Unleashing the Power of Agricultural Data: Insights from Tanzania's Digitalization of Routine Data System

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Abstract

Across Africa, including Tanzania, numerous countries have embraced digitalization in their agricultural information systems to harness the benefits of improved efficiency and productivity. The adopted systems can be grouped into two main categories: those aiming to improve farmers' productivity and efficiencies and those aiming to improve organizational administrative efficiencies. While the former has received significant scholarly attention, the latter has not been fully investigated. Thus, using the case of the Agricultural Routine Data System (ARDS), this paper analyzes the system's strengths, weaknesses, opportunities, and threats (SWOT) for effective designing of digital agricultural information systems. A survey of 30 agricultural extension agents working at ward and village levels was conducted. Additional data were collected through a documentary review of grey literature about ARDS and in-depth interviews with six key informants. It was found that ARDS is a robust system that captures essential agricultural information though it is challenged by combining information for crops and livestock. The study concludes that the adoption of ICT has great potential to increase food production and farmers' income by optimizing agricultural production and enabling informed decision-making enhanced by quality data. To improve the performance, the study recommends training to be offered to frontline extension agents on how to collect quality data, exclude livestock information from the system and digitalize the system at the village and ward levels.

Keywords: Digitalization, Agricultural Data Systems, Evaluation, Tanzania

Introduction

Globally, agriculture is the most important sector for raising income among the poor. It supports the livelihood of 65 percent of poor working adults (Castañeda *et al.,* 2016) and accounts for 14% of GDP in sub-Saharan Africa (Bruzzone, 2021). In Tanzania, the sector contributes about 28 percent of the country's gross domestic product and about 24 percent of the total exports, and earnings, and 65 percent of total employment (FYDP3, 2021). Despite its immense contribution, the agriculture sector continues to perform poorly with an annual average growth of 5.1 percent (FYDP3, 2021). To transform the sector many countries Tanzania inclusive have implemented different initiatives including digitalizing the sector. It is believed that digital technologies have the potential to transform the sector through improving efficiency along the agricultural value chains (Stupina *et al.,* 2021).

There are two main approaches to digitalizing agriculture. The first approach is the use of digital technologies by farmers (Gabriel and Gandorfer, 2023). In this approach digital technologies are implemented in almost all nodes of the agricultural value chains to enhance productivity through precision agriculture (Paustian and Theuvsen, 2017; Rowe *et al.,* 2019; Du, 2023), enhancing market systems by improving transparency (Deichmann *et al.,* 2016), improve extension services (Ajani, 2014), and agricultural data systems (Gabriel and Gandorfer, 2023). Although some

studies show some negative effects of digital technologies in the agricultural sector (Mushi *et al.,* 2022), most assessments of applications of digital technologies in various contexts have shown positive results (Deichmann *et al.,* 2016; Evans, 2018; Izuogu *et al.,* 2023).

The second approach is the use of digital technologies to improve agricultural administration activities. In this approach, digital technologies are adopted to enhance communication between administrative units. While the adoption of digital technologies by farmers has received significant scholarly attention, the adoption of digital systems by administrative departments has not been fully investigated thus their performances are not well understood. Gebresenbet *et al.* (2023) investigate the role of emerging technologies for integrated data gathering, analyses, and efficient use. Also, a study by Ehlers *et al.* (2021) delves into the extent to which digital technologies can trigger different choices of agricultural policy instruments and novel design specifications that address problems of sustainability in farming more effectively and efficiently. Although these studies acknowledge the power of digital technologies in improving agricultural administration activities, they lack an assessment of the proposed systems. Thus, this study uses the Agricultural Routine Data System (ARDS) as an example of an agricultural digital system implemented in Tanzania. The study provides empirical findings on how the system is performing in terms of its strengths, weaknesses, opportunities, and threats (SWOT) in order to draw lessons that can help design effective digital agricultural information systems.

Various challenges have been reported in the literature regarding the performance, infrastructural issues, and the quality data produced through the agricultural administrative routine statistics. Korbut (2016) points out that the estimation of area and yield does not yield reliable estimates. They are subjective and could be biased in many cases, such as assessing crop production by observing the harvests and, more often, by interviewing experts (village heads, farmers, traders) in their assigned localities as the initial data collection point. It is also reported that agricultural officers tend to overestimate production in their respective designated areas to support their accomplishment claims. Furthermore, Maligalig (2015) argues that no validation process could improve the quality of estimates due to how the administrative, agricultural routine reporting system works. As a result, it is argued that the national-level estimates are usually biased.

