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Mapping of Science, Technology and Innovation actors championing agroecological practices for sub-Saharan Africa

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About

The [DeSIRA Initiative](#) (Development Smart Innovation through Research in Agriculture), funded by the European Commission, Directorate General for International Partnerships (DG INTPA), seeks to enhance an inclusive, sustainable and climate-relevant transformation of rural areas and of agri-food systems, by linking better agricultural innovation with research for more developmental impact. It supports actions in low- and middle-income countries (LMICs) to strengthen the resilience of their agri-food systems, the relevance of the national and regional research and innovation systems, and the coherence and efficiency of their agricultural public research and extension services related to climate change challenges.

[DeSIRA-LIFT](#) (Leveraging the DeSIRA Initiative for Agri-Food Systems Transformation) is a service project (June 2021 – May 2024) to the European Commission, DG INTPA with the main objective to enhance the impact of the DeSIRA Initiative by providing (on-demand) services to DeSIRA project holders and partners. DeSIRA-LIFT includes three service areas aligned to the three DeSIRA Pillars: *Service Area 1* supports country-led DeSIRA projects to enhance their impacts on climate-oriented innovation systems in line with more sustainable food system transitions. *Service Area 2* supports the Comprehensive Africa Agriculture Development Programme (CAADP) ex-pillar IV organizations in their Agricultural Knowledge and Innovation Systems (AKIS) related roles. *Service Area 3* is providing support to policy makers on themes related to agricultural research for development (AR4D) and innovation policies and programming.

DeSIRA-LIFT is implemented by members of the Agrinatura and EFARD, in particular the members: Wageningen UR, CIRAD ISA (University of Lisbon), NRI (University of Greenwich), SLU and COLEAD. [Agrinatura](#) is the European Alliance on agricultural knowledge for development. [EFARD](#) is an umbrella network of European research and non-research stakeholders from public and private European organisations and the European Commission.

Acknowledgements

A particular focus of DeSIRA-LIFT's advisory work is to support and promote agroecological pathways as a viable transition option for sustainable agri-food systems in Africa. This document delivers the results of a mapping exercise of African research and education organisations and networks involved in research and innovation initiatives in the field of agroecology and other innovative approaches. The mapping aims to feed into the European Commission's programming efforts within the framework of the Regional Indicative Programme for Africa, specifically Priority Area 4 on Digital and Science, Technology and Innovation.

The mapping is based on the analysis of intelligence collected within the DeSIRA Initiative and documents provided by selected organisations and networks. It is also based on interviews with key resource persons in these organisations and networks, including the DeSIRA community projects, Agrinatura, EFARD, the CAADP-XP4 organisations, networks of universities such as RUFORUM, key funders and key CGIAR actors. Therefore, we would like to sincerely thank all those who have directly or indirectly contributed to this report. We would like to particularly acknowledge the exchanges with representatives of CAADP-XP4 organisations (FARA, ASARECA, CCARDESA, CORAF/WECARD, AFAAS) and RUFORUM, which provided fundamental input for this assignment and were highly appreciated by the DeSIRA-LIFT team.

As underlined in the Introduction of this document, a mapping exercise like this one is a snapshot of a situation at a specific moment in time. This document is a time-bound recording of research and innovation actors active in agroecology. Any efforts to keep this document 'alive' - exhaustive and accurate - are highly appreciated. Do not hesitate to share any comments on the results of this exercise at info@desiralift.org and work with us towards version 2 of this mapping report.

Disclaimer

This publication has been realized within the DeSIRA-LIFT project financed by the European Commission / DG INTPA (FOOD/2021/424-11) and implemented by member organisations of the Agrinatura and European Forum on Agricultural Research for Development (EFARD) networks. The content of this publication is the sole responsibility of the author(s) and does not necessarily represent the views of Agrinatura, EFARD or the European Commission.

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Acronyms

3AO	Alliance for Agroecology in West Africa
ABC	Alliance of Biodiversity International and CIAT
ACALISE	African Centre for Agroecology & Livelihood Systems
ACE Impact	African Centres of Excellence Impact
AFAAS	African Forum for Agricultural Advisory Services
AFD	Agence Française de Développement (French Development Agency)
AFSA	Alliance for Food Sovereignty in Africa
AGROVEG	Agroecological Methodology in VEGetable crops
ASAP	Systèmes agro-sylvo-pastoraux en Afrique de l'Ouest
ASARECA	Association for strengthening agricultural research in Eastern and central Africa
AU	African Union
AfricaRice	The Africa Rice Centre
AFROREC	Africa Organic Research Conference
BvAT	Biovision Africa Trust
CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
CEA-CCBAD	African Centre of Excellence on Climate Change, Biodiversity and Sustainable Agriculture
CERAAS	Centre for the Improvement of Adaptation to Drought
CGIAR	The Consultative Group for International Agricultural Research
CILSS	Comité permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel
CIMMYT	The International Maize and Wheat Improvement Centre
CIP	The International Potato Center
CIRDES	Centre International de recherche-développement sur l'élevage en zone subhumide
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CNRST	National Centre for Scientific and Technological Research
CNS-FL	National Centre for Specialization in Fruits and Vegetables
CORAF	West and Central African Council for Agricultural Research and Development
CREAF	The Centre for Research on Ecology and Forestry Applications
DG INTPA	Directorate-General for International Partnerships
DeSIRA	Development Smart Innovation through Research in Agriculture

DeSIRA-LIFT	Development Smart Innovation through Research in Agriculture-Leveraging the DeSIRA Initiative for agri-food systems transformation
DIVECOSYS	Diversité biologique et systèmes agroécologiques
dP	Dispositifs de recherche et de formation en Partenariat
DRREA	Directorates for Environmental and Agricultural Research
EC	European Commission
EIAR	Ethiopian Institute of Agricultural Research
EOA	Ecological Organic Agriculture
EU	European Union
ECOWAS	Economic Community of West African States
FAO	Food and Agricultural Organisation of the United Nations
FARA	Forum for Agricultural Research in Africa
F&B	Forêts et Biodiversité
FANRPAN	Food and Natural Resources Policy Advocacy Network
FOFIFA	Centre National de la Recherche Appliquée du Développement Rural
FSA	Faculty of Agronomic Sciences
FUNAAB	Federal University of Agriculture Abeokuta
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GT	Green Transition
GSDM	Professionnels de l'Agroecologies
IAVAO	Innovation et Amélioration Variétale en Afrique de l'Ouest
ICARDA	International Centre for Agricultural Research in the Dry Areas
ICIPE	International Centre of Insect Physiology and Ecology
ICRAF	International Council for Research in Agroforestry
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IER	Institut d'Economie Rurale
IFOAM	The International Federation of Organic Agriculture Movements
IFPRI	International Food Policy Research Institute
IITA	International Institute for Tropical Agriculture
ILRI	International Livestock Research Institute
IITA	International Institute of Tropical Agriculture
INRAB	Institute National des Recherches Agricoles du Benin
INERA	Institute of Environment and Agricultural Research

