Continental Data Capture Strategy (CDCS)

A Practical Guide for Knowledge Managers in Africa AR4D

By
ABUGRI Benjamin & BRANDNER Andreas

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Forum for Agricultural Research in Africa (FARA)

No. 9 Flower Avenue, New Achimota Mile 7
PMB CT 173, Accra, Ghana
Telephone: +233 302 772823 / 302 779421 Fax: +233 302 773676 /
Email: publications@faraafrica.org;
Website: www.faraafrica.org

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Foreword

Knowledge Management and Decision Support initiatives are crucial for catalyzing agricultural innovation and climate-relevant interventions. In the last decade, there has been a significant increase in knowledge management and decision support interventions in development programmes across Africa. However, the World Economic Forum's report posits that Informed decision-making processes at all levels are weak due to low availability and accessibility of relevant and reliable data, information or knowledge

Existing agricultural and agribusiness knowledge and statistics are spotty and unreliable in Africa – this despite the existence of official statistics agencies in most, if not all, African countries (housed either by national bureaus of statistics, the national chamber of commerce, or within ministries of agriculture) with the responsibility to collect, manage, and make available reliable agricultural knowledge. This situation has substantially hampered efforts to ground agricultural planning and policymaking in evidence. This situation poses a substantial challenge to CAADP in its preparations for the severe attention that will (and should) be paid to Malabo Indicators and to the targets that are set for biennial reviews of CAADP plans at the country level. This situation also poses challenges at grounding Sustainable Development Goals (SDGs) indicators in reliable data.

Several significant institutional developments in recent years provide a handy foundation for an attempt to improve the situation as regards agricultural knowledge, information and data capture and dissemination in Africa:

1. The **Global Strategy to Improve Agricultural and Rural Statistics** is a multi-agency initiative led by the Food and Agriculture Organization of the United Nations (FAO). The Global Strategy provides technical guidance (based on a world-class synthesis of global experience and novel methodological advancements) that can form the basis for identifying and implementing institutional and methodological improvements in Africa's agricultural knowledge and statistics programs.

2. The emergence of the **Comprehensive Africa Agricultural Development Program (CAADP)** – CAADP provides the platform and mandate for leadership (political and technical) and collective action at continental and regional levels to support the strengthening of agricultural programs, policies, and institutions at every level in Africa.

3. The establishment of the **Global Rural and Agriculture Integrated Surveys Partnership (GRAInS)** between the World Bank, FAO, the International Fund for Agricultural Development (IFAD), the United States Agency for International Development (USAID), the United States Department of Agriculture (USDA) and the Bill and Melinda Gates Foundation (BMGF) to enhance operational and methodological coordination among

the primary household and farm survey data initiatives, namely the World Bank Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA) in the Development Data Group, FAO Agricultural and Rural Integrated Surveys (AGRIS), and USAID Core Agricultural Rural Development Surveys (CARDS), as well as other survey efforts led by various agencies.

4. FARA, in 2017, took steps based on its many years of experience and feedback received from over 40 NARIs to analyze and assess ways to improve the forum's information management and collaboration with our partners. Our objectives were to enhance knowledge generation and networking processes and to work more efficiently with our stakeholders. This preparation resulted in the development of the "FARADataInformS" (FARA Data & Information Systems). FARADataInformS is a component of the Observatory for the Science Agenda and Africa AR4D. It serves as a repository of relevant Science and Technology Indicators (STI) metrics at the country level that serve as the primary resource from which various information products can be derived. It is a web-based platform with analytical features, built on open source and uses (Application Programming Interface- APIs) to integrate data from the existing relevant sources. FARADataInformS offers opportunities for individuals, Programme teams, regional, sub-regional and national partners to work more dynamically, as it allows enhanced information and communication flows and generation of relevant reports. Through its online Community and Experts Directory, Collaborators can work more interactively. It positions Africa Agriculture in relevant global platforms. **FARADataInformS** is an extension of the Africa Agricultural observatory (in CAADP and the S3A). With the World Bank (MDTF) initial support, the European Commission's DESIRA funded CAADP-XP4 Project is very well situated to work closely with the SROs and AFAAS and other relevant partners.

Working through CAADP to scale up and strengthen agricultural knowledge and statistics in Africa have not made as much progress as might have been hoped. Renewed attention is needed through the CAADP-XP4 to boost the momentum of existing initiatives and arrangements, and some of the ongoing initiatives highlighted above could be catalytic in achieving these goals. A concerted and coordinated effort is needed across Africa to improve African agriculture knowledge capture.

The expertise developed among stakeholders within the NARES over the years, in collaboration with FARA and partners (AFAAS, CCARDESA, CORAF, ASARECA), has established a knowledge delivery infrastructure resulting in the development of this Continental Data Capture Strategy for Africa, focusing on AR4D institutions.

With four (4) significant chapters, the development of the CDCS did an exhaustive analysis of current strategies, documents and systems, and interviews and workshops. FARA´s

current Knowledge Manage-ment and Decision Support System was reviewed and commented as well as the KM Approaches of the other CAADP-XP4 partners and some best practices in the field of agricultural development. An integrative approach to Data Capturing in the context of a Continental Knowledge Management Framework for Agricultural Development is ready and available for adoption/adaption at all levels of implementation.

I wish you a fruitful reading.

Yemi Akinbamijo (PhD),
Executive Director, FARA

Preface

Knowledge is at the heart of sustainable development!

The achievement of the SDGs and the S3A depends significantly on the ability of all local, national, regional and global partners to make the best use of knowledge for transformative action. Knowledge has been widely recognised in SDG17 (Partnerships for the Goals) and the Agricultural Sector of Africa. The Comprehensive African Agriculture Development Programme (CAADP) and later the Malabo Declaration state the relevance of knowledge as the critical resource in Agricultural Development, particularly in Africa. The AU and all partners and stakeholders are committed, but how is knowledge managed on a continental level? It is not that easy, and there is no out-of-the-box recipe that fits all sizes, cultures, traditions, and ambitions. However, all efforts are at risk of failure without a common framework, lacking coordination and integration. The development of a Continental Data Capture Strategy, embedded in a Knowledge Management Framework for Agricultural Development in Africa, is an important achievement, milestone, and joint effort of all CAADP XP-4 partners (FARA, AFAAS, ASARECA, CCARDESA, CORAF, NAASRO and the NARES). Stakeholders are to be recognised to achieve this result!

Data > information > knowledge > action

Data is an essential pillar for knowledge-based development, but it is not enough. Data, understood as mostly numeric units of information must be contextualised to create valuable information and support decision-making. However, information needs to be understood and interpreted by human beings to create knowledge. Then it still requires motivation and resources to put knowledge to action. It is a long value chain, which needs to be managed. Therefore, a strategic, targeted, and integrated Knowledge Management Approach is necessary to orchestrate people, technologies, and processes.

Knowledge partnerships and common agendas

Knowledge is a decentralised resource. Nobody knows everything. Therefore, the performance of agricultural knowledge ecosystems is paramount in the implementation of an integrated KM Framework, and agricultural knowledge partnerships are necessary at continental, regional, national, and local levels. The Integration Agenda, proposed in this CDCS, is a major prerequisite for the functionality of linked knowledge partnerships.

Knowledge skills and Artificial Intelligence

Knowledge work is different from other forms of work. It can be learnt, and it has to be learnt. It doesn´t appear on its own. Significant efforts need to be taken to build the capacities in all stakeholder groups to perform in the knowledge era. New topics, like Artificial Intelligence, need to be integrated into the concepts as fast as possible. Hesitating means losing. The

most considerable risk is to wait. AI is a must to handle the steadily growing amounts of data.

Most important, however, are our values! Knowledge cannot make a change if not applied by caring people. We pray that the spirit of love and care will make the Continental Data Capture Strategy fly for the benefit of African Agriculture and Sustainable Development.

Andreas Brandner (PhD)
Executive Director
Knowledge for Development Partnership

Benjamin Abugri (Mr)
Knowledge Management Lead
Forum for Agricultural Research in Africa

Acknowledgement

This Continental Data Capture Strategy (CDCS) is developed by the Forum for Agricultural Research in Africa (FARA) as part of the observatory for Africa Agricultural Research for Development (AR4D) and the Science Agenda for Agriculture in Africa (S3A) under the CAADP X-Piller 4 Programme funded by the European Commission through IFAD. The content was derived from collaboration with the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), the Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA), the West and Central African Council for Agricultural Research and Development (CORAF), the North Africa Agricultural Sub-Regional Organization (NAASRO) and the African Forum for Agricultural Advisory Services (AFAAS). Other experiences were drawn from the International Fund for Agricultural Development (IFAD) and International Livestock Research Institute (ILRI).

The authors would like to thank the Executive Director of FARA, Dr Yemi Akinbamijo and the Director for Research and Innovation, Dr Aggrey Agumya, and the immediate past Director of Research and Innovation, Dr Irene Annor-Frempong, for their leadership and technical guidance. The authors express their gratitude to Dr Enoch Warinda (Ag. ED of ASARECA), Dr Cliff Sibusiso Dlamini (ED of CCARDESA), Dr Abdou Tenkouano (ED of CORAF), Prof. Mohamed Soliman (Ag. ED of NAASRO) and Dr Silim Nahdy (ED of AFAAS).

Unique appreciations go to colleague Knowledge Management focal persons within the CAADP-XP4 programme, including Mr Ben Moses Illakut (ASARECA), Ms Bridget Kakuwa (CCARDESA), Mr Zinsou Kpavode and Mr Andri Raso (AFAAS) for their support. From the Akosombo Agenda through to the validation of the CDCS, they were very crucial. Furthermore, special acknowledgement goes to colleagues at FARA, especially Mr Krishan Bheenick, for their constructive comments that led to the finalization of the CDCS. A special appreciation goes to the Knowledge Management, Learning and Communications Cluster team (Daniel Peprah, Samuel Attakorah, Gabriel Quansah and Christabel Essel) for your tremendous support in producing, translating and disseminating the final CDCS. Finally, to all stakeholders from the various National Agricultural Research and Institutes (NARI) and Extension Focal Points across Africa, your direct and indirect contributions are commendable.

About the Authors

Benjamin Abugri (Mr)

Benjamin Abugri is a Certified Knowledge Manager and the Knowledge Management and Outreach Officer for the Forum for Agricultural Research in Africa (FARA). He is the Lead Specialist responsible for implementing activities of the Knowledge Management, Learning and Communications functions. He has vast experience in Knowledge Management, Communications, outreach, networking, coordination, Project Management and Community Engagement. Before joining FARA in February 2017, Benjamin served as Knowledge Management Specialist for the University Research Company (URC) USAID funded Systems for Health Project. He also worked as Knowledge Management Program Manager for the John Snow (JSI) Health Research & Training Institute USAID funded SPRING Project; and Knowledge Management & New Initiatives Coordinator for World Vision International. Before taking up Knowledge Management roles in 2013, Benjamin spent over 6 years working as a Programme Officer implementing projects in Food Security & Micro-finance, Health, Education, Water & Sanitation, and Child Sponsorship in rural communities of Ghana. He holds a B.Ed in Accounting & Business Management from the University of Cape Coast, Ghana; a Postgraduate Certificate in M&E from The University for Development Studies, Ghana and an MBA in Strategic & Project management from the Paris Graduate School of Management, France. Benjamin is currently a PhD Candidate in Public Administration & Policy Management at the University of Ghana Business School.

Email: babugri@faraafrica.org or sabugri@gmail.com

Andreas Brandner (PhD)

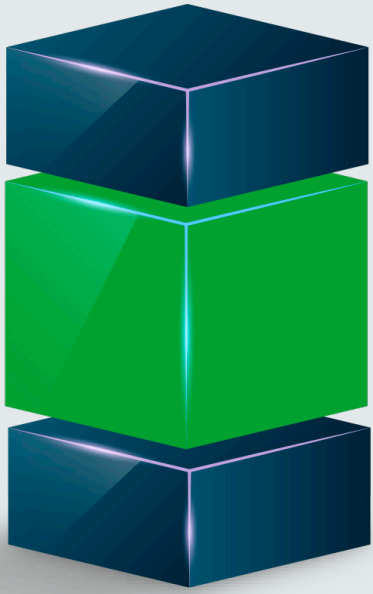
Andreas Brandner is Founder and Managing Director of KM-A (www.km-a.net) since 2001 providing educational, advisory, research and innovation services to international customers. He established the Knowledge Management Academy as one of the first and world-leading training institutions in KM. Since 2017 he is also Executive Director of the Knowledge for Development Partnership, a global multi-stakeholder platform linking KM with the SDGs. He is editor of the Agenda Knowledge for Development and the Knowledge Agenda for Uganda.

In 2017, he established Knowledge City (www.knowledge.city) as an international network of Competence Centres for KM, including Accra, Berlin, Dhaka, Geneva, Johannesburg, Kampala, Lagos, Lomé, Lusaka, Nairobi, Sofia, Vienna. Andreas is core team member of KM4Dev and advisory board member of the German Society for KM (www.gfwm.de).

He is advisor to companies, international organisations, governments, and academic institutions including Nokia, Siemens, HP, UNIDO, IAEA, OSCE, GIZ, AfDB, City of Vienna, the Governments of Austria, Kenyan, the UAE, European Science Fund, Austrian Academy of Sciences, Austrian National Library, FARA, and ASARECA. In 2020 he established the School of Knowledge Sciences. He runs the global KM Award since 2009, he is author of books and articles. His current focus is on advancing KM in multi-stakeholder partnerships.

Email: andreas.brandner@k4dp.org

Poll Results from Validation Workshop



29%
It's very well done

57%
It is well done

29%
It is OK

0% It has a few interesting aspects

0% Not well done at all

Acronyms

AFAAS	African Forum for Agricultural Advisory Services
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central
AOSTI	African Observatory for Science, Technology, and Innovation
CAADP	Comprehensive Africa Agriculture Development Program
CAADP-XP4	Comprehensive Africa Agriculture Development Program Ex Pillar IV
CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
CDCS	Continental Data Capture Strategy
CGIAR	Consultative Group for International Agricultural Research
CORAF	West and Central African Council for Agricultural Research and Development
CTA	Technical Centre for Agricultural and Rural Cooperation
EAC	East African Community
ECA	Eastern and Central Africa
EUR	Euros
FAAP	Framework for African Agricultural Productivity
FARA	Forum for Agricultural Research in Africa
IARC	International Agricultural Research Centre
ICT	Information and Communication Technology
IT	Information Technology
M&E	Monitoring and Evaluation
NAASRO	Northern Africa Agricultural Sub-Regional Organization
NARI	National Agricultural Research Institute
NARS	National Agricultural Research System
URL	Uniform Resource Locator (web page address)
USD	United States Dollars

Summary

This Continental Data Capture Strategy (CDCS) has been developed by FARA from November 2020 to February 2021 in collaboration with experts, representatives of CAADP-XP4 Partners AFAAS, CCARDESA, ASARECA, CORAF, as well as in consultation with expert and representatives of National Research Institutes, and other AR4D partners and experts.

