CCARDESA

Centre for Coordination of Agricultural Research & Development for Southern Africa
Centre De Coordination De La Recherche Et Du Développement Agricole De L'afrique Australe
Centro para a Coordenação da Investigação e Desenvolvimento Agrário na África Austral

SADC
SOUTHERN AFRICAN DEVELOPMENT COMMUNITY
TOWARDS A COMMON FUTURE

Status of Agricultural Information Communication and Knowledge Management in the SADC region

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Technical Centre for Agricultural and Rural Cooperation (CTA)

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Acronyms and Abbreviations

ACE	Agricultural Commodity and Exchange
AMEWI	Agricultural Marketing and Early Warning Information
AR4D	Agricultural Research for Development
BOFINET	Botswana Fibre Network
CCARDESA	Centre for Coordination of Agricultural Research and development for Southern Africa
CTA	Technical Centre for Agricultural and Rural Cooperation (CTA)
FARA	Forum for Agricultural Research in Africa
FAREI	Mauritius Food and Agricultural Research and Extension Institute
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
ICKM	Information Communication and Knowledge Management
ICT	Information Communication Technologies
IVR	Interactive voice response
KTA	Knowledge Transfer Africa
MAFAAS	Malawi the Forum for Agricultural and Advisory Services
MAIS	Mobile Agricultural Information Services
MAL	Ministry of Agriculture and Livestock
MBC	Mauritius Broadcasting Corporation
MTOP	Medium Term Operational Plan
NAIS,	National Agricultural Information Services
NASFAM	National Smallholder Farmers' Association of Malawi
NBC	Namibian Broadcasting Corporation
RDA	Rural Development Areas
SADC FANR	SADC Food and Natural Resources Directorate
SMS	Short Message Services
TCP	Technical Cooperation Programme
UDI	Information and Documentation Unit
USSD	Unstructured Supplementary Service Data
ZARI	Zambia Agricultural Research Institute

1. Introduction

The Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) is a sub-regional organisation established in July 2011 by the Southern African Development Community (SADC) Member States to coordinate agricultural research and development in the region. According to its first medium term operational plan (MTOP) 2013-2018, CCARDESA implements its programmes along four key thematic areas: 1. Farmer Empowerment, and Market Access; 2. Research and Technology Generation, and Farmer Demand Driven Advisory Services and Innovations; 3. Knowledge, Information, and Communication; and 4. Institutional Development and Capacity Building.

The third thematic area of Knowledge, Information, and Communication recognises CCARDESA as a regional knowledge broker in Agricultural Research for Development (AR4D). Under this theme, CCARDESA runs programmes and projects that promote agricultural information generation, management, sharing and dissemination. It recognises the role of Information and Communication Technologies (ICTs) as an indispensable tool to facilitate timely flow of information and knowledge across the region.

In order to properly position its interventions, CCARDESA recognises the need to understand the status of Agricultural Information, Communication, and Knowledge Management (ICKM) in the region. This includes but is not limited to understanding the key stakeholders in agricultural information generation and knowledge sharing in the region, the tools and methods being used to share information and knowledge as well as challenges and opportunities being faced in these ICKM processes. CCARDESA undertook a study to determine the status of ICKM in AR4D in the SADC region with a view of determining possible ways of further strengthening agricultural information and knowledge sharing. This report is a synthesis of the outcomes of the study.

2. Methodology

This report was developed by gathering information from SADC member states. A total of 12 countries successfully provided feedback to the enquiry. While nine countries provided information through country status reports during the first phase of enquiry, three contributed directly to this report during the verification process. The enquiry sought to determine the following:

- major players in agricultural research and development in each country;
- existing knowledge sharing mechanisms;
- the state of ICT infrastructure and tools;
- key challenges in sharing agricultural information and knowledge;
- key initiatives in each member state, and
- possible CCARDESA interventions in supporting regional knowledge and information sharing in AR4D.

The process of gathering data followed several stages;

i. During the first CCARDESA General Assembly in 2014, a questionnaire was administered to ascertain the most used tools in knowledge management in CCARDESA member states, unmet information needs and the perspectives of participants in information and knowledge management with regard to CCARDESA's possible role and support to the region.

ii. Through the CCARDESA network of Directors of Agricultural Research, member states were requested to appoint focal people on Information, Communication, and Knowledge Management (ICKM) who would work with CCARDESA on a continuous basis on ICKM issues. Eleven countries out of fifteen appointed the required focal people of at least one person per country and at most 2 people.

iii. Appointed ICKM focal people were then assigned a task to make a general enquiry on the status of ICKM in their respective countries. In this regard a guideline was prepared and shared with member states. The approach which each country would take to provide the information was left flexible to enable focal people to adopt context specific approaches.

iv. A workshop was organised to bring the focal people together to discuss the reports and map a way forward for CCARDESA in order to meet the regional information and knowledge needs. The major result of the final consultation meeting was a recommendation for CCARDESA to build an ICKM system which would be supported by all member states.

This report summarises the findings of the process across the SADC region. However, it deliberately does not include a database of major stakeholders in AR4D which was developed during the process as it is believed that information in the database needs to be verified to reflect most recent changes.

3. Information and knowledge sharing mechanisms

ICKM focal people were requested to identify key stakeholders in AR4D in their respective countries both in the public and private sectors. For the identified institutions, they were requested to explain how these are managing information, sharing it with their stakeholders, including farmers, as well as any efforts to capture information from farmers. It was important to highlight special initiatives in each respective country, e.g. special networks, expert groups, radio programmes, social media, print publications, how research and development

information is shared, how indigenous knowledge is captured from farmers and ultimately shared. The following mechanisms were identified across the region.

3.1 Libraries

Libraries were indicated as an important aspect of ICKM in most SADC countries. Despite existence of differences in their structure as well as clientele that they serve, almost all countries reported that they use libraries for disseminating and storage of agricultural information. The following are some of the examples of how libraries are being used in the various countries.

