, and Nkambule (2014), despite international organizations such as the Food and Agriculture Organization (2012) and the World Bank (2007) encouraging women's involvement in rural development schemes. The majority of the respondents were aged between 20 and 60 years (85 %) and most had formal education (97.6 %), with 48 % having post high school qualifications. A majority of the farmers (66, 39 %) surveyed were between the ages of 41 and 50 years of age, followed by those between 31 and 40 years (24 %) and 51 and 60 years (21 %), with the least represented being farmers between 20 and 30 years and those above 60 years (15 %). The findings show that the farmers were predominantly within the average active working age, with more farmers between the ages of 20 and 50 years. The study further indicates that a majority (65.5 %) of farmers were supervisors, followed by 23.8 % of managers and 5.4 % executive committee members. Results also revealed that the mean average farm size for smallholder farmers was 47.7 ha, and that a third of the farms have above 50 ha of farmland, which suggests that, technically, they are medium scale farmers as per the SSA farmer classification scheme. The current study indicated that a large proportion of farmers (91 %) had more than five years farming experience, followed by those with two to five years (13, 8 %) and below two years (1 %). The study further revealed that a majority of farmers (67 %) have more than ten full-time employees.

4.2 Information Needed by the Farmers: Factor Analysis

Exploratory factor analysis (herein referred to as factor analysis) was used to determine the type of information needs required by smallholder farmers. As a prerequisite to factor analysis, the dataset was assessed to ensure that it met the preliminary assumptions for further factor analysis. Several considerations were taken into account to ensure the factorability of the dataset.

The first consideration was validation of the sample (sample size). To assess the adequacy of the sample size of the dataset, the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity were used. The KMO test was used to verify whether the data collected qualified for factor analysis whereas the Bartlett's Test of Sphericity test was conducted to assess whether the dataset had patterned relationships (Field 2005, 652). As shown in Table 1, the KMO values are 0.736 above the recommended threshold of 0.6 and Bartlett's test of sphericity is significant ($p < 0.05$), and the acceptable sample sizes to yield acceptable factors were those with a KMO above the threshold of 0.6 (Kaiser 1974). The Bartlett's test should be significant ($p < 0.05$) for the data to be factorable (Field 2005, 652).

Table 1: KMO and Bartlett's test of sphericity.

Kaiser–Meyer–Olkin measure of sampling adequacy		**0.736**
Bartlett's test of sphericity	Approx. chi-square	776.610
	df	55
	Sig.	0.000

Another important test was to determine if there were no issues with the dataset by ensuring that there were patterned relationships between the variables in the correlation matrix. Items that lack patterned relationships have correlation coefficients that are less than r = 0.3 (Yong and Pearce 2013). Table 2 shows the correlation matrix for the 11 types of information needs with correlation matrix values of less than one, which implies that correlation values (0.901 … 0.301) are acceptable. In addition, there is "quite a number" (more than half) of correlation values that are greater than 0.3 in magnitude, indicating that factor analysis is appropriate (Hooper 2012). Furthermore, Table 3 depicts the anti-image correlation matrix to measure sampling adequacy for all 11 types of information needs/factors with values between 0.791 and 0.566 above the threshold of 0.5, suggesting that the dataset is suitable for factor analysis (Yong and Pearce 2013).

The third determinant of dataset eligibility for a good factor analysis is the adequacy of the sample size, that is, the number of valid and usable collected questionnaires or cases. Many researchers have given wide varying "rules of thumb" relating to the determination of a suitable sample size. Comrey and Lee (1992) classified adequate sample sizes for factor analysis as follows: 50 = very poor, 100 = poor, 200 = fair, 300 = good, 500 = very good, 1000 or more = excellent. However, some authors are not content with these guidelines (MacCallum et al. 1999; Worthington and Whittaker 2006); Worthington and Whittaker (2006) provided alternative guidelines for determining the minimum necessary sample size, N, in factor analysis, with one of the overarching guidelines recommending that "sample

Table 2: Correlation matrix.

Type of information	1	2	3	4	5	6	7	8	9	10	11
1. Financial advice	1.000										
2. Market information	0.375	1.000									
3. Weather information	0.340	0.223	1.000								
4. Agronomic information	0.426	0.119	0.518	1.000							
5. Sources of agricultural inputs	0.287	0.204	0.467	0.456	1.000						
6. Disease and pest control	0.309	0.228	0.422	0.354	0.604	1.000					
7. Transport	0.140	0.297	0.091	0.177	0.220	0.262	1.000				
8. Training information	0.286	0.331	0.286	0.332	0.336	0.306	0.184	1.000			
9. Policy/farmer development	0.311	0.301	0.339	0.196	0.495	0.253	0.046	0.621	1.000		
10. Regulations/standards	0.260	0.295	0.325	0.167	0.512	0.359	0.075	0.557	0.901	1.000	
11. Other	−0.304	−0.036	−0.275	−0.176	−0.113	−0.136	0.035	−0.122	−0.199	−0.186	1.000

Table 3: Anti-image matrices.

Type of information	1	2	3	4	5	6	7	8	9	10	11
1. Financial advice	0.757[a]										
2. Market information	−0.310	0.743[a]									
3. Weather information	0.013	−0.122	0.840[a]								
4. Agronomic information	−0.307	0.156	−0.353	0.715[a]							
5. Sources of agricultural inputs	0.065	0.030	−0.103	−0.283	0.798[a]						
6. Disease and pest control	−0.144	−0.015	−0.174	0.047	−0.455	0.705[a]					
7. Transport	0.012	−0.249	0.082	−0.071	−0.106	−0.110	0.723[a]				
8. Training information	0.055	−0.143	0.056	−0.264	0.173	−0.173	−0.106	0.816[a]			
9. Policy/farmer development	−0.166	−0.008	−0.094	0.085	−0.226	0.340	0.086	−0.361	0.648[a]		
10. Regulations/standards	0.108	−0.049	0.029	0.070	−0.031	−0.282	−0.005	0.046	−0.823	0.702[a]	
11. Other	0.235	−0.111	0.178	−0.003	−0.086	0.028	−0.042	−0.026	0.033	0.035	0.742[a]

[a]Measure of sampling adequacy (MSA).

Table 4: Communalities.