Data capturing has been described as a process, which is embedded in the wider concept of the knowledge life cycle, which includes searching, finding, acquiring, creating, sharing, applying, and capturing knowledge. Like these other knowledge processes, capturing requires targets, roles & responsibilities, and measurements within an integrated knowledge management strategy.

The development of the CDCS was based on analysis of current strategies, documents and systems, as well as interviews and workshops. FARA´s current Knowledge Management and Decision Support System has been reviewed and commented as well as the KM Approaches of the other CAADP-XP4 partners and some best practices in the field of agricultural development. An integrative approach to Data Capturing in the context of a Continental Knowledge Management Framework for Agricultural Development has been developed.

The situation analysis has shown a clear commitment with supportive leadership, competent knowledge management, ambitious programmes and systems, well populated communities, and more. However, the ambitions and commitments to data capturing and knowledge management are hampered by still understaffed continental coordination as well as inadequate resources to develop, maintain and sustain capacities, systems, methods, and tools on national, regional and continental level. Through better coordination based on a systematic, integrated, and coordinated approach and the emphasis on less costy approaches – like communities of practice or the coordinated use of open source software – would allow to increase the impact even with limited resources. Increased and well trained human resources dedicated to KM are needed at all levels (continental, regional, national).

The following key recommendations are provided to establish a sustainable data capture programme, which essentially will also be the basis for continental knowledge management.

1. Continental Knowledge Development Goals: The strong commitments to knowledge-based agricultural development should be better operationalized through smart knowledge development goals.

2. Continental Knowledge Governance, Monitoring and Learning: A coordinated approach to knowledge in Africa requires continental knowledge governance system, based on knowledge partnership, knowledge agenda, knowledge report, KM roles and responsibilities

3. Continental Knowledge Products and Services: Through better coordination of knowledge products and services, the dissemination of knowledge assets would be easier and faster. Strengths in each region could be shared faster on continental level.

4. Continental Knowledge Skills Programme: An ambitious educational and transformational programme should be established to qualify Knowledge Managers for transformational leadership; efforts to be aligned on a continental basis.

5. Continental Knowledge Systems and Data Integration: A number of systems and tools are showing up as continental common sense, like DSpace as a repository and DGroups for Communities of Practice. Integration of such applications would create an integrated, continental access to knowledge for the first time and is highly recommended. FARADataInformS should focus its services on customer needs rather than sustain historic project outcomes. A new approach to FARADataInformS needs to assort its knowledge assets along relevant services, which are provided in high quality, up-to-date, functional and in a user-friendly way. A few "killer-applications" – highly relevant, widely known and used – are preferrable to a wide spectrum of inadequately staffed, resourced and maintained infosystems.

Although continentally integrated DSpace-installations will be a milestone in the integration of content, the new technological developments must be used fast with high commitment. The development of a knowledge graph[1] as a fundament for explainable Artificial Intelligence solutions to be developed in the next years. Semantic search, recommender systems, and smart farm-advisors are just the beginning of the digital transformation. Investment is needed, the sooner the better, and will pay back in many ways. Facilitating and resourcing an African AI Community would be a relevant step into

[1] Like a taxonomy, but with more expressive linkages, structuring agricultural knowledge and thereby allowing to link data and create added value.

this direction.

6. Continental Knowledge Communities (CoPs): . These are practical recommendations to capture knowledge in various contexts. While priorities for their implementation may differ, the approaches themselves can be generic, facilitated and coordinated through FARA.

7. 8 operational Knowledge Capturing processes are recommended for implementation. These are practical recommendations to capture knowledge in various contexts. While priorities for their implementation may differ, the approaches themselves can be generic, facilitated and coordinated through FARA.

The 8 knowledge capturing processes include:

The Continental Data Capture Strategy includes an implementation plan with responsibilities and a timeframe.

Introduction
Background

The Forum for Agricultural Research in Africa (FARA), the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA), the Centre for Coordination of Agricultural and Development for Southern Africa (CCARDESA), the West and Central Africa Council for Agricultural Research and Development (CORAF/WECARD), and the African Forum for Agricultural Advisory Services (AFAAS), are co-implementing the CAADP Ex-Pillar 4 on Agricultural Research and Innovation (CAADP-XP4) Project.

The CAADP-XP4 Project is financially supported by the European Union and administrated by the International Fund for Agricultural Development (IFAD) for four (4) years, 2019-2023. The CAADP-XP4 project supports a science-led and climate-relevant agricultural transformation in Africa. It aims at strengthening AR4D implementing organizations (AFAAS, ASARECA, CCARDESA, CORAF and FARA) to collectively support African countries implement relevant programmes of the Comprehensive Africa Agriculture Development Programme (CAADP) through inclusive regional and international partnerships; production and exchange of climate-relevant agricultural knowledge; effective communication, monitoring and evaluation; promotion of systemic and effective use of science, knowledge and innovation; and representation of the sub-regional and national organizations at the continental level.

The overall objective of the CAADP-XP4 is to increase the contribution of Africa's regional and country-level agriculture and food innovation systems towards the achievement of climate-relevant and sustainable transformation of the continent's agriculture and food systems.

The specific objective is to improve the individual and collective capacities of the key supra-national agricultural research and innovation institutions in their support to countries to achieve the programme's overall objective, through (i) establishing and strengthening multi-stakeholder partnerships (including European institutions) for climate-relevant innovation; (ii) strengthening policies, regional institutional arrangements and markets access; (iii) enhancing knowledge management for advocacy and decision support; and (iv) strengthening coordination (including planning, M&E and learning) and reporting.

Rationale

The idea of this Continental Data Capture Strategy (CDCS) is to help provide guidelines and coordinate the strategies and activities of continental partners – in specific the CAADP-XP4 partners FARA, AFAAS, CCARDESA, CORAF and ASARECA – in capturing data and linking them for the benefit of continental advancement of knowledge for agricultural development. "Capturing" data/knowledge however, is one of several critical steps, which need to be orchestrated to create value. According to the international KM standard ISO30401, "capturing" is an element in the knowledge life cycle, like targeting, finding, acquiring, sharing, applying, capturing, and measuring knowledge.

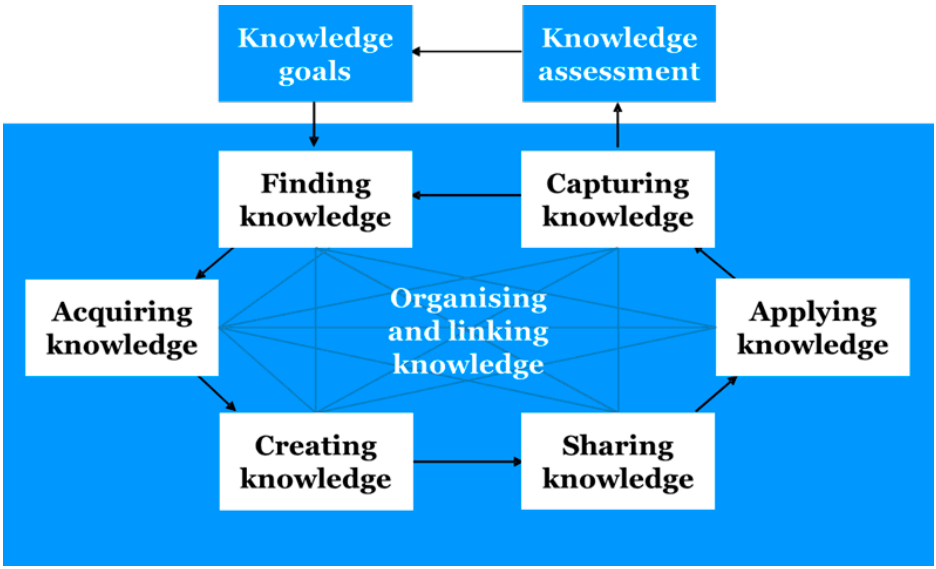


Figure 1: Knowledge Lifecycle

after Probst, Raub, Romhardt (2012): Wissen managen.

A stand-alone data capture strategy to be effective will benefit from meaningful linkages with other processes in the integrated knowledge lifecycle. For that reason, the integrated understanding of the Knowledge Management process is outlined here to give a framework and context for data capturing. It is useful and beneficial to position data capturing in a targeted, systematic, and integrated approach to knowledge. Therefore, anchoring the CDCS in a continental Knowledge for Agricultural Development Approach would be desirable, and will be proposed as an outcome/finding of the process. However, the focus of the concept shall be on the capturing process, specifically having in mind the existing knowledge products and services provided by FARA, which lack a systematic approach to be filled with data and fulfil their intended purpose.

The analysis confirmed the need for an integrated, but still focused approach, and through collaborative work it was finally possible to outline an integrated, continental Knowledge for Agricultural Development Framework and to describe the prioritized knowledge capturing processes to be applied by all continental partners based on widely existing IT Infrastructures.

As a third component of this CDCS, a recommendation is provided on how to link data on the basis of semantic technologies, developing a knowledge graph and building artificial intelligence solutions on top of it. Considering the 10-years perspective of this strategy and the critical and strategic role that the CAADP-XP4 institutions play for the Africa Continent, the upcoming opportunities of semantics data linking and artificial intelligence need to be addressed early and with the highest priority.

Methodology

The development of this Continental Data Capture Strategy was based on research and review of available documents and online resources of FARA, SROs, and AR4D partners, as well as on expert interviews and workshops with focal points and experts of these organizations. The theoretical framework for the development of the CDCS is an adopted version of the KM4D Framework, a model that has been developed by Knowledge for Development Partnership (K4DP), linking Knowledge Management with Sustainable Development. This model has been further developed to be used as the **Continental Knowledge for Agricultural Development Model**. It is based on a value-chain approach, explains the theory of change, and is described in more detail below.

The Continental Data Capture Strategy is implemented in the following steps:

[3] See: https://www.k4dp.org/wp-content/uploads/2021/03/Global-Knowledge-Management-4-Development-Framework-and-Award-1-2021.pdf

Situation Analysis

FARA´s Knowledge Management and Decision Support Strategy

The Knowledge Management & Decision Support (KDS) Cluster Strategy 2019 – 2028 (Now revised to be called the Knowledge Management, Learning and Communications – KMLC Cluster 2021-2028), provides an overview of existing initiatives and institutions mainly aimed to achieve the targets of the CAADP – and specifically Pillar 4, reflecting the situation that informed decision-making processes at all levels are weak due to low availability and accessibility of relevant and reliable data, information or knowledge.

The document avails the vision that "By 2028, FARA (Forum) becomes the number one gender-sensitive knowledge gateway and observatory to AR4D and S3A knowledge and information in Africa" and provides 6 core aspirations, which are:

A. FARA becomes the leading publishing institution for all AR4D knowledge products in Africa.

B. FARA becomes the convergence organization for all African experts in AR4D in Africa and in the Diaspora

C. The centre of excellence and convener of knowledge management for African Agricultural providing relevant tools and products to the last mile.

D. FARADataInformS receives recognition for reference by the AU and other strategic institutions. Establish and sustain itself as the most credible and reliable portal (periodic releases and publications of relevant continental indicators and research results)

E. Working closely with the NAIS and SROs offering countries an added opportunity for greater collaboration, learning and sharing.

F. FARA providing opportunities for effective and factual Communication, decision making and Visibility for its constituent members and partners.

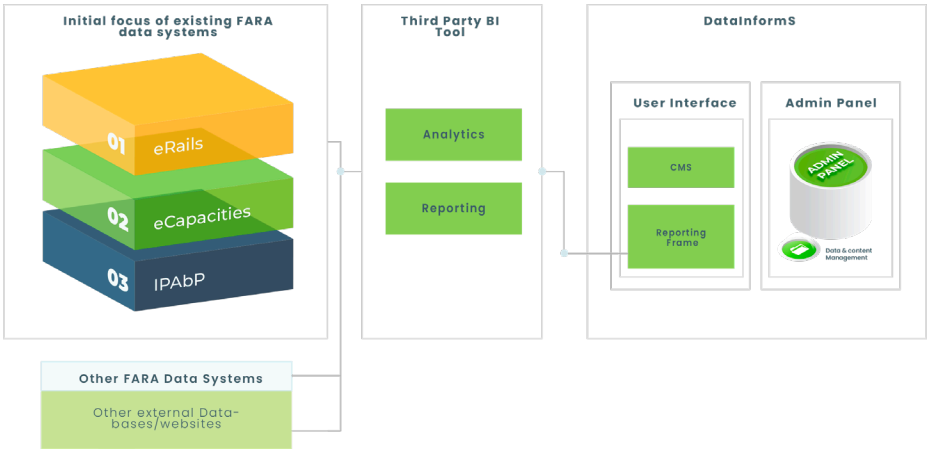
It outlines the aspired impact/outcome of the KDS Strategy and defines 6 strategic focal areas, which are:

1. Interoperable Knowledge Management Platform facilitating knowledge integration for exchange;
2. Facilitating collaboration and coordination of Knowledge Management (among networks, systems and structures in the context of the AKIS)
3. Knowledge products and tools connecting the last mile
4. Information & Data Management tailored to the African context
5. Advocacy, policy engagement and outreach
6. KM and ICT innovation and tools for leveraging stakeholders

These focal areas are elaborated briefly, highlighting specifically the instruments to be developed or maintained. Finally, it provides an overview of the Knowledge Management Tools underpinning the FARADataInformS, including,

- eCapacities
- eRAILS
- IPAbP
- PAEPARD
- BiomassNet
- Library
- DGroups
- Social Media Outreach

FARADataInformS System Architecture



There are linkages to the more detailed descriptions and guidance documents for each of these tools to explore in more detail.

Thereby, the KDS Strategy provides ambitious targets, prioritized areas of work, and practical tools for application, and the implementation of it would be highly desirable. However, there are gaps and challenges identified, which may hamper the implementation – or when solved could boost the success of this strategy. Find here some comments on the KDS Strategy:

[3] SMART = specific, measurable, achievable, reasonable, time-bound

• **Knowledge Development Goals:** While the overall ambitions and targets are formulated nicely in a way that nobody could refuse them, the real, concrete knowledge goals are not defined to be operational. In fact, "knowledge" is a comprehensive concept and difficult to put into numbers, but as long as the knowledge goals are not SMART , clear and concrete, their achievement might fail. Poorly formulated knowledge goals are linked with insufficient evidence and transparency of the agricultural knowledge ecosystems. The key elements of the knowledge ecosystem, including knowledge skills, knowledge flows, knowledge culture, knowledge assets, are not transparent, and FARA could be a proponent in pushing **a continental research agenda on knowledge ecosystems –** additionally to agricultural research. On that basis it would be easier to define knowledge development goals and systematically advance knowledge ecosystems that are fundamental for agricultural development.