IRAD	Institut de Recherche Agricole pour le Développement
IRD	French Agricultural Research Centre for International Development
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
LABEF	Laboratoire de Biomathématiques et d'Estimations Forestières, Laboratory of Applied Ecology
LEA	Laboratoire d'Ecologie Appliquée
LMICs	Low- and Middle-Income Countries
LSA	Laboratory of Food Sciences
MIP	Multi-Annual Indicative Programme
MUST	Mbarara University of Science and Technology
NGO	Non-Governmental Organisation
NOARA	Network of Organic Agriculture Researchers in Africa
ORM4Soil	Organic Resource Management for Soil Fertility
PELUM	Participatory Ecological Land Use Management
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SABC	Africa Centre of Excellence for Climate Smart Agriculture and Biodiversity Conservation
SCAC	The Cooperation and Cultural Action Service
SDGs	Sustainable Development Goals
SFR RACINES	Federative Structure for Research, Training and Expertise for Development on Climate Resilience of Agroecosystems and preservation of natural resources and Ecological Intensification in the Sahel
SPAD	Systèmes de production d'altitude et de durabilité à Madagascar
STI	Science and Technology and Innovations
SUA	Sokoine University of Agriculture
UCAD	Université Cheikh Anta Diop
UOB	University of Bukavu
WACWISA	West Africa Centre for Water, Irrigation and Sustainable Agriculture
WASCAL	West African Science Service Centre on Climate Change and Adapted Land Use
WECARD	West and Central African Council for Agricultural Research and Development

1. Introduction

The European Union (EU) supports the United Nations' [2030 Agenda](#) for Sustainable Development, the [Paris Agreement](#) and the [Convention on Biological Diversity](#) to help eradicate poverty, reduce inequalities and achieve sustainable development. In addition, regional actions of the EU pursue and project the EU's interests and values in support of universal global agendas and initiatives. The European Green Deal is one of the EU's strategies to implement these agendas in Europe, but also provides direction for international partnerships between the EU and other regions.¹

The Directorate General for International Partnerships (DG INTPA) is responsible for formulating the EU's international partnerships and development policy, with the ultimate goal to reduce poverty, ensure sustainable development, and promote democracy, human rights, and the rule of law across the world.

The European Union (EU) is calling for a strategic partnership with Africa to pursue common priorities and tackle multi-dimensional challenges related to environment, climate, society, economics and politics, in order to implement the Sustainable Development Goals (SDGs). The Multi-Annual Indicative Programme (MIP) for sub-Saharan Africa - the regional as well as the national MIPs - outlines the priorities of EU's partnership with sub-Saharan Africa for the period 2021-2027. The regional MIP also takes into account the priorities of the African Union (AU) and the regional organisations in Africa. Funding for the regional MIP and its individual actions will be sourced from the three sub-regional budget lines for respectively West Africa, Eastern and Central Africa and Southern Africa.

The regional MIP focusses on six priority areas:²

1. Human Development
2. Governance, Peace and Security, Culture
3. Green Transition
4. Digital and Science, Technology and Innovation
5. Sustainable Growth and Decent Jobs
6. Migration and Forced Displacement

DG INTPA aims to pursue new funding opportunities under priorities 3 (Green Transition) and 4 (STI component) of the regional MIP to, respectively, i) support multi-stakeholder consortia to bring innovations to scale (DeSIRA+), and ii) strengthen Centres of Excellence on agroecology in sub-Saharan Africa. Both opportunities aim to support *agroecological transitions* of agri-food systems transformations. DG INTPA aims to collaborate intensively with its African institutional partners in the implementation of both opportunities.

This report presents a shortlist of research institutes, universities and/or networks/alliances of researchers/research organisations that are currently involved in research and innovation that *support* agroecological transitions. The shortlist has been elaborated following an extensive actor mapping exercise of organisations involved in research and innovation on agroecology in sub-Saharan Africa. The results of this exercise can be found in Annex 1, i.e., a longlist of research institutes/centres, universities, networks of researchers or research organisations. The shortlist presented in this report provides recommendations for the organisations to be considered under priority 4 (STI component) of the Regional MIP. However, it needs to be underlined that the longlist as well as the shortlist should strictly be considered as the results of an initial mapping exercise, subject to limitations further explained in Chapter 2.

Following this introductory section, chapter 2 provides a description about the approach and mapping methodology, including an overview of the steps and criteria used to narrow down the long list, resulting in a short list of *potential* STI actors. Chapter 3 consist of a description of short-listed actors per region and chapter 4 gives a number of concluding remarks. Annex 1 provides the longlist of networks, universities and organisations in line with the STI component of the MIP.

¹ NDICI-Global Europe 'Global Challenges' thematic programme Multi-Annual indicative programme 2021-2027. Annex.

² Sub-Saharan Africa Multi-Annual Indicative programme 2021-2027.

2. Approach and mapping methodology

As mentioned in the introduction, this report includes a 'long list' of research institutes and universities, as well as a 'short list'. This chapter describes the methodology and criteria used for the selection of research institutes, universities and/or *networks/alliances of researchers/research institutes* and the applied justification for listing research actors on the long list (in Annex 1). From a practical point of view a very long list of actors will be unhelpful to the EC programming in sub-Saharan Africa, therefore this chapter also describes the steps used that resulted in a 'short' list of research actors (in Chapter 3) to be considered under priority 4 of the STI component of the regional MIP.

Considering the holistic feature of the agroecological transition to food systems transformation, which fundamentally relies on, takes advantage of, and maximises the use of ecological processes to support agriculture (crops and animal production) means that a wide range of organisations engaged in sustainable agriculture *could claim* to pursue agroecology. During this mapping exercise, agroecology was addressed from a broad (perhaps its broadest) perspective, resulting in a plethora of actors. The steps below indicate the criteria used to narrow down.