The Ministry of Agriculture in Swaziland established several libraries across the country to reach out to farmers through Rural Development Areas (RDA). The headquarter library which is the main source of information for other libraries has access to international information resources, which include Agricultural News from Botswana, for example.

Tanzania reported a similar setup to the one in Swaziland. In Tanzania the Division of Research and Development (DRD) runs a library which is administered by the Information and Documentation Unit (IDU). The library provides information to stakeholders in areas that are difficult to reach using different ICT technologies. It targets researchers, extension officers and academics; though there is no mention of farmers as direct beneficiaries. The IDU supports AR4D in terms of information management that entails acquiring, processing, storing, organizing and disseminating agricultural information. It was also mentioned that Sokoine University of Agriculture manages Tanzania's National Library of Agriculture. Moreover, various international stakeholders were reported to play a crucial role in supporting information and knowledge sharing efforts. These include CTA, FARA and CGIAR. In addition, Tanzania reported presence of Ward Agricultural Resource Centres, which are under the local government, as well as Zonal Information and Liaison Units and Research Documentation Centres for dissemination, storage and use of reference materials which are based in several agricultural research centres across Tanzania.

For Lesotho, it was indicated that "Resource Centres" are established in all rural villages. These resource centres are manned by experts called Agricultural Technical Officers (ATOs) who interact with farmers. There can be ATO-crops, ATO-livestock, and ATO-nutrition etc. The ATOs are backstopped by Subject Matter Specialists (SMS) in the District Agricultural Office (DAO) in every district. Lesotho has 10 districts where each district has a minimum of 5 Resource Centres. It is not clear if these resource centres run information services which are open to the public or they solely rely on the extension officers who serve about 200 farmers per officer.

In Zambia, the Zambia Agricultural Research Institute (ZARI) runs a special library aimed at meeting information needs of researchers. The National Farmers Union of Zambia runs community information centres in order to reach out to farmers.

In South Africa, the Agricultural Research Council (ARC) established an Agricultural Information Hub whose aim is to reach out to the smallholder sectors. However, it is not clear how the hub operates.

For Malawi, it was reported that four major Agricultural Research Stations, namely Chitedze, Bvumbwe, Lunyangwa and Makoka, have established Information and Library Service facilities. These facilities operate together with a network of libraries under public and private universities as well as National Library Services of Malawi. In addition, the Ministry through the Department of Agricultural Extension, established several Agricultural Resource Centres (ARCs) which are used to disseminate agricultural information to farmers in all 28 districts.

The ARCs serve as information hubs as well as demonstration centres where various technologies are demonstrated. These ARCs are established both at village and district levels. At district level, each Agricultural District Office is expected to have an ARC so that members of staff and the community are able to access information. Among others, the ARCs are supposed to have a demonstration plot to showcase various technologies, provide access to internet, a television set and a computer in addition to hard copies of various documents. At village level the government encourages communities to establish resource centres which are stocked with different agricultural publications.

For Mauritius, it was reported that the Mauritius Food and Agricultural Research and Extension Institute (FAREI) hosts documentation centres for its extension and research staff. A copy of technical publications released by the institution is forwarded to external documentation centres where members of the public can access it.

Though some countries have not reported about their library systems, it is evident that libraries still form a common means for sharing agricultural information in the region.

3.2. Radio and television programmes

National radio and television stations are reported to be widely used by almost all participating countries. Almost all countries reported producing and airing agricultural programmes on national radio and television stations. Use of community radios was specifically reported by Lesotho, Malawi, Zambia and Zimbabwe.

In Malawi, radio has been rated to be the most frequently used media for disseminating information since it is considered as the prime source for agricultural information among most farmers in the country (Farm Radio Malawi, 2011). Various organisations produce and air radio programmes on national, private and community radio stations. For example, the Ministry of Agriculture, Irrigation and Water Development airs “Ulimi wa Lero,”a weekly farmers’ programme on the country’s national and private radio stations. Community radio stations such as “Dzimwe” and “Mudzi wathu” also air radio programmes that are produced by the Ministry of Agriculture as well as other organisations such as Farm Radio Malawi, NASFAM and Total Land Care. In addition, these organisations and the Ministry also air TV programmes on both national and private TV stations.

Lesotho has TV slots every Tuesday all year round and daily radio slots for broadcasting agricultural issues and related research technologies.

The Namibian Broadcasting Corporation (NBC) has a one hour slot every Tuesday for broadcasting agriculture related topics including research findings.

Botswana has a weekly Radio talk show called Breadbasket which discusses agriculture related topics and allows listeners to call in.

In Zambia there are the Farm Forum and the Rural Notebook agricultural programmes on national broadcasting services.

Tanzania has dedicated channels called Mulimi TV, ITV, TV1 and Abood TV. Tanzania also has radio programmes like *Ukulima wa Kisasa* which is aired by Tanzania Broadcasting Cooperation (TBC), *Nufaika* which is aired by Radio Free Africa and others.

In Mauritius, there are 3 radio programmes run throughout the year by the Food and Agricultural Research Extension Institute (FAREI) on the Mauritius Broadcasting Corporation (MBC). These are the *Spot Agricole* aired daily on Kool FM (local time and accessible on live internet radio), *Krishi Darshan* and *Vulgarisation Agricole* aired on Radio Mauritius 1 on

Wednesdays (also accessible online). FAREI occasionally participates on live radio programmes and collaborates with the MBC in the making of agricultural TV programmes.

Other countries also mention agricultural slots on the National Radio and TV stations though they have not provided much detail.

Lesotho, Malawi, Zambia and Zimbabwe, who reported the use of community radios, indicated their ability to reach farmers with context-specific information as one of the advantages. In addition, ability to use the language that is understood by the majority of the community members was also reported as an advantage of using community radios. However, it was reported that some of the community radio stations face challenges through political interference. For example, *Kumakomo FM, a* community radio station in Mutare, Zimbabwe was reported to suffer operational challenges as some officials sought to shut it down.

