



Improving Policymaking for Agricultural and Rural Development in Africa

The role of ICTs and Knowledge Management

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This paper investigates the role of knowledge management in African agricultural and rural development policies, and how information and communications technologies (ICTs) can contribute to enhance it. African Policymakers are aware of the importance of knowledge management; however, its actual use is constrained by inter-related factors encompassing the national context and investments in ICTs for knowledge management are still limited. As a result, the capacity to collect and analyse locally-generated and locally-relevant data is low and so is the use of these information for policymaking. ICTs are being used to varying degrees but the linkages between ICTs, knowledge management and policymaking are not yet well established.

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Summary

Despite being crucial in ensuring food security and enhancing poverty alleviation for rural households, agriculture and rural development (ARD) in Africa continues to lag behind other developing regions. Some of the challenges facing ARD in Africa include poor access to capital, poor infrastructure, inadequate market structure and low levels of public investment – all exacerbated by ineffective policymaking and implementation.

Faced with these challenges, improving policymaking through effective knowledge management (KM) is imperative. This entails turning data and information into actionable knowledge, which is made available and accessible to concerned stakeholders, especially policymakers. The advent of new forms of communication and data manipulation made possible by information and communication technologies (ICTs) raises expectations concerning the ability of policymaking to be improved through judicious use of KM enabled by ICTs. We find, however, that the role KM plays in African ARD policymaking processes is highly debatable. The paper contributes to this discourse by addressing issues pertaining to the availability of data and information on agricultural production, issues that hinder policy implementation, institutional frameworks and the roles of the various actors and stakeholders, and the ability of ICTs to enhance KM.

ARD practitioners in Africa are aware of the important role of KM in policymaking; however, the actual use of KM is constrained or diminished by inter-related factors encompassing the national context where politics can overshadow policymaking and there are limited capacities and low levels of investment in ICTs and KM.

At a global level, information and data are widely available; however, there is a paucity of locally-generated and locally-relevant data and information in Africa. The capacity to collect, analyse and use data is low and hence access and use of information and data for policymaking is limited. ICTs are being used to varying degrees but the linkages between ICTs, KM and policymaking are not yet well established.

1

Introduction

Contextual overview of ARD in Africa

Agriculture is essential in rural development but its contribution to growth is declining in part because there are many complexities involved in identifying and implementing agricultural policies that support small farmers in ways that lead to poverty reduction and economic development (Spielman and Pandya-Lorch, 2009; World Bank, 2008). More than 60% of Africa's population is rural, depending on subsistence farming for livelihood, yet in the majority of African countries the proportion of arable land is less than 10%¹. This necessitates prudent management of land resources and practices that increase agricultural yield. Disturbingly, agricultural productivity or yields have not increased, although net production may have. The explanation is that agricultural growth in Africa is generally achieved by cultivating more land and by mobilizing a larger agricultural labour force, which produces very little improvement in yields (NEPAD, 2014b). This does not augur well when projections are that feeding the future population will require a 70% increase in food production (FAO, 2009a; Haggblade and Hazell, 2010).

In many countries, the agriculture sector is dominant in raising incomes among the poor by as much as four times more than other sectors (World Bank, 2008); about 17% of the GDP (gross domestic product) and 40% of exports are from agriculture. However, the number of poor people in Africa has increased steadily over the last 20 years. In 2010, 93% of people in sub-

Saharan Africa were ranked as poor – living on less than US\$5/day.

Africa also has the youngest population in the world (AfDB, 2012), referred to by some as the 'youth bulge' and the 'youth dividend' by others. Against a backdrop where most rural youth derive employment and livelihood from agriculture, failure to address prevailing inefficiencies in the sector makes this demography a ticking time-bomb.

The issues of declining productivity, increasing population and increasing poverty present enormous social imperatives requiring answers to questions about the efficacy of policymaking processes and their relevance to the future challenges that smallholder farmers will encounter. Political instability, weak governance systems and corruption continue to plague Africa, while policy coherence and effective implementation remain a challenge.

The good news is that Africa has recently seen renewed political commitment to further strengthen the strategic role of agriculture for the continent's development agenda. For example, the New Partnership for Africa's Development (NEPAD) initiated the Comprehensive Africa Agriculture Development Programme (CAADP) with two specific targets: attain 6% annual growth in agricultural productivity and sustain commitments of a minimum of 10% of annual budgets to agriculture. In this way, CAADP is expected to improve implementation of agricultural policies and contribute to achieving sustainable national growth and poverty reduction. The African Peer Review Mechanism (APRM) is another NEPAD initiative grounded on the assumption that good

¹ Approximately 44% of the land in sub-Saharan Africa is classified as agricultural land (arable land plus land used for pastures and permanent crops). Arable land here is used to denote land for crop cultivation.

governance will lead to improvement of policymaking processes, which will lead to better policies and policy environments. Together, CAADP and APRM have the potential to trigger new ways of bringing change in Africa's agriculture (Zimmerman, 2009). It should be noted that in the 10 years since CAADP was launched, more than half of the countries have signed compacts but few are consistently meeting the targets² (Benin and Yu, 2013; ReSAKSS, 2013). This raises inevitable concerns regarding how policies are evolving and implemented at country-level. The Regional Economic Communities (RECs) are recognised as an important link in the implementation of continental initiatives such as CAADP and APRM, and challenges persist in achieving the necessary complementarities and synergies between the various actors at national, regional and continental level.