	Initial	Extraction
Financial advice	1.000	0.680
Market information	1.000	0.725
Weather information	1.000	0.615
Agronomic information	1.000	0.641
Sources of agricultural inputs	1.000	0.759
Disease and pest control	1.000	0.633
Transport	1.000	0.670
Training information	1.000	0.590
Policy/farmer development	1.000	0.918
Regulations/standards	1.000	0.891
Other information	1.000	0.662

sizes of 150–200 are likely to be adequate with datasets containing communalities higher than 0.50" (Worthington and Whittaker 2006, 817). This view is shared by Pallant (2010), who suggests that, ideally, the data should have at least 150 cases. In this study, the number of respondents or cases used were N = 168, with item commonalities ranging between 0.590 and 0.918 (Table 4), representing a good fit within the low-to-moderate range characterizing social sciences research (Costello and Osborne 2005, 7). Table 4 depicts the commonalities for the variables, with the results showing that after all the factors were extracted through the use of the Principal Component Analysis (PCA) method, all the values are larger than 0.5 which indicates approval of values (Worthington and Whittaker 2006).

Factor extraction was conducted using the principal component analysis (PCA), which Costello and Osborne (2005) argued is the most preferable factor extraction method in factor analysis. As a result, four factors were extracted, which explained about 71 % of the total variance (Table 5). In social science, a solution that represents above 60 % of the variance is considered appropriate (Maskey, Fei, and Nguyen 2018); the higher the value of the factor loading and the total accumulative variance of factor, the better the explanatory power of the data (Asafo-Adjei and Buabeng 2016). Table 5 shows the total variance explained

Table 5: Total variance explained.

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	4.128	37.525	37.525	4.128	37.525	37.525	2.562	23.288	23.288
2	1.408	12.801	50.326	1.408	12.801	50.326	2.353	21.386	44.675
3	1.215	11.043	61.369	1.215	11.043	61.369	1.445	13.136	57.810
4	1.034	9.397	70.766	1.034	9.397	70.766	1.425	12.956	70.766
5	0.751	6.830	77.596						
6	0.680	6.183	83.778						
7	0.569	5.170	88.948						
8	0.491	4.463	93.412						
9	0.380	3.452	96.864						
10	0.265	2.406	99.270						
11	0.080	0.730	100						

Note: Extraction method: principal component analysis.

Table 6: Rotated component matrix.

	Component			
	1	2	3	4
Policy/farmer development	0.934			
Regulations/standards	0.918			
Training information	0.683			
Sources of agricultural inputs		0.762		
Disease and pest control		0.743		
Agronomic information		0.720		
Weather information		0.667		
Market information			0.763	
Transport			0.746	
Other information				−0.788
Financial advice				0.658

Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization; a rotation converged in 7 iterations.

for the types of information needs factors, which shows that four components were extracted, which were above the recommended eigenvalue of 1 (Hooper 2012; Yong and Pearce 2013). The totals for the extracted components were 4.128, 1.408, 1.215 and 1.034 respectively, with variance percentages of 37.525, 12.801, 11.043 and 9.397, with the components having a cumulative percentage of 70.766 before and after rotation using the varimax method. Elsewhere, findings from the factor extraction (Table 6) reveal that the information needs of smallholder sugarcane farmers can be grouped into four factors, which are categorized and labelled as follows: legislative compliance, crop husbandry, markets and transport, and financial advice information. The cumulative variance explained by these four factors was 71 %.

The first factor, "legislative compliance," had higher loading, accounting for 23 % of the variance, indicating that farmers required information related to policy, government regulation, and training. Farmers have to comply with everchanging rules and regulations on environmental, financial, safety, and employment legislation. The factor suggests that farmers require training information on laws and regulations set out by the government regarding their agricultural operation; it is important that farmers understand all the relevant laws, regulations, and policies they must follow such as the storage and disposal of pesticides and pesticides containers. The consequences of not complying with industry's legislative requirements can be very costly in terms of penalties and fines. In South Africa, a study by Netnou-Nkoana et al. (2015) found that smallholder farmers were not aware of the existence of the legislation on plant breeders' rights and its implications. By the same token, Mbagwu, Benson, and Onuoha (2018) observed that in developing countries, there was a lack of a designated information providing agencies, whether from government or the private sector, which is a bottleneck to access to government-related information.

The second factor is labelled "crop husbandry" and accounted for 21 % of the 71 % variance, indicating that farmers are concerned about information on sources of agricultural inputs, diseases and pest control, agronomic information, and weather information. This factor loaded highly, almost at the same level of the first factor. It is widely acknowledged in the farming industry that access to and understanding of the agronomy (e.g. variety selection, fertilizer application) of crops is crucial in producing the highest possible yield of high-quality produce that can generate good profits. The findings are supported by data from interviewees from support agricultural organizations (Table 4) that indicate that farmers were more concerned about information related to crop husbandry such as the

agronomy, weather, pests, and disease. One informant mentioned that: "They also need to know how to plant their crops, what kind of planting material to use, where to source such material, how to manage crops in terms of diseases, how to prevent crop diseases and when to use specific chemicals" (Male, Agriculture Economist, in 40s).

These findings are also in line with those of Mtega, Ngoepe, and Luyanda Dube (2016), who found that rice farmers in rural Tanzania required agricultural knowledge on crop husbandry techniques, such as land preparation, seed selection, and planting. Similar findings were revealed in a study by Phiri, Chipeta, and Chawinga (2019), who investigated the information needs of rural smallholder farmers in Malawi and found that a majority of farmers needed crop husbandry information. Another study by Elly and Silayo (2013) assessed the agricultural information needs of rural farmers in Tanzania and discovered that close to one third of farmers' information needs bordered on crop husbandry, while that of Naveed and Anwar (2013) to identify agricultural information needs of Pakistani farmers found that the information needs of the farmers centered around crop husbandry. The results of these studies perhaps demonstrate the increasing need for dissemination of information that provides more efficient techniques of growing field crops such as sugarcane.

While the study suggests that a lack of access to agronomic information might be an issue on the one hand, the overarching issues seem to relate to the level of information required which could be linked to the education level of the farmer. However, the level of information required for a specific task depends on the information requirements of said task, which has implications for the design of an information provision strategy. Some key informants are of the view that farmers may not comprehend the information, especially from third parties, who are not experienced in dealing with farmers. One key informant said: "Some of them are basic farmers who are not highly educated to be able to understand some of the information they receive, especially from government and other stakeholders who are not necessarily trained to communicate with farmers" (Male, CEO, in 50s).