3.3 The traditional extension system

Most countries reported existence of the traditional extension systems which reach out to farmers. These include public and non-governmental extension systems which facilitate field days, exchange visits and demonstration plots in their areas of coverage. It is however not clear how these collaborate among each other in order to convey the same information to farmers. Operational challenges of extension have not been clearly brought out even though it is known that most public extensions systems are not operating to full capacity due to limited resources and other constraints.

In most countries, the traditional extension system is largely characterised by face to face communication between extension officials and farmers. Farmer to farmer learning is also facilitated through face to face communication. This method of communication has proved to be effective in information sharing among rural communities.

Farm trials and demonstration sites were cited as widely used and effective methods of knowledge sharing in Malawi and Zambia. For example, in Zambia farmers plant new varieties on their own plots for research purposes with monitoring and support from the National Agricultural Research Institute (ZARI) or seed companies.

For Botswana traditional set ups such as customary gathering places (called *Kgotla*), where a village chief consults his/her subjects are used to disseminate agricultural information. Similarly, in Zimbabwe village meetings are periodically called to make special announcements. Schools are also important to relay information from extension people through children to parents who happen to be farmers. Such information is the simple form of announcements, warnings of weather changes etc. In Malawi, village gatherings such as funerals, religious and other village meetings are used to disseminate various information including agricultural information. For example, whenever there is an important message extension agents relay the information to the village leaders who share it with all the people in the village, including religious leaders so that they make announcements in their places of worship.

In Mauritius, extension officers hold meetings, conduct tours and demonstrations regularly (at least monthly) on topics of interest for the benefit of farmers. In Lesotho, stories of change are used to share experiences through either face to face communication or documentation of farmer experiences. These stories of change are shared on any given platform such as the media. There is no prescribed mechanism to document and share these. However NGOs sometimes document these into written documents to share through websites and newsletters.

In Botswana, there are Rural Training Centres which are formal facilities to train farmers in specific farming practices.

3.5 Call Centre/Contact Centre

Call or contact centres are not very popular in most countries in the region as it was only reported to be used in Botswana and Malawi. The Call Centre in Botswana is Customer Service Centre that can be accessed through various channels email, fax and voice calls. However 99% of customers prefer voice calls. The call centre aims to provide answers on all agricultural questions from farmers. Questions range from farm management, livestock advisory, livestock identification, to telephone directory, marketing information, reporting outbreaks of diseases and enquiries about participating in government agricultural projects. The service is accessible to all the customers regardless of the status, including government employees.

Malawi's call centre was established in 2016 and is known as "Mlimi Hotline" where farmers are able to call for free and ask questions about agriculture. In the call centres, extension agents serve as centre managers and respond to phone calls live. The complex questions are documented and sent to research experts for more information. This also serves as a platform to formulate new research agendas. In Malawi the call centre is regarded as "a form of cyber extension to augment the meagre resources such as human capital resources". Services of call centres include an e-notification platform, a contact email and fax service. The e-notification is a system where SMS alerts are sent to farmers to notify them about expiry of brand certificates, market information and trade restrictions for horticultural traders and producers.

3.6 Social media and websites

Most countries reported the use of websites by different stakeholders. However only Botswana, Madagascar and Zambia specifically reported on the use of social media by government units. The Botswana Facebook page for the Ministry of Agriculture boasted over 12,000 likes in 2015, while for Malawi the Forum for Agricultural and Advisory Services (MaFAAS) Facebook page reported1,110 likes in 2016 implying that the tool has wide reach. Zambia also mentioned discussion groups (Dgroups) although their use was not clearly discussed.

3.7 Print media

Traditional print media which include newspapers, flyers, and pamphlets are widely used. Almost all countries report that traditional print media still remain effective despite other methods of communication. Mainstream newspapers usually have articles or inserts which cover topical agricultural issues, these may be sponsored or special editions. Moreover, journals such as the Zimbabwe Journal of Agricultural Research and the Zimbabwe Agricultural Journal, as well as Newsletters published by the Zimbabwe Farmers Union, are also relevant print media. All SADC countries stressed the need to support the traditional means of media since they still prove to be important. For instance, Lesotho reported that traditional media is important to reach out to disadvantaged groups like women and youth who do not have access to electronic devices. In Tanzania, the Ministry of Agriculture publishes a quarterly newsletter called "*Kilimo Ushirika Tanzania*", the Department of Research publishes a newsletter called Tanzania Agricultural Research and Training Newsletter, Sokoine University of Agriculture publishes the Journal of Agricultural Science and the Department of Extension publishes a magazine in Swahili called *Ukilima wa Kisasa*. It emerged that there is no vernacular agricultural paper in Swaziland. The New Era, a daily newspaper in Namibia prints a column or article on agriculture every Tuesday. Moreover, the Ministry of Agriculture,

Water and Forestry of Namibia has a flyer called Spotlight where non-peer reviewed research notes are published.

For Malawi, it was reported that the Ministry of Agriculture, through the Department of Agricultural Extension Services' communication branch produces a bi-monthly farm magazine known as "*Za a chikumbi*" in *chichewa*, the country's vernacular language. The magazine, which carries news and feature stories is distributed to all farmers throughout the country. In 2016, the Ministry started producing an electronic newsletter known as "Agri-eNews" which targets policy makers, staff and programme implementers. Other organisations, such as NASFAM, also produce various publications, including leaflets and posters on good agricultural practices which are disseminated to farmers across the country. Newspapers such as "Malawi News" and "The Nation" also have agricultural columns where they feature agricultural stories.

The Ministry of Agriculture in Botswana has converted some pamphlets and agricultural policy documents into braille as one of the initiatives to have inclusive information dissemination systems to cater for the visually impaired agricultural stakeholders.
It was reported that some print media, especially private agricultural magazines and newspapers, e.g. the Farmers' Guide in Botswana stopped production unpredictably which could have been caused by viability issues.