In the face of the challenges facing Africa's agricultural sector, agriculture and rural development (ARD) practitioners are increasingly recognising the importance of knowledge management (KM) as a crucial element – given the proliferation of information, demands for rapid assimilation of data and the increased value placed on knowledge as an asset in influencing effective agriculture policymaking (McIntyre *et al.*, 2008; Ojijo *et al.*, 2013). Some of the problems facing ARD are to a degree associated with ineffective KM, although other factors such as the influence of national context and politics are equally important. As such, ARD policymaking is by and large driven by the interaction between political, knowledge and other policy influences (Gitau, 2008; Jones, 2009; Jones *et al.*, 2009, 2012). Political interests are the outcome of a political bargain between politicians and their citizens, who demand policy action or defend special interests in exchange for political support. Thus, the extent to which knowledge does influence policy change in the agricultural sector is an area of much concern and debate.

The pervasiveness and versatility of ICTs provides a natural fit with the demands of KM for collection, processing, storage and dissemination of data, information and knowledge. Reaping the benefits of ICTs requires investment in infrastructure, technology and expertise; and while Africa has made significant strides, investments do not match anticipated benefits and so Africa continues to lag behind the rest of the world. The potential impact of ICTs for boosting the agricultural sector and the lives of Africa's farmers has been touted to great lengths but challenges remain with affordability and sustainability (Deloitte, 2012; UNDP, 2012; World Bank, 2011).

In view of the foregoing, we advance an argument suggesting that knowledge is an important influence in agriculture policymaking processes but power and politics can have an overriding influence. We further note the symbiotic relationship between ICTs and KM in that ICTs provide new ways of manipulating data and making the information and knowledge available and accessible to those who demand it; KM on the other hand can stimulate the development and use of ICTs. However, low levels of investments in ICTs place Africa at a disadvantage in terms of realising the benefits of ICTs for KM and this therefore has spill-over effects on policy formulation and implementation.

Objectives and questions

The overall goal of this paper is to contribute to the understanding of policymaking processes in ARD by identifying the major debates on KM and ICTs. The motivation of the paper is to influence the content of policy dialogues and documents, and to improve the efficiency and effectiveness of policy processes. The paper addresses five related questions:

1. Is there a problem of limited information about agricultural production and other statistics? If yes, how serious is it and what can be done about it? Can better knowledge supported by timely and more precise data collection contribute to the relevance, consistency and effectiveness of policies?
2. What is/are the problem(s) hindering effective policy implementation? Is it really lack of data or information? Power relations? Trade blocs?
3. Who are the stakeholders or actors generating, collating, analysing and disseminating the information? Who are those accessing and using it?
4. What institutional frameworks exist, within which ICTs are implemented and knowledge is created, that can guide and support agricultural and/or rural development and hence contribute to alleviating the problem (of limited agricultural production)?
5. What ICTs are being used to improve stakeholders' access to knowledge about agriculture and to what extent have they succeeded?

² Since 2003 only 13 countries have in one or more years met or exceeded the CAADP target of 10% spending on agriculture, while only seven have consistently surpassed the target in most years (Benin and Yu, 2013).