This assertion is shared by Ndlovu, Dlamini, and Nkambule (2014) and Dlamini and Worth (2016), who were quite concerned about the education level of some farmers which was rather low, which may negatively affect their understanding of technical sugarcane management practices. On the other hand, most technical sugarcane practices could be learned provided that the receiver's sense making and world views are considered in the transfer of information by applying the relevant information transfer mechanisms with which receivers can relate. According to Meyer (2009), people in rural communities are, to a larger extent, heterogeneous in terms of their information practices, with some information users semi-literate and others illiterate, with smallholder sugarcane farmers falling into the latter category. Meyer argued that indigenous people over the years have developed specific communication mechanisms such as storytelling, memorising, repetition, dancing, acting, observing, and demonstrations to collect, store, and share information. It can therefore be assumed that farmers with a low level of education have the potential to understand sugarcane management practices as long as their oral context is taken into consideration in the formulation of information provision strategies. Findings, on the characteristics of respondents, show that less than one fifth of the farmers had formal tertiary training, in spite of the fact that the agriculture sector is knowledge intensive and complex (Babu et al. 2012). The complexity perhaps comes from the fact that the farmers were initially growing subsistence crops on a small scale, yet now, under a new regime, are obliged to grow sugarcane on commercial basis, and to follow business principles that might be a challenge if they are not well versed on the proper management of the crop.

In the farming industry, farmers must make several decisions that include adoption of more productive technologies, management of these technologies, human resource management, as well as skillful manipulation of the limited resources to improve output (Van den Ban 1998). On the contrary, when information is transferred from sender to receiver, this only applies where both have the same background knowledge of a practice. Where the transfer process spans across cultural boundaries (implying traditional practices versus modern industrial practices), other strategies need to be harnessed to accommodate the receiver (smallholder sugarcane farmer) (Meyer 2009).

The third factor, which explains 13 % of the variance, is labelled "market and transport" with two variables loaded, namely marketing and transport information. Notwithstanding that the marketing of sugar to international markets is the prerogative of the Swaziland Sugarcane Association (Masuku 2003), farmers are still concerned about the uncertainty of the markets; this was concurred by Terry and Ogg (2017) who identified market volatility as a major threat to the profitability of the sugar industry in Swaziland. This factor also reveals that farmers are concerned about transportation of their produce to the (market) mills. Despite the government of Swaziland intensively investing in road infrastructure in the sugarcane belt at the time when there was increased introduction of smallholder sugarcane development projects in the Lowveld, unsubsidized transport cost, distance from the mill, and regulatory regimes on transport affect the profitability and

performance of the sugarcane farmers in the Swaziland sugarcane supply chain (Masuku 2011; Mhlanga-Ndlovu and Nhamo 2017). Therefore, access to an efficient transport system is essential for efficient haulage of sugarcane to the mills.

The fourth factor is labelled "financial advice," which has a positive loading (financial advice) and a negative loading for "other information," indicating that there was negative correlation between the variables and the component/fourth factor. Simply, there was no other information required by the farmers. Many studies suggest that access to finance is the major obstacle among smallholder farmers (Elly and Silayo 2013; Galadima 2014; Samuel 2008); farmers use financial resources to pay for the operational costs of growing sugarcane such as irrigation equipment, machinery and fertilisers, and harvesting. For instance, Mhlanga-Ndlovu and Nhamo (2017) reported that smallholder farmers spend 38 % of their finances on harvesting. The EU's financial support, combined with the Swaziland government's support towards irrigation infrastructure, makes it attractive for a financial institution to finance smallholder sugarcane farmers given their potential to repay loans (Malaza and Myeni 2009; Samuel 2008; Shongwe 2009; Terry and Ogg 2017). According to Shongwe (2009), smallholder sugarcane farmer received grants from the EU accounted for 70 % of the costs involved in the production of sugarcane by the respective farming companies. As a result, financial risk becomes minimal to private financial institutions interested in the financing of farmers because the larger burden is borne by the EU.

Unbundled, the survey shows that the information needs of the smallholder sugarcane farmers are: government policies on farmer development, regulations, training, sources of agricultural inputs, agronomy, disease and pest control, weather, the markets, transport, and finance information. The findings of the study showed that the information needs of farmers are not unique to that of other smallholder farmers in other developing countries, apart from the way they are categorized and the type of enterprise undertaken (Elly and Silayo 2013; Lwoga, Ngulube, and Stilwell 2010; Msoffe and Ngulube 2016; Tena et al. 2016).

The results presented in Table 6 are supported by responses to the interview schedule, where the officials from agricultural support organisations were asked to indicate the kind of requests they receive from smallholder sugarcane farmers. In the same vein, most agricultural support organizations indicated that most farmers required information related to the management of the sugarcane crop (crop husbandry). Table 7 below shows the results of the thematic analysis on the type of information needs of farmers from the perspective of agricultural support organisations.

It became evident from the data that all the officials who were interviewed confirmed that they receive various information requests from SSFs such as agronomy, weather, finance, pests and disease, markets, irrigation, and policy related information. Among these information requests, agronomic information (50 %) emerged as the most important information need category during content analysis. This was followed by finance (33.3 %), pests and disease (33.3 %), and irrigation (33.3 %), while the least important requests were weather (16.6 %) and policy information (16.6 %). It is clear from the results that a majority (four out of seven) of information need categories fall within the theme of crop husbandry; these include agronomy, weather, pests and disease, and irrigation information. Other themes included finance, markets, and policy information, however, these emerged as least important.

4.3 Information Needs Differences Between the Milling Groups

An analysis of variance (ANOVA) was computed to determine if there was a statistically significant difference in the information needs of farmers between the mill groups (Mhlume, Simunye and Big Bend) where smallholder sugarcane farmers belong. The mill groups were used as independent variables. As presented in Table 8, the results show the significance value ($F = 0.418$, $p = 0.659$) which is above 0.05. Therefore, there was no statistically significant

Table 7: Categories of information need request received by agricultural support organisations officials.

Participant	Agronomy	Weather	Finance	Pest & diseases	Market	Irrigation	Policy
SNLS	X	–	–	–	–	–	–
MOA	X	–	–	X	–	X	–
FINCORP	–	–	X	–	–	–	–
SCGA	–	–	–	–	X	–	X
SWADE	X	X	–	–	–	X	–
Swazi bank	–	–	X	X	–	–	–
N = 6	50 %	16.6 %	33.3 %	33.3 %	16.6 %	33.3 %	16.6 %

Table 8: ANOVA on the information needs of farmers between mill groups.

Mill group	N	M	SD	F	P
Mhlume	87	3.155	0.465	0.418	0.659
Simunye	14	3.078	0.714		
Big bend	67	3.200	0.447		

difference between the information needs of farmers between the three mill groups.