Step 1. A general survey to identify organisations through internet, through reports and based on scientific literature;

Step 2. Direct consultations/exchanges with representatives of, FARA, ASARECA, CCARDESA, CORAF/WECARD, AFAAS and RUFORUM to elicit some of the information and intelligence in their possession concerning research organisations/institutes, universities, potentially centres of excellence, alliances/networks that support the agroecological transition;

Step 3. Design of a *draft* long list of research organisations/institutes (e.g., public or private institutes at global, national or local level, centres linked to universities, specific university departments, etc.). International or European organisations have only been included when (repeatedly) involved in initiatives, programmes or projects related to agroecology in sub-Saharan Africa.

Step 4. Definition of focussed criteria for the narrowing down of the STI actor long list on the basis of which a draft short list was designed.

Step 5. Second exchange with CAADP-XP4 organisations and RUFORUM to *reflect on* and provide feedback to the current short list and/or add to the to the short and longlist.

Regarding steps 1, 2 and 3

More than 170 entries have been recorded for the STI component in the long list.

Adding an organisation to the long list depended on whether, e.g.,

- online texts, documents and reports indicated that organisations are working on or involved in agroecology (initiatives, programmes, projects etc.);
- wording of services/programmes of the organisation itself are compatible with agroecology (also documents and texts of organisations, highlighting e.g., organic agriculture, biobased solutions, agrobiodiversity have been assessed);
- organisations are participating in projects addressing agroecology;
- organisations are participating in e.g., 'Dispositifs de recherche et de formation en Partenariat' (platforms in partnership for research and training) initiated by CIRAD, or other partnerships, which are explicitly addressing agroecology;

Few organisations have been added to the longlist that underlined certain combinations/groups of activities which make the organisations highly compatible with an agroecological approach or mindset (e.g., participatory research/transdisciplinary research related to natural resources management in farmland or rural landscapes).

Regarding step 4

A shortlist of the most relevant, active, effective and most influential actors was identified based on specific selection criteria. The criteria defined for the final selection of the relevant actors for the STI include:

- Evidence of active production of research results (e.g., in the form of technology and innovation products, like biopesticides, or shared results on participatory research to boost agrobiodiversity or an agroecological transition); and/or
- Evidence of hosting or running specific training or education programmes/trajectories on Agroecology (e.g. having an MSc. programme dedicated to agroecology)
- Evidence of mentioned linkages with field-based beneficiaries (e.g., farmers organisations and NGOs) or linkages with Green Transition actors;
- Evidence of pronounced linkages with policy formulation/policy making and other policy research and influencing organisations at the national and pan-African level (by assessing online reports and documents); and/or
- Evidence of alignment with or pronounced support to the agroecology agenda of the AU commission, sub regional organisations and of the processes of international partners e.g., the EU or the FAO agroecology agenda. For some shortlisted actors (see Chapter 3) this has specifically been mentioned.

It has to be underlined that the criteria outlined above require the availability of *substantive* information on location, contacts, geographical scope of activities (regional, multi-country or simply domestic) and on the activities or programmes of the actors, in order to make a sound judgement on the actor's involvement in agroecology. The availability of information was *mainly* limited to what could be found on internet and, therefore, the shortlist as well as the longlist are to be regarded as an initial result of a first mapping trial of STI actors. Both lists, by all means, are not claiming to be conclusive, nor exhaustive or complete!

Guided by the above indicated criteria, a group of STI actors has been selected, which is presented in Chapter 3. Note that:

- European research organisations (active in sub-Saharan Africa and included in the longlist) have been excluded from the shortlist;
- The shortlist has been presented by region, based on the geographic coverage of CORAF/WECARD (West Africa), ASARECA (Central / Eastern Africa) and CCARDESA (Southern Africa) respectively;
- It has been preferred to annex the more extensive list of actors, should that be of any interest to DG INTPA;
- The shortlist of today will not be the shortlist of tomorrow.

Regarding step 5

The shortlist and long list have been assessed by CORAF, CCARDESA, ASARECA, AFAAS and RUFORUM (from November 2022 to January 2023) and additions have in particular been made to the long list (see Annex 1). The CAADP-XP4 organisations particularly stressed that 'on the ground' local initiatives are plentiful, but for now less linked to the STI component of the MIP for sub-Saharan Africa.

3. Short list of Science, Technology and Innovation (STI) actors in sub-Saharan Africa

Please note that the order in which organisations are listed are not based on priority. Where possible research actors have been listed by country.

3.1 STI organisations and networks at continental level

The **Platforms in partnership for research and training** (dP) are an original form of scientific partnership developed by CIRAD and its partners who share the same strategic priorities. These are long-term alliances of a critical mass of organizations and individual researchers and actors involved in STI activities. The diversity of disciplines (interdisciplinarity) and actors (transdisciplinarity) are key assets for the design of shared interventions embodied in a portfolio of projects, often acquired through competitive calls. They concentrate resources and skills on shared research and innovation topics at regional scale including institutional capacity building and training activities. The dP model is flexible and aspires to a common set of principles and operating rules for governance, leadership and scientific programming: long-term institutional partnership, shared governance, pooling of resources and field-based activities in response to development issues. Each dP is leaning on a memorandum of understanding signed by the member partners, which systematically includes CIRAD. Co-governance is a constant feature: 14 of the 22 dP are coordinated or co-coordinated by a partnering institution on a rotating basis, and a large majority has a multi-partner steering committee. The dP are evaluated every five years by a committee of three independent experts. The common history and shared confidence earned over time between partners of a single dP, along with a strong rooting within specific local context (social, economic, academic, biophysical), make the platform quite reactive to regional and international calls of proposal. Built and co-managed with the partners, the dP are open to the civil society (private sector, professional and non-governmental organisations, associations, etc.) and aim to be structured according to an impact pathway. The networking within a dP is a means of developing major integrative projects, building robust datasets, facilitating exchanges of researchers and students, and integrating scientific communities in the South into large-scale thematic or geographical initiatives with international players. Seven dP have a direct link with the topic of agroecology in Africa: ASAP, IAVAO and DIVECOSYS in Western Africa, Agroforestry Cameroon in Central Africa, and F&B, SPAD and BIOCONTROL-OI in Eastern and Southern Africa (see Annex 1 for a more detailed description of these dP). Three CGIAR Centres, IITA, AfricaRice and ICRAF are members of one or two of these dP.