• **Lack of Continental Knowledge Leadership and Partnership component:** It may seem obvious that all partners and stakeholders are ambitious, motivated, and eager to share their knowledge in order to achieve continental goals and to foster agricultural development. However, contributing to continental knowledge is an effort that people may not be willing to make without individual benefits. Such benefits can include financial benefits, but one cannot pay all contributors for each knowledge sharing activity. Social recognition, sense of community, trust, mutual learning and support, as well as the belief in something greater, in common goals, are common elements of a knowledge culture. Creating a culture/context, in which partners actively share knowledge, information, data, experience, amongst others, requires strong leadership and comprehensive, collective efforts. A strong knowledge ecosystem, in which all partners contribute on their end to finally achieve a better whole, requires knowledge culture. Leadership (not only by political leaders) and active agri-knowledge partnership are essential to create such an ecosystem. Because it was evident that no single partner has the understanding and knowledge of designing such culture on his desk.

• **Lack of Continental Knowledge Governance Model**: Considering that FARA is more than its Secretariat, the roles and responsibilities for a Knowledge Management Strategy need to be clarified on a wider level. In a Multi-Stakeholder-setup a governance model cannot be determined by one central partner, like the secretariat, but it needs to be co-created. That´s an additional reason why a continental agri-knowledge partnership is necessary for developing such a strategy.

• **Key knowledge assets on continental level:** The implementation of the KDS Strategy requires a concrete understanding of the knowledge needed to deliver the services. There seems to be a lack of human assets (knowledge management capacities, knowledge skills), and where they exist, they are uncoordinated and less effective, structure assets

(platforms and software to capture and link data), relationship assets (like collaborative communities of practice on knowledge management-related topics). It would be recommended to determine the knowledge needed to operate all processes and provide knowledge products and services on a continental level. This would also help address the lack of these resources, like creating a continental training programme for all those responsible for Knowledge Management, the coordinated development of IT Tools or the common development of Communities of Practices.

• **Continental knowledge processes are not defined.** Capturing as a process is missing – which gives reason to this strategy – but also others like searching, acquiring, creating, sharing are missing. This leads to unworkability of the overall idea. As long as concrete processes are missing, FARA builds on interpretation and goodwill.

• **Knowledge Indicators and a continental knowledge report,** linked with the Knowledge Development Goals, would strengthen the KDS Strategy. Although FARA´s KM activities are planned and monitored, an annual, strategic knowledge management planning and monitoring process is not yet available. The existing indicators for Knowledge Management could be widely disseminated and anchored in the partner scorecards

.

• **Required resources,** including financial sustainability, are essential, as Knowledge Management requires long-term commitments, reliability and sustainability. It has shown that project funding provides a kick for new activities, which cannot be sustained adequately after project closure. Knowledge transfer from projects to sustainable operations is still a challenge and the existence of databases that are still available after project closure but not populated demonstrate the destructive power of this unsolved problem.

To conclude, an integrated continental model for knowledge management supported and implemented by the continental partners cannot be overemphasized. Capacity building as well as the establishment of a continental knowledge management community, are essential starting points.

The highly productive workshop in Akosombo/Ghana in November 2020 was an important milestone for the development of such an integrated model, called Akosombo Integration Agenda.

[4] Workshop on Semantic and Relational DBMS for systems operated at FARA

FARA Data and Information Systems

[8] https://faradatainforms.faraafrica.org/about-faradatainforms

FARADataInformS

"The development of the FARADataInformS in 2017/2018 marked the beginning of an important coordinated effort aimed at achieving greater integration and harmonization of FARA's knowledge systems developed over the years for AR4D and the S3A. Whiles it asserts as a repository and observatory of relevant Science and Technology Indicators (STI) metrics with analytical features for agriculture at the country level serving as the basic resource from which various information services and products are derived, FARADataInformS will continue to establish and sustain itself as the most credible and reliable portal for periodic releases and publications of relevant continental indicators and research results, working closely with the NARS and SROs offering countries an added opportunity for greater collaboration, learning and sharing. It will continue to build stronger partnerships and outreach with relevant stakeholders at the National level and other continental and sub-continental institutions to develop and implement appropriate knowledge capture, dissemination and application strategy to ensure sustainability of these knowledge systems and other relevant data needs that will emerge."

FARADataInformS is an important step to integrate resources from existing databases, which have been created in projects which were closed years ago, and to sustain them in an integrated, user-oriented way. It is the right direction, and all the systems are legitimate and relevant. However, there is still a way to go. Not only the integration of these databases is a challenge, but also the population and continued use without the resources, which have enabled their development and existence. Currently 6 core information systems, including eCapacities Africa, BiomassNet, PAEPARD, Innovation Platforms Agribusiness, eRAILs II, and PANAP Network, are managed mainly by one person, who also manages the Communities of Practice on DGroups with over 35,000 members and other tools and communication channels. It is obvious that the resources are insufficient to run, maintain and populate such ambitious infosystems without a wider, collaborative and better-equipped approach. Currently, the InfoSystems lack content, attractiveness, maintenance, credibility, functionality, and competitiveness compared with other tools on the market, and most of them are substantially outdated. This is certainly due to lack of resources on the one side, but also a matter of lacking joint continental efforts and commitments. Relevant processes to make them a success, like this data capture strategy, are missing, and – as mentioned before – the capturing is only one of many elements that need to play together to bring a continental vision like FARADataInformS to success.

[5] https://faradatainforms.faraafrica.org/about-faradatainforms

The acquisition or capture of data for the existing systems will hardly work, as they are not attractive enough for people to upload content or to join a system which is outdated. Several key elements of the Infosystems reflect history (projects) and donor relations rather than current needs of direct target groups and indirect beneficiaries. The transfer of remaining knowledge assets into a user-friendly surface did not yet take place.
The exiting tools may not suffice to achieve the desired agricultural development impact and they lack the attractiveness. Usually, at least 2-3 „killer applications" – widely used apps with high benefits – need to be established to also mobilize users to make use of the other tools.

„Info systems" or "knowledge services"?

The term system reflects "knowledge as an object" limited to explicit documented knowledge. The term "services" reflects an active, user-oriented activity, that includes explicit + implicit knowledge combined with human interaction. From this perspective, the reformulation of "info systems" could be considered. The info systems (or knowledge services) should address the needs of customers rather than reflect historic project titles. Such services could include:

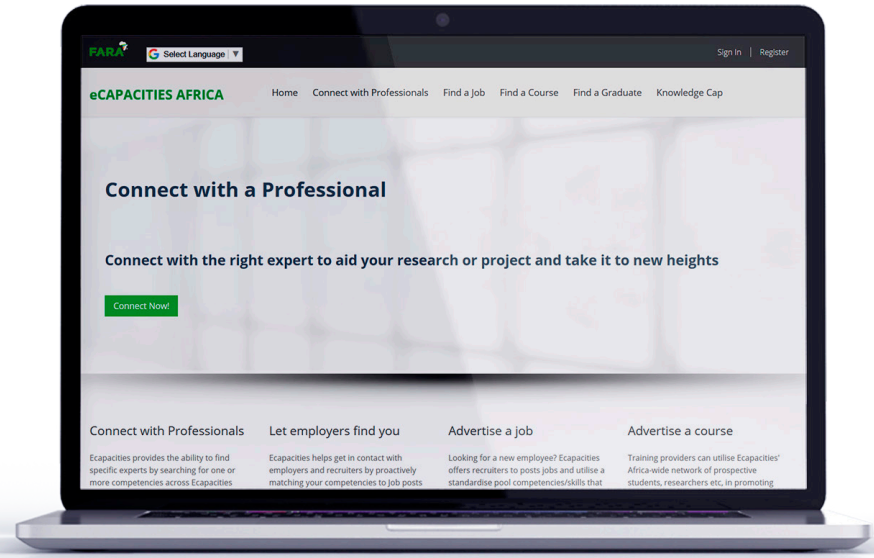
- African Agri Advisor as the lead application providing advice to farmers
- Communities of Practice and Networks (facilitating thematic collaboration with active participation and co-creativity), which can also go beyond DGroups, and include the Innovation Platform Agribusiness
- Learning Services (trainings, webinars, learning resources)
- Agriculture TV
- FARA Blog (instead of PAEPARD Blog)
- Expert Recommender (eCapacities works as well as a term)
- eLibrary (as it is, providing access to scientific output)
- FARA Space (as a continental DSpace Installation, linking local, regional, continental and global DSpaces, integrating repositories)
- Agri Data (open data portal based on DKAN)
- Knowledge Management Services (Advancing Knowledge Management, Knowledge Skills, and national Knowledge Ecosystems)
- Emergencies (giving advice in emergency situations)

These new knowledge services should be promoted with new functionalities and a new brand with self-sustaining business models independent of project-/donor- funding.
A new, attractive, technically innovative, competitive, credible user-interface could create new trust and willingness to contribute data and join partnerships and trust; whereas old, not maintained, outdated data(bases) should move as soon as possible to the background.
Community-spirit, joint vision and passion, trust, and reliability are prerequisite for sustainable knowledge sharing! The Communities of Practice – with significantly strengthened facilitation efforts and more collaborative character – could be a starting point for new "knowledge services" provides by FARADataInformS.
FARA should take a leadership role in applying innovative tools to link all relevant data in African Agriculture in a meaningful way and provide intelligent applications to its various stakeholder groups! As a continental Forum for Research and Development it should be a role model in the application of innovative technology for its own systems and mobilize resources accordingly.

eCapacities

One of the ideas of eCapacities is to match supply and demand for agricultural skills. "When employer expectations are mapped and known, skills and competences imbued by a particular intellectual activity can be tailored to meet such expectations" . Additionally, eCapacities is intended to be a Decision Support System for human resource management and human capital formation by workplaces including staffing, training, motivation and maintenance. However,

- The functionalities and search functions are limited and not competitive compared to other tools on the market, like social media. The acceptance and active use of eCapacities if evidently low.
- The low number of profiles, which are widely not updated, are too little and unreliable to support decisions. There are low benefits for the contributors and users to join this databased and upload and maintain data there.
- The resources needed to keep content up to date are not available at FARA, a self-sustained business model is missing to sustain the necessary resources without donor-funding.



[6] FARA: About eCapacities. The Online Platform for Workspaces, Providers, Graduates and Job Seekers to Interact, 2015 https
[7] Idem

Innovation Platforms Agribusiness

The innovation platform shall "ensures that agricultural technologies are translated into measurable impact in livelihood and quality of life of farmers as well as other stakeholders."

The idea of creating transparency of existing networks and communities is certainly at the heart of a knowledge management initiative and could create big value, however

- functionalities and search functions are very limited, many profiles are not maintained, and it is not immediately clear, when they are updated the last time,
- there is a huge number with significant redundancies: 397900 entries,
- the benefit for the contributors and users is low; therefore the acceptance is low,
- resources are lacking to keep content up to date, promote the platform, a business model is missing to self-sustain the platform without donor funding.

eRAILs

eRAILs is based on a project to reach out to farmers, learn from their questions and answers and leverage on the experiences captured by the experts and farmers, providing a growing database of challenges and solutions. This initiative was a big success and appreciated by many countries and stakeholders, but unfortunately

- it could not be sustained beyond the project´s donor funding, a business model is missing for self-sustained operations,
- it is not updated, certain achievements are locked by the developer because of legal dispute,
- there is a lack of private/individual/organisational initiative to continue and a lack of investment beyond donors.

PAEPARD

PAEPARD (Platform for an Africa-Europe Partnership for Agricultural Research for Development) mobilizes resources for priority projects that combine African and European institutional and financial resources for mutually advantageous projects. Comparable to the other infosystems, PAEPARD is based on a donor project that is closed, and the infosystem as a whole is barely updated due to lack of resources. The project was finished in 2018, the platform has the character of being outdated, although some relevant content is updated. The Content it not available fully in English.

The PAEPARD Blog is a key channel of FARA, and it is hardly understandable why this blog runs under the brand PAEPARD, as the content is not specifically linked with that platform. It would be recommended to rebrand it as a FARA Blog.

Again, the resources to maintain the functionalities of this partnership are inadequate and a business model for self-sustained operations is missing.

[8] https://faradatainforms.faraafrica.org/
[9] https://faradatainforms.faraafrica.org/

PANAP

„PANAP is a network among academic/research and institutional partners collaborating with the European Commission - JRC, in developing research on agricultural economics and policy issues with a focus on Africa. It is still a young initiative under development which shall become part of FARADataInformS when completed.

The system currently seems to be weakly equipped and the website is not user-friendly, linking to EU/JCR platform with EU content, where it is difficult to find PANAP. Some content is uploaded, but the comprehensive political declarations, action agenda and promises do not match with real (visible) action." Leadership seems to be lacking.

From the angle of trust in reliable information, and functional services, it seems recommended to keep offline all those functionalities, which are not yet work well, and announce only what can be fulfilled in adequate time.

The BiomassNet

„BiomassNet is the first pan-African expert network on food and non-food biomass. It provides an interactive platform for networking and information exchange between experts." The idea is again promising, but the implementation is lacking resources and maintenance. The content partially outdated, too little substance to attract people to search here. The news are old, no events are available. In order to position FARA as a competent, trusted, reliable knowledge provider, it is important to keep the quality of this system – like any other system - high, meaning: up-to-date, substantial, relevant, functional, user-friendly. Whatever does not fulfil these criteria, should rather be taken offline, or elements of iit could be put in different context, like library or other.

Concluding:

The InfoSystems of FARA have been pursuing a relevant mission and have been set up with passion and vision. However, the sustainability is lacking, and the systems are mostly outdated. A transfer of those still relevant resources into a new concept is recommended, based on a self-sustained business model, to cover the cost of maintenance through the provided services and value created or through long-term funding. This Continental Data Capture Strategy cannot compensate for the lack of these business commitments. Concepts and even active capturing processes and techniques cannot revive the systems as they are, due to lack of functionality and attractiveness for the users. At least substantial functional development is needed, a complete re-launch would be recommended. The use of semantic solutions and artificial intelligence will be necessary to help provide a modern search functionality or expert recommender systems, like everybody can use them on Facebook, LinkedIn or other social media. Further recommendations on semantic solutions and AI are provided below.