Scholars have asserted that the need for information is heavily influenced by an individual's association to a social or professional group (Choo and Auster 1993, 284; Du Preez 2015, 242) or a task or role in the work-based environment (context) (Leckie, Pettigrew, and Sylvain 1996). In the same vein, Lwoga, Ngulube, and Stilwell (2010, 97) aver that the information needs of rural farmers are location-specific, implying that individuals may experience different information gaps, defined along their social, professional or geographic affiliations. On that basis, one-way ANOVA was performed on the dataset to ascertain whether there were differences in information needs between the Mhlume, Simunye, and Big Bend Mill groups (Table 8). The findings of the study indicated that there was no statistically significant difference between the information needs of farmers between the mill groups, suggesting that the geographic context had no effect on the information needs of farmers. This means that the information needs of smallholder sugarcane farmers are the same across the mill groups, which could be explained by the fact that most of the farmers under the auspices of these mill groups are mainly located in the semi-arid Lowveld of Swaziland, where production challenges for sugarcane farmers are relatively similar.

Contrary to these findings, Lwoga, Ngulube, and Stilwell (2010), in a study conducted from 12 districts in Tanzania, assessed the information needs of small-scale farmers and discovered that the information needs of farmers were location specific to a certain extent. Similarly, Elly and Silayo (2013) found that there was a significant difference between two wards in farmers' information needs in Tanzania. The disparities between the results of the present study and that of Lwoga, Ngulube, and Stilwell (2010) and Elly and Silayo (2013) could be attributed to the fact that these studies were conducted in diverse agricultural contexts (crops and livestock enterprises) and the populations of their studies were largely based in diverse agro-ecological zones.

4.4 Information Resources/Channels Used by Farmers

The study analyzed resources of information used by smallholder sugarcane farmers to access agricultural information. In the questionnaire, farmers were asked to indicate the information resources they currently use to access agricultural information, with a list of possible resources provided, with the option to choose more than one. The findings (Table 9) show that smallholder sugarcane farmers prefer to obtain agricultural information through extension officers, farmer groups, mobile phones, input suppliers, personal knowledge, the internet, other farmers, newspapers, and the radio.

A substantial number of farmers expressed high preference for extension officers, indicating that farmers prefer traditional mechanism for accessing information. This is consistent with the work of Dlamini and Worth (2016) and

Table 9: Resources of agricultural information by mill group (N = 168).

Information resource/channel	Mhlume		Simunye		Big bend		Total		Rank
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	
Extension officers	84	50.0	14	8.3	63	37.5	161	95.8	1
Farmer group	77	45.8	14	8.3	54	32.1	145	86.3	2
Mobile phone	47	28.0	10	6.0	45	26.8	102	60.7	3
Input supplier	44	26.2	9	5.4	38	22.6	91	54.2	4
Personal knowledge	37	22.0	6	3.6	40	23.8	83	49.4	5
Internet/WWW	27	16.1	6	3.6	28	16.7	61	36.3	6
Other farmers	21	12.5	7	4.2	33	19.6	61	36.3	7
Newspaper	26	15.5	6	3.6	26	15.5	58	34.5	8
Radio	30	17.9	5	3.0	17	10.1	52	31.0	9
Television	23	13.7	3	1.8	18	10.7	44	26.2	10
Landline/telephone	1	0.6	0	0.0	2	1.2	3	1.8	11
Local library	2	1.2	0	0.0	0	0.0	2	1.2	12

Note: Multiple responses were possible.

Jibowo and Dube (2008), who reported that extension work still emerges as the main pathway for communicating agricultural information to rural farmers in Swaziland. Literature reveals that the sugar industry in Swaziland heavily relies on the use of extension officers to communicate information to smallholder farmers; SSA, SWADE, millers, and GOS provide extension services to farmers to equip them with skills necessary to be successful in the industry (Dlamini and Dlamini 2012; Malaza and Myeni 2009; Terry and Ogg 2017). Similar findings were observed in a study by Galadima (2014) which investigated the constraints on farmers' access to agricultural information in Nigeria and reported that 62 % of the farmers consulted extension officers for agricultural related information. The results of this study together with the findings of Galadima's study clearly showed that farmers prefer to get their information through extension officers. The findings suggest that information providers have to first determine the appropriate means of disseminating information to farmers to maximize the chances of having more farmers receiving information.

When agricultural support organizations were asked to state the mechanism they use to disseminate information, a majority of key informants (83 %) of the study indicated that they do so through face-to-face communication. One key informant claimed that it is very useful to meet the farmer in person so that they can explain the concepts and in turn give the farmer a chance to ask questions. An official from FINCORP stated that: "We interact with our farmers through meetings, one on one. Most of the sugarcane farmers have companies so we meet with their boards of directors to share any information updates on loans" (Male, Branch Manager, in 40s). In the same vein, an official from SWADE stated that: "When we want to update them on certain things which we feel they should know, we organise meetings with them. We go to them and we talk to them in those meetings face to face" (Male, Extension Officer, in 30s).

In Swaziland, extension officers, primarily from the large-scale sugarcane producers and including those from government, aid farmers by ensuring that they adhere to basic good management practices (Dlamini and Worth 2016). The results of the present study are corroborated in a study by Mtega, Ngoepe, and Dube (2016), which investigated the accessibility of agricultural knowledge among smallholder farmers in Tanzania and found that smallholder farmers primarily used agricultural extension officers to access agriculture related information. In agreement, Lwoga, Ngulube, and Stilwell (2010) reported that physical communication is important in sharing agricultural knowledge because farmers are able to internalize knowledge gained from tacit sources compared to explicit sources of knowledge such as ICTs. Thus, information intermediaries must consider the information behavior of farmers in terms of how they handle information as they prepare information products to help farmers improve their farming activities.

Moreover, the findings revealed that the second most preferred information resource is farmer groups, presenting an alternative to only relying on extension officers. The findings of this study suggest that farmers prefer to access information from familiar communication channels, with which they are able to establish relationships. One key informant from SWADE indicated that farmers are continually forming groups to collectively bargain when making purchases for farm inputs like fertilizer. Elsewhere, Dlamini and Worth (2016) averred that extension work plays an important role in the promotion of farmer group formation, while according to Meyer (2009) group action to exchange/share information is a typical information behaviour pattern within rural communities where people are hesitant to act alone, which stems from the oral tradition. Meyer further pointed out that group dynamics play an important role in the acceptance of information packages, and hence an innovation would be more easily adopted in a group setup than it would by an individual acting in isolation.