Table 1 lists key agricultural publications which were reported for each country.

Table 1: Key Agricultural publications in the SADC Region

Country	Publication	Publisher
Botswana	AgriNews,	Botswana University of Agriculture and Natural Resources
	Ikeetletse, (A technical guide)	Ministry of Agricultural Development and Food Security
	Price bulletins magazines, production manuals, brochures, pamphlets	Several players
	Botswana Journal of Agriculture and Applied Sciences (BOJAAS)	Botswana University of Agriculture and Natural Resources (BUAN)
	BAMB Newslettter	Botswana Agricultural Marketing Board
Lesotho	The Silo Magazine	Lesotho Agricultural Information Services
	Mobu ke Letlotlo (Magazine), Newsletters, Calenders, Brochures, Pamphlets.	Lesotho Agricultural Information Services (Ministry of Agriculture and Food Security)
	Newsletters	Rural Self- Help Development Association and FAO
Malawi	"Za achikumbi" (aBi-monthly farmer's magazine)	Ministry of Agriculture, Irrigation and Water Development, Agricultural Communication Branch
	Journal of Agricultural Sciences in Malawi	Ministry of Agriculture, Irrigation and Water Development, Agricultural Communication Branch
Mauritius	Farming News Guide Agricole and miscellaneous technical publications, pamphlets as well as books.	Food and Agricultural Research and Extension Institute
Namibia	AGRICOLA	Ministry of Agriculture, Water and Forestry Directorate of Agricultural Research and Development
	Agriforum	Agripublisher

	International Science and Technology Journal of Namibia (ISTJN)	University of Namibia Faculty of Science
Tanzania	Kilimo Ushirika	Tanzania the Ministry of Agriculture
	Tanzania Agricultural Research and Training newsletter	The Department of Research
	Journal of Agricultural Science	Sokoine University of Agriculture
	Ukulima wa Kisasa	Department of Extension
Zimbabwe	Zimbabwe Journal of Agricultural Research	University of Zimbabwe
	Zimbabwe Agricultural Journal	Agricultural Research Council of Zimbabwe, 79 Harare Drive, Marlborough, Harare
	Newsletters	Zimbabwe Farmers Union

3.6 Agricultural Shows

Agricultural shows are huge events in many SADC countries. Farmers and other stakeholders have an opportunity to meet during these national days and field demonstrations. Related are Agricultural Technology Fairs reported to be led by Plan International in the case of Zimbabwe, and the Windhoek Industrial and Agricultural Show in Namibia.

In Malawi, agricultural shows are conducted both at village and district levels every year. In addition, in August every year an annual event known as the National Agricultural Fair is conducted with participation of farmers and other stakeholders nationwide. Seed fairs are also conducted in rural areas to disseminate newly released varieties by various public and private sector actors. The seed fairs have also been used as the fora for tapping and collecting indigenous knowledge on important traits for conservation and more research work.

Several fairs are organised in Mauritius. The World Food Day is organised annually, while periodically other exhibitions and fairs are organised for agricultural trade and entrepreneurship, jobs in agricultural markets and open days in agricultural places of interest (e.g. research stations, model farms, agro processing resource centres).

3.7 Innovation platforms

The Innovation Platform approach is currently favoured in many actors in the agricultural research for development arena, including FARA, CCARDESA, CGIAR and others. The approach entails considering and bringing together all relevant actors within a given systems of interest or value chain to ensure proper understanding of needs and interests among different players. They provide a shared space for farmers, agricultural service providers, researchers, private sector and other stakeholders to jointly identify and analyse existing constraints and jointly work towards overcoming these. A key aim of these innovation platforms is to work towards common goals, learn from each other and co-develop new knowledge in order to create more sustainable solutions. Several innovation platforms were set up in Zambia, Zimbabwe, Malawi, Madagascar, Namibia and other countries.

Innovation platforms are mentioned as a means of sharing information in the report from Zimbabwe. However, these normally employ other methods which include, face to face communication and publications in sharing information. Lesotho is in the process of establishing these platforms through the FAO TCP project “Strengthening Agricultural Research and Extension System in Lesotho”.

In Malawi, there are several innovation platforms. However, not much is reported on their achievements in knowledge sharing at national level. The Malawi Forum for Agricultural and Advisory Services (MaFAAS) serves as an innovation platform where players in the sector are invited to share their experiences and knowledge as well as come up with solutions to address the challenges that the agricultural sector is facing. The main player in innovation platforms for rural areas in Malawi are the decentralised extension structure known as District Agricultural Extension Services Systems (DAESS). The system starts from the grassroots with Area Stakeholder Panels and ends with District Agricultural Committees. This was put in place to coordinate all agricultural development efforts provided by various players offering demand-driven research and extension services.

4. ICT infrastructure and tools

In this section, focal people were asked to describe the status of internet connectivity in identified institutions and the country in general and the use of mobile devices and innovative initiatives which are in place to take advantage of the infrastructure. They were also asked to explain how disadvantaged groups (poor, youth, and women) are involved in the resultant information flow.

It emerged that there is a gap between countries and between regions in the same country in terms of ICT infrastructure. Mauritius had 42.5% internet penetration in 2016 while its mobile (SIM) penetration was 146%. This might mean that about 46% of people have more than one mobile sim card each. South Africa and Botswana reported over 95% of internet connectivity. Several countries in the region reported challenges in internet connectivity. Some Ministries and departments of agriculture do not have access to internet especially offices which are in remote areas. In Lesotho and Malawi some areas do not have access to electricity to enable such connectivity or increase use of ICTs. Lesotho and Malawi also reported that access to computers and necessary computer skills are challenges in utilising ICT infrastructure and tools.