Conceptual framework

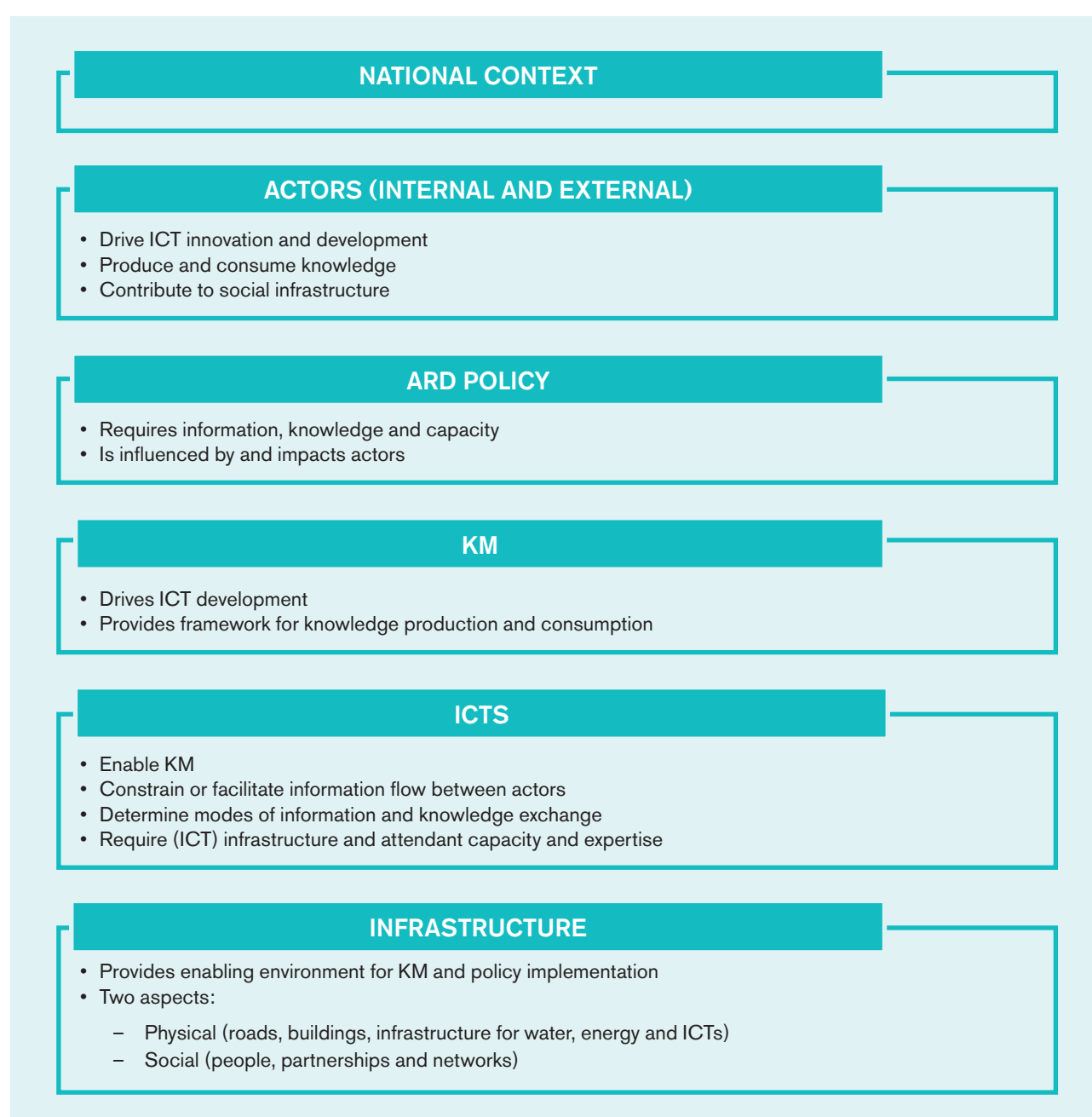
The diagram in Figure 1 shows the conceptual framework on which the paper draws the arguments and much of the discussion surrounding the interplay between ICTs, KM and ARD policymaking.

The framework assumes that ARD policy is influenced by several interacting factors and that the national context is the overriding factor. National context in this case refers to socioeconomic status (Least Developed Country (LDC), middle-income or non-LDC), policy coherence, geopolitics and the political economy, which are generally heterogeneous among countries.

KM and ICTs shape the ARD policy environment depending in part on the national context. KM is influenced by both external and internal actors: internal actors include policymakers, national researchers, intermediaries/knowledge brokers and farmers, while the external actors include development partners and international researchers. We expect that countries with strong interaction among internal actors will have more effective KM systems and that these countries are more likely to have better ARD policy processes.

The relationship between actors and ICTs emerges in the demand for and use of ICT-enabled services; further ICTs change the ways in which actors communicate and

Figure 1. Conceptual framework – ICTs, KM and ARD policymaking.



exchange knowledge and information and depending on the type of ICTs available may constrain actors. Considering that ICTs are increasingly becoming an essential part of KM systems, the level of ICT development could be an indicator of maturity of KM i.e. we expect countries with more developed ICT infrastructure and services to have more mature KM systems, and hence to have better integration of these in ARD policymaking.

Lastly, infrastructure which we classify into physical and social infrastructure provides an enabling environment for policy implementation and underpins the use of KM and ICTs by the various actors within the national context.

2

Knowledge Management

Hierarchical model of knowledge

We use the model of Davenport and Prusak (2005) of a hierarchical progression that translates data to wisdom through intermediate stages of information and knowledge using the following definitions:

- **Data:** facts, observations and data points, eg agricultural yield – tonnes of maize
- **Information:** data with context or 'know-what', eg distribution of agricultural yield
- **Knowledge:** information with meaning or 'know-how,' eg influence of soil fertility on agricultural yield
- **Wisdom:** Knowledge with insight, eg sowing according to observed variation in seasons

Given this hierarchy, it is evident that data is the foundation for KM and a paucity of data will lead to ineffective KM. Having said that, availability of data does not necessarily imply effective KM; it is the ability to create or acquire data and then translate or adapt that to a specific context that leads to effectiveness. This is illustrated in the KM framework in Figure 2 (adapted from Lau, 2004) that shows how data, information, knowledge and wisdom continuously pass through three phases of production, use and refinement.

Types and sources of knowledge

There are many different ways of classifying knowledge and Table 1 illustrates some of the more common categories found in the literature (Jones *et al.*, 2009; Lau, 2004):

It should be noted that explicit and tacit knowledge represent categorisation of knowledge at the highest level and that knowledge can be one or the other of these but not both. With regard to the remaining categorisations, there may be overlaps – for instance informal knowledge can overlap with indigenous knowledge whereas formal knowledge might overlap with research knowledge.