The study also found that the third most used information resource is mobile phones, which is consistent with the finding of the study that most participant farmers owned mobile phones. The findings provide evidence for the increasing influence of ICTs in rural communities and further support the assertion by the Food and Agriculture Organization (2012) and Dlamini and Worth (2018) that mobile phones have now penetrated even rural communities. The Food and Agriculture Organization (2012) reported that mobile technology is ubiquitous and holds great promise in rural development, and Dlamini and Worth (2018, 25) detail that more than 60 % of farmers in the sugar industry have mobile phones. Moreover, mobile phones can easily deliver undiluted information packages, and in a cost-effective manner (Anunobi and Anunobi 2018). The study further confirmed that while ICTs may be widely used, however, face-to-face interaction is still a predominant mode of communicating agricultural information to smallholder sugarcane farmers. In contrast, results also revealed that the library is the least used information communication channel in the sugar industry. The key informant from the Swaziland National Library Services (SNLS) disclosed that the library receives publications from the Swaziland Sugar Association such as annual reports and periodic agricultural research newsletters. In addition, the library has a collection of government gazettes and has access to a digital library in the field of agriculture called Access to Global Online Research in

Agriculture (AGORA). However, the minimal use of the library was caused by the lack of dedicated agricultural information resource sections in the Swaziland National Library Service (SNLS), which is compounded by the fact that the libraries are under-resourced. This was confirmed by the interviewed official from SNLS who said: "The budget for procuring agricultural information is not enough, so we can only buy resources once in a while" (Female, Branch Librarian, in 40s).

5 Conclusion, Implications, and Recommendations

The findings of the current study revealed that farmers need information about government policies on farmer development, regulations, training, sources of agricultural inputs, agronomy, disease and pest control, weather, markets, transport, and finance information. The results further revealed that there was no statistically significant difference between the information needs of farmers between the mill groups, indicating that the geographic context had no effect on the information needs of farmers. The findings suggest that SSFs have unmet information needs, which are homogenous across the mill groups, while face-to-face (extension officers and farmer groups) communication remains the most reliable means of accessing information by SSFs, followed by ICTs (mobile phone).

The study has implications for practice, policy, and theory. From the practical perspective, the study enhances awareness about the importance of conducting information needs assessments prior to providing information services products to customers. From a policy perspective, the study provides a framework for the formulation of relevant information delivery policies to guide the provision of agricultural information to SSFs in the sugar industry. Furthermore, the issues discussed in this paper will enhance research on the information behaviour patterns of farmers in rural areas accustomed to oral tradition.

Based on the findings of the study, the following recommendations are proffered:

- Considering the sheer homogeneity of the SSFs, it is recommended that information providers develop a single information provision package targeting all the farmers irrespective of geographical location, taking into consideration their information needs and preferred means of accessing information.
- Information providers should use multiple modes of communicating agricultural information to SSFs that include face-to-face communication and (ICTs) mobile phones to ensure that information is effectively disseminated to as many farmers as possible.
- As information needs change over time, there is a need to periodically assess the information needs of farmers, taking into consideration the level of development within their regions.

References

Abbas, M., S. Muhammad, I. Nabi, and M. Kashif. 2003. "Farmer's Information Sources, Their Awareness and Adoption of Recommended Sugarcane Production Technologies in the Central Punjab." *Pakistan Journal of Agricultural Sciences* 40 (3–4): 202–6. https://pakjas.com.pk/papers/521.pdf (accessed March 25, 2024).

African Development Bank. 2019. "Eswatini – Country Strategy Paper 2014–2018." https://www.afdb.org/en/documents/document/eswatini-country-strategy-paper-2014-2018-108787 (accessed March 25, 2024).

Agbamu, J. U. 2006. *Essentials of Agricultural Communication in Nigeria*. Lagos: Malthouse Press Limited.

Al Musawi, H. 2013. "Information Provision and Retrieval in the Farming Industry in Western Australia." Edith Cowan University. https://ro.ecu.edu.au/theses/866/ (accessed March 25, 2024).

Anunobi, C. P., and C. V. Anunobi. 2018. "Improving Rural Farmers' Access to Information through ICT Based Extension Information Services." Paper Presented at: IFLA WLIC 2018 – Kuala Lumpur, Malaysia – Transform Libraries, Transform Societies in Session 166 – Agricultural Libraries SIG. http://library.ifla.org/2197/1/166-anunobi-en.pdf (accessed March 25, 2024).

Ary, D., L. C. Jacobs, A. Razavieh, and C. Sorensen. 2006. *Introduction to Research in Education. Wadsworth, Cengage Learning*, 7th ed. London: Wadsworth.

Asafo-Adjei, E., and E. Buabeng. 2016. "An Evaluation of Challenges Facing Smallholders in Ghana: A Case Study for the Aowin Suaman District." *Journal of Biology, Agriculture and Health Care* 6 (3): 22–9. https://www.iiste.org/Journals/index.php/JBAH/article/view/28726/29489 (accessed March 24, 2024).

Babu, S. C., C. J. Glendenning, K. Asenso-Okyere, and S. K. Govindarajan. 2012. "Farmers' Information Needs and Search Behaviors: Case Study in Tamil Nadu, India." Washington. http://www.ifpri.org/sites/default/files/publications/ifpridp01165.pdf (accessed March 25, 2024).

Baker, T. L. 1999. *Doing Social Research*. Boston: McGraw-Hill.

Bawden, D. 2006. "Users, User Studies and Human Information Behaviour 'On User Studies and Information Needs." *Journal of Documentation* 62 (6): 671–9. https://doi.org/10.1108/00220410610714903.

Belkin, N. J., R. N. Oddy, and H. M. Brooks. 1982. "ASK for Information Retrieval: Part I. Background and Theory." *Journal of Documentation* 38 (2): 61–7. https://doi.org/10.1108/eb026722.

Bello, M., and C. P. O. Obinne. 2012. "Problems and Prospects of Agricultural Information Sources Utilization by Small Scale Farmers: A Case from Nasarawa State of Nigeria." *Journal of Communication* 3 (2): 91–8. https://doi.org/10.1080/0976691x.2012.11884799.

Bothma, T. J. D., and H. Bergenholtz. 2013. "Information Needs Changing over Time': A Critical Discussion." *South African Journal of Libraries and Information Science* 79 (1): 22–34. https://doi.org/10.7553/79-1-112.

Byström, K., and K. Järvelin. 1995. "Task Complexity Affects Information Seeking and Use." *Information Processing & Management* 31 (2): 191–213. https://doi.org/10.1016/0306-4573(95)80035-R.

Case, D. O. 2012. *Looking for Information*, 3rd ed. Bingley: Emerald.

Chen, Y., and Y. Lu. 2020. "Factors Influencing the Information Needs and Information Access Channels of Farmers: An Empirical Study in Guangdong, China." *Journal of Information Science* 46 (1): 3–22. https://doi.org/10.1177/0165551518819970.