Wallgren and Wallgren (2015) claim that the people (notably staff) responsible for agricultural routine data collection are not always motivated. There is a lack of training, and the reports usually are not standardized. Therefore, it is essential to empirically find the gaps and recommend improving administrative, and agricultural routine data systems in specific countries to minimize the bias of estimates and provide a better data support system for agrarian policy-making and monitoring. The findings could also be used to design a protocol for testing ARDS implementation in a country.

Agricultural Routine Data System (ARDS)

Established in 2008, the Agricultural Routine Data System (ARDS) is a data collection and reporting system of Tanzania's agricultural sector. The system was initiated through the "Project for the Capacity Development on Data Collection, Analysis and Data-based Reporting under Agricultural Sector Development Programme Phase One (ASDP I)", which was a technical cooperation project between the Ministry of Agriculture and the Japan International Cooperation Agency (JICA). This project supported the development of ARDS and its operation, which enables addressing the issues of agricultural data collection, reporting, and analysis imperative for the decision-making of policymakers and government officials. Therefore, ARDS was developed to improve the collection and reporting of crop and livestock data whereby due to the inefficiencies that existed the central government had difficulties in assessing the actual situation of the sectors.
Through ARDS agricultural performance information is collected, managed, and transmitted from Local Government Authorities (LGAs) to the Agricultural Sector Lead Ministries (ASLMs) through Regions. The agricultural

extension officers in villages and wards collect data during their fieldwork and submit them at regular intervals to the headquarters of the Local Government Authorities (LGA) The data are then formally registered to the ARDS database once approved by the Regional Office. The work takes place regularly at frequencies of monthly, quarterly, and annual. These data are assembled into the Integrated Reports by ARDS Web Portal. Collected data are used at various levels of the Government, LGAs, Regional Administrations, and Ministries for monitoring plans and implementation. Currently, the ARDS is implemented by almost all LGAs in Tanzania. However, there is limited empirical evidence about its performance in terms of strengths, weaknesses, opportunities, and threats. For instance, a study by Bhatia et al. (2016) analyzed how results data are collected, shared, and used in the agriculture sector. Although the study also covered the ARDS system, it paid little attention to the system's performance in terms of strengths, weaknesses, opportunities, and threats. With respect to agricultural information systems scholars such as Demiryurek *et al.* (2008) have argued that assessment of the performance of agricultural information systems is important for drawing lessons that can help design effective digital agricultural information systems.

SWOT Framework for Analysing ARDS

Improving information collection and analysis of agricultural data is important as can lead to quality data which is needed for making decisions for improving the sector. The adoption of digital systems like the case of ARDS in Tanzania is among the strategies used to improve the process of collecting, analyzing, and reporting agricultural information. Whether we are able to exploit and benefit from the opportunities which the digital systems present, or be overwhelmed by the challenges inherent to digital systems will be determined by how well we understand the strengths and limitations of these systems. In an effort to contribute to such an understanding, we offer an analysis following the strengths, weaknesses, opportunities, and threats. In this case strengths are enhancers of desired performance while weaknesses are inhibitors to desired performance with both being within the system. Opportunities are enhancers and threats are inhibitors to desired performance, though these are considered outside of the system or organization's control (Lewis and Littler, 1997 cited in Leigh, 2005). We consider that ARDS has internal strengths and external opportunities that the responsible Ministries can leverage to accomplish the intended objectives of this system while also seeking to mitigate internal weaknesses and external threats (ibid).

Methodology

This study used a cross-sectional study design to collect both quantitative and qualitative data. The study population comprised agricultural extension agents enrolled at the Sokoine University of Agriculture (SUA). After identifying the study population, a sampling frame of 40 students was established with the help of class representatives. This sampling frame included all students who were working as extension agents. Due to students' tight schedules, a self-administered questionnaire was sent to the 40 agricultural extension students through their class representatives (CRs). Because there were few students working as extension agents, the goal was to involve all of them in the study, however, only 30 (75%) students returned the questionnaire. According to Saldivar (2012), this is a good response. Although we cannot confidently claim that these students represent all extension agents working at village and ward levels in the country, their experiences of using the ARDS shed light on its strengths and weaknesses.