For policymakers, researchers and development practitioners, sources of knowledge stem from empirical research, published literature and online databases and repositories as well as from personal interactions with peers, both informally and through organized knowledge exchanges (eg conferences, workshops and peer review of publications)

For smallholder farmers, the main sources of knowledge and information are through peer-exchanges, extension advisory services and through media such as the radio and TV. Print literature can also be a source of information but the efficacy is compromised by low levels of literacy, necessitating the use of intermediaries to process the information on behalf of the farmers. In recent times, mobile messaging (text, voice and multimedia) has gained popularity as a way of connecting with farmers, the main challenge being literacy and the cost of access.

Figure 2: KM Framework Illustrating Hierarchy of Translation From Data to Wisdom

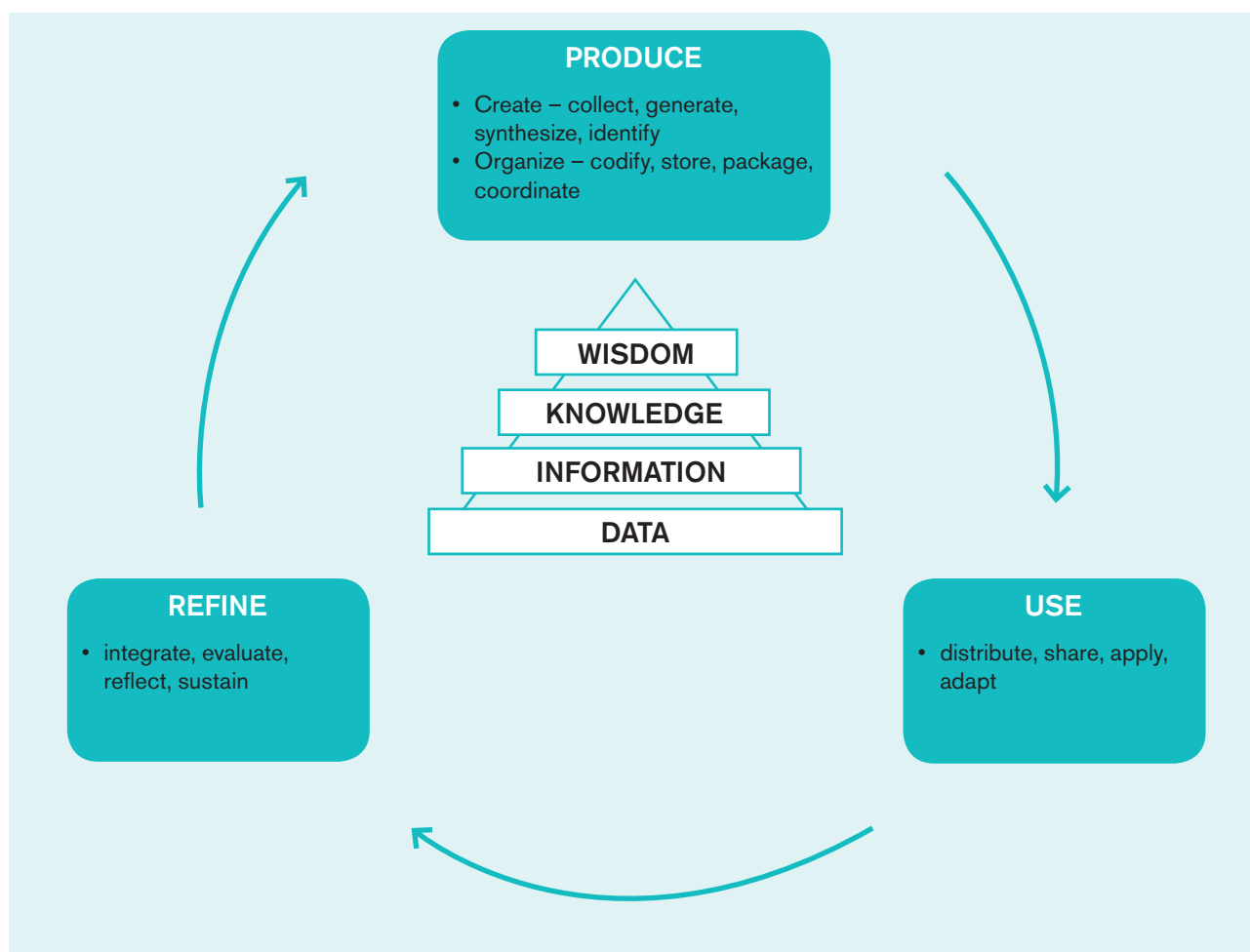


Table 1 – Types of Knowledge

Explicit (codified) knowledge	knowledge that can be consciously understood and articulated
Tacit knowledge	knowledge that the knowledge holder is not aware of; expressed through experience
Formal knowledge	knowledge acquired through formal education
Informal knowledge	knowledge that is handed down or acquired through experience
Indigenous/traditional knowledge	local knowledge unique to a culture or society that is passed down in communities (usually orally) from generation to generation
Participatory/citizens' knowledge	knowledge held by citizens based on their daily lives
Project/programme knowledge	generated from implementation of a project or programme
Research knowledge	acquired through (scientific) investigation

3

KM, ICTs and ARD Policymaking in Africa – the Issues and Debates

Data is available but not always useable

Data for and about African agriculture is sometimes produced by external experts or local researchers who may not be fully aware of the data needs of policymakers, farmers and other users; the data collected, generated and synthesised thus needs refinement to make it useable for policy and decision making. However, there is limited technical capacity within Africa to do these refinements and this explains why data may not feature much in policymaking. A review of CAADP implementation showed significant shortcomings with the way data was collected and presented; and this has an impact on the effectiveness of policy (Benin and Yu, 2013).