Choo, C. W., and E. Auster. 1993. "Environmental Scanning: Acquisition and Use of Information by Managers." In *Annual Review of Information Science and Technology 28*, edited by M. E. William, 279–314. Medford: Learned Information, Inc.

Chowdhury, G. G., and S. Chowdhury. 1999. "Digital Library Research: Major Issues and Trends." *Journal of Documentation* 55 (4): 409–48. https://doi.org/10.1108/EUM0000000007154.

Christensen, L. B., R. B. Johnson, and R. A. Turner. 2001. *Research Methods, Design and Analysis*, 11th ed. Boston: Pearson.

Cole, C. 2011. "A Theory of Information Need for Information Retrieval that Connects Information to Knowledge." *Journal of the American Society for Information Science and Technology* 62 (7): 1216–31. https://doi.org/10.1002/asi.21541.

Comrey, A. L., and H. B. Lee. 1992. *A First Course in Factor Analysis*, 2nd ed. Hillsdale: Lawrence Erlbaum.

Costello, A. B., and J. W. Osborne. 2005. "Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most from Your Analysis." *Practical Assessment, Research and Evaluation* 10 (7): 1–9. https://doi.org/10.7275/jyj1-4868.

Dervin, B. 1998. "Sense-Making Theory and Practice: An Overview of User Interests in Knowledge Seeking and Use." *Journal of Knowledge Management* 2 (2): 36–46. https://doi.org/10.1108/13673279810249369.

Dlamini, M. M., and B. M. Dlamini. 2012. "Explanatory Variables Associated with the Yield Performance Gap Among Small-Medium-And Large-Scale Sugarcane (Saccharum Officinarum) Growers at Ubombo Sugar, Big Bend, Swaziland." *Asian Journal of Agricultural Sciences* 4 (1): 32–9. https://maxwellsci.com/print/ajas/v4-32-39.pdf (accessed March 25, 2024).

Dlamini, D. D., and M. B. Masuku. 2011. "Land Tenure and Land Productivity: A Case of Maize Production in Swaziland." *Asian Journal of Agricultural Sciences* 3 (4): 301–7. https://maxwellsci.com/print/ajas/v3-301-307.pdf (accessed March 25, 2024).

Dlamini, M. M., and S. H. Worth. 2016. "Agricultural Extension in the Facilitation of Improved Sugarcane Productivity Among Small Scale Growers in Swaziland: A Swot Analysis." *Asian Journal of Agricultural Extension, Economics & Sociology* 12 (3): 1–13. https://doi.org/10.9734/AJAEES/2016/27094.

Dlamini, M. M., and S. H. Worth. 2018. "Information Management Using ICTs to Access Sugarcane Production Information in Swaziland: Perceptions of Smallholder Sugarcane Farmers and Extension Officers." *International Journal of Social Sciences and Management Review* 1 (1): 15–29. https://ijssmr.org/uploads/ijssmr01_02.pdf (accessed March 25, 2024).

Du Preez, M. 2015. "The Role of Social Networks in Consulting Engineers' Collaborative Information Behaviour." University of South Africa. http://uir.unisa.ac.za/handle/10500/1941 (accessed March 25, 2024).

Ellis, D. 1989. "Behavioural Approach to Information Retrieval Design." *Journal of Documentation* 46: 318–38.

Elly, T., and E. E. Silayo. 2013. "Agricultural Information Needs and Sources of the Rural Farmers in Tanzania A Case of Iringa Rural District." *Library Review* 62 (8/9): 547–66. https://doi.org/10.1108/LR-01-2013-0009.

Eswatini Sugar Association (ESA). 2021. "Production." http://www.esa.co.sz/production/ (accessed March 25, 2024).

Field, A. 2005. *Discovering Statistics Using SPSS*, 2nd ed. London: Sage.

Food and Agriculture Organization. 2011. "Swaziland Agricultural Development Programme (SADP)." http://www.fao.org/3/a-bd203e.pdf (accessed March 25, 2024).

Food and Agriculture Organization. 2012. *Mobile Technologies for Food Security, Agriculture and Rural Development: The Role of the Public Sector*. Rome: FAO. http://www.fao.org/3/i3074e/i3074e.pdf (accessed March 25, 2024).

Galadima, M. 2014. "Constraints on Farmers Access to Agricultural Information Delivery: A Survey of Rural Farmers in Yobe State, Nigeria." *IOSR Journal of Agriculture and Veterinary Science* 7 (9): 18–22. http://www.iosrjournals.org/iosr-javs/papers/vol7-issue9/Version-2/C07921822.pdf (accessed March 25, 2024).

Godbold, N. 2006. "Beyond Information Seeking: Towards a General Model of Information Behaviour." *Information Research* 11 (4). http://www.informationr.net/ir/11-4/paper269.html (accessed March 25, 2024).

Government of Swaziland. 1999. *The National Development Strategy (NDS)*. Mbabane: Ministry of Economic Planning and Development.

Hepworth, M. 2007. "Knowledge of Information Behaviour and its Relevance to the Design of People-Centred Information Products and Services." *Journal of Documentation* 63 (1): 33–56. https://doi.org/10.1108/00220410710723876.

Hooper, D. 2012. "ARROW @ TU Dublin." In *Approaches to Quantitative Research – Theory and Its Practical Application: A Guide to Dissertation Students*, edited by H. Chen, 1–32. Cork: Oak Tree Press.

Israel, G. D. 1992. "Determining Sample Size Fact Sheet." Gainesville. https://edis.ifas.ufl.edu/publication/pd006 (accessed March 25, 2024).

Jaeger, P. T., and G. Burnett. 2010. *Information Worlds: Social Context, Technology, and Information Behavior in the Age of the Internet*, Vol. 9780203851. New York: Routledge.

Järvelin, K., and T. D. Wilson. 2003. "On Conceptual Models for Information Seeking and Retrieval Research." *Information Research* 9 (1). http://informationr.net/ir/9-1/paper163.html (accessed March 25, 2024).

Jibowo, A. A., and M. A. Dube. 2008. "Effectiveness of Agricultural Extension in Swaziland as Perceived by Agricultural Extension Staff." *UNISWA Research Journal of Agriculture, Science and Technology* 11 (1): 57–67. https://doi.org/10.4314/uniswa-rjast.v11i1.53554.

Kaiser, H. F. 1974. "An Index of Factorial Simplicity." *Psychometrika* 39 (1): 31–6. https://doi.org/10.1007/BF02291575.

Kalusopa, T. 2005. "The Challenges of Utilizing Information Communication Technologies (ICTs) for the Small-Scale Farmers in Zambia." *Library Hi Tech* 23 (3): 414–24. https://doi.org/10.1108/07378830510621810.