The **CGIAR with its initiative 'Transformational agroecology across food, land and water systems'** aims to develop and scale agroecological innovations for small-scale farmers and other agricultural and food system actors across different socioecological contexts in seven low- and middle-income countries, including Burkina Faso, Kenya and Zimbabwe. The initiative has the following objectives: i) Assess and demonstrate which agroecological innovations (practices, business models, and institutional arrangements) work best, where, why, and for whom. ii) Identify business opportunities and financial mechanisms for local enterprises to deal with agroecological innovations. iii) Develop strategies and action plans that encourage and support sustainable behaviour change oriented to agroecological principles and transitions. iv) Determine the most suitable policies and mechanisms of policy integration for promoting effective and sustainable agroecological transitions. In territories referred to as "Agroecological Living Landscapes", the initiative will engage with diverse stakeholders, including farmer associations or communities, researchers from multiple disciplines, private companies, international and national non-governmental organizations as well as local, regional, and national policymakers. Several CGIAR centres are involved in the initiative: CIAT, CIMMYT, CIP, ICARDA, IFPRI, IITA, and IWMI. Key scaling and implementing partners include Biovision, GIZ, CIRAD, and CIFOR-ICRAF. The Agroecology Initiative was conceived within, contributes to, and learns from the Transformative Partnership Platform on Agroecology (TPP), which convenes multiple stakeholders from civil society, agricultural research, rural advisory, and development sectors.

Another relevant **CGIAR initiative is the 'Nature Positive Solutions'** research initiative that aims to re-imagine, co-create, and implement nature-positive solutions-based agrifood systems that equitably support local food and livelihoods, while simultaneously ensuring that agriculture is a net positive contributor to nature. This objective will be achieved through: Developing nature-positive solutions for conservation of interlinked agrobiodiversity, water and soils systems, focusing on the nexus of agrobiodiversity conservation and the water and soil resource management critical to reversing biodiversity loss; managing biodiversity and other natural resources in a sustainable, nature-positive way, working with smallholder communities to improve production systems, introducing solutions and innovations around biodiversity, water and soil management; Promoting nature-positive solutions as cost-efficiency models for community land restoration by providing the evidence base and capacity to monitor and quantify ecosystem service delivery and maximize efficiency to help local restoration stakeholders establish innovative solutions that attract investment and break the degradation cycle; Educating a wide range of stakeholders on nature-positive solutions for a circular economy approach to rural waste management, ensuring that recycling is used effectively by SMEs to generate increased resources that benefit poor farming households in rural areas and help reduce greenhouse gas emissions; Engaging key actors in creating an enabling environment for nature-positive solutions by a) researching the cost of food, including the hidden costs of women's labour and b) valuing and shaping different incentives, and c) building mainstreaming implementation and scaling capacity. This Initiative will work in Burkina Faso, Colombia, India, Kenya and Vietnam, and will extract lessons with global application.

The **Alliance of Biodiversity International and CIAT (ABC/CGIAR)** was established in 2019 to address four interconnected global crises: climate change, biodiversity loss, environmental degradation and malnutrition. Its research areas include: healthful food systems, multifunctional landscapes, climate action, agrobiodiversity, digital inclusion, better crops and gender inclusion. One of its four major cross-cutting research areas seeks to unlock the full potential of agroecology, and through that transform local and global food systems to meet multiple sustainability objectives. The research focuses not only on agricultural practices, but also on business models, institutional arrangements and agroecological innovations. The Alliance conducts research at the farm, landscape, regional and global level, using a systems approach that incorporates expertise and methodologies from multiple disciplines. A specific project on ABC's agrobiodiversity thematic area is the "Bridging Agriculture and Environment: Southern African Crop Wild Relative Regional Network". The program seeks to establish strategic partnerships/networks of protected areas for conserving crop wild relatives and use; design mechanisms to enhance the benefits farmers from conserving crop wild relatives; increase access to germplasm, and build gendered capacity, underpinning southern-African food security and poverty reduction. The national partners (Malawi, Tanzania and Zambia) have an established multi-stakeholder committee to provide guidance on the development of respective national strategy and action plans, with specific areas for the establishment of genetic reserves for in situ conservation of crop wild relatives. Its research areas are climate action, agrobiodiversity, digital inclusion, crop improvement and gender and inclusion.

The Africa Rice Centre (AfricaRice/CGIAR) is a pan-African Centre of Excellence for rice research, development and capacity building. Its headquarters are located in Bouake, Côte d'Ivoire, with regional research centres in Saint-Louis (Senegal) and Ibadan (Nigeria) There are country offices in Cotonou (Benin) and Antananarivo (Madagascar). The centre has linkages with policy formulating organisations in Africa, and its network extends to countries in the West Africa sub-region and an intergovernmental association of African member countries. AfricaRice is one of 15 international agricultural research centres of the CGIAR and is a member of the dP SPAD. There is reasonable evidence of alignment with the agroecology agenda of the AU Commission, sub-regional organisations and international partners, such as EU or FAO agroecological projects. The organisation conserves rice genetic resources and provides smallholder farmers with climate- resilient rice varieties that are better adapted to production environments and consumer preferences.

CIFOR-ICRAF's work on agroecology uses a systems approach to determine 'Options by context' (OxC), working closely with smallholder farmers to develop locally relevant innovations. Though its main focus is on agroforestry, but it also addresses, among others, biosolutions and agrobiodiversity. ICRAF has its headquarters located in Nairobi, Kenya, and regional offices in West, Central, East and Southern Africa. Some of its programs include Increasing small-scale farmer benefits from agroforestry tree products in West and Central Africa; Promoting Rural Innovations through Participatory Tree Domestication in West and Central Africa; Programme to Support Smallholder Conservation Agriculture Promotion in Western and Central Africa; Reversing Land Degradation in

Africa by Scaling-up Evergreen Agriculture (Regreening Africa) (Ongoing); Provision of Adequate Tree Seed Portfolio in Ethiopia. CIFOR-ICRAF also hosts the Transformative Partnership Platform (TPP) on Agroecology. This TPP convenes a broad partnership to address knowledge and implementation gaps constraining agroecological transitions. It aims to provide evidence to underpin advocacy and inform policymakers about how to successfully implement agroecological approaches.

The mission of the **International Centre of Insect Physiology and Ecology (ICIPE)** is to use insect science for sustainable development, to ensure food security and improve the overall health of communities in Africa by addressing the interlinked problems of poverty, poor health, low agricultural productivity and environmental degradation. ICIPE is committed to developing and disseminating environmentally safe, affordable, acceptable and accessible tools and strategies to control insect pests and disease vectors. ICIPE's mandate further extends to the sustainable conservation and utilisation of Africa's rich biodiversity. ICIPE has an agroecology program relating plant health through the development of integrated pest management (IPM) options for pre- and post-harvest pests, and for parasitic weeds (such as Striga) in staple food crops (cereals and grain legumes); horticultural crops (vegetable and fruit) and commercial crops (coffee, cotton, cashew, sugarcane and cocoa). ICIPE's IPM strategies and technologies avoids the use of the often expensive and harmful pesticides. As a result, there is more focus on biological control, biopesticides and habitat management strategies.