In addition, much of the important qualitative information collected at the lowest levels, such as comments in reports, are difficult to aggregate and thus do not move through the system to the top-levels of government. These are eventually diluted and simplified into general themes (eg many final reports include statements such as “the major issue is the lack of capacity”). There

is also a tension between donor requirements for monitoring and evaluation and generation of data for use by policymakers: data that may be deemed useful for policymakers may not meet donor requirements and vice versa. In Malawi a study found that the information collected by the Ministry of Agriculture and Food Security (MoAFS) was not useful for its development partners, although it served national priorities. This is further exacerbated by poor designs of interventions, which make meaningful impact assessments difficult if not impossible (Loevinsohn *et al.*, 2013). Pressures to meet donor requirements may override the information needs and priorities of governments; in the face of limited capacity, development partners need to ensure that they are positioned to support and complement national priorities rather than adding to the complexities.

The other issue worth examining is on knowledge and technologies for spurring agricultural production. Our review found that extension documents are produced by national agriculture research and extension systems to inform smallholder farmers about the latest recommendations concerning different agricultural practices but these documents are not disseminated, updated or managed to respond to the

needs of extension workers, advisers and farmers. In Malawi such documents are largely produced based on project funding rather than routine services to the farming communities. The situation remains true for technical reports, books and research papers related to agricultural production.

Some notable initiatives to deal with these deficiencies include The African Science Technology and Innovation Indicators (ASTII) initiative, the Regional Strategic Analysis and Knowledge Support System (ReSAKSS) and the Africa Action Plan for the Global Strategy for Improving Agricultural and Rural Statistics.

Asymmetries exist in production, consumption and storage of knowledge

Collection of statistics and data at global level is well-documented and known; institutions such as the Food and Agricultural Organisation (FAO), the International Food Policy Research Institute (IFPRI) and the Consultative Group on International Agricultural Research (CGIAR) among others are reputed for collecting and disseminating agricultural statistics and over time, many repositories of statistics and data on agricultural and other development indicators have been established (IFPRI, 2014). Due to the multiplicity of actors, there is on the one hand duplication and on the other fragmentation of information. These repositories are usually located on ICT infrastructure that resides outside of Africa, as such using the data carries a premium with respect to connectivity and other costs associated with access to the repositories. Users in Africa therefore face constraints with finding relevant information, manipulating it and having ready access. It is encouraging that there is a growing global movement to consolidate information repositories and standardize metadata to make it easier to use (Caracciolo and Keizer, 2012). However for policymakers and researchers in Africa, the lack of locally-generated repositories will continue to pose challenges. If the data collection is externally driven and efforts are not made to ensure that they are created, owned and maintained nationally, then Africa will continue to experience the problem of information asymmetries that plague policymaking processes.

Although it is increasing, the production of knowledge through research in Africa is not at par with global levels (Schemm, 2013). The Africa Innovation Outlook 2014 revealed that research outputs in science and technology are less than 1% of global output; this is attributable to the low levels of national funding for research and the low levels of capacity at post-graduate

level (NEPAD, 2014a). Most research done in and about Africa is done by non-Africans just as most content on the internet about Africa is not generated in Africa or by Africans. This points to a need to address the localization of research and the generation of research outputs that are contextualized to African needs. Driving such research boils down to countries taking time to strengthen research institutions and developing national research agendas. It is also important to ensure that partnerships and collaboration focus on transfer of research skills and to enhancing the research capacity of African institutions (Lynam *et al.*, 2012; McIntyre *et al.*, 2008).

Despite progressive investment in agriculture and food security, African governments have not yet fully exploited ICTs to enhance the flow of knowledge and information, and movement of people, goods and services (including the production and supply of agricultural inputs) within and among nations, regions and the continent at large. This is despite the need for Africa to create and consolidate existing databases on agriculture to support and complement related food security initiatives (Dioné and Kagwanja, 2005; NEPAD 2014b). While pronouncements continue to be made about the role of knowledge for policy and decision making, these need to be matched by adequate levels of investment in KM and ICTs (AU, 2014).

Locally-generated data suffers from poor quality and reliability

Kelly and Donovan (2008) conducted four different country case studies in Mali, Zambia, Mozambique and Rwanda on agricultural statistics and found that there had been improvements in data quality and relevance to the policymaking process. However, they noted that challenges persisted with sampling and measurement, coordination between actors, disaggregation of data and adequate funding for data collection. The concerns over data quality are echoed by FAO's analysis of 44 countries in sub-Saharan Africa in which only two countries had high standards in data collection, while standards in 21 countries remained low (Carletto *et al.*, 2013). This explains why data on Africa is usually collected by external agencies; in most countries, local collection of data suffers from quality due to limited skills and capacity and so local agricultural statistics and data are often poor or incomplete. As an example, key data on areas cultivated and yields are too often based on the estimates of field staff, rather than actual measurements.