In addition to the sample of 30 students who returned the questionnaire, we conducted 20 interviews with key informants who were selected based on their knowledge of the ARDS system. The key informants came from 13 regions covering 24 districts in Mainland Tanzania where the 30 extension agents were reported to be working. The selected key informants were ARDS officers working at district and regional levels. The interviews of key informants were guided by a checklist of questions that covered the strengths, weaknesses, opportunities, and threats of the system. Most of the interviews

were done face-to-face, and where face-to-face proved not to be convenient, phone interviews were conducted. For the phone interviews, the first contact was devoted to building rapport through self-introduction and introducing the purpose of the study. Also, in the first contact, a day for the key informant interview was arranged.

Also, secondary data were collected through a documentary review of grey literature about ARDS. Largely, these included reports with information about the importance of adopting ARDS, steps used to introduce the system, and statistics of adoption.

With respect to data analysis, SPSS software was used to analyze quantitative data. On the other hand, content analysis was used to analyze data obtained through a review of documents. Furthermore, thematic analysis was used to analyze data obtained from key informants following the steps described by Braun and Clarke (2006). The themes generated from qualitative data were in line with the framework of SWOT and their description helped to assess both internal and external aspects affecting the performance of the ARDS in terms of the flow of data, reporting mechanisms, means of data flow from the village level to the district, and the feedback mechanism.

Results

Demographic characteristics of the respondents

Approximately 83% of the respondents were male, while the remaining 17% were female. These results indicate the prevailing gender distribution. They corroborate the earlier studies that reported male domination in the field of agricultural extension in Tanzania (Kyaruzi *et al.,* 2010).

Additionally, the data shows that the majority of the respondents (80%) worked at the ward level, while a smaller proportion (20%) worked at the village level. Among the reasons for having more extension agents at the ward than at the village level could be the insufficient number of extension agents in Tanzania as pointed out by Martin (2023). The findings suggest that the government's ambition for each village to be served by an extension agent has not been realized. As a measure of overcoming the challenge of insufficient extension agents, most of the recruited agents are posted at the ward level in order to serve more villages.

Regarding their experience, all of the respondents interviewed had prior experience using the ARDS system, with their experience ranging from two to seven years. Specifically, the findings demonstrate that about 53% of the respondents had experience ranging from five to seven years.

Furthermore, the findings indicate that more than two-thirds (73.3%) of the respondents reported attending the ARDS training sessions organized in their respective districts. These training sessions were typically organized by the district councils, with the majority of respondents (77.3%) reporting that the trainers came from the Department of Agriculture and Livestock.

Strengths of the ARDS

The survey and in-depth interviews conducted with extension officers at the village, ward, district, and regional levels revealed that the ARDS has strengths that make it useful and become an essential system for collection and conveying agricultural information which is needed for policy decision-making and agricultural sector development. The survey findings show that about 89% of the respondents reported that the ARDS is robust because it can collect all necessary agricultural-related information from the farmers frequently. Also, 80% of the respondents reported that all crops grown and livestock kept are contained in the ARDS form. Furthermore, 40% of respondents reported that the ARDS form can also capture information on the challenges facing farmers in crop production including pests and diseases. As indicated in Table 2, the ARDS has other strengths that make it useful in collecting and conveying agricultural information. The findings from the in-depth interviews with the key informants were in line with the findings of the survey. For example, one extension officer explained:

The tool does not only collect information on inputs and yields used but also has a section for recording the agricultural-related challenges

facing farmers in the village (Key informant interview with ward ARDS officer, 2021).

caused delays because livestock extension officers were not filling out the forms on time.