4.1 Broadband

It was reported that SADC countries are working to develop their National Broadband Internet backbones. Tanzania acknowledged the role of the Ministry of Agriculture Food Security and Cooperatives in collaboration with regional and sub regional organisations which supported improvements in internet connectivity. Overall connectivity in Tanzania is enhanced by the construction of the National ICT Broadband Backbone (NICTBB) which provides connectivity to household levels. The backbone has made internet connectivity and communication cheaper for Tanzania. Madagascar also reports the presence of fibre optic connectivity though it is not clear how this has enhanced agricultural information and knowledge sharing. In Botswana, the Botswana Fibre Network (BOFINET) is a parastatal which was established to improve internet connectivity across the country and every government department is set to have fibre optic internet connectivity.

4.2 Mobile phones

The advent of mobile technology has widened coverage of internet access even though it is too expensive for most disadvantaged people. Costs are higher where there is no competition of service providers. For example, Swaziland has only one mobile service provider as compared to Tanzania, which has five mobile service providers which include large players like VODACOM, AIRTEL and ZANTEL. Such developments in Tanzania and South Africa have led to cheaper mobile communication and several innovations which are beneficial to farmers and rural communities as a whole. (See Annex 1 for ICT innovations in the region).

The innovations are so beneficial that Mauritius has now adopted a policy by including ICT for development and innovation in agriculture in its Strategic Plan 2016-2020 for the crop, livestock and forestry sectors.

Innovations which take advantage of widespread use of mobile phones in the region include sharing information through short videos enabled by such applications as WhatsApp. The availability of smartphones to disadvantaged people is however, still a challenge. Even where mobile phones are available access to internet based information through mobile phones attract exorbitant charges which most people do not afford. The use of SMS and USSD technologies is therefore widespread.

In Malawi, the mobile phone was rated highly among available ICT tools to disseminate instant and up-to-date agricultural information, hence a boom of various players providing Mobile Agricultural Information Services (MAIS). The information is packaged to be compatible with SMS and interactive voice response (IVR) platforms. In order to ensure harmonisation and coordination of messages, a National Agricultural Content Development Committee for ICTs was jointly formed by public and private partnership. The committee coordinates content development and validates all messages that are sent through mobile platforms.

FAREI in Mauritius developed an Online Crop Disease Identification System which is based on the transfer of imagery via internet for the rapid identification of symptoms and diseases. The system that was initially developed (in 2013) to operate with computers and scanners is now being improved to extend its use with mobile devices. FAREI also runs an Agricultural Information Service via SMS with the aim of sending disease alerts. It has now extended its use to include various agricultural extension advisory information.

5. Key challenges in terms of availability and accessibility of agricultural information

The ICKM focal persons in the SADC Member States were asked to document barriers for information flow from research, extension, farmers, policy makers, universities, etc. They were requested to describe these and explain possible causes (where possible). Following are the main challenges which were reported.

5.1 Weak linkages between extension, research and farmers

All countries reported an effort by the state and private players to reach farmers with knowledge. However poor linkages between research, extension, farmers and other players are cited to be delaying or hindering the flow of information. Communication between research and extension was cited to be weak. The existence of parallel structures of extension was also noted. Government extension and non-governmental extension players do not interact in order to convey common messages to farmers.

Farmers as custodians of indigenous knowledge systems, and as they face the practical side of production, are an essential source of information which extension and researchers should take advantage of. Lesotho and South Africa report that such linkages need to be improved in their respective countries. A delay in information flow from farmers to extension, researchers and policy makers results in slower responses to agricultural problems than necessary. Zambia reports that the extension gathers indigenous knowledge through extension visits. It is however not clear how the knowledge is used to inform further research.

It emerged that there are several players in agricultural research and information sharing which include development partners, non-governmental organisations as well as research and

extension. These players are however, not coordinated despite the fact that their target beneficiaries are the same farmers. This leads to duplication of efforts, waste of resources and sometimes confusion as a result of communication of contradictory messages to farmers.

Tanzania acknowledges that good coordination in the management of agricultural knowledge, networking, and collaborative arrangements among different stakeholders in agriculture and related sectors at both national and sub-regional levels can lead to value addition and expansion of knowledge within the sector. A good example of collaboration between different players is reported in Tanzania where the research system, extension services and the private sector collaborate to develop and maintain a platform to facilitate access to agricultural market information through mobile phones. Another successful example is from Malawi, where the Ministry of Agriculture together with other stakeholders came together and established the National Agricultural Content Development Committee (NACDC) which is responsible for ensuring harmonisation of messages that are delivered to farmers. Through joint planning and collaboration, NACDC was able to establish a mobile platform known as “Mchikumbi 212” which is used to deliver harmonised agricultural information to farmers. In addition, through coordination between the Ministry and other stakeholders such as Farm Radio, Malawi was able to establish an agricultural call centre known as “Mlimi hotline”

The Innovation approach discussed earlier is being used to minimise challenges which are caused by poor linkages and lack of coordination.

5.2 Extension capacity

This challenge was stressed by South Africa where a dual extension system exists for commercial farmers and for small-scale farmers. Small-scale farmers are largely serviced through a lower extension producer ratio as compared to commercial farmers. Land redistribution and the assumption that every rural inhabitant is a farmer put pressure on small-scale extension and this has an impact on how they share information.

5.3 Information packaging for the correct audiences

Scientific research information makes no sense to farmers unless it is simplified and sometimes communicated in local languages. There are generally low budgets allocated for knowledge translation, information repackaging and dissemination. As cited by Lesotho, farmers tend to understand illustrations better but producing publications with illustrations tends to be more expensive due to demands for graphic skills and colour printing. Information fails to reach farmers as a result of inappropriate packaging in terms of language used, medium as well as the channels of communication.