[2] https://faradatainforms.faraafrica.org/
[3] https://faradatainforms.faraafrica.org/

Review of KM and data capture strategies of CAADP-XP4-Partners and NARIs

ASARECA, CORAF, CCARDESA and **AFAAS** have all a long history in providing knowledge products and services to their members and end-users. Knowledge Management as a position and as a strategic, targeted, integrated approach to managing the whole knowledge lifecycle within a KM Framework is quite new, but strategies have been developed or are available in a draft version or under development. The KM approaches presented were substantial, balanced, showing strategic, organizational, social, and technical components. Knowledge Management positions are defined and are partially staffed with Knowledge Managers, having dedicated education and experience in this field. Capacities are being developed, systems being integrated, common understanding being developed. The interviews with the focal points of the organizations showed a clear, strong commitment to Knowledge Management. Although activities are still not integrated or coordinated with continental partners, the commitment to integrate the approaches is expressed. All of them have the major challenge of passing the last mile and reaching the end-user, making a change in behavior and accelerating agricultural business. Specifically, the SROs (**ASARECA, CCARDESA**, and **CORAF**) aim at strengthening Knowledge Management practices within their member states, specifically in the NARIs.

The **NARIs** themselves are at very different levels in Knowledge Management. Some NARIs have long-standing experiences and achievements in KM, and a wide range of NARIs have established information systems to integrate the scientific resources of its national academic institutions, like universities and research institutes. The most important tool on academic institutional and national level is DSpace as a repository for scientific publications. It is therefore reasonable to position DSpace on a continental level as a tool for continental data and knowledge integration.

KALRO (Kenya) is one of the more advanced NARIs in KM, and role model with a well-equipped KM team, tools and resources. The development of mobile apps is an outstanding innovation specifically in reaching the farmers. Making such achievements rapidly visible and available on a continental level would be a knowledge goal. The significantly above average growth rates in agricultural development in Kenya might be linked with the more advanced Knowledge Management approach. Other NARIs are still at the very beginning with lacking infrastructures and siloed national publications and knowledge resources. However, all Knowledge Managers of the 12 interviewed NARIs and AR4D partners are eager to cooperate with regional/continental partners. The majority of the NARIs have established the function of Knowledge Management, which is an excellent foundation for a continental knowledge management framework.

The approaches of CORAF and CCARDESA are shown below:

CORAF

CORAF is the Subregional Organisation for Agricultural Research for West and Central Africa. Knowledge Management is established as a core function, but the approach is new and dedicated staff is just being selected and onboarded.

In its presentation on KM at the recent workshop organised by FARA , CORAF describes three pillars of KM

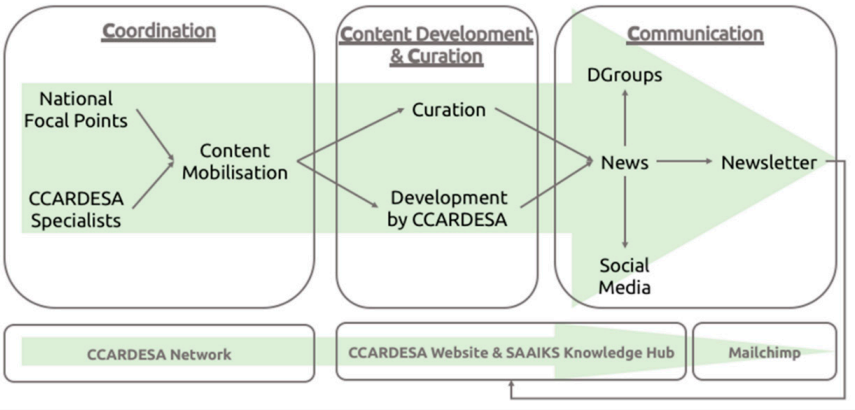
CORAF maintains specific databases and tools, like MITA, Market of Innovations and Agricultural Technologies, Agripreneur TV, the Fertilizer and Seed Recommendations for West Africa Map (FeSeRWAM), a Seed demand forecasting tool, West Africa Seed Information Exchange (WASIX), as well as the website with resources and social media.

Conclusion and key learnings: The KM concept is still at an initial stage (as to the presenter). CORAF however builds on databases and systems, which can create value for FARA (Forum) as well. More integration and collaboration with CORAF can be fruitful. Specifically, with MITA and Agriculture TV, CORAF is maintaining strong efforts to reach the last mile.

CCARDESA

A brief Overview on CCARDESA KM Systems has been presented by CCARDESA during the workshop organised by FARA in November 2020. There is a draft strategy since 2016, which is updated 2018 as a draft. The following overview of KM components has been provided:

[12] An overview on studies and evidence is provided on : African Digital Research Repositories: update July 2019 (internationalafricaninstitute.org)
[13] NARIs in Uganda, Kenya, Sudan, Burundi, DRC, Madagascar, Ruanda, Ethiopia, Eritrea, ROC, as well as RUFORUM and CABI have been interviewed in November 2020.
[14] Zinsou E. KPAVODE,M&E Officer: Overview of CORAF Knowledge Management Systems, presentation Nov 2020



The access to the knowledge platforms is via the website, which is built on Drupal. Some content is availed there, the DGroups is used for Discussion groups and Communities collaboration:

[15] Bridget Kakuwa, Information & Knowledge Management Officer: Brief Overview and Discussion on CCARDESA KM Systems

Conclusion and key learnings:

Although the KM Strategy is still not approved and staff is being developed, KM has a history at CCARDESA and follows an integrated approach. The installation of dSpace for the integration of knowledge resources of the member states is considered. dGroups is already in use for Communities, the website is the portal which directs to various resources and applications. CCARDESA (like also CORAF) has expressed a wish and need to coordinate and integrate its KM Approaches, tools, processes and also the competency framework for the Knowledge Management function.

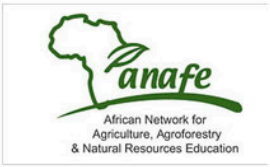
ASARECA

ASARECA has developed a Knowledge Management and Communication Strategy end of 2020. It is fully aligned with the KM4D model, which has been presented above and it can act as a role model for the other SROs. The Knowledge and Information Hub currently being developed is based on DSpace, Drupal and DKAN created to integrate all knowledge products and services of its member states and availing it in an end-user friendly way.
The conceptual foundation for the use of semantic technologies, development of knowledge graph and advanced semantic solutions – like semantic search, recommender systems, agri coach, and more – are created, but the implementation is yet in a decision process. A collaborative approach to co-create a knowledge graph and semantic applications on a continental level would be highly recommended to avoid conceptual gaps, safe cost and increase usability of the tools.

Communities of Practice are a core element of the KMC Strategy, but the use of tools is not limited to a specific platform like DGroups, while social media communication plays a vital role in reaching out and delivering knowledge products to end-users.
Knowledge Leadership and national Agricultural Knowledge Partnerships are key elements in ASARECA´s KMC Strategy, being pioneer activities and role models for the continental partners.
Now that ASARECA has aligned its approach with the KM4D model, the commitment to implement fully the strategy should be closely monitored. ASARECA can set the tone for all partners, bearing in mind that good KM strategies must have commitments for implementation.

Considering the various strengths of CCARDESA, CORAF, and ASARECA it is advisable to coordinate with FARA and AFAAS to align systems, approaches and tools. Using dSpace as a repository and dGroups for communities and collaboration is considered a relevant starting point together with joint capacity development activities.

Operated by the Africa-AgJCD group (Africa Agriculture Joint Capacity Development group)



AR4D Partners and Stakeholders

On an international level, Knowledge Management has been established at a very high level at IFAD and ILRI, having received the prestigious international Knowledge Management Award in 2018 (IFAD) and 2019 (ILRI). The KM Approaches of IFAD and ILRI are strategic, systematic and integrated, innovative and grounded, well anchored in the organization´s overall strategy and well equipped. Also development partners like USAID, GIZ, UKAID, have long-standing practices in Knowledge Management.

The examples of IFAD and ILRI provide a best practice and some of the key elements are outlined here:

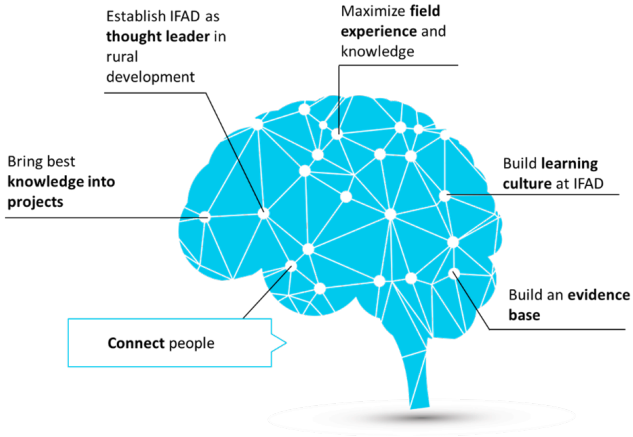
IFAD International Fund for Agricultural Development

IFAD is a leading KM Practitioner in the UN System for many years. In 2018 it received the International KM Award. In 2019, it reviewed and updated its KM Strategy which is available online . The Knowledge Manager is an experienced expert and plays a leading role in the global Knowledge Management for Development Community for many years. Although experience and external support was available, the review and update took almost a year of time.

It aims at the following outcomes:

In a presentation, the Knowledge Manager of IFAD, Helen Gillman, refers to the following success factors:

[8] https://www.km-a.net/networking/knowledge-management-award/
[9] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwj0rO-HyMDtAhVow4sKHXeQDf0QFjABegQIAxAC&url=https%3A%2F%2Fwww.ifad.org%2Fen%2Fdocument-detail%2Fasset%2F39500088&usg=AOvVaw1STIA6XHk-QhPDh3WG4PUb



Key recommendations provided are:

- Define a clear purpose,
- Leadership is essential,
- Integrate methods and tools,
- Connect and collaborate,
- Provide resources,
- Give incentives,

Key actions in IFAD´s KM Strategy:

a) Knowledge generation:

- Set a strategic knowledge agenda to inform investments and improve external visibility of IFAD content
- Leverage knowledge with and from partners

b) Knowledge use

- Improve curation, sharing and use of evidence, lessons learned and scaling up of good practice
- Continue to develop and evolve IT solutions and platform

c) Enabling Environment

- Develop an incentive framework
- Build capacity and awareness
- Embed CoPs, networks and other appropriate mechanisms to support knowledge development and use.
- Strengthen knowledge retention
- Strengthen KM architecture

Conclusion and key learnings:

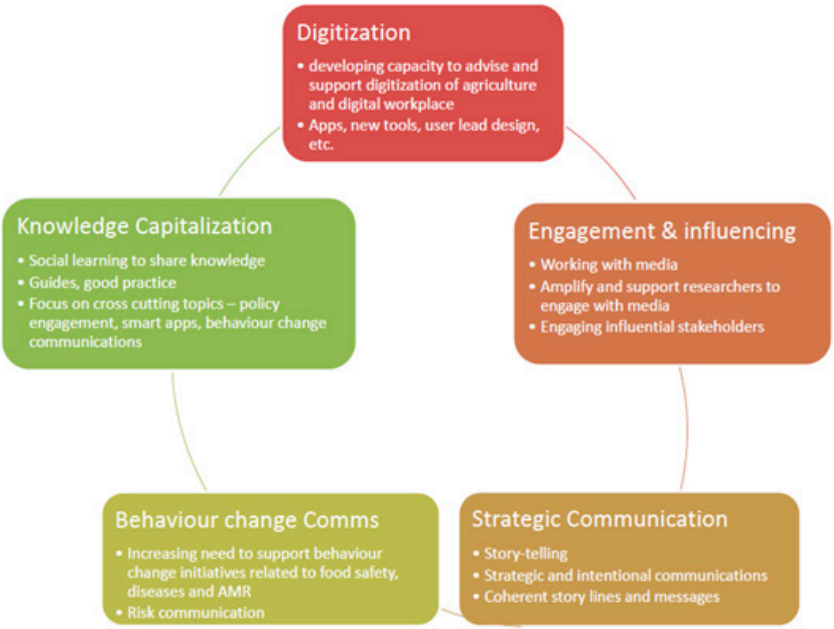
IFAD describe the objectives, actions, structures, roles, and responsibilities, as well as risks and measurements in an integrated way. The development of such an integrated KM approach and even the recent update has taken many years, it requires time. Connecting people is a key recommendation.

ILRI – International Livestock Research Institute

ILRI is a long-term practitioner in KM with strategies and programmes developed over many years and implemented with experienced staff, who is actively involved in the global Knowledge Management for Development Community for many years. ILRI has received the global KM Award in 2019.

ILRI follows an integrated approach to Knowledge Management and Communication Management.

The addresses challenges with the following strategic response:

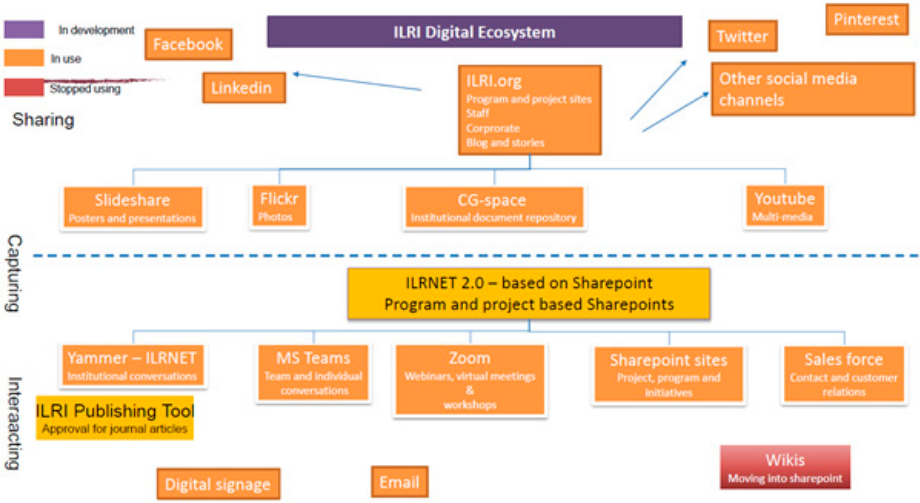


ILRI Communications and Knowledge Management Strategy (cgiar.org)

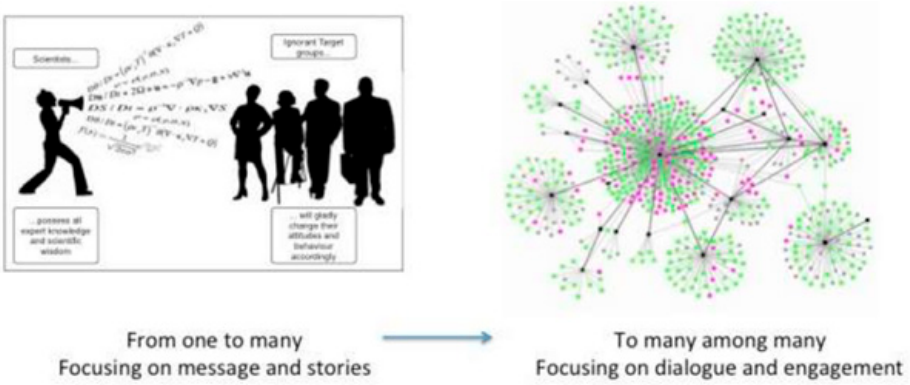
[8] ILRI Communications and Knowledge Management Strategy (cgiar.org)

ILRI´s KMC offers the following services:

ILRI´s Digital Ecosystem is described as follows:



ILRI **promotes the shift** from communicating knowledge **"from one to many"** facilitation of dialogue and engagement to share knowledge in a decentralized way **"to many among many"** and connect the communities.