Klair, K. S., A. Boggia, and D. W. Richardson. 1998. "The Changing Information Needs of Farmers in the U.S. and Europe." In *Sixth Joint Conference on Food, Agriculture and the Environment, Minneapolis, 31 August – 2 September*. https://www.researchgate.net/publication/2800770_The_Changing_Information_Needs_of_Farmers_in_the_US_and_Europe (accessed March 25, 2024).

Krikelas, J. 1983. "Information-Seeking Behavior: Patterns and Concepts." *Drexel Library Quarterly* 19 (2): 5–20.

Krishna, A., and G. Naik. 2020. "Addressing Crisis in Indian Agriculture through Agricultural Information Delivery." *IIMB Management Review* 32 (2). https://doi.org/10.1016/j.iimb.2020.09.004.

Kuhlthau, C. C. 1991. "Inside the Serach Process: Information Seeking from the Users' Perspective." *Journal of the American Society for Information Science* 42 (5): 361–71. https://doi.org/10.1002/(SICI)1097-4571(199106)42:5<361::AID-ASI6>3.0.CO;2-%23.

Leckie, G. J., K. E. Pettigrew, and C. Sylvain. 1996. "Modeling the Information Seeking of Professionals: A General Model Derived from Research on Engineers, Health Care Professionals, and Lawyers." *The Library Quarterly* 66 (2): 161–93. https://doi.org/10.1086/602864.

Lwoga, E. T., P. Ngulube, and C. Stilwell. 2010. "Understanding Indigenous Knowledge: Bridging the Knowledge Gap through a Knowledge Creation Model for Agricultural Development." *SA Journal of Information Management* 12 (1): 2–8. https://doi.org/10.4102/sajim.v12i1.436.

Lwoga, E. T., C. Stilwell, and P. Ngulube. 2011. "Access and Use of Agricultural Information and Knowledge in Tanzania." *Library Review* 60 (5): 383–95, https://doi.org/10.1108/00242531111135263.

MacCallum, R. C., K. F. Widaman, S. Zhang, and S. Hong. 1999. "Sample Size in Factor Analysis." *Psychological Methods* 4 (1): 84–99. https://doi.org/10.1037/1082-989X.4.1.84.

Malaza, S., and D. M. Myeni. 2009. "Integrating Smallholder Growers into Competitive Sugarcane Production." *Proceedings of the South African Sugar Technologists Association* 82: 405–8. https://www.researchgate.net/publication/267857076_Integrating_smallholder_growers_into_competitive_sugarcane_production (accessed March 25, 2024).

Maskey, R., J. Fei, and H.-O. Nguyen. 2018. "Use of Exploratory Factor Analysis in Maritime Research." *The Asian Journal of Shipping and Logistics* 34 (2): 91–111. https://doi.org/10.1016/j.ajsl.2018.06.006.

Masuku, M. B. 2003. "The Role of Contractual Relationships in the Performance of Supply Chains: The Case of the Sugar Industry in Swaziland." University of Pretoria. https://repository.up.ac.za/handle/2263/26320?show=full (accessed March 25, 2024).

Masuku, M. B. 2011. "Determinants of Sugarcane Profitability: The Case of Smallholder Cane Growers in Swaziland." *Asian Journal of Agricultural Sciences* 3 (3): 210–4. https://maxwellsci.com/print/ajas/v3-210-214.pdf (accessed March 25, 2024).

May, J., J. Kurugia, and M. Ndokweni. 2007. "Information and Communication Technologies and Agricultural Development in Sub-Saharan Africa: Transformation and Employment Generation." Nairobi: African Economic Research Consortium (AERC).

Mbagwu, F. C., O. V. Benson, and C. O. Onuoha. 2018. "Challenges of Meeting Information Needs of Rural Farmers through Internet-Based Services: Experiences from Developing Countries in Africa." In *Transform Libraries, Transform Societies. World Library and Information Congress 84th IFLA General Conference and Assembly 24–30 August 2018, Kuala Lumpur, Malaysia*. http://library.ifla.org/2195/1/166-mbagwu-en.pdf (accessed March 25, 2024).

Meyer, H. W. J. 2009. "The Influence of Information Behaviour on Information Sharing across Cultural Boundaries in Development Contexts." *Information Research* 14 (1). http://informationr.net/ir/14-1/paper393.html (accessed March 25, 2024).

Mgbada, J. U. 2006. "Effectiveness of Information Sources on Improved Farming Practices to Women Farmers in Enugu State, Nigeria." *Global Approaches to Extension Practice: A Journal of Agricultural Extension* 2 (1): 67–78. https://doi.org/10.4314/gaep.v2i1.34952.

Mhlanga-Ndlovu, B. F. N., and G. Nhamo. 2017. "An Assessment of Swaziland Sugarcane Farmer Associations' Vulnerability to Climate Change." *Journal of Integrative Environmental Sciences* 14 (1): 38–56. https://doi.org/10.1080/1943815X.2017.1335329.

Msoffe, G. E. P., and P. Ngulube. 2016. "Information Needs of Poultry Farmers in Selected Rural Areas of Tanzania." *Information Development* 32 (4): 1085–96. https://doi.org/10.1177/0266666915587749.

Mtega, W. P., M. Ngoepe, and L. Dube. 2016. "Factors Influencing Access to Agricultural Knowledge: The Case of Smallholder Rice Farmers in the Kilombero District of Tanzania." *SA Journal of Information Management* 18 (1). https://doi.org/10.4102/sajim.v18i1.679.

Munyua, H., and C. Stilwell. 2010. "A Mixed Qualitative-Quantitative-Participatory Methodology." *Library Management* 31 (1/2): 5–18. https://doi.org/10.1108/01435121011013359.

Naveed, M. A., and M. A. Anwar. 2013. "Agricultural Information Needs of Pakistan Farmers." *Malaysian Journal of Library & Information Science* 18 (3): 13–23. https://mjlis.um.edu.my/index.php/MJLIS/article/view/1872 (accessed March 25, 2024).

Ndlovu, M., C. S. Dlamini, and B. Nkambule. 2014. "Towards a Theoretical Framework for Sustainable Smallholder Irrigation Farming: A Case Study of Lusip Smallholder Sugarcane Farmers in Swaziland." *African Journal of Agricultural Research* 9 (43): 3205–14. https://doi.org/10.5897/AJAR2013.7510.

Netnou-Nkoana, N. C., J. B. Jaftha, M. A. Dibiloane, and J. Eloff. 2015. "Understanding of the Farmers' Privilege Concept by Smallholder Farmers in South Africa." *South African Journal of Science* 111 (1–2): 1–5. https://doi.org/10.17159/sajs.2015/2013-0344.