The **International Union for Conservation of Nature (IUCN)** harnesses knowledge and resources globally. IUCN provides public, private and non-governmental organisations with the knowledge, tools and projects that enable societies, economies and nature to thrive together. These include data, assessments and analysis, trusted standards, neutral convening fora, and capacity-building resources. Its focal areas include species conservation science, species conservation action, protected areas, ecosystem restoration, assessing ecosystems, nature and the Paris agreement, forests, business engagement, marine ecosystems and nature-based solutions for climate. IUCN operates in Gland, Switzerland, but its regional offices in Africa are in Mozambique, South Africa, Tanzania, Kenya, Zimbabwe and DR Congo. Agroecology related projects of IUCN include Biodiversity (monitoring species and ecosystems, and steers policy and action to protect and restore biodiversity); Nature-based solutions (leverage nature and the power of healthy ecosystems to protect people, optimise infrastructure and safeguard a stable and biodiverse future); and protection of ecosystems, and promotion of sustainable use of landscapes and advance justice and equity in conservation.

The **Network of Organic Agriculture Researchers in Africa (NOARA)** is a network of organic farmers, agricultural organisations/firms, associations, researchers, agro-processors, marketers, consumers, or company/individual of good and ethical standing, in the organic agricultural sector in Africa. NOARA is located in Dar es Salaam, Tanzania and has its outlet in the Department of Agronomy, University of Ibadan. It is involved in organising public forums, some of which include the 1st Africa Organic Research Conference (AFROREC). NOARA partners with the ECOWAS organic agriculture initiatives and is engaged in digitalisation in the organic agricultural program by publishing research findings in peer-reviewed journals. It also carried out specific agroecological projects such as organising practical Agroecology training session for farmers and CSOs, in collaboration with Health of Mother Earth Foundation (HOMEF).

The Transformative Partnership Platform on Agroecology (TPP) is a network which has the objective to address *knowledge and research gaps regarding agroecology* to foster the transition to more sustainable agricultural and food systems. It attains its objective by accelerating and coordinating actions of various institutions working on agroecology across various scales, contexts and locations. Key partners of TPP are CGIAR research programme and centres, French research institutions (CIRAD, IRD and INRAE), and CIFOR-ICRAF. Key projects carried out by TPP that are related to agroecology include: socioeconomic viability of agroecology (a project that facilitates knowledge and tool building to match agroecological options to different contexts, and synthesizes global evidence on the socio-economic viability of agroecological approaches). Another project is the fall armyworm project which evaluates the agronomic and socio-economic viability of agroecological options for pest control across multiple tropical developing countries in Africa, Asia and Latin America. The DeSIRA projects Transition involved the TPP.

3.2 STI organisations in Central and Eastern Africa

Few of the national agricultural research organisations in Central and Eastern Africa include agroecology as a priority topic in their research portfolio. Several universities conduct research on agroecology, however.

3.2.1 National research institutes in Central and Eastern Africa

Cameroon

The **Institut de Recherche Agricole pour le Développement (IRAD)**, as the National Agricultural Research Institute of Cameroon, is involved in agricultural research as well as promoting agricultural development. Its objectives include: (i) to implement scientific programming centred around the priority sectors for the development of the country, and based on the real needs of the end-users, (ii) to ensure the sustainable management of local resources and the conservation of the environment, (iii) to promote valorisation and put at the disposal of the beneficiaries data, results and products that respond to their needs, and (iv) to make available all information that can have an impact on agricultural development. In this framework, agroforestry is supported by the Department Environment, Forest & Biodiversity. IRAD is a member of the dP Agroforestry Cameroon.

Ethiopia

The **Ethiopian Institute of Agricultural Research (EIAR)** is a research institute for agricultural study in Ethiopia located in Oromia, Ethiopia. EIAR comprises 20 research centres and sites across various agroecological zones in the country. EIAR is responsible for running federal research centres and regional research Institutes. Its research areas are crop research, livestock research, natural resource management research, agricultural engineering research, climate, geo-spatial and biometrics research, agricultural economics research, pastoral, agro-pastoral and special support regions research and capacity building, and agricultural biotechnology research. Some of its partners include FAO, IFAD, ICRAF, ICRISAT, and organisations based in Ethiopia. EIAR also has a natural resource management research projects like soil fertility improvement, micro-nutrient status, agricultural water and soil salinity management, and soil salinity management.

3.2.2 Universities in Central and Eastern Africa

Cameroon

The **University of Dschang** is located in the town of Dschang, West Cameroon. It has roots in three agricultural training schools and evolved from an agricultural institution. Its Faculty of Agricultural Sciences (FASA) is a member of the dP Agroforestry Cameroon. Its MSc course 'Aménagement des Systèmes Forestiers et Agroforestiers' includes modules developed by the dP. The university has also been involved in advocacy work with studies on possibilities to include agroecology in the national climate policy frameworks.

Democratic Republic of the Congo

The **Evangelical University in Africa**, together with the **University of Bukavu (UOB)** and the **Catholic University of Graben (UCG)** in DR Congo, in partnership with RUFORUM, have launched a PhD programme in Agroecology and Climate Sciences. The PhD program will be jointly run by the four universities in DR Congo. The PhD programme is born out of consultations during the United Nations Food System Summit Dialogue of 2021. Actors identified key areas for science-led interventions to strengthen Africa Agri-food Systems. These include capacity building, research and innovations to combat the effects of climate change and environmental hazards on the continent. RUFORUM has provided seed funding for the PhD programme that will involve faculty and students from across the continent. The PhD Program is linked to other related centres of excellence in and outside Africa.

Ethiopia

The **Haramaya University** in Ethiopia hosts the **Africa Centre of Excellence for Climate Smart Agriculture and Biodiversity Conservation (Climate SABC)** established in 2016. The centre was established with financial support

from the World Bank, provides post-graduate training and research in Climate Smart Agriculture and Biodiversity Conservation and Ecosystem Management. Research topics address regional priority areas (crop, livestock; soil and water; policy; institutions and innovation; agricultural information and communication; natural risk management; biodiversity and ecosystem management; agricultural and applied economics). In addition, short term training programs are provided to various stakeholders and partners, including technical staff, students, and faculties from regional, international, and national partners, to enhance the region's capacity in climate-smart agriculture and biodiversity conservation. The "Agroecology and Integrated soil fertility management (ISFM)" project will help the University to look at its own academic curriculum limitations and provide timely education to students on the addressed themes. Moreover, the ecologically integrated soil development project will create good opportunities to complete various activities which are underway to improve the sector and prevent depletion of critical natural resources.