A related issue about agricultural data in Africa is the huge variations associated with estimates. As cited by Carletto *et al.* (2013), the School of Oriental and African Studies reported that in Malawi, there were large differences in the estimates of the number of farm households between the Ministry of Agriculture and the National Statistics Office with 3.4 and 2.47 million, respectively, which in turn affects the accuracy and effectiveness of planning for the subsidized input program.

The issue of quality data and information for effective policy formulation presents as a chicken-and-egg problem; impact evaluations are rigorous exercises that require a lot of data and information and can be quite costly. However, carrying out such evaluations can help to build and strengthen local capacity (Wadja *et al.*, 2008). In the same vein as impact evaluations, evidence gap maps are suggested as a way of dealing with the challenge of scattered sources of information that make it difficult for policymakers to get a complete view of the policy environment (Snilstveit *et al.*, 2013).

More data does not mean better policies

A model of the relationship between information and policy (Blandford, 2007) illustrates that the generation of more information does not necessarily lead to better or more-informed decision making. The effectiveness of information is linked to how closely aligned the information is to the needs of the user and the way in which the information is packaged and presented. Benin and Yu (2013) cited the lack of disaggregated data on CAADP commitments as a reason for the difficulty of assessing and comparing the performance of national agriculture investment plans. Another example of this in the African context is disaster relief in Malawi where information is used for responding to the immediate needs of farmers while data that would help officials to better allocate the limited resources is not given much emphasis. The case for more data is that it provides a basis for more effective mutual accountability between stakeholders.

Challenges remain with management of indigenous knowledge

The issue of knowledge production and how it relates to research and valorisation of indigenous knowledge is another area of concern. Africa has a strong history of oral tradition and a wealth of knowledge that has been handed down and continues to be handed down

through the spoken word. Even for agriculture, (rural) farmers are more comfortable with auditory messages and peer-exchanges, especially since literacy levels are low, making written information beyond the reach of many. The challenge is the curation of this indigenous knowledge, ensuring that it is preserved and made available for rural populations. Currently indigenous knowledge systems appear to be focused on the use of the web for curation; however, given the prevailing state of affairs with respect to internet access, there is need to consider using more accessible technologies like radio and TV. The SADC Regional Agricultural Policy (SADC, 2013) takes note of the importance of indigenous knowledge although the focus appears to be more on preservation of intellectual property rights than on curation and dissemination of knowledge.

ICT development in Africa is sub-optimal and not conducive for KM

The growth and development of telecommunication services, including ICTs, in Africa has not kept pace with the rest of the world. The advent of mobile telecommunications has accelerated this growth, with Africa recording growth rates in excess of 20% year-on-year since 2000, and the number of mobile subscriptions has grown by five times since the start of the millennium. Mobile communication and the rise of the internet have contributed in ways unforeseen to easing communication and access to information in Africa. Sadly, access is still not affordable for most people and even though mobile subscription rates are at 60%, internet penetration is only 16%. Limited internet access and general access to ICTs in rural areas impacts on participation in policy processes (Munyua, 2007; NEPAD, 2013).

The available international bandwidth to Africa has increased from 100 Gbps in 2008 to 1.5 Tbps in 2013, yet per capita, Africa still lags behind the rest of the world: the average bandwidth per person is 2 Kbps compared to more than 90 Kbps in Europe. It is clear that with the current pace of development, Africa will continue to lag behind other regions and the so-called 'digital divide' will continue to increase. Furthermore, most investments in ICTs are made in urban areas where returns are higher, resulting in a rural–urban digital divide that manifests at national level. This rural–urban divide may be more detrimental to national development than the divide between countries or regions. The digital divide also contributes to some of the challenges of information asymmetry that present at national and regional levels.

The enabling environment for delivering KM in ARD is complex

The use of KM in policymaking and implementation for ARD in Africa has not met with the required environment to actualize success. Integrated approaches to KM require a balance between connecting producers of information with consumers, learning from these connections and making both the learning and information easily accessible. In Africa challenges are encountered with making and sustaining these connections due to constraints that may have nothing to do with the production and consumption of knowledge and information. As an example, Ethiopia has the largest agricultural extension system in sub-Saharan Africa (UNDP, 2012); however, the success of farmer training centres, which facilitate information and knowledge exchange among researchers, extension workers and farmers is compromised by inadequate infrastructure, budgetary shortfalls, no or limited access to electricity, lack of equipment such as TVs and computers and inadequate skills to use ICTs.

Social infrastructure is just as important as physical infrastructure

In addition to physical infrastructure (roads, buildings, infrastructure for energy, water supply and ICTs), social infrastructure³ as described in (Pretty *et al.*, 2011) is just as important for creating an environment in which KM and/or ICTs are able to improve policymaking and implementation for ARD. Morocco is a good example, where a structured partnership between the Ministry of Agriculture, agro-industry, farmers and a research and development (R&D) institution has created a self-sustaining model. The Ministry is assisted in providing extension services to farmers; farmers have access to credit, a ready market for their produce and can receive technical advice and knowledge; the R&D institution can recruit researchers and carry out informed research that is easily translated into practical action; and agro-industry is assured of a steady supply of good quality produce (Asenso-Okyere K. *et al.*, 2008). While these partnerships and networks (which others refer to as social networks or social capital) may evolve and mature over time, there should also be deliberate efforts to structure and incubate them.