Conclusion and key learnings:

ILRI has developed the integrated approach with experiences experts and a strong team over many years. The dSpace installation (CG repository) is a key element in its IT-Architecture, with strong emphasis on the taxonomy. All resources even on social media are linked with the CGSpace and therefore centrally accessible and searchable. The decentralized approach of facilitating dialogue corresponds to the idea of establishing communities of practice.

ILRI´s context as a research institute, as well as its approach and concept of Knowledge Management are very comparable to FARA. ILRI seems to be an ideal partner to form a learning partnership, share experiences and co-create solutions.

An overall conclusion of the presented case studies would be that an integrated, systematic approach, addressing the human factors of collaboration, knowledge sharing culture, diversity (and more) as well as technical and organisational aspects, as well as processes need to be aligned along a clear strategy.

Strategy

Akosombo Workshop

Based on the Situation Analysis and the discussions with members, partners, and stakeholders, the following concept has been developed and components have been identified as critical for a sustainable continental data capture strategy. The Akosombo Workshop organized by FARA from 25 November to 1 December 2020, convened the CAADP-XP4 partners as well as a number external experts and consultants working on components relevant to data capturing and Knowledge Management. Various aspects of data capturing have been discussed and elaborated. At the end of the workshop, in a collaborative approach of all participants, and inspired by a statement by FARA´s ED, the integrated KM Concept was created in a knowledge café, moderated by Andreas Brandner, Benjamin Abugri, and Krishan Bheenick. Action points for the implementation were developed and both put together as the Akosombo Integration Agenda. This knowledge café itself has been an essential part of the development process for this strategy, and therefore the Akosombo Integration Agenda is an achievement of this work.

During the workshop the following challenges/pain points have been developed, a vision 2030 been created, action points identified, and next steps drafted for these 7 topics:

Some participants at the Akosombo workshop

Areas of Integration	Pain Points/ Issues	Vision 2030	Action Points	Next Steps
1. Knowledge Management Approaches: Targeted, systematic, integrated approach	• Lack of common understanding of knowledge management approaches or concepts Siloed activities	Established common understanding of required knowledge management definitions and concepts Established KM Partnerships between FARA, the SROs and Countries	KM awareness conference involving Management (Culture) (ST) Written Commitment by key AR4D stakeholders (ST) Awareness (events) and experience sharing within and outside the organization (ST to MT) FARA to setup a continental KM community (ST) Exchange programs between partners and practitioners (MT) Mobile Apps be adopted by FARA and the SRO's to disseminate knowledge product (ST to MT) Clear policy on knowledge systems development (MT) AR4D Institutional Knowledge Systems alignment (MT to LT) Common KM strategy with harmonized written approaches to be used by FARA and the SRO's	A continental AR4D KM strategy adaptable for SROs, and for all countries and stakeholders (FARA & SROs) – Mgt approval Continental AR4D Knowledge Graph established (FARA & SROs) – Mgt approval KM leads for each institution to start discussion with their mgt immediately

Areas of Integration	Pain Points /Issues	Vision 2030	Action Points	Next Steps
2. KM Tools: dSpace, dGroups, Knowledge Graph, other?	• Inadequate Visibility, costs duplication and efforts duplication	Integrated Tools by FARA and SROs (including countries) and should be: • More automated • Intelligently linked • Deliver innovative service based on Artificial Intelligence. • Allows greater collaboration with subregions, countries/ stakeholders,...	• Strengthen visibility by allowing recommendation in each partner KS (ST) • FARA to facilitate the sharing/ merging with partners SROs of Knowledge Management Tools (Dgroups, DSpace, Meetings etc) to maximize usage and strengthened synergy (ST – MT). • Refresher training for partners/ members to familiarize with the tools (ST) • Develop and implement Knowledge Graphs to help data's organization (ST to MT).	• Strengthened engagement and communication to make the tools more visible (FARA & SROs) • FARA to train and assure SROs of retaining their autonomy despite KM Tools integration (FARA Lead) • Sharing knowledge on tools used • Consider moving hosting of tools to Amazon web services (AWS) – (FARA KM & IT) • Facilitate and establish communities of practice for the tools of KM. (ex: Community Knowledge Graph) – (SROs & FARA)

Areas of Integration	Pain Points /Issues	Vision 2030	Action Points	Next Steps
3. Knowledge Resource: from data to knowledge products/services: guiding principles, formats, quality, standards • Journals • Reports (AR4D) • News Articles • Technical Briefs • Policy Briefs • Manuals • Hand Notes • Videos (Documentaries) • DisseminationNotes	• Limited quality management processes from country to continental level • Inadequate capacity (human capacity) • Non-existent data collection and dissemination structure from country to continental level • Inadequate infrastructure	Available and user-friendly knowledge products reaching the last mile	• Adapt to Universal standards (ISO, etc) (MT) • Adapt Universal standards and procedures for collecting, indexing and storing data (ST to MT)	**Short-term** • Establish a community for knowledge products and services (FARA & SROs) • Mapping of core knowledge structure guidelines and implement step-by-step (FARA & SROs) **Medium-Long term** • Establish an innovation lab (annual) to come up with new services and products (FARA & SROs)

Areas of Integration	Pain Points /Issues	Vision 2030	Action Points	Next Steps
4. KM Processes: Capturing, Transforming, Sharing	• Data creation • Data collection o Organizations work in isolation o Organizations belonging to several bodies repeat data collection processes o Organizations hoarding data o Uncoordinated data collection processes among SROs o Inefficient data collection processes • Dissemination of Knowledge • Application of Knowledge	Established integrated Knowledge Management infrastructures and processes among SROs, countries and linking with continental level	• Collection of standard operating procedures/ process guidelines linked with Knowledge Management governance model • Demonstrate good practices for implementation of procedures • Establishment of communities around knowledge graph development	**Short-term** • FARA & SROs should facilitate the establishment of quality management teams at all levels •FARA & SROs should facilitate capacity building for Knowledge Management processes **Medium Term** oFARA & SROs Facilitate community for Artificial Intelligence (AI) that is well-equipped for innovative solutions for Knowledge Management

Areas of Integration	Pain Points /Issues	Vision 2030	Action Points	Next Steps
5. Communities	• No connection as activities are independently executed • Financial (thus funding mechanisms • Poor coordination (Eg FARA social media is not accessible by SROs and vice versa	Integration - Connect the communities of all the platforms	• Find appropriate mechanisms to connect e.g. social media, KM Apps etc	Develop and motivation package for KM (FARA & SROs) • Partners avail themselves for engaging / collaborating FARA & SROs) • Guidelines developed for Common platform to connect with the communities FARA • Find a converging point for the different programs within the AR4D institutions e.g. M&E case point

Areas of Integration	Pain Points /Issues	Vision 2030	Action Points	Next Steps
6. KM Capacity Development: Training Courses, competency frameworks, KM Community; mutual support; complementary strengths	• Low capacity in KM concepts & practices • Lack/inadequate adequate human resources for KM • Low budget on KM • Low capacity to create knowledge products (audience-based) • Low prioritization on KM mechanisms • Technology change, lifestyle change, enabling environment • Lack of KM understanding (sometimes put under KT, M&E etc) • Poor KM infrastructure (software, hardware, orgware)	• Increased joint investment, collaboration and prioritation for KM by AR4D organizations	• Training & workshop on KM in different sectors & communities (ST to MT) • Awareness creation to senior management on KM • Increased peer learning (Exchange) (ST to MT) • Linking KM with ICT especially in terms of tools being used • Developing KM Training standards for the continent (AFRICA KM) AR4D (ST to MT)	Build capacities for a common community KM mechanisms & practices • Build a common framework for fundraising (FARA & SROs) • Peer to peer learning (FARA & SROs) • Common KM capacity building strategy (by all partners) (FARA) •Rolling out certification on KM (focusing on the strategy) (FARA)

Areas of Integration	Pain Points /Issues	Vision 2030	Action Points	Next Steps
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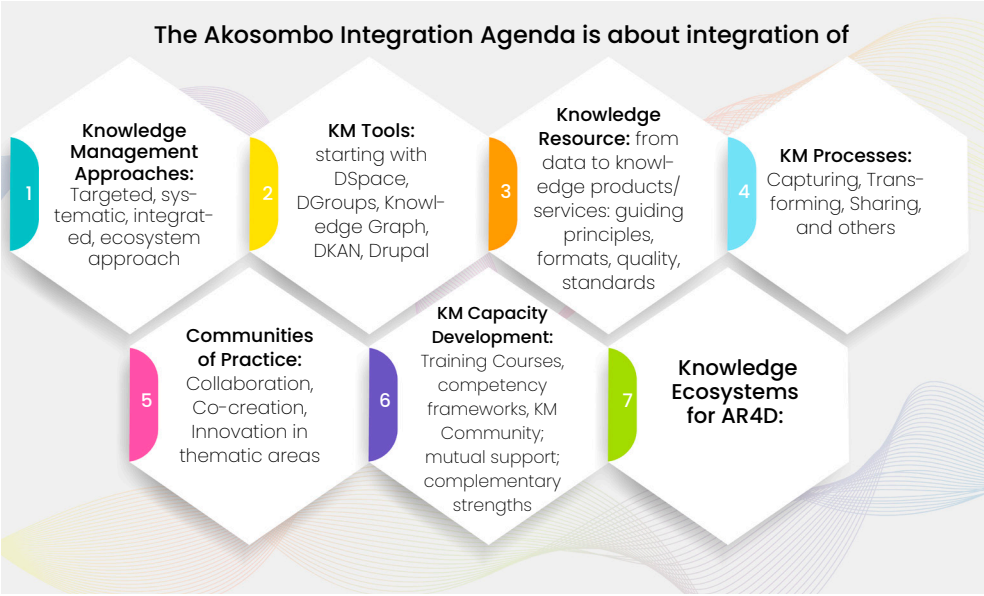
Areas of Integration	Pain Points /Issues	Vision 2030	Action Points	Next Steps
7. Knowledge Ecosystems for AR4D: Agricultural Knowledge Agenda and Knowledge Partnership; KM Conferences	Good efforts and work done does not lead to desired outcome	• KM framework prepared for countries and stakeholders • Partnerships established between FARA and the SRO's on KM research	• Briefs on use of knowledge management products made available to farmers • Network should be built between Africa and other continents to share experiences on knowledge management activities • The use of IT tools and platforms should be used to create awareness for knowledge management	• Annual KM conference organized at both FARA & SROs levels (FARA & SROs) • Support countries to development their Knowledge agenda/strategies (FARA & SROs)

The Akosombo Integration Agenda is an important element and component of this strategy and focuses specifically on the Integration of Knowledge Management components, which should be aligned to co-create the best value through continental collaboration.



Agricultural Knowledge Agenda and Knowledge Partnership; KM Conferences

The concept of the Akosombo Integration Agenda is solid and consistent, the implementation has already started and is coordinated by the Knowledge Manager of FARA.

Continental KM Framework

While the Akosombo Integration Agenda is needs and action-driven, it also reflects and provides the key components for a Continental Knowledge Management Framework for Agricultural Development

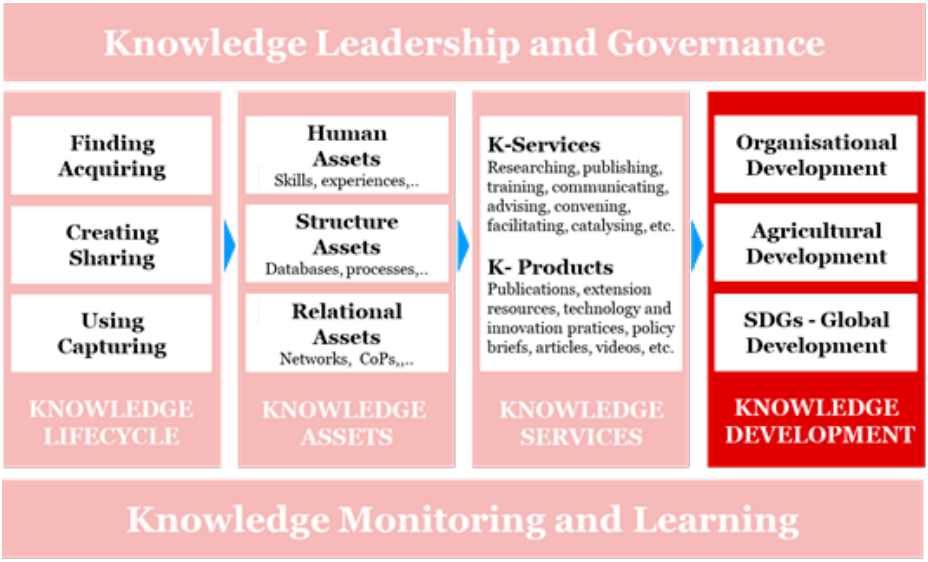
This framework puts together the key elements of the Akosombo Integration Agenda as an integrated concept. It gives guidance to the KM Focal points to follow a common approach, which is linked with global standards, like ISO30401 on Knowledge Management and KM4D Framework and. This KM Framework describes a theory of change for agricultural development based on knowledge, linking core elements of the Knowledge Lifecycle with Knowledge Assets, as input factors for the delivery of knowledge services and products (output) for the benefits of sustainable development of organizations, the agricultural sectoral and of the planet (outcome).

[9] Based on K4DP's „Knowledge Management for Development Framework" and adjusted for this purpose.

This concept frames the key components of the Continental Data Capture Strategy, which are described below in more detail:

Components

Continental Knowledge Development Goals



The joint formulation and decentralized adoption of concrete knowledge development goals is essential for the coordinated management of a continental knowledge management and knowledge capturing programme. As long as goals and indicators are not co-created, widely communicated and internalized in all partner institutions, their achievement is improbable. An instrument and process (Knowledge Agenda Process) as well as a structure (Knowledge Partnership) for the continental formulation and monitoring are needed (see Knowledge Governance below). A coordinated approach to knowledge evidently needs to be coordinated, requires a driving force, committing initial resources. Considering its mandate, FARA has to facilitate a continental knowledge partnership, to coordinate the formulation of a continental knowledge agenda, and the promote a continental knowledge management framework.