Table 2: Strengths of ARDS

		Responses		Percent of Cases
		N	Percent	
Strengths of ARDS	It is a good system for collecting agricultural information from the farmers	24	77.4	88.9
	It has a section for collecting information on the crop production challenges	7	22.6	25.9
Total		**31**	**100.0**	**114.8**
Strengths of ARDS forms	The record information on the challenges facing farmers on crop production	12	27.3	40.0
	Form is easy to fill	2	4.5	6.7
	form is standard/same form is used to collect information monthly	4	9.1	13.3
	contains all the most crops and livestock/its easy to remember all the crops	24	54.5	80.0
	Records weather information	2	4.5	6.7
Total		**44**	**100.0**	**146.7**

Source: Survey 2020

Weaknesses

The findings of the study in Table 3 show that ARDS has some inherent weaknesses which need to be resolved. The main weakness reported is the inclusion of livestock information in the ARDS form. This was reported by 63.6% of the respondents. Also, interviews with key informants also revealed similar findings. Explaining how the inclusion of the livestock aspect is the setback, a key informant working at the village level had the following to say:

You know crops and livestock are currently under different ministries; we fill in crop-related aspects in the form and the livestock detail is filled in by the field livestock officer working in the same village, this takes a lot of time and sometimes the livestock officers are reluctant to fill in the form because it does not belong to their Ministry. Overall, this caused delays in submitting the report and we are blamed for the same (Key Informant Interview District ARDS officer #5, 2021).

During the interviews, it was also pointed out that integrating livestock information and agricultural information in one form mostly

Another weakness reported was the inclusion of information that is not readily available to extension agents. A case in point is weather information which was reported by 30% of respondents. The respondents explained that some villages are located far away from weather stations thus the inclusion of weather information is unnecessary and is at the expense of other necessary information.

Similar was reported during the key informant interviews. As one key informant claimed:

"The forms have sections for unnecessary information, for example, the amount of rain in the village, really, this is difficult to get because there are no instruments to capture rain records in the village, also there is a section for recording newcomers in the villages for agricultural activities, this is difficult to capture" (Key informant interview with Ward ARDS officer #1, 2021).

Furthermore, the use of paperwork at the village and ward levels was mentioned by about 37% of the respondents as a main weakness. The same was reported by key informants during

the interviews. The interviewed extension officers reported that lack of digital tools in data collection consumes their time which could be used in other extension activities. Also, the use of paperwork has cost implications on the side of extension agents because they need to photocopy in order to have enough forms for collecting the needed information from farmers, which also compromises efficiency. A key informant at the ward level explained:

You know if we want to improve the efficiency and quality of the data reported by extension agents we need to digitalize the whole system. Currently, digitalization is from the district level onwards. I think it is important also digitalize the process of data collection. Digitalizing data collection not only will reduce the possibility of error at the point of in-field data collection, but it will also automate data auditing (Key informant Interview with Ward ARDS officer#3, 2021

case, the use of information communication technologies (ICT) is emphasized in different sectors including agriculture. In line with the telecommunication regulatory framework, the Ministry of Agriculture and Food Security (MAFS) has been emphasizing the adoption of ICT. This is reflected in different policies for instance the 1997 Agriculture and Livestock Policy Chap 3.3 (D) (4) (i) states that in order to strengthen the collection and monitoring of information, the government will place adequate statisticians in every district with necessary basic facilities including radio-call system, linked computer system, telephone, and faxes. Also, the National Agriculture Policy 2013 (NAP 2013) Chap. 3.30 (3) (i-iii) emphasizes the application of Information and Communication Technologies (ICTs) in agriculture to improve efficiency in agricultural development processes and services.

Table 3: Weakness of ARDS

Weakness of ARDS	Responses		Percent of Cases
	N	Percent	
Combining information of crops and livestock	19	51.3	63.3
It is time consuming	13	35.4	43.3
No feedback mechanisms	7	18.9	23.3
Lack of standard measures for crops sold in bundles	3	8.6	10.0
Including weather information which is not readily available	9	25.7	30.0
Lacks a section for farmers opinions	4	11.4	13.4
Some crops are missing in the form	6	17.1	20.0

Source: Survey 2020

Opportunities

Based on the documents reviewed, there are a number of opportunities for implementing and sustaining the ARDS in Tanzania. The implementation of the rural electrification programme in Tanzania has increased the number of villages with access to electricity. Across Tanzania, both in urban and rural areas now are better served with electricity.

Additionally, unlike in other countries of Africa (see Ayim *et al.,* 2022), a review of documents from Tanzania shows that the digitalization of agriculture is supported by policy and regulatory framework. In this

Threats of the ARDS

Findings in Table 4 reveal a number of threats that limit ARDS from achieving its intended goal. The findings show that at the village and ward levels where hard copies are used, lack of working facilities (as reported by 67%), the reluctance of farmers to provide correct information of their agricultural information (47%), and limited support for transport by the employers (as reported by 40%) are the main threats. Other threats mentioned include the large size of the working area (30%) and inadequate training for frontline extension agents.