Mekelle University in Ethiopia has established a MSc programme on Agroecology as a collaboration with the Swedish University of Agricultural Sciences (SLU) and Uganda Martyr's University. It is also one of the active members of the Agroecology Platform of Ethiopia involving among others The Canadian Food Grains Bank (CFGB), Adama Science and Technology University, Arsi University, Mennonite Central Committee Ethiopia (MCCE), CAFOD, Food for the Hungry Ethiopia (FHE), Hamburg Consult, Bread for the World, PELUM Ethiopia, Food Secure Schools, and Mintesenot Urban Agriculture.

Kenya

University of Nairobi (UNONBI) Faculty of Agriculture spearheads several research and training programmes on agroecology and organic agriculture. Some key areas of research include crop protection, dryland resource management, and horticulture, management of agroecosystem and environment, plant breeding and biotechnology and management of soil. It also works with farming communities in experimenting with innovations on agroecological practices. The Faculty of Agriculture has a blended training conducted online, face to face lectures and field based practical sessions on agroecology and agrobiodiversity. In partnership with Makerere University, Sokoine University of Agriculture, Bahir Dar University, Uganda Martyrs University and other partners, it conducts the "International Training Course on Organic Agriculture".

Jomo Kenyatta University of Agriculture and Technology (JKUAT) is a public research university located in Juja, Kenya. It was established in 1981 as Jomo Kenyatta College of Agriculture and Technology (JKCAT) and was later upgraded to a full-fledged university in 1994. JKUAT is one of the leading institutions of higher learning in Kenya, particularly in the field of agriculture, engineering, and technology. JKUAT's School of Agriculture and Food Sciences is one of the largest schools in the university and is recognized as a centre of excellence in agricultural research and innovation. The school conducts research on sustainable agriculture and natural resources management, with a focus on promoting the adoption of agroecological practices that enhance productivity, environmental sustainability, and food security. Some of the research areas in which the school is actively involved include: i) *Sustainable crop production and management* involving research on the development of sustainable cropping systems that enhance productivity, soil fertility, and pest management; ii) *Sustainable livestock production and management* which includes research on the development of sustainable livestock production systems that promote animal health, welfare, and environmental sustainability; iii) *Natural resources management* involving research on the sustainable use and management of natural resources such as land, water, and forests; iv) *Food security and nutrition* focussed on research on the development of sustainable food systems that promote food security, nutrition, and income generation for smallholder farmers. In addition to research, the School of Agriculture and Food Sciences offers several courses related to *agroecology, organic agriculture, and agribusiness*. The courses are designed to equip students with the skills and knowledge necessary to address the challenges facing the agricultural sector in Kenya and beyond. The school also has several outreach programs that promote the adoption of sustainable agriculture practices among farmers and rural communities.

Tanzania

Sokoine University of Agriculture (SUA) in Tanzania is involved in at least two agroecological research projects: Agroecological Methodology in VEGetable crops (AGROVEG); and Ecologically based rodent pest management for sustainable agriculture and food security in Africa (EcoRodMan) (ACE IRPM). AGROVEG is a collaborative project between the Royal Museum for Central Africa (RMCA, Belgium, as leading Institution), Eduardo Mondlane University

(Mozambique), and Sokoine University of Agriculture (SUA). The project proposes the development of environmental-friendly methodologies, along agroecological principles, to mitigate the impact of fruit flies on vegetables such as cucurbits and Solanaceous crops. SUA is also involved in agroecology research and advocacy; the main objective of the research is to evaluate existing agroecological practices so as to identify the best agroecological practices based on the information and knowledge obtained from studies in the field. The specific objectives are to: i. Generate scientific data to support advocacy efforts for agroecology as a viable solution for food security and the empowerment of farmers to influence policy makers and the executive within the government at all levels, and ii. Document evidence that can support other stakeholders such as development partners, academia and policy makers in Tanzania in their efforts to influence national and district level policies on embracing ecological agriculture as a solution to: a) Increase the productivity and profitability of the agriculture sector; b) Enhance the livelihoods of smallholder farmers; and c) Improve the environmental conditions and soil fertility for future generations. SUA also offers a PhD programme in Agroecology. The emphasis is on eco-friendly technologies for the management of soil health while also reducing the impact of biotic and abiotic stresses in order to increase agricultural productivity. The programme also emphasizes on developing skills and mindset change to facilitate the integration of farm biosystems and households into value chains of agroecological products.

Uganda

Mbarara University of Science and Technology (MUST) known as Mbarara University, is based in Mbarara District in Uganda. The i-SOFT Demonstration site is one of the three innovation hubs of MUST. The i-SOFT Demonstration Site is a centre for learning and training farmers and students in areas such as applications of organic fertilizers and organic pesticides. MUST also demonstrates efforts in support of a circular economy by converting biowaste from biomass into energy and protein that in turn sustain the biomass. The i-SOFT Demonstration Site also produces biogas and this presents potential to innovators interested in renewable energy to innovate around the areas of biogas and greenhouse impact.

The **Uganda Martyrs University** in Uganda host the **African Centre for Agroecology & Livelihood Systems (ACALISE)** under the ACE II project funded by the World Bank. The main objective of ACALISE is to train a critical mass of agroecology and livelihood systems experts. It is funded by the World Bank through the Government of Uganda as a regional centre of excellence to collaborate quality postgraduate education (MSc and PhD programmes) as well as applied research to address key development challenges facing the East and Southern Africa and beyond. With the farming communities, it establishes demonstration farms to provide hands-on skills to the communities on the relevant technologies and practices to improve production, productivity and value addition.

3.2.3 Other STI actors in Central and Eastern Africa

Biovision Africa Trust (BvAT) is a not-for-profit organisation established in Kenya by the Biovision Foundation for ecological development in Switzerland. BvAT's has a farmer communication programme to provide information and knowledge on ecological sustainable agricultural practices to smallholder farmers in Kenya, Tanzania and neighbouring countries. Other information programs include the organic farmer magazine, the organic farmer radio and Infonet, field-based extension services through the farmer communication outreach pathway and Mkulima Mbunifu Magazine. Some innovative technologies promoted by BvAT include ICIPE's Push-Pull, fall armyworm control and tsetse fly repellent collar technologies.