5.4 Reluctance of researchers to share information

Many researchers in the region are reluctant to share scientific information. They prefer sharing information through reputable research journals with their scientific peers. A lot of research output has not found its way off the shelves to farmers for adoption. Thus, there is a need for each country to set up ICKM structures and policies to encourage researches to make their findings available to the public. Research systems and funders should demand that the research output be made available to a wider audience. Where research is published through science journals, most institutions in Africa cannot afford to subscribe for their access let alone their translation for use at farm levels. There is need to raise awareness to countries and institutions which qualify for free access to these journals through such initiatives as Access to Global Online Research in agriculture (AGORA). Researchers still hold on to information in the old belief that “Information is power”. There is need to educate researchers that “information sharing” is “*The power*” in the modern era.

5.5 Unreliable ICT infrastructure

Underdeveloped infrastructure, frequent power cuts in Tanzania, Malawi, Zimbabwe and others hinder accessibility of information since internet connectivity and mobile phones rely on electrical power. Use of solar power can help alleviate this challenge. Even though most countries are working on developing the Fibre Optic Internet backbone, countries are not yet completely connected.

5.6 Human resources to support information management and sharing

Information packaging and sharing activities rely on a skilled human resource base. Most government departments are generally understaffed and employees have so much pressure on other duties that they cannot do much in ICKM. Communications and knowledge management are skills which are not often prioritised and yet they should be part of everyone's job description. Technical skills to communicate science i.e. translate, package or produce quality agricultural information radio and TV programmes are also a challenge.

5.7 Inadequate information needs analysis

For communication and information sharing to be effective, there is need for a proper understanding of stakeholders, their knowledge, skills, attitudes, practices and needs. Tanzania cites failure to understand stakeholders as a factor which leads to use of wrong messages, media channels, and weak monitoring and evaluation of the systems. For example, most of the information that is shared by countries is general and fails to address specific needs of the farmers depending on their location and economic status. Part of this is due to lack of resources for conducting information needs analysis as well as failure among other stakeholders to understand the importance of conducting a needs analysis. In addition, lack of appreciation on the role of communication contributes to the problem. This is because most of the players in the agricultural sector view communication as being synonymous to visibility or publicity, so they do not care about the impact of the messages but rather focus on the amount of materials that they produce.

5.8 Absence of monitoring and evaluation mechanisms for information sharing activities

Lack of proper mechanisms for monitoring and evaluating information sharing activities makes it hard to understand farmers' information needs and perceptions regarding the availability and accessibility of communication channels that are being used for information sharing. It also makes it difficult to know mechanisms of ICKM which are most effective for reaching farmers, women, youth and other stakeholders. For example, in Malawi there used to be an evaluation unit under the Ministry's communication branch which was responsible for evaluating all messages that were sent to farmers to assess the impact and address the necessary challenges. However, this section was abolished and the roles were moved to be carried out by the Department of Planning which does not have any communications experts. As a result of lack of priority and expertise no evaluation is done and the impact of ICKM activities is not assessed.

5.9 Absence of electronic documents on websites

Despite a wealth of research work being carried out across SADC, not much is available on NARS websites. An effort in this direction must therefore be made for better access to critical information for agricultural growth and development.

6. Current ICKM initiatives

Focal people were asked to identify innovative initiatives in their countries which can be taken advantage of by the agricultural sector in order to improve knowledge sharing. Common to all countries are emerging social media platforms through which several players share information of interest. For example, in Botswana there is the Temo~Thuo Farmer's Group which has over 95,000 followers, the Ministry of Agricultural Development and Food Security has a group with over 13,000 followers in 2015. In Zimbabwe there is the eMkambo Whatsapp group through which farmers share market information and advice each other on challenges they are facing. There is also a farmer's network group with 151 members. Annex 1 shows a summary of reported innovative initiatives.

7. Suggested areas of intervention for CCARDESA

Focal people were requested to advise CCARDESA as regional knowledge broker on what they thought could be done at regional level to complement efforts of countries and in facilitating knowledge sharing amongst countries in the region.

CCARDESA was requested to consider the following as possible points of intervention to improve agricultural information and knowledge sharing in the region:

- Creation of a knowledge management hub connecting various stakeholders in different countries. This can be set up in one of the active countries and satellite units be established in each country.
- Formation of National Information, Communication and Knowledge Management Systems which feed into one regional system.
- Provide or negotiate for affordable hosting facilities for a country to host information repositories e.g. lobby through the SADC Parliamentary Forum for reduction of costs of hosting agricultural information repositories.
- Build the capacity of SADC member states in information repackaging and dissemination through modern technologies.
- Encourage organisations to publish more knowledge products especially of best practices.
- Encourage farmers to document their experiences or facilitate capturing of their experiences for farmer to farmer knowledge sharing in relevant languages and formats.
- Support the capacity and widen scope of "The dialog platform" in Zimbabwe to serve as a model for the region and scale up to other countries.
- Facilitation of Agricultural Information Centres in strategic places of the country and the region.
- Establishment of a SADC wide agricultural information and knowledge management repository.
- Facilitation of use of social media tools to disseminate/share information amongst member states.
- Facilitate establishment of regional inter-library knowledge sharing systems.
- Facilitate regular trainings on ICT systems, information dissemination/sharing and data management: Most members of AR4D organisations have never received training on the use of ICT systems. This has created difficulties in sharing information over the internet.
- Provision of IT equipment for information dissemination.
- Strategies for integrating ICT into rural development need to focus on widespread local adoption.
- Conduct a more thorough study to evaluate the existing agricultural information flow and management in the country in order to identify best practices for information sharing and management.

- Strengthening structures and systems for managing regular and updated information.
- Promoting collaboration among researchers and between research and extension systems fostering the spirit of information sharing among them.
- Establishment of call centres: Call centres play a vital role in responding to farmers' problems instantly as such in order to improve information sharing there is need to ensure that countries have call centres in place.
- Creation of an official pool of resource persons, example focal persons in ICKM, who are duly recognised by respective Ministries/Countries and can freely collaborate with CCARDESA. [Note: despite nomination as focal persons, focal people are not given enough time, logistics or release to attend CCARDESA meetings. Much of the work is being done from home at expense of family time and using own resources.