The Knowledge Development Goals should distinguish between – according to the Knowledge Management Framework) the following:

• Outcome indicators: They describe the competences that partner will have to perform better

• Output indicators: They describe the delivery of knowledge services and products to achieve these outcomes.

• Knowledge asset indicators: They describe the knowledge assets (Human assets, Structure Assets, Relationship Assets), which are needed to provide the knowledge services and products.

• Knowledge lifecycle indicators: They describe essential knowledge life cycle activities, like capturing activities.

Anchoring in partner institutions is essential, this means that SROs and NARIs should integrate such knowledge development goals within their management systems. These include Strategies, operational plans, departmental goas, and finally individual performance goals. Based on an integrated approach to Knowledge Management (see Akosombo Integration Agenda) this could be achievable within the next years.

The following Knowledge Management Output Goals, presented by FARA at the Akosombo workshop, are a good starting point:

FARA Knowledge Management Output Goals

• At least 4 million value chain actors reached through FARA online platforms.

• At least 50 knowledge platforms used for information exchange and delivery.

• At least 500 knowledge products (research reports, technical papers, analyses and briefs) generated and disseminated by FARA, SROs, AFAAS and National Partners.

• Information on at least 500 proven agriculture technologies and practices disseminated through FARADataInformS.

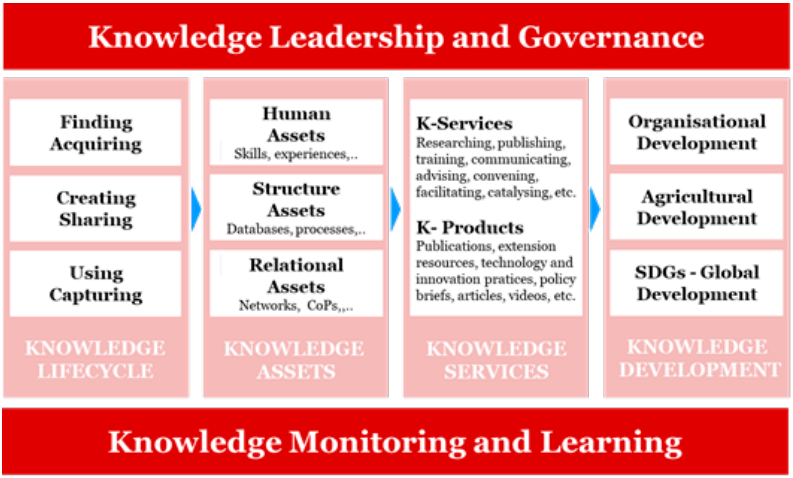
• At least 10,000 experts (African & non-African) availed in a database that is accessible by AR4D users.

• At least 40 African countries self-assessing existing policies and their implementation using Policy Practice Index tools.

• At least 20 policy briefs developed to support advocacy, policy harmonization on emerging issues including land, water, nutrition, amongst others.

• At least 15 partnerships, collaborations or participation in global knowledge sharing platforms.

3.2 Continental Knowledge Governance, Monitoring and Learning



A solid governance model is a critical requirement for a Knowledge Management Strategy in general as well as for a Knowledge Capture Strategy. Clear roles and responsibilities for knowledge management and capturing, adequately anchored in the Management Systems of all partner institutions, combined with monitoring and recognition/sanctioning instruments, are needed to guarantee the successful implementation.

Knowledge Leadership:

The starting point in the governance model is leadership. The relevance of knowledge management / capturing needs to be defined and communicated by the TOP Management of all partner institutions. Leadership on continental level (FARA) needs to be paired with leadership on regional and national levels, in governmental, as well as academic and private stakeholder groups. All those partner institutions, whose contribution to the continental data capture strategy is needed, require leadership towards the expected contribution, because capturing and sharing knowledge is at the heart of individual and organizational work, it is time demanding and sensitive. Without leadership, this will not happen. Targets, principles, goals need to be formulated and communicated in each institution. Communication can and should happen in any way that is common in the institutions, the more it is personal and direct, the better.

Additionally, specific instrument for continental leadership can be created. The compilation of statements from leaders in a continental Knowledge Agenda has worked well on global level for the Knowledge for Development Agenda. Leaders (hierarchical leaders, but also thought leaders) could be requested to formulate their commitments and share them widely, also video interviews, knowledge talks or comparable knowledge products suitable for social media dissemination could work well.

Knowledge Partnership

The Knowledge Partnership is an essential dialogue platform for driving knowledge management on a continental level, because no institution alone can define and decide on knowledge effectively. Participation of those who are expected to capture/share knowledge is essential, which requires participation of practitioners as well as of experts. Whereas FARA as such is a partnership for scientific collaboration, the Knowledge Partnership is a platform within FARA to address specifically the Knowledge Management activities. The Knowledge Partnership should have instruments like the Knowledge Agenda to formulate its Outputs and a Knowledge Report to reflect on achievements. Regular (online) Knowledge Partnership Meetings or an Annual Knowledge Partnership Conference could be anchor points for communication and specifically socialization, which is needed to build trust and a sense of community. Within the Knowledge Partnership, the Knowledge Management Community should play a leading role, taking responsibility for the coordinated implementation of all activities. Further communities should be established for specific tasks, like CoP Semantic Knowledge Modeling and Artificial Intelligence, which is a critical component in a sustainable Continental Data Capture Strategy. ASARECA for example is currently launching a Regional Community of Practice for Artificial Intelligence, which should be aligned with a continental CoP. Other CoPs could be established to foster Knowledge Capturing in specific areas. A CoP for Extension Services seems highly relevant to advance knowledge capturing in this critical area and the Africa Forum for Agricultural Advisory Services (AFAAS) will be very instrumental in this direction.

Integrated Management System

Management Systems clarify goals, roles and responsibilities, tasks, and expectations to achieve organizational goals. Knowledge goals, outputs, tasks need to be anchored at the same level and with the same relevance as other goals, outputs, and tasks. Often financial goals are defined very clearly and followed-up with utmost attention, whereas knowledge is often unclear or neglected. Specifically, the roles of Leaders/Managers, Knowledge Managers, and Knowledge Workers are to be defined. Usually it is the Knowledge Workers (like scientists, practitioners, project staff) who are expected to capture knowledge, but the concrete expectations are unclear. Specific attention should be given to those who are structuring and organizing knowledge processes, like Community Facilitators or Project Managers or Functional Managers, because they can influence directly whether and how knowledge is captured in their communities or projects or functions. Capturing skills are needed to capture knowledge – explicit knowledge and data as well as tacit knowledge and experiences – in a usable way.

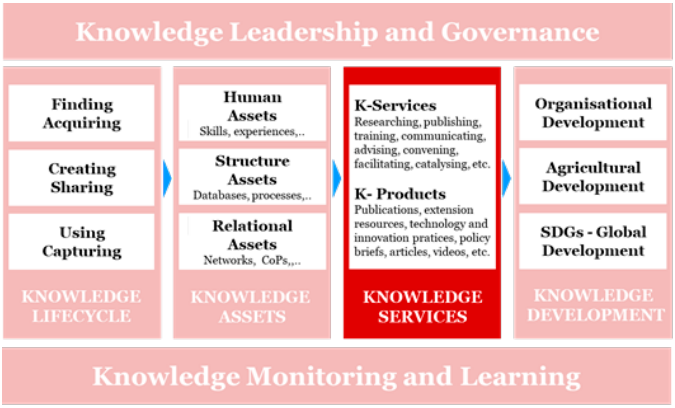
Additionally, specific attention should be given to providers and developers of tools, like information and communication tools, to provide the right formats, processes and technologies for knowledge and data capturing.

Finally, the role of subject matter experts is highly relevant, who will be responsible for specific thematic areas and the design of data and information in the knowledge graph (see below).

Knowledge measurements and recognition systems should be anchored in all national organization (NARIs, Ministries), subregional organizations (ASARECA, CORAF, CCARDESA) and continental organizations (like FARA, AFAAS). Specific recognition could be given through a Knowledge Management Award for Agricultural Development. Categories could be defined including for Knowledge Capturing. Awards could be presented for outstanding achievements or best practices at the Annual Knowledge Partnership Conference. Other Awards could also be given for online discussions and activeness in collaborative platforms like DGroups. The current efforts of automating certificates in Dgroups to award active membership and contributions to specific discussions, supports this idea.

Measurements should be integrated in the continental knowledge management process, a PDCA plan-do-check-act cycle for Knowledge Management.

Continental Knowledge Products and Services

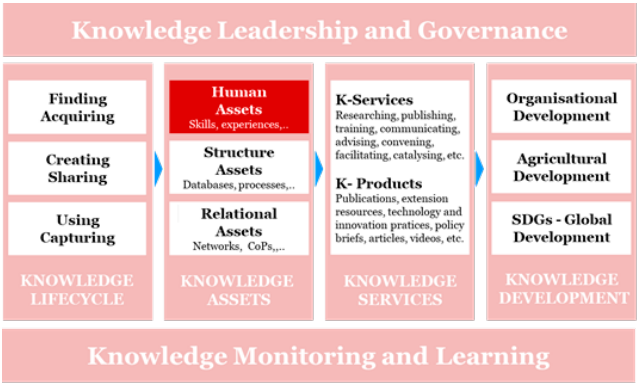


Knowledge Capturing as such always serves a purpose. Capturing leads to having data and knowledge assets available, but these data have to be used, provided, delivered in specific formats – knowledge products or services – to specific customers for specific purposes. This can span from a scoreboard to monitor the achievement of the Malabo Goals (built mainly on pure indicators) and to take corrective action (eg through policy briefs which build on interpretation of indicators with recommendations, a very qualitative product). It can also include best practices in extension services, which are highly based on experience / tacit knowledge. It could also include a continental flagship publication on Africa Status Report on Agricultural Research and Innovation (AfARR)
The coordination of knowledge products and services on a continental level is essential to create value from a continental data capture strategy and achieve impact.
Currently, the SROs and NARIs create knowledge products in their own, specific ways and formats, all having their specific legitimation and benefits, but difficult to integrate. While ASARECA for instance focuses on the development of "TIMPS – Technology and Innovation Management Practices", CORAF has "good practice guidance notes". CORAF´s Agripreneur TV is quite unique, while Communities are established in all regions on comparable topics but without integration.

It would be highly beneficial to coordinate such knowledge products and services to integrate them on common platforms (like FARADataInformS) and avail them to all countries. This will not only be for the benefit of each country, institution and end-user. Any kind of continental strategy and measure require integration of data, knowledge and knowledge products.

Common standards for the capturing are needed, even very hard indicators, like the Malabo indicators, require clear definitions and standards to be comparable. These evidently have to be developed one by one in partnership of the participating institutions.

Continental Knowledge Skills Programme



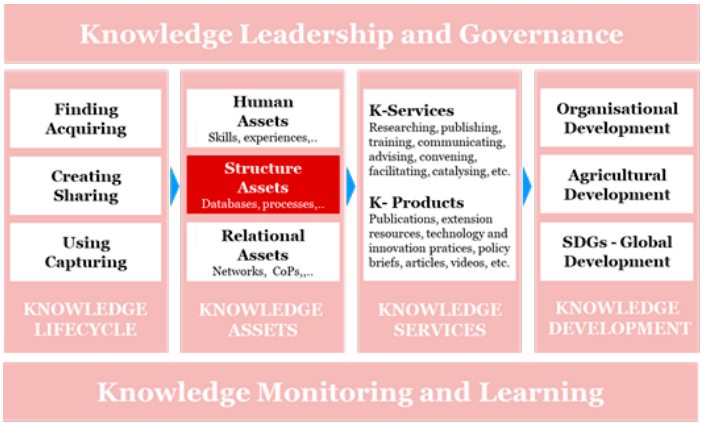
As a continental apex knowledge organization, FARA is managing knowledge on a continental level, while SROs and NARIs have comparable responsibility on regional and national levels. They have already or are in the stage of developing Knowledge Management concepts and capacities for the implementation.

FARA can and should play a supportive and coordinating role in developing these capacities in Knowledge Management and support the implementation based on subsidiarity on the one side but aiming at integration on the other side for the benefit of continental value addition. A common approach to Knowledge Management, as well as aligned methods, tools, concepts, and formats will be beneficial for collaboration and knowledge sharing. This activity includes a set of complementing activities to support members in taking responsible action as a Knowledge Hub in their countries. It should be considered that the SROs are currently in the process of developing equal processes, therefore taking coordinative action would be timely and relevant.

A capacity building program could include the following:

- Coordinating Trainings in Knowledge Management and Capturing
- Providing coaching and supporting in KM specifically to SROs
- Community of Knowledge Management focal points for peer learning

Continental Knowledge Systems and Data Integration



The development of IT Systems functional to integrate data from continental, regional, national, and local partners is paramount. The analysis of existing IT Systems has shown that there is a number of tools with a high level of application in countries and SROs, like specifically DSpace, being the most important repository software for publications and other scientific outputs, knowledge products. Through DSpace, content of research institutions is integrated, searchable, accessible on one spot. Either the Agricultural Universities / research organisations have collections within the DSpace Installation of the NARIs or they are linked with APIs - application programming interfaces, which link the data automatically, in real time. There is no necessity to upload the content to a common DSpace installation, but it is an option.

DSpace is by far the most common repository software. The significant majority of African Research Institutions use DSpace, and a detailed analysis of the application in the ASARECA countries has shown that 70% of the NARIs in Eastern and Central Africa use it, as well as strategic partners, CGIAR, ILRI, and many others. DSpace is open source and well known in the scientific community. A community of practitioners can be created easily and a lot can be achieved short-term by aligning repositories along DSpace.

Semantic integration through knowledge graph and APIs

The future of data integration however is not the integration of tools, but the semantic integration of data on the basis of APIs. Even if DSpace is a widely used system for publications and scientific outputs, like publications, the full amount of data and knowledge on agricultural

[20] https://www.internationalafricaninstitute.org/downloads/African_Digital_Research_Repositories__Mapping-the-Landscape.pdf

knowledge in Africa can never be stored in one single software solution, repository, or database. The decentralization of data is unavoidable due to a growing number of functionalities and applications, which have their specific purpose. However, the integration is needed to make data searchable, accessible and usable. This can only be done through semantic linking. The logic of the linkages can be simple (eg based on categories or hierarchical structures) or more complex and expressive through semantic linkages between the elements. The knowledge graph is the state-of-the-art knowledge modelling approach, built on ontologies and enriched with content. Knowledge graphs model a knowledge domain (like agricultural development in Africa) and give add meaning to the data.
The world´s biggest knowledge graph is Google´s knowledge graph and it helps to find resources even though they are located on different servers in different formats, because the content is readable and through the knowledge graph have meaning.