ICT-enabled KM services are not sustainable

There is a move towards agricultural information systems (including market information systems) which provide farmers with information on farm inputs (availability and price), offers for produce and other ancillary services. Models for these systems are varied: on the one hand, there are fully-subsidized services provided by governments and on the other fully commercial services offered by 'infopreneurs'. While the need for these services is not debatable, it is still an open question how to provide these services in a sustainable manner and in a way that does not negatively impact on the rural farmers' ability to earn a living. Some evidence shows that initiatives that use mobile phones to provide access to information for rural farmers do not scale-up due to sustainability issues: initiatives are usually started as funded projects with the expectation that people will be willing to pay for the services once they realise the value (FAO, 2012). For many of Africa's rural people who live on less than US\$1 per day, while they may recognise the value of the services, they may not have the financial means to pay. This calls into question the role of Universal Service and Access Funds (USAFs) which are contributions levied by telecommunication regulators on operators as a way of ensuring that telecommunication services are rolled out to rural and under-served areas. Reports have shown that the bulk of funds collected under USAFs are under-spent (Munyua, 2007).

Lessons can be learned from the approach used in Uganda where Grameen AppLab partners with government and NGOs to employ farmers to collect information on agricultural diseases. This method, which relies on local people to transmit data to more centrally located research and extension staff, is much less costly and can provide much more timely information than traditional (disease) surveys. There is also a case to be made for the use of radio and TV, which do not have the same cost-burden as mobile messaging and internet for transmitting information to farmers; for example in Malawi, radio is used to provide market information to farmers (Manda, 2012).

While the internet has become a facet of daily life for most people, including most Africans in urban areas, the reality is that radio and TV are still the most pervasive form of communication. All areas in Africa are covered by a radio signal and more than 90% of people own or have access to a radio; TV penetration is around 40% (more than 50% of rural populations own a radio while close to 10% own a TV). Investments in ICTs should

³Pretty *et al.* (2011) refer to "...a social infrastructure of relations of trust, connections and norms ..."

therefore not overlook the importance of these more traditional forms, which have the ability to reach larger numbers of people in ways that are more cost-effective.

Often overlooked and remembered as an after-thought are the challenges that persist with electrification and transportation, which also have a bearing on the provision and uptake of ICTs (Burgos and Eduard, 2011; Knox *et al.*, 2013)

There is a disconnect between ICT and agriculture e-strategies

By 2010, about half of African countries had developed e-strategies. An informal survey carried out in 2013 revealed that the majority of countries (close to 90%) did not have specific e-strategies for agriculture, indicating the need for further work and models to guide the development of e-agriculture strategies (CTA, 2013a). The development of strategies for e-agriculture or ICT for agriculture is often an isolated effort that is not integrated with the agricultural development plans or the general e-strategy of a country. Additionally, a NEPAD study on ARD policy processes (NEPAD, unpublished) found that non-ICT related and specifically the CAADP policy processes lack visibility in the ICT community. It is noteworthy that CAADP does not have any specific work-stream related to e-strategies for agriculture, yet successful implementation of the four CAADP pillars will depend on having a robust and sustainable ICT infrastructure in both rural and urban areas (FARA, 2011). In the SADC Regional Policy for Agriculture, there is no mention of the role of ICTs. There is thus a problem of coordination between the ICT and agriculture sectors on the issue of e-strategies for agriculture.

The impact of ICT interventions in agriculture is still being proven

The rapid increase in mobile access and coverage has positioned mobile communications as the access technology of choice for both voice and data in most African countries. Muto and Yamano (2009) investigated the impact of mobile phones on farmers' market participation in Uganda. They found that improved access to price information appeared to reduce marketing costs and increase farm-gate prices; mobile phone coverage was associated with a 20% increase in sales of bananas, although the same could not be established for maize. Pye-Smith

(2013) provided examples of how ICTs at community telecentres are transforming the lives of rural people in Rwanda. Mobile platforms may also have potential for enabling rural people to find employment (FAO, 2012; Qiang *et al.*, 2012; UNDP, 2012).

The ICT landscape in Africa is dotted with a plethora of (pilot) projects and initiatives across almost all sectors. These initiatives record some successes and appear to have impact at micro-level; however, wider impact at a national or regional level is not clear. Another dimension of the debate proposes that there is a growing body of evidence linking investment in ICTs to economic growth, but little convincing evidence exists on the links to pro-poor growth.