Table 4: Threats of ARDS

Threats of ARDS	Response		Percent of cases
	N	Percent	
Negative attitude among farmers in giving right information/ poor cooperation	14	23.0	46.7
Large working area/inadequate extension officers	9	14.8	30.0
Limited training on data collection	6	9.8	20.0
Limited access to adequate number of data collection forms	12	16.6	40.0
Lack of transport facilities from the employer	20	32.8	66.7
Total	61	100.0	203.3

Source: Survey 2020

The results of the survey were confirmed by findings of the in-depth interviews as revealed in the quotes below:

I'm forced to make photocopies of the forms myself and incur the cost to go to the district office to submit the filled forms. The district office does not support me in anything to do this task, I do not have a transport facility or even the forms which are needed to collect information from farmers and at the same the working areas is so big, so I must print as many copies as possible to reach out most of the farmers in the villages…(Key informant interview with Ward ARDS officer#2, 2021).

Some farmers are afraid of giving actual information because they are scared of being taxed, and some have superstitious beliefs… others are not motivated to give information because they do not get farming inputs from the government (Key informant interview with Ward ARDS officer #9, 2021)

The major threat of the system is the big size of my working area, carrying out tasks in the whole area is a challenge because first I don't have transport facilities, and farmers are many, which makes me unable to reach all the farmers or fail to get their information…this lead to not recording all information from all farmers (Key informant interview with Ward ARDS #12, 2021).

These findings indicate that most of the threats are institutional threats that need government interventions, for example, lack of government incentives such as transport facilities and financial incentives to cover printing costs, taxes on crops as well as the inability to deploy enough agricultural extension officers to be able to operate the ARDS system effectively and efficiently. These findings corroborate the AfDB report (2013) which shows that the African region's capacity of the agricultural statistical system is affected by weak institutional infrastructure, weak resource base, and poor funding for agricultural statistic activities. We, therefore, argue that the government's will to curb these institutional conditions would strengthen ARDS in terms of producing reliable and quality data for agriculture sector use.

Further interviews with the key informants revealed other threats including limited emphasis on the quality of data received by the ARDS officers at the district level. One key informant narrated:

We measure success by counting the number of reports submitted by field extension officers, for instance, if we receive less than 50% of the expected reports, we say we are underperforming; the quality aspect is not part of the assessment of underperformance (Key informant interview with District Agricultural Extension officer, 2021).

Discussion

This study aimed to analyze the ARDS' strengths, weaknesses, opportunities, and threats (SWOT) for the effective designing of digital agricultural information systems. The study findings indicate that the major strength of ARDS lies in its ability to capture key agricultural information. The findings affirm the arguments by Ssekiboobo and Muwanga-Zake (2016) that the Agricultural Routine Data System (ARDS) in Tanzania is one of the best agricultural administrative data collection

systems in Africa, due to consistency and coverage.

On the other hand, the integration of agricultural and livestock information in one form was pointed out as a major weakness of the system. This might also be attributed to the fact that collecting livestock information is done by a livestock extension officer. Thus, the agricultural extension officers were forced to consult livestock extension officers to fill in livestock-related information before the form could be submitted to the district. Based on these findings, we argue that having separate forms for agricultural information and livestock information would improve the efficiency of the system. Other weaknesses of the system that need to be taken into consideration include limited supervision from the district level and reliance on paperwork at village and ward levels.

The study has shown an increase in electricity infrastructure especially in rural areas is an opportunity for digitalizing the agriculture sector. In line with this improvement is the increase in ownership of mobile phones coupled with increased network coverage in 2G, 3G, 4G, and now 5G. This improvement makes it possible to implement digital systems like ARDS in Tanzania. The rural electrification program is consistent with the findings that alerted that a complete digitalization of the ARDS to the village level requires all villages to be connected to the national electricity grid.
Also, although previous studies (Maru, 2004; Sannoh, 2015; Carletto *et al.,* 2017) indicated that human capital is a challenge in African countries, in Tanzania the implementation of ARDS is favored by an increase in human capital. Although the pace of increase of ICT literacy is still low, in recent years there has been a considerable improvement. The improvement in ICT literacy is facilitated by the education sector whereby some primary and secondary schools in Tanzania have introduced ICT-related subjects in their curriculum or extra-curriculum. Also, digital skills training is provided by private educational institutions, mobile network companies, and online platforms, or through programs and projects launched by development organizations. All these have contributed to the ICT literacy among Tanzanians, thus offering opportunities for implementing digital agriculture.