Semantic tools and artificial intelligence

On the basis of meaningful data and information (meaningful because they are meaningfully linked through a knowledge graph), a number of semantic tools and functionalities can be developed. These include semantic search (like on google) as well as recommender systems (recommendations for content or people) or functionalities like a farm advisor, advising farmers step by step how to advance their production, combined with learning material, contacts, recommendations, etc.

One of the most advanced tools for semantic knowledge modelling is PoolParty, a software solution provided by the Semantic Web Company . The "Semantic Suite" provides a unique bundle of functionalities, which are not available on the open-source market. In this current stage of development in the IT Sector, open-source software is not recommended since the systems are not integrated, functional and reliable enough. It is recommended to invest in a proprietory software solution like PoolParty (or another tool on the market) and guarantee the functionality and reliability from the beginning.

Semantic Tools like PoolParty are mostly "semantic middleware", which means that they build on existing data sources (repositories, databases, etc.) link them through the knowledge graph, and provide the enriched data to a user interface, which is often developed with common

[2] www.semantic-web.com

Content Management Systems like Drupal and WordPress. Thereby it can be integrated into any existing website and uses data without changing or migrating them. The following graph shows this position between content and user:

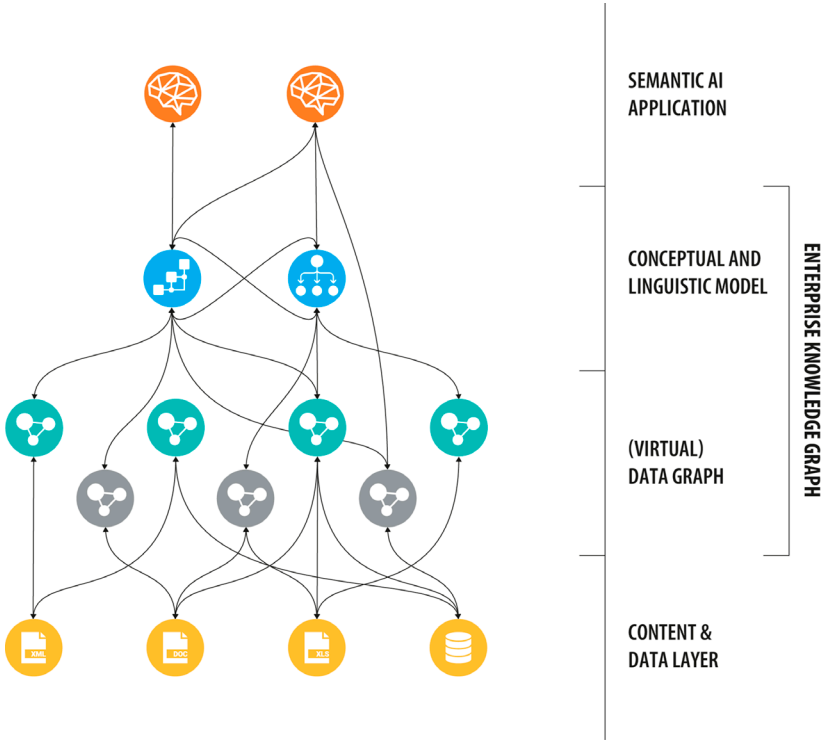


Figure: The position of the Knowledge Graph between Content Layer and User Interface

Through text mining and corpus analysis, the existing knowledge resources of all members could be analyzed, data could be extracted and enriched. Within very short time, all existing publications in Africa would be enriched through metainformation, users will get directly not only to the documents, but even to the specific chapters and paragraphs of documents to use the information provided.

Existing Databases of SROs and NARIs could for instance be connected through APIs and made available for existing infosystems (like eCapacities) or a new system, like an expert recommender system could build on the existing data of eCapacities and databases of SROs/NARIs to provide a new, more attractive solution to the end-users.

This would be the recommended situation, considering that the current version of eCapacities does not provide modern and up-to-date functionalities and user-value.

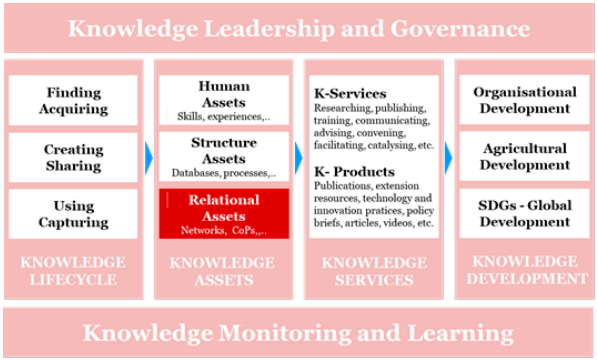
Likewise, existing data from Ministries (or NARIs) on the Malabo goals could be linked through the semantic middleware and APIs with the Business Intelligence Installation of FARA and visualizing the progress with charts in real-time. The more data are combined (eg. with Geographical Information System or other databases) the more functionalities can be offered. These need to be programmed and require the contribution of subject matter-expertise to design the logic of data, information, and interpretation.
Through digital workflow processes the information could then even be pushed to specific receivers or integrated in reports or communication channels.

The Knowledge Graph and AI as a continental opportunity

Linking continental data and providing Artificial Intelligence Solutions to all stakeholder groups is certainly one of the biggest opportunities of our time. FARA should start immediately to form a Community and a Centre for Artificial Intelligence in Agriculture to coordinate developments and applications from the beginning. There is no doubt that innovations will come up fast and change the way how data, information, and knowledge are used within the next years. If FARA wants to play a role in the next decade, it has to dedicate attention and resources to it.
Since the development of such tools requires financial resources, all partners will gain from a strong continental collaboration. The development of a knowledge graph doesn´t need to be developed by each organization, and the tools do not need to be purchased by all of them separately. Considering that the cost for PoolParty implementation with several AI Solution will cost about 5-600.000 Euros for a period of 5 years, it is easier to carry such cost together than individually on the level of SROs or NARIs. The sustainability of such a step may be guaranteed easier on continental than on regional level, and thereby is a matter of subsidiarity, where each SRO may not have the resources alone and FARA can add value to the regional efforts. The benefit of collaboration is also in strengthening the capacities in the countries and concentrating continental expertise for continental solutions.

The recommendation is to develop a knowledge graph with a professional software (like PoolParty) as a fundament for knowledge organization, data capturing and integration, and development of Artificial Intelligence Solutions, starting with semantic search and expert recommender.

Continental Knowledge Communities / Innovation Platforms



The relationship assets of a continental Knowledge Management Programme is strongly built on Knowledge Communities, Innovation Platforms or however they are named. These are communities of people who are interested in the development of a knowledge domain and achieving common impact, like advancing best practices, policies or science. In the context of the governance model, Communities of Practice have been already highlighted (like a Knowledge Management Community). In the context of concrete agricultural topics (like post-harvest loss, etc.) they are essential prerequisites for delivering solutions and innovations.

Knowledge Communities are an essential element in the continental knowledge ecosystem with the following functions (among others):

- Knowledge Communities facilitate connections between people with common interest and expertise which otherwise wouldn´t have been established. People with high commitment to a topic are connected.
- Knowledge Communities support the capturing, collection, sharing, discussing, evaluating/reflecting, enriching, and disseminating of data and knowledge within a knowledge domain.
- Networks of people from different organizational units as well as with different job types leverage innovation potential.
- Technologies and knowledge get visible in a very early stage and can be jointly advanced.
- Experts can identify their audience for knowledge exchange, get response to questions and mutual advice. Communities are a space for peer learning and continuous improvement.

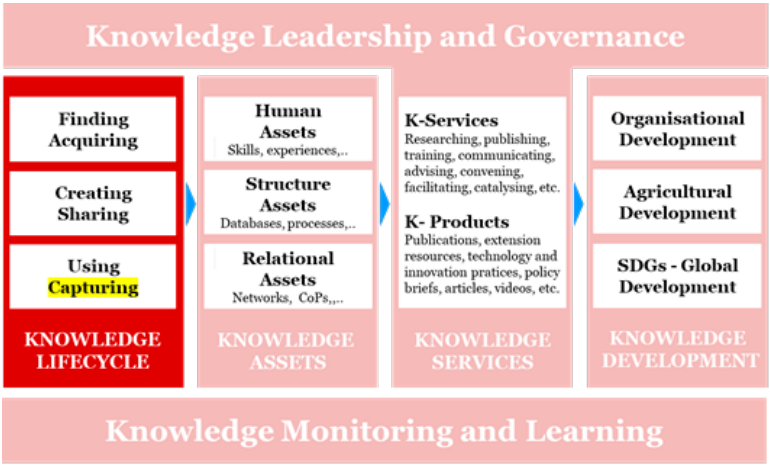
Many networks are established all over Africa, and many of them create substantial value. However, the facilitation of Knowledge Communities is demanding and requires skilled facilitators. The following table compares loose networks and professionally facilitated Knowledge Communities:

Figure: From loose relations ... to a professional community

Considering the high relevance of professional facilitation, it is highly recommended to offer specific trainings in Community Facilitation and to create a Community of Facilitators. Such a Community would help to coordinate the capturing activities of all Communities (or Innovation Platforms, Networks, etc.) to contribute data and knowledge on a continental level. A coordination of Facilitators will be a backbone for the revival of FARA´s Agriculture Innovation Platform and Agri-Business Portal (IPAbP). Only through competent facilitators, a common interest, and the communication channel of the Community, the maintenance and advancement of the Communities will succeed.

FARA could offer regularly all Communities/Innovation Platforms a cost-free training and onboard them to join the AIP, boost their activities and impact, and capture relevant knowledge to be shared on other infosystems, like eCapacities.

Continental Knowledge Capturing Processes



Knowledge Processes are the very operational steps to search, acquire, create, share, apply or capture knowledge. Capturing data / knowledge is one of them and addresses specifically the transformation of implicit or tacit or not documented knowledge into an explicit and shareable form.

In the context of modern semantic technologies data capturing specifically means the process of automatically extracting data from documents (like articles), transforming it into machine-readable data, and adding meaning to it through metadata. This process depends on technical solutions and needs to be defined for specific use-cases, which will continuously change and develop during the next 10 years.

The following recommendations for data capturing address specifically the capturing of implicit/tacit knowledge or unstructured/siloed knowledge and transforming it into explicit and shareable data. This data finally can be linked with continental databases using semantic tools. In the following sectionseight capturing processes are introduced and described, the implementation may require training or facilitation and tailoring in specific contexts. These capturing processes are recommended for implementation, and the more complete and consistent the implementation the better for the organisations and for continental knowledge capturing. There is no necessary sequence, and any institution may decide on prioritizataion individually.

Capturing data and knowledge is critical when specific activities end. When projects end (research projects, political processes, etc.) it is critical to capture the knowledge to make it available for other projects or activities. When an event – like a conference – ends, a lot of knowledge is created, and if not captured may not be sustained to a desirable extent. When people leave their workplace or their organization, capturing knowledge means to secure the knowledge and experience and to sustain performance. While individual knowledge capture seems to be an organizational issue, the impact will be continental as well, as the knowledge lost on individual level finally also gets lost for the continental community. Numerous experts with highly relevant knowledge for agricultural development retire without knowledge capture and their knowledge is lost.

The first three capturing processes are addressing these situations.

1) Capturing knowledge from projects
2) Capturing knowledge from events
3) Capturing knowledge of leaving experts

Capturing data and knowledge is also critical at specific stages in a process. After a milestone in a project, or at a certain stage of community work when outcomes are produced, capturing makes them available to others beyond the project or community members.

Three additional capturing processes are addressing these situations.

4) Capturing knowledge from Knowledge Communities
5) Capturing knowledge from social media and apps
6) Capturing knowledge from extension services

Capturing data and knowledge is specifically relevant from knowledgeable external partners, like donors, consultants. Knowledge capturing can and should be agreed with such partners as an element of the cooperation.

Two additional capturing processes are addressing these situations.

7) Capturing knowledge from donors and other AR4D partners
8) Capturing knowledge from Consultants

The generic approach is mainly the same for all of these processes, but the specification and execution will differ for all processes, therefore they require specific leadership, responsibility, and resources.

Capturing knowledge after projects

Action: Capturing knowledge after projects	
Benefit	A systematic knowledge capturing process after projects will help • capturing and sustaining for the organization (as well as other continental partners): skills, experiences (human resources), relevant data and information (codified knowledge) as well as relations, partnerships, and feedback from stakeholders (relationship capital) • sustaining performance beyond project closure of the project • avoiding repetition of mistakes • learning from experiences and advancing individual, as well as organizational competences Capturing after FARA´s projects shall additionally motivation people to join FARA´s knowledge services and populate eCapacities and other "infosystems/knowledge services" with content.
Key measures	1. Qualifying Knowledge Capture Facilitators 2. Developing a Knowledge Capturing Standard for projects 3. Anchoring the process in project TORs 4. Implementing the process 5. Establishing a Community of Practice for K-Capturing Facilitators and continuously advance the process and skills
Key Deliverables	• Qualified Knowledge Capture Facilitators • Knowledge Capturing Standard for projects • Established Community of Practice for K-Capturing
Resources	• Training cost • Facilitation time /cost for continental Capturing CoP (2 days per month, 5-10 days for initial mobilization • Time for capturing (depending on project size)

Responsibilities	Within FARA Secretariat as well as in the other organisations, the implementation should be driven by the Knowledge Management Officer. The continentally coordinated implementation should be driven by the KM Community under the continental facilitation of FARA, regional facilitation by SRO KMers, locally by NARI KMers
Target	• 90% of project with a volume of more than xxx (eg 30.000 EUR) applies the Knowledge Capturing Process • TOP3 learnings are shared continentally
Implementation period	A generic process can be established with 3 months Knowledge Capturing Facilitators can be trained within 6-12 months
Risks and their mitigation	Motivation and leadership risk: Knowledge Capturing not considered a value to the project managers (they have the knowledge anyway). Mitigation: Leadership is needed to make capturing a must. Facilitation and easy to apply methods make the implementation easy and attractive. Competence gap: Trained facilitators are not available (or budgeted) and incompetent facilitation frustrates the participants. Mitigation: Regular trainings are provided and learning videos are available online. Knowledge Managers provide trainings inhouse (train-the-trainer concept).

Capturing knowledge from events

Action: Capturing knowledge from events	
Benefit	Relevant data, information, learnings, and relations (like capacities, expert profiles,..), captured after events are availed to the whole organization and to continental partners. Wider dissemination and application of knowledge. Motivation of people to join FARA´s knowledge services. Population of eCapacities
Key measures	• Develop a simple knowledge capturing process (template/form) and a motivational video for staff. Training must not be needed. • Integrate the knowledge capture into the requirements for staff for any training, conference, event. • Review of capturing efforts to be part of performance talks.
Key Deliverables	• Simple knowledge capture process for evens (template/form) • Shot motivational video • Template for text to be integrated in job requirements and reviews
Resources	• Cost for motivational video and dissemination efforts • Time for capturing (depending on the event)
Responsibilities	The implementation should be driven by the KM Officers of the organizations, lead by the organization´s leadership, and executed by the event managers (for the event as such) as well as by the participants (for the transfer into their organisations).
Target	• 90% of all events of at least one day are captured. • All potential experts participating in events are invited to join eCapacities.