3.3 STI organisations in West Africa

Multiple national agricultural research organisations in West Africa include agroecology as a priority topic in their research portfolio. Several universities conduct research on agroecology, but their agroecology portfolios are limited in size. Brief descriptions are given below.

3.3.1 National research institutes in West Africa

Regional

The **International Centre for Research and Development on Livestock in Subhumid Zones (CIRDES)** is an intergovernmental organisation regrouping eight countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea, Guinea Bissau, Mali, Niger and Togo) and is located in Bobo-Dioulasso in Burkina Faso. Ghana and France are associate countries of CIRDES. It has signed a headquarters agreement with Burkina Faso and is placed under the administrative authority of the Ministries in charge of livestock in member countries. CIRDES has the mandate to carry out research and development activities to improve the health of animals and increase their productivity in order to satisfy the growing needs of the populations and increase their income while respecting the ecological balance. CIRDES is a member of the dP ASAP. CIRDES is a part an African consortium collaborating with French research institutions to develop a major joint study programme that will focus on agroecological transitions, and has in the past been involved in several innovation projects looking into e.g. farm manure production increases in quantity and quality, on productive, resilient and healthy agropastoral systems in West Africa, and also in conservation agriculture.

Benin

Institute of Agronomic Research of Benin (INRAB) is a public institution involved in agricultural research and is based in Cotonou, Benin. It was created in 1992 and is placed under the supervision of the ministry in charge of agriculture. INRAB brings together all the players in the agricultural research sector, employing nearly 500 people including 27 researchers. It hosts eight research stations that cover the whole of Benin and where agroecology is one of the scientific priorities. Its mission is to implement the Government's policy in the field of agricultural research through the production of information and appropriate technologies in harmony with the preservation of natural resources in order to meet the challenges of the rural world and to contribute to scientific progress. INRAB's responsibilities include plant, animal, fish and forestry production and climate change, studies and policy analysis, training, services and consultations. Regarding research, the main topical areas are fertility, fertilisation, phytosanitary control, conservation and improvement of phylogenetic resources (seeds), economic and financial profitability and forestry research. INRAB is member of the dP Agro-silvo-pastoral systems in West Africa (ASAP) and Biological diversity and agroecological systems – soil and crop health (DIVECOSYS).

Burkina Faso

Institute of Environment and Agricultural Research (INERA) situated in Ouagadougou, Burkina Faso is one of the four specialized institutes of the National Centre for Scientific and Technological Research (CNRST). It is in charge of agricultural and environmental studies and research. The operation of INERA is based on five Regional Directorates for Environmental and Agricultural Research (DRREA); an environmental, agricultural and training research centre (CREAF) in Kamboinsé; and four scientific departments comprising 18 programs and a National Centre for Specialization in Fruits and Vegetables (CNS-FL). Partnership include CORAF, universities and schools of higher education, research institutions operating in Burkina, technical and scientific partners, financial institutions and research institutes. INERA is involved in farmer-to-farmer dissemination of agroecology in the Eastern Region of Burkina Faso in collaboration with Association Nourrir sans Détruire (ANSD), NGOs, and farmers organizations. INERA plays a crucial role in the SustainSahel project, focusing on fodder production and use, livestock production systems, integration of plant and animal production; plant biodiversity and resilience to climate change, productivity of production systems, agroecology and environment; and dual purposes crop interventions, integration of cop-livestock production. INERA is member of the dP on Agro-silvo-pastoral systems in West Africa (ASAP), Innovation and plant breeding in West Africa (IAVAO), and Information for food security (ISA).

Mali

Institut d'Economie Rurale (IER) is a public research institute based in Bamako, Mali. IER conducts research into 1. Rainfed crops (Millet, Sorghum, Maize, Cotton, Groundnut, Cowpea); 2. Irrigated crops (Irrigated rice, Lowland rice, Fruits and Vegetables); 3. Animal production (Cattle, Small ruminants, Poultry); 4. Forest, wildlife and fish resources; 5. Production Systems and Natural Resource Management; and 6. Economics of sectors and agricultural machinery. IER's agricultural development objectives are focused on improving food security, conserving natural resources, controlling desertification, developing and diversifying agricultural production, and boosting farmers' incomes. As the public scientific and technological research institute in Mali, it conducts research with local communities. IER is member of the dP on Agro-silvo-pastoral systems in West Africa (ASAP), Innovation and plant

breeding in West Africa (IAVAO), Biological diversity and agroecological systems – soil and crop health (DIVECOSYS) and Information for food security (ISA).

Niger

The Institute of Agronomic Research of Niger (INRAN) is a public research institution operated under the Ministry of Agriculture in Niamey, Niger. INRAN's objectives include designing and implementing agricultural research programs in all sectors of Rural development; and coordinating and supervising all agronomic research undertaken in Niger. It also contributes to developing national policy in agricultural research and scientific and technical development and disseminating research results and products. INRAN is member of the dP on Innovation and plant breeding in West Africa (IAVAO) and Information for food security (ISA).

Senegal

Senegalese Agricultural Research Institute (ISRA) is located in Dakar, Senegal. It was created in 1974 and has been operating in the six eco-geographical zones of Senegal thanks to a dense infrastructure consisting of regional centres, national laboratories, research and production units and support points for extension and multi-local experiments (PAPEM). It has the specificity of carrying out finalized research for development in four fields of production (plant, animal, forestry, fisheries) and in socioeconomics. ISRA's main mission is basic and applied research with the following objectives : (i) the development and advancement of scientific and/or technological research; (ii) the participation in the elaboration of the national development policy in its fields of competence; (iii) the valorisation of research results, both at the level of the scientific community and at the level of all sectors of economic and social life; (iv) the transfer of scientific and technological knowledge; (v) training in research and through research. The organisation has three scientific and strategic focuses: promotion of efficient, resilient, competitive and sustainable production systems; transformation of agriculture and sustainable support for family farms and agro industries; monitoring, forecasting and valuation; and capacity development and partnership consolidation. Research priorities are varietal selection, biotechnology, soil fertility, animal health and production, fisheries and aquaculture production, management and governance of natural resources, pest management, and management of post-harvest losses. ISRA hosts the **CERAAS** (Centre d'étude régional pour l'amélioration de l'adaptation à la sécheresse) based in Thiès whose mandate is to provide technical solutions to mitigate the depressive effect of drought on agricultural production in order to reduce the food and nutrition deficit and improve the living standards of the populations of West and Central Africa. ISRA is co-founding member of the dP on Innovation and plant breeding in West Africa (IAVAO), Biological diversity and agroecological systems – soil and crop health (DIVECOSYS), and Pastoralism and drylands in West Africa (PPZS). ISRA is also involved in the SustainSahel project. ISRA is further involved in agroforestry research in partnership with the Michigan University.