8. Conclusion

All countries rely on traditional means of extension and communication. Challenges of knowledge translation still exist. Information wrongly packaged is not useable. That limits the flow of information from technical generators to non-technical consumers who are largely farmers. Efforts of using face to face communications, field days, agricultural shows cut across the region. However, development in ICT infrastructure differs from country to country and that explains a great gap in ICT innovations. For example, penetration of mobile technologies offers great opportunities to reach remote areas though the complexity of services differ depending on affordability of charges which they attract in different countries.

Given this status of ICKM in the SADC Region, a one size fit all approach in regional interventions might not attain intended objectives, particularly among farmers. Strengthening the capacity of institutions and changing attitudes towards information sharing and repackaging are critical interventions from regional level. However resources and approaches necessary per country are not the same.

It is recommended that in-depth studies be conducted in each country to provide more detailed status updates and these have to be done periodically to ensure that interventions are guided by up-to-date reports. At regional level, a solution being proposed for CCARDESA to build a regional ICKM platform would offer a great opportunity for regional knowledge sharing and access though it might achieve less when directly reaching out to farmers.

9. Annex

Annex 1. ICT Initiatives

Country	Innovation	Description
1. Botswana	Botswana Agribusiness Forum (www.agribotswana.com).	This website is privately owned and was established by a young entrepreneur as a database and agricultural business forum. It facilitates sharing of agricultural information. It is an initiative by a younger entrepreneur to facilitate information sharing.
	Modisar (www.modisar.com)	A precision livestock management system developed by Modisar Net to help farmers manage their animals. It allows one to capture farm financial activities and be able to print different types of financial reports, capture & store different animal activities, manage farm inventories and allows farm employees to collaborate.
	Botswana internal agricultural information management system	A system by the Ministry of Agriculture and Food Security assists in monitoring and evaluation, ICKM.
	1-2-4 Service	An initiative by Human Network International which uses USSD to provide automated responses to agricultural questions. Initially it started off with covering crop technical information. However, there are plans to include livestock information. (By dialling 124 on an orange line one has access to the information)
	AMEWI	AMEWI is an online system developed by AgriBusiness Forum Botswana that bridges the information dissemination and communication gap in the farming industry through the use of ICT. It provides market, early warning and other agricultural information. It exists as web based system and mobile application.
2. Malawi	Mchikumbi“212”mobile platform	An initiative by the Ministry of Agriculture in collaboration with other stakeholders through the National Agricultural Content Development Committee shares agricultural information to farmers through mobile phones known as one way of enhancing information and knowledge sharing as well harmonization of messages
	Esoko platform	Enhances provision of agricultural extension and market information to farmers. Implemented by the Ministry of agriculture where it is used to provide localised agricultural information to specific farmers. It is also being implemented by Agricultural Commodity and Exchange organization (ACE) to provide market information to farmers through text messages
	Mlimi hot line	Call centre where farmers are able to call and ask agricultural related questions. Being implemented by the Ministry of agriculture in conjunction with Farm Radio Malawi

Country	Innovation	Description
3. Mauritius	Agricultural Production and Market Information System http://www.farei.mu/apmis Software for the identification of pests and diseases http://www.farei.mu (in download section)	Gives production and market information as well as trends Has information on pests and diseases of 6 major crop families including potato, tomato, cucurbits, onion, crucifers and beans
4. South Africa	Extension suit online	Online application developed by Manstrat Agricultural Intelligence Solutions to provide linkage and information transfer between research, extension services and farmers.
	Agri-hub in Mokopane	There is no clear explanation of what really it is but it is led by The Bohwa Ba Rena Community Trust in Mokopane.
	Countrystat	An initiative involving FAO and the government to provide a framework for organising, integrating and disseminating statistical data and metadata on food and agriculture.
	Farmbook/MEAS	A business planner application designed to enable field agents to help farmers plan their farm business more effectively and quickly evaluate their productivity and profitability. It also has nine distance learning modules on five skill sets i.e. group organisation, natural resource management, financial education, marketing and innovation.
	AgTag	It's a new system which aims to provide individual farmers with a link to informative and relevant agricultural articles, videos and audio inputs.
	AgriTouch	An information kiosk approach used in Western Cape to enable access to market and technical information via agri-suit online.
	SmartPen	A government programme to improve the efficiency of reporting by extension officers and to provide them information about extension. Extension use technology to register projects with GPS coordinates and photographs and provide real time monitoring and farmer support through regular site visits.
	Carbon calculator	A project of the South African fruit and wine industry to facilitate compliance with carbon emission regulations and to gain access to international retail supply chains. The online tool allows users to calculate their carbon footprint and understand efficiency opportunities and potential future risks. This helps to facilitate climate smart agriculture for the sector.
	Limpopo eAgric Initiative	A project which seeks to address timely access to market and technical information, without reliance on extension officers and secondly access to skills to enable use of ICT. It uses a number of ways including a bulk SMS service, access to the internet, Digital Doorways and farmer basic ICT training