National context overrides KM in policymaking processes

While acknowledging the importance of statistics and data, successful policies can emerge without reference to evidence (Booth, 2012; Ton *et al.*, 2013). As an example, the design of the Malawi Farm Input Subsidy Program (FISP) was not based on any research and much of the policy research conducted was by donors who wanted to make assessments on the impact of their investments in supporting the program. It should be noted, however, that local research provided evidence that supporting the subsidy program but this knowledge and attendant expertise were not used to design the program, and politics was more of a factor in its implementation (Chinsinga, 2007). The Malawi FISP reveals some features of policymaking which could be expected to generalize to other African countries:

- Politics and political power takes precedence in policymaking
- End users, such as farmers, have little or no say in policy formulation
- Policy implementation is usually not based on prevailing evidence, rather evidence is generated after the fact to justify policy that has already been implemented

This interplay between politics and agricultural policy is not unique to Malawi and has been evidenced in other countries (Cabral *et al.*, 2006; Gitau, 2008; Poulton, 2012). As noted by Tilstone *et al.* (2013), "Policymaking is often influenced by political/ power interests, so that the provision of information or evidence alone will not have an impact". Ghana, Nigeria, Sierra Leone and Tanzania are examples of countries with 'strong competitive electoral pressure' where agricultural growth is used to appeal to the electorate (Pinto *et al.*, 2014).

Geopolitics, trade blocs and policy implications

ARD policies are influenced by processes at several levels: global, continental, regional and national. At a continental level, the African Union Summit passes decisions, declarations and resolutions which are intended to be translated into the requisite policies and strategies at regional and national level. One challenge is that these decisions and declarations are non-binding and there is no provision for enforcement – the best that can be done is to monitor progress on implementation as is done with CAADP.

Despite the existence of RECs, intra-African trade is still relatively low. The existence of protective measures prohibiting cross-border trade in certain agricultural products also impacts on the ability of smallholder farmers to realise profits from their farming. Currently, efforts are underway to remove non-tariff barriers to trade and stimulate trade within RECs.

4

Conclusion

Polymaking is a knowledge- or information-intensive process, yet the reality for most African countries is that policies are usually developed without any reference to prevailing evidence or research; at best, research or evidence may be used at the implementation stage. Worse still, the monitoring and evaluation aspects may be weak, resulting in little information gathered to inform the next policy iteration.

Evidence-based polymaking is not a reality in most African countries for several reasons. First, the 'evidence' is usually not generated locally and hence is also not stored locally. This poses problems in terms of accessing and making meaningful use of the information; it also calls into question relevance of the data for polymaking. The collection of statistics and data and the subsequent translation of these into useful information require commitment and investment in people and institutions. Information needs to be packaged and available in a way that is meaningful and relevant to polymakers and other stakeholders.

Second, most research about Africa is not done by Africans and most publications on Africa are done outside of Africa. Stakeholders in Africa can access research outputs either through print publications (rapidly declining with time) and through electronic and online media. The costs to access journals and repositories are significant and should be built into institutional budgets; there have been initiatives to make journals available for free or at discounted rates that have helped but have not been able to be sustained. Furthermore, countries need to allocate more resources for national repositories, as much research work that is done is undocumented and lost because of lack of systems for curation and dissemination

Third, is the limited capacity in most African countries to conduct research, collect and analyse information. Efforts need to be directed towards promoting development of local capacity to undertake research and make the research outputs available in forms that meet the needs of end users. Strategies for research should include the element of national repositories and appropriate systems for curation and dissemination. On the dimension of KM, research outputs, whether generated in Africa or not, need to be readily available to the relevant stakeholders and key messages need to be synthesised according to the stakeholders' needs.

Although they are the most impacted by ARD policies, local/grassroots communities have little or no involvement in policy processes and politics tend to overshadow policy development. The political economy in Africa is predominantly state-centred with governments having the most influence on policy decisions; they are also able to use, misuse or selectively apply knowledge and information to push through policies that contribute to political agendas.

The impact and effectiveness of ICT interventions in agriculture is still in infancy and not rigorously proven at national or regional scales, and most countries do not have e-strategies for agriculture. Cost is a significant factor in the adoption of ICTs, especially for advisory and extension services and governments need to find innovative ways of delivering these services cost-effectively. The rise of cooperatives may be one way of mitigating the cost factor since the cost could be spread among the members, thus easing the individual burden on farmers.

While ICTs are increasingly recognised as an integral part of KM, it is less clear how to make the linkages between ICTs and KM in policymaking. Consequently, ICTs have not yet found their place in policymaking processes for ARD. African countries need to demonstrate that ICTs and KM are valued as an essential part of policy and decision making through adequate levels of investment in both the physical and social infrastructure. This paper sought to answer several questions in relation to policymaking for ARD in Africa. This general analysis reveals that at a global level, information and data is widely available; however, there is a paucity of locally-generated and -relevant data and information in Africa. The capacity to collect, analyse and use data is low and hence access and use of information and data for policymaking is limited. ICTs are being used to varying degrees but the linkages between ICTs, KM and policymaking are not yet well established.

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This paper investigates the role of knowledge management in African agricultural and rural development policies, and how information and communications technologies (ICTs) can contribute to enhance it. African Policymakers are aware of the importance of knowledge management; however, its actual use is constrained by inter-related factors encompassing the national context and investments in ICTs for knowledge management are still limited.

As a result, the capacity to collect and analyse locally-generated and locally-relevant data is low and so is the use of these information for policymaking. ICTs are being used to varying degrees but the linkages between ICTs, knowledge management and policymaking are not yet well established.

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