Ngoepe, M. 2012. "Fostering a Framework to Embed the Records Management Function into the Auditing Process in the South African Public Sector." University of South Africa. http://uir.unisa.ac.za/handle/10500/15418 (accessed March 25, 2024).

Ngulube, P. 2005. "Research Procedures Used by Master of Information Studies Students at the University of Natal in the Period 1982–2002 with Special Reference to Their Sampling Techniques and Survey Response Rates: A Methodological Discourse." *The International Information & Library Review* 37 (2): 127–43. https://doi.org/10.1016/j.iilr.2005.04.002.

Niedzwiedzka, B. 2003. "A Proposed General Model of Information Behaviour." *Information Research* 9 (1). http://www.informationr.net/ir/9-1/paper164.html (accessed March 25, 2024).

Ogungbeni, J., W. Ogungbo, and O. Adeleke. 2013. "Agricultural Information Needs of Farmers in Lagos State, Nigeria." *International Journal of Agricultural Science and Research* 2 (4): 116–23. https://www.academeresearchjournals.org/download.php?id=512782439154739916.pdf (accessed March 25, 2024).

Pallant, J. 2010. *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using Spss Program*. Sydney: Allan & Unwin.

Phiri, A., G. T. Chipeta, and W. D. Chawinga. 2019. "Information Needs and Barriers of Rural Smallholder Farmers in Developing Countries: A Case Study of Rural Smallholder Farmers in Malawi." *Information Development* 35 (3). https://doi.org/10.1177/0266666918755222.

Raufu, M. O., M. B. Masuku, and A. A. Tijani. 2015. "The Use of ICT for Tertiary Education in Agriculture and Research in Swaziland: The Case of University of Swaziland." *Journal of Agricultural Studies* 4 (1): 1–11. https://doi.org/10.5296/jas.v4i1.8142.

Richardson, D. 1997. *The Internet and Rural and Agriculture Development: An Intergrated Approach*. Rome: FAO. http://www.fao.org/3/w6840e/w6840e00.htm (accessed March 25, 2024).

Robson, A., and L. Robinson. 2013. "Building on Models of Information Behaviour: Linking Information Seeking and Communication." *Journal of Documentation* 69 (2): 169–93. https://doi.org/10.1108/00220411311300039.

Samuel, S. 2008. "Towards Finding an Appropriate and Relevant Financial Delivery System to Support Small Cane Growers in Swaziland." Pretoria: University of Pretoria.

Sandrey, R., and N. Vink. 2009. "Sugar in South Africa and Swaziland." In *Monitoring Regional Intergration in South Africa Yearbook*, 184–205. Stellenbosch: Trade Law Centre for Southern Africa.

Shongwe, F. 2009. "Nedbank Finances LUSIP Farmers with 14M." Times of Swaziland, July 8, 2009. http://www.times.co.sz/news/7682-nedbank-finances-lusip-farmers-with-e14m.html (accessed March 25, 2024).

Sifundza, J. T., and P. B. Ntuli. 2001. "Potential of, and Constraints to, Smallholder Sugarcane Production in Swaziland. Swaziland Sugar Association Extension Farming Services." *Proceedings of the South African Sugar Technologists Association* 75: 192–5.

Swaziland Sugar Association (SSA). 2016. "Swaziland Crop Statistics 2015/2016." Mbabane: Swaziland Sugar Association.

Tena, E., F. Mekbib, H. Shimelis, and L. Mwadzingeni. 2016. "Sugarcane Production under Smallholder Farming Systems: Farmers Preferred Traits, Constraints and Genetic Resources." *Cogent Food & Agriculture* 2 (1): 1–15. https://doi.org/10.1080/23311932.2016.1191323.

Terry, A. K. 1997. "Extending Participation in the Swaziland Sugar Industry to Small-Scale Growers: Patterns and Prospects." *Singapore Journal of Tropical Geography* 18 (2): 196–209. https://doi.org/10.1111/1467-9493.00016.

Terry, A., and M. Ogg. 2017. "Restructuring the Swazi Sugar Industry: The Changing Role and Political Significance of Smallholders." *Journal of Southern African Studies* 43 (3): 585–603. https://doi.org/10.1080/03057070.2016.1190520.

United Nations Conference on Trade and Development. 2000. "Policies for Smallscale Sugarcane Growing in Swaziland." http://unctad.org/en/Docs/poitcdcomd28.en.pdf (accessed March 25, 2024).

Van den Ban, A. 1998. "Supporting Farmers Decision-Making Process by Agricultural Extension." *Journal of Extension Systems* 14: 55–64. https://edepot.wur.nl/27801 (accessed March 25, 2024).

Wilson, T. D. 1981. "On User Studies and Information Needs." *Journal of Documentation* 37 (1): 3–15. https://doi.org/10.1108/eb026702.

Wilson, T. D. 1997. "Information Behaviour: An Interdisciplinary Perspective." *Information Processing & Management* 33 (4): 551–72. https://doi.org/10.1016/s0306-4573(97)00028-9.

Wilson, T. D. 1999. "Models in Information Behaviour Research." *Journal of Documentation* 55 (3): 249–70. https://doi.org/10.1108/EUM0000000007145.

Wilson, T. D. 2000. "Human Information Behavior." *Information Science* 3 (2): 49–55. https://doi.org/10.28945/576.

World Bank. 2007. "World Development Report, 2008: Agriculture for Development." Washington: World Bank. https://openknowledge.worldbank.org/handle/10986/5990 (accessed March 25, 2024).

World Bank. 2011. "Swaziland Rural Sector Review: Priorities for the Development of Smallholder Agriculture in Swaziland." Washington: World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/12770/702000ESW0P11900PN100June0270020110.pdf?sequence=1 (accessed March 25, 2024).

Worthington, R. L., and T. A. Whittaker. 2006. "Scale Development Research: A Content Analysis and Recommendations for Best Practices." *The Counseling Psychologist* 34 (6): 806–38. https://doi.org/10.1177/0011000006288127.

Yong, A. G., and S. Pearce. 2013. "A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis." *Tutorials in Quantitative Methods for Psychology* 9 (2): 79–94. https://doi.org/10.20982/tqmp.09.2.p079.

Zondag, M., S. Koppert, C. De Lauwere, P. Sloot, and A. Pauer. 2015. "Needs of Young Farmers: Report I of the Pilot Project: Exchange Programmes for Young Farmers." https://op.europa.eu/en/publication-detail/-/publication/fa9c8e5e-eff8-11e5-8529-01aa75ed71a1 (accessed March 25, 2024).