Implementation period	The process itself can be anchored in the processes within 3 months. Further advancement shall take place on a continuous basis within the KM (or Knowledge Capturing) Community.
Risks and their mitigation	Motivation and leadership risk: Knowledge Capturing not considered a value to the event managers, responsibility and time is lacking. Mitigation: Leadership is needed to make capturing a must. Facilitation and easy to apply methods make the implementation easy and attractive.
Resources	• Cost for motivational video and dissemination efforts • Time for capturing (depending on the event)

Capturing knowledge of leaving experts

Introduction

Action: Capturing knowledge of leaving experts	
Benefit	Minimization of knowledge loss when people change positions or leave the organization; sustainability of performance; retention of critical knowledge; avoidance of repeated mistakes; continuity of relations
Key measures	1. Development of standard process / methodology for offboarding 2. Training of off-boarding-Experts 3. Anchoring off-boarding in the Management-Systems of Organizations
Key Deliverables	• Off-boarding process • Trained Off-boarding Facilitators • Example/Template for anchoring the off-boarding process in a Management System
Resources	•Training cost • 0,5-1 day of facilitation per off-boarding
Responsibilities	• Lead by the management • driven by the KMers •implemented by Off-boarding facilitators
Target	•Off-boarding process implemented for any person leaving he organization with a Knowledge Loss Risk of 4 or 5 (on a scale from 1-5).
Implementation period	•Methods are developed and facilitators trained within 6 months.

Risks and their mitigation	• Motivation and leadership risk: Knowledge Capturing not considered a value to the leaving expert (they have minor benefit) or to the manager (eg lack of time/attention). Mitigation: Leadership should be briefed by KMers. Facilitation and easy to apply methods make the implementation easy and attractive. • Competence gap: Lack of trained facilitators. Mitigation: Regular trainings are provided and learning videos are available online. Knowledge Managers provide trainings inhouse (train-the-trainer concept).

Capturing knowledge from CoPs

Communities of practice are groups of people with a common practice and thematic interest, but often the ideas, discussions, knowledge produced and shared is not available to the outside. Even when shared, the knowledge products may not be provided in the right formats and without context. Knowledge Capturing can systematically and strategically capture knowledge and transform it into user-friendly knowledge products and services.

People in CoPs may contribute to the infosystems and be available for eCapacities: Considering the number of 35.000 members of FARA´s DGroups communities, the potential benefit for content creation, problem solving, and mutual advice (eg through eCapacities,..) is huge.

Action: Capturing knowledge from CoPs	
Benefit	Communities produce knowledge for continental use and benefit. Investments in CoPs show concrete results and create better Return On Investment. Participants of CoPs are motivated because their findings reach out wider. eCapacities and other infosystems are better populated.
Key measures	Training CoP Facilitators on knowledge capturing (should be an element of any CoP Facilitation training) 2. Promotion of "Charters" for the CoPs, clarifying outputs of the CoPs, specifying the knowledge products and services generated. 3. Knowledge Reports to be generated by CoPs, informing about achievements and outputs.
Key Deliverables	All CoPs are facilitated by a trained CoP Facilitator; quantity and quality of captured knowledge is defined. •Number of knowledge products and services regularly produced and disseminated by CoPs

Resources	• Time to motivate, advise and train CoP Facilitators • The capturing of knowledge should be an intrinsic activity of the CoPs and shouldn´t require additional financial resources.
Risks and their mitigation	CoP Facilitators, supported by the Knowledge Managers
Target	• All CoPs follow a CoP process with a Charter and report on knowledge captured and shared.
Implementation period	•Initial number of facilitators can be trained within 6 months. Implementation is ongoing.
Risks and their mitigation	•Technology and integration risk: Knowledge is captured at a (virtual or analogue) place which is not continentally integrated. Knowledge captured remains available only for the participants of the Community. ing remains to be limited to the CoP Participants alone. Mitigation: Leadership support to be provided to KMers. Facilitation and easy to apply methods make the implementation easy and attractive. •Competence gap: Lack of trained facilitators. Mitigation: Regular trainings are provided and learning videos are available online. Knowledge Managers provide trainings inhouse (train-the-trainer concept).

Capturing knowledge from social media and apps

Action: Capturing knowledge from social media and apps	
Benefit	Identifying relevant people/companies/jobseekers through existing networks and link them with eCapacities. Relevant knowledge created and shared in special media – including expert profiles or contacts; ideas and experiences, relations – are transferred into an organizational context to be available through FARADataInformS
Key measures	1. Strengthen content at social media, invite strategically to the groups, organize subgroups, invite them to join eCapacities 2. Promotion of FARADataInformS in social media to attract participants to use eg eCapacities. 3. Regular knowledge transfer from social media too FARA´s infosystems. 4. Building linkages between the knowledge graph and social media to include content in semantic search.
Key Deliverables	• Regular presence for FARADataInformS in social media • New relevant contacts identified; groups/subgrous established; • People registered on eCapacities with profiles • Content gained from social media for other infosystems
Resources	• Weekly capturing efforts in each social media channel • Facilitated and supported social media community • Professional training and coaching for social media communication
Responsibilities	FARA, SROs, AFAAS to establish, maintain and link groups and subgroups; invite members to join eCapacities Those responsible for social media communication (Knowledge Management and Communication officers?) and subject matter experts in specific communities.

Target	Grow eCapacities and key social media communities by xxx (eg 400) persons per month; achieve a number of registered people which is attractive for job providers to post jobs (competitive-ness)
Implementation period	First, the FARA knowledge services need to be at a high level, competitive and attractive. Mobilizing widely to the current eCapacities is not recommended. When eCapacities is competitive, wide mobilization shall start and then requires ongoing activities
Risks and their mitigation	• Attractiveness gap: The tools are not attractive, people are mobilized, but then not interested to join. Mitigation: First, the tools need to be updated and made more attractive. • Mobilization gap: Not enough people are mobilized within the first 4 months, loss of credibility and interest Mitigation: Resource mobilization, until a critical mass is achieved, there should be significant resources (time) available.

Capturing knowledge from extension and farmer advisory services

Action: Capturing knowledge from extension and farmer advisory services	
Benefit	Extension officers and service providers (public or private) are those professionals with the direct contact with the farmers, reaching out to the last mile. The experiences and learnings from these services are critical to increase the performance of the agricultural system. Benefits of this capturing process is better understanding the real needs as well as addressing them better and increasing the overall impact of the AR4D efforts.
Key measures	1. Creating adequate continental formats for capturing (eg knowledge briefs; best practice report; pest monitor; etc.) and spaces to capture them (NARIs or SROs or FARA or AFAAS). 2. Providing all extensionists access to the system 3. Leadership by ministries and anchoring capturing in the job requirements for extension officers 4. Promotional video for using the system and other supportive measures 5. National, regional, continental "Extension CoP" to evaluate learnings, condense findings, provide relevant knowledge products and services.
Key Deliverables	• Formats and platforms for capturing knowledge from extension services • Substantial number of knowledge resources created from extension services • Extension CoP providing knowledge products and services
Resources	• Time for capturing needs to be provided to extension officers • Extension CoP to spend time on reflection, condensing, service delivery •Cost for development of formats and platforms on national/regional/continental level

Responsibilities	FARA KM and AFAAS KM should have the lead in this to coordinate a continental approach. Regional KM and national KM to support the ministries in the implementation.
Target	Increase the impact of extension offices by eg 50%. Achieve inputs for policy / ecosystem improvements, eg. xxx policy briefs to be created by the Extension CoP
Implementation period	• Implementation of formats and platform to be implemented within 6 months; mobilization and dissemination (stepwise) pilot countries 6-12 months; further countries up to 24 months • Extension CoPs established within 6 months, number of CoPs growing
Risks and their mitigation	• Leadership and resource gap: Lack of attention given to capturing; lack of time provided to the extension officers; lack of leadership. Mitigation: KM Leadership on continental, regional, national level (see knowledge leadership); anchoring capturing tasks in Extension Management Systems. Recognition system (eg award) • Competence gaps: Extension officers don´t know how to do and use the system. Mitigation: Simple and easy tool/process. Developing learning videos.

Capturing knowledge from donors and other AR4D partners

Action: Capturing knowledge from donors and other AR4D partners	
Benefit	Donors have comprehensive knowledge assets available, which are often not shared in a targeted way. Even learning from projects themselves is a challenging and demanding task, which is not always assured. Sharing systematically and effectively with the outside is often lacking. A systematic process to knowledge capture could avail better the richness of donor knowledge to those who need it.
Key measures	FARA to coordinate an annual knowledge capture conference for either individual donors or a group of donors to identify relevant knowledge resources and determine a knowledge transfer plan, which shall be implemented in partnership with the donors. Additionally, donors could be motivated to integrate knowledge transfer activities into project milestones/closure, to assure dissemination.
Key Deliverables	1. Knowledge Capture workshops 2. Knowledge Transfer Plans 3. Knowledge resources availed to continental partners systematically
Resources	• Cost for organizing an annual workshop. • Cost for the implementation of the Knowledge Transfer Plans – depending on the identified knowledge resources
Responsibilities	• FARA KM to coordinate; participation of all CAADP-XP4 Partners
Target	Increasing the availability of knowledge resources via FARADataInformS and other knowledge hubs of SROs / NARIs. Avoid redundancies in developing data, information, and knowledge
Implementation period	Annually

Risks and their mitigation	Motivational gap: Donors are not interested / willing to share knowledge. Mitigation: A dedicated conference/workshop would highlight the relevance; FARA Leadership to create attention and awareness of the needs and benefits. •Implementation gap: Knowledge to be captured and measures are defined, but the implementation is weak, due to minor priority. Mitigation: KM Team to regularly follow up with donors; Integrate donors in the continental KM Community

Capturing knowledge from consultants

Action: Capturing knowledge from consultants	
Benefit	Consultants come and go on a regular basis. They complete their assignments, hand over their results, their knowledge leaves to a big extent.
Key measures	1. Knowledge transfer to be integrated in contracts 2. Consultant debriefing and k-transfer session
Key Deliverables	• Templates for knowledge transfer requirements within TORs • Methodology/procedure for consultant debriefing session •Trainings for procurement officers
Resources	• Cost for development of templates and procedures • Training cost
Responsibilities	• KM Community (continental, regional and national) to coordinate with Procurement officers
Target	Integrate systematic knowledge transfer process into TORs for consultancies beyond 20.000 USD.
Implementation period	Doable within 12 months to train all procurement officers in AR4D Institutions
Risks and their mitigation	• Acceptance gap: Consultants may not be willing to share their expertise. The best consultants may not apply under too heavy requirements. Mitigation: Sensitive formulation as a bonus in the evaluation. Appreciative interaction with consultants!

Implementation

The implementation of the continental data capture strategy requires continental leadership and coordination as well as regional and national operationalization and leadership as well. The efforts to develop capturing on a continental level from the beginning may often not be seen by national or regional partners, when even the local capturing is lacking. However, a continental approach provides significant support for local/national/regional efforts and produces more benefits by receiving much more knowledge then knowledge is captured and shared. Community spirit and ongoing communication and collaboration is essential and therefore the establishment and passionate facilitation of a continental KM Community of Practice combined with strong continental knowledge leadership is a fundamental requirement for all efforts. Without these existing, the implementation will fail.

The integrated approach to these activities is also unavoidable. It requires a carefully orchestrated implementation of all the measures because they determine each other: A tool without competences will not be used. Competent people without tools will not have a chance to share their knowledge widely. Competent people with good tools but lack of community will create volumes of unread and unused documents. All of these will fail without resources, leadership and governance. Knowledge capturing is part of a comprehensive Knowledge Management System and as an interdisciplinary task, it is complex and demanding. However, KM is the key to agricultural development and must be given the highest priority.

The achievement of the Malabo Goals and CAADP Goals requires the best possible Knowledge Management being a core business process, while the resources dedicated to KM are far from adequate! Most organizations declare how relevant KM is but have by far less resources for KM than for overheads and administrative processes.
The fact that FARA, all Sub-Regional Organizations and most of the NARIs have established a KM unit is a big step forward and encouraging. Through consequent professional development, capacity development, continental collaboration, equipment with resources and continued leadership, the necessary change can happen.

Roles and Responsibilities for the Implementation

Table: Roles and responsibilities of continental partners in the implementation of the Continental Data Capture Strategy

Activities/Roles in the CDCS implementation	FLM	FKM	SROA	NARI	ACAD	Min	AR4D	DP	OS
Continental Knowledge Development Goals									
Continental Knowledge Governance, Monitoring and Learning									
Continental Knowledge Products and Services									
Continental Knowledge Skills Programme									
Continental Knowledge Systems and Data Integration									
Continental Knowledge Communities (CoPs)									
Capturing knowledge from projects									
Capturing knowledge from events									
Capturing knowledge of leaving experts									
Capturing knowledge from Knowledge Communities									
Capturing knowledge from social media and apps									
Capturing knowledge from extension services									
Capturing knowledge from donors and other AR4D partners									
Capturing knowledge from Consultants									

Lead or major role ***Significant role*** ***Involved***

FLM - FARA Leadership and Management, incl. Board of Directors, Directors and Managers
FKM - FARA Knowledge Management Department
FIT - FARA IT Department
SRO - Sub-Regional Organizations and AFAAS
NARI - National Research Institutions
ACAD - Academic Institutions incl. Universities and Research Organizations
MIN - National Ministries and Governmental bodies
EXT - Extension Services (public and private)
AR4D - AR4D Partners, incl. Farmer Associations, Civil Society Organizations, Value Chain Stakeholders, etc.
DP - Development Partners
OS -Other Stakeholders

Implementation Roadmap

Implementation Period	Y1: Q1-4				Years 2-10								
	1	2	3	4	2	3	4	5	6	7	8	9	10
Continental Knowledge Development Goals													
Continental Knowledge Governance, Monitoring and Learning													
Continental Knowledge Products and Services													
Continental Knowledge Skills Programme													
Continental Knowledge Systems and Data Integration													
Continental Knowledge Communities (CoPs)													
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Forum for Agricultural Research in Africa
(FARA) Secretariat
No. 9 Flower Avenue, New Achimota Mile 7
PMB CT 173, Accra, Ghana
Telephone: +233 302 772823 / 302 779421
Fax: +233 302 773676 /

Email: info@faraafrica.org
Website: www.faraafrica.org

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