Regarding the system's threats, the study findings indicate that most of the threats are institutional threats that need government interventions, for example, lack of government incentives such as transport facilities and financial incentives to cover printing costs, taxes on crops as well as the inability to deploy enough agricultural extension officers to be able to operate the ARDS system effectively and efficiently. Furthermore, the survey results indicate that the majority of the respondents worked at the ward level. Among the reasons for having more extension agents at the ward than at the village level could be the insufficient number of extension agents in Tanzania as pointed out by Martin (2023). The findings suggest that the government's ambition for each village to be served by an extension agent has not been realized. As a measure of overcoming the challenge of insufficient extension agents, most of the recruited agents are posted at the ward level to serve more villages.

These findings corroborate the AfDB report (2013) which shows that the African region's capacity of the agricultural statistical system is affected by weak institutional infrastructure, weak resources base, and poor funding for agricultural statistic activities. We, therefore, argue that the government's interventions to curb these institutional conditions would strengthen ARDS in terms of producing reliable and quality data for agriculture sector use. The study findings further highlight the role of informal institutions such as superstitious beliefs in impeding the implementation of ARDS. This suggests there is limited awareness among farmers regarding the importance of providing information. We argue that, in any interventions involving farmers, the government should prioritize farmers when creating awareness because they are key agents in the success of agricultural policy interventions.

Concerning capacity building, findings from the review of reports from JICA show that capacity building for extension officers on the ARDS was enhanced. However, these are inconsistent with the survey and key informants'

interview results indicate limited capacity building as another threat to the system. The inconsistency between the findings of this study and the JICA reports could be attributed to the fact that much of the training was at the district and regional levels while the frontline extension agents at the village and ward levels were required to implement ARDS without any or with limited training on the system. These findings are in line with previous research highlighting that the staff responsible for agricultural routine data collection are not always motivated and there is a lack of training (Wallgren and Wallgren, 2015).

Although the current study did not focus on the issue of data quality, the key informant interviews revealed that the quality aspect of the data collected is currently not taken into consideration by extension agents. This may imply that data produced through ARDS might not be of good quality. The issue of data quality has been highlighted by other scholars such as Ssekiboobo and Muwanga-Zake (2016) and Carletto *et al.* (2017) that one major drawback of current routine data systems in Africa is the high degree of arbitrariness and subjectivity in data collection protocols. In the context of Tanzania, further investigation is needed to empirically document the quality status of ARDS data submitted to the districts.

Conclusion and recommendations

The use of ARDS in collecting and reporting agricultural information in Tanzania has great potential for optimizing agricultural production and enabling informed decision-making through enhanced data quality data. The study has revealed the main strength of the ARDS as reported by the users of the system, which is its robustness, meaning that it collects almost all necessary agricultural-related information every month. Thus, ARDS data could be used as one of the primary sources for the monitoring and evaluation of Agricultural Sector Development Programs such as ASDP 1 and ASDP2 which are the top programs for the agriculture sector in Tanzania.

However, the system suffers from two main weaknesses including livestock information which causes delays in submitting the information to respective authorities, and the use of paperwork at the village and ward levels. The opportunities of the system are many among them being improvement in power supply in rural areas and supportive policy and regulatory framework. Also, another opportunity is the government's commitment to improving the agriculture sector through the adoption of information and community technologies. The main threats of the system are mainly institutional for example, a lack of financial and transport incentives for the extension officers to collect data from large areas; and limited training offered to extension agents regarding the collection of quality data. To improve the efficiency of the system the study recommends training to be offered to extension agents on how to collect quality data. Also, digitalizing the system at the village and ward levels is very important. This will reduce the time spent collecting and reporting the collected data and improve the quality of the collected data. Similarly, the system needs to exclude livestock information because crops and livestock are under different ministries.

Limitations of the study

Participants of this study were the extension agents undertaking their bachelor's degree studies at the Sokoine University of Agriculture. Although we cannot confidently claim that these students represent all extension agents working at village and ward levels in the country, their views shed light on the performance of the ARDS.

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