Country	Innovation	Description
	Fruitlook	An initiative of the Western Cape Department of Agriculture which is aimed at addressing the challenge of sustainable farming through the efficient use of water in agriculture. It developed a Fruitlook which is a web portal for deciduous fruit and grape growers in the Western Cape Province. It has been applied in practice to advise numerous fruit farmers. Application for emerging farmers has not yet been established.
	MySmart.farm	An ICT platform that allows framing business optimization. It addresses the challenges of precision farming, decision making and risk management. It is a system that collates and collects all the data that a farmer needs.
	AgricultureMarket Information and Early warning System (AMES)	A web and cell phone based application to assist farmers and agribusinesses to access early warning information, market updates and trading amongst trading partners. The app is an interactive tool and promotes dialogue amongst role players in agricultural industry. It also creates a trading platform between farmers and traders as well as suppliers of inputs.
5. Tanzania	M-Pesa	A mobile money transfer service to help people and companies make quick financial transactions in payment for any products including agricultural goods.
	The ICT for Rural Development (ICT4RD)	A pilot project is exploring a broadband model for rural areas, with access to secondary schools in Bunda, Serengeti and Bagamoyo districts.
6. Zambia	SMS platform for agriculture marketing information	Zambia National Farmers Union
	Agri-business and marketing information platform	Agri-business and marketing information platform run by Ministry of Agriculture and Livestock (MAL) through the department of agri-business.
	SMS platform	SMS platform run by MAL under the department of the national agriculture information services (NAIS). This platform provides a cell phone number where farmers can sms agriculture questions and these questions are answered via text or through the ZNBC radio agricultural programmes conducted by NAIS
7. Zimbabwe	EcoFarmer - a revolutionary way of farming using mobile technology provided by Econet Wireless- - https://www.econet.co.zw/ecofarmer	A micro insurance project which is designed to insure inputs and crops against drought or excessive rainfall. Insured farmers receive daily weather information, farming tips, and market information.
	eMkambo News http://www.emkambo.co.zw/	An initiative by Knowledge Transfer Africa (KTA) and Microsoft which is an interactive knowledge sharing platform for the agricultural sector. It is a space for private companies to target markets and for farmers to link to each other across the country.

Country	Innovation	Description
	E-discussion platform - under construction	A platform being developed by the Agricultural Research Council of Zimbabwe to facilitate online discussion of pertinent issues in agriculture.
	eAgro	A platform by Agro Dealers Association of Zimbabwe which facilitates the purchase of inputs and sell of outputs using mobile phones. It shows market information for both inputs and produce (Who has what at what price) and facilitates automatic online payment. (Uses major mobile platforms NetOne, Econet and Telecel)

Annex 2. Contributors

Country	Name	Description
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Malawi	Fally Masambuka-Kanchewa	Communications specialist with focus on communication for development and social change Ministry of Agriculture, Irrigation and Water Development
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Annex 3. A guide for focal people to carry out an in country inquiry

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Guidelines for preparing Information Communication and Knowledge Management (ICKM) country status report:

For CCARDESA to support member states in ICKM initiatives, there is need for CCARDESA to understand the current status of ICKM in each member state. ICKM focal persons for each member state are expected to attend a workshop which CCARDESA is organising during which they will present the status of their respective countries. Each presentation should answer at least the following six questions.

1. Which institutions, governmental and non-governmental are playing a role in AR4D in your country
2. Which information and knowledge sharing mechanisms are in place within and among various institutions of your country?
3. What ICT infrastructure and tools are being used to facilitate information and knowledge sharing in your country?
4. What are the key challenges in availability and accessibility of agricultural information that your country is currently facing?
5. What are the current ICKM initiatives in your country, including in the agricultural sector, that can serve as an entry point for ICKM activities in AR4D
6. What areas of intervention can CCARDESA pursue to improve agricultural information sharing within and among member states?

Section	Description
1. Which institutions, governmental and non-governmental are playing a role in AR4D in your country	Identify key institutions in your country which are dealing with agriculture and development. List the name, address and contact details. Verify the correctness of this information since the information will become documented as crucial information about your country. These can be farmer organisations, government departments, universities, colleges and other players. Note that it might not be possible to be comprehensive for now but more information might be added later so give priority to major players. To make this easy I have put an online spreadsheet with institutions which was compiled in 2008 by SADC. May you simply update the provided details and add missing institutions and delete those which do not exist anymore. Remember to fill in the "verified by" Row to acknowledge your effort. Follow the link and make the changes online: https://docs.google.com/spreadsheet/ccc?key=0AmpiaivI7fBycG1OdEZib01tVm1xMHB6RGU5QkR2Vnc#gid=4

Member States:

Angola	Lesotho	Malawi	Namibia	Swaziland
Botswana	Madagascar	Mauritius	Seychelles	United Republic of Tanzania
Democratic République du Congo	Mozambique	South Africa	Zambia	Zimbabwe

2. Which information and knowledge sharing mechanisms are in place within and among various institutions of your country?	For the identified institutions, explain how they are managing information, sharing it with their stakeholders including farmers as well as any efforts to capture information from farmers. It is important to highlight special initiatives in your countries e.g special networks in the country, expert groups, radio programmes, social media, print publications, how is research information shared, how is indegionous knowledge captured from farmers etc)
3. What ICT infrastructure and tools are being used to facilitate information and knowledge sharing in your country?	What is the staus of internet connectivity in the institutions or country in general, the use of mobile devices, which intiatives are in place, how are the disadvantaged groups (poor, youth, and women) involved in the information flow etc.
4. What are the key challenges in terms of availability and accessibility of agricultural information that your country is currently facing?	Are there any barriers for information flow from research, extesion, farmers, policy makers, universities, etc. Describe them and possible causes (where possible)
5. What are the current ICKM initiatives in your country, including in the agricultural sector, that can serve as an entry point for ICKM activities in AR4D	Give information on what else is happening in the country which can be taken advantage of by the agricultural sector in order to improve knowledge sharing.
6. What area of intervention can CCARDESA pursue to improve agricultural information sharing within and among member states?	Give advice to CCARDESA on how you think it can be of help to completement efforts of your country and in facilitating knowledge sharing with other coutries of the region.

NB: Kindly note that more information may be added to enrich your presentation.

Please submit reports by 15 March 2015 to dzengenene@ccardesa.org. Tickets for your attendence at the meeting will be sent to you immediately after submission. Aslo clearly indicate the names of two people who will have worked on the report.

Member States:

Angola	Lesotho	Malawi	Namibia	Swaziland
Botswana	Madagascar	Mauritius	Seychelles	United Republic of Tanza
Democratic République du Congo	Mozambique	South Africa	Zambia	Zimbabwe