3.3.2 Universities in West Africa

Benin

The **Université d'Abomey-Calavi (FSAUAC)**, Benin, hosts the Laboratoire d'Ecologie Appliquée (LEA) at the Faculty of Agronomic Sciences (FSA). Activities for the LEA include capacity building through training, basic research and applied research for development. The LEA has attracted over 50 PhD students and 80 MSc students since its creation. To date, the LEA has completed and has been involved in various projects on sustainable management of natural resources, domestication of fodder and food tree species in Africa, organic agriculture research and training, bioenergy development, nutrient management, and many other themes related to sustainable agricultural development. Partnerships include, Laboratoire de Biomathématiques et d'Estimations Forestières (LABEF), Laboratory of Applied Ecology (LEA) and Laboratory of Food Sciences (LSA), University of Abomey-Calavi. Other partners are Lycee Technique Agricole Medji De Sekou, Lycee Technique Agricole De Natitingou, La Bourgeoise and CIDEV ONG. The Université d'Abomey-Calavi, participated in the agroecology food systems caravan. The institution is also involved in ORM4Soil projects. FSAUAC is member of the dP on Biological diversity and agroecological systems – soil and crop health (DIVECOSYS).

Burkina Faso

The **Joseph Ki-Zerbo University** (Ouagadougou, Burkina Faso) hosts the Master course Agrinovia, which is a higher education (Master II) and professional training programme on innovation and rural development in West Africa. It is a member of the dP DIVECOSYS and is responsible for its coordination.

The **Nazi Boni University** in Bobo-Dioulasso (Burkina Faso) trains agricultural engineers in rural development in four different courses: Agronomy, Livestock, Water and Forestry, and Rural Sociology and Economy. It also offers postgraduate training in the form of an MSc degree in Integrated Natural Resource Management and a Doctorate in Rural Development. It provides training in agricultural extension including two streams of Senior Agricultural Extension Technicians and Agricultural Extension Advisors. The University is a member of the dP ASAP and has commanded a MSc course in Agroecology to the dP Asap.

Ivory Coast

Institut National Polytechnique Félix Houphouët-Boigny-École Supérieure d'Agronomie (INPHB-ESA) is based in Côte d'Ivoire. The École Supérieure d'Agronomie provides educational training on agricultural engineering, agricultural techniques engineering, and techniques in agronomy. INPHB-ESA is member of the dP on Biological diversity and agroecological systems – soil and crop health (DIVECOSYS).

Mali

Institut Polytechnique Rural de Formation et de Recherche Appliquée (IPR-IFRA) is located in Bamako, Mali. The institute is structured into five teaching and research units: animal improvement and reproduction, animal health, animal food and nutrition, the technology of products of animal origin and animal production. IPR-IFRA is involved in the SustainSahel project, where the institution focuses on agronomy, livestock, water and forestry and rural engineering, agroforestry and partnership development with farmers.

Nigeria

Federal University of Agriculture Abeokuta (FUNAAB), Nigeria, has several departments that conduct research and training in sustainable agricultural initiative. The Department of Plant and Physiology and Crop Protection, in particular, focuses on the organic agricultural initiative. The Federal University of Agriculture is a member of the working group on organic agriculture research of Nigerian universities. It associates with AU's EOA initiatives and the ECOWAS agroecological program. The university is also a member of the Network of Organic Agriculture Researchers in Africa (NOARA) FUNAAB hosts the ACE-I-funded Centre for Agricultural Development and Sustainable Environment (CEADESE).

University of Ibadan hosts Nigeria's organic agriculture research initiative and is also a partner of the ECOWAS/AU organic agriculture and agroecological principles. The University of Ibadan conducts research and innovations on organic techniques to enhance food security.

Senegal

Cheikh Anta Diop University (UCAD) is a university in Dakar, Senegal. It was officially inaugurated in 1959 and became Cheikh Anta Diop University of Dakar in 1987. UCAD is composed of higher education and research institutions divided into faculties, graduate schools, university institutes, doctoral schools as well as the Ecole Inter-Etats des Sciences et Médecine Vétérinaires which depends scientifically on the University. The research system at UCAD is structured around a Directorate of Research and Innovation which is the pilot body, a Scientific Council, the Directorate of Cooperation, the Intellectual Property Service and the valorisation of research results, and the Research Ethics Committee. UCAD is tasked with generating and transmitting knowledge and developing research. The university teaches and researches into biotechnologies, science and the environment, agrobiolgy and agrochemistry. UCAD is founding member of the dP on Biological diversity and agroecological systems – soil and crop health (DIVECOSYS) and PPZS. It runs the MSc course on “Ecologie, agroforesterie, adaptation” (dP DIVECOSYS) and the Formation Doctorale “Pastoralisme” (dP PPZS). The university also partners with the Joint Action for Farmers' organisation in West Africa, a farmer association that also focuses on organic and agroecological initiatives.

The University of Sine Saloum El Hadji Ibrahima Niass (USSEIN) in Senegal is an agricultural university created in 2013. Its objectives are to (i) train human resources capable of responding to the needs of agricultural and rural

development, and to develop the knowledge and technologies required for local, national and regional development, (ii) promote an inclusive approach that takes into account the traditional contributions of communities in adaptation and innovation strategies, (iii) build an innovative partnership between farmers, researchers and extension workers for the development of appropriate and sustainable technologies, and (iv) develop research for innovation and agricultural development in programmes and graduate schools that benefits the community. USSEIN and AGREENIUM share a framework of actions on activities related to university teaching and research in the field of agricultural sciences, for example for the development of Bachelor and Master courses in the field of agroecology, including the Bigomix module in association with the dP IAVAO.

3.3.3 Other STI actors in West Africa

Regional

The Alliance for Agroecology in West Africa (3AO), created in April 2018, having more than 60 member organisations, is a cross-sectoral cooperation platform that aims to strengthen synergies between different organisations and scales of action, to promote agroecology in the sub-region. 3AO is based on the observation that the agroecological transition requires simultaneous action within different spheres of influence (farmers, politicians, researchers, civil society) and at different levels of governance (local, national, regional, international) to unlock the status quo. The Alliance's activities are organised around an evolving action plan and an online collaborative space, which promote the sharing of good practices, experiences and expertise, while increasing the visibility of members' work and limiting the risk of duplicating efforts in pursuit of common goals. The Alliance Steering Committee ensures the coordination and monitoring of activities, and includes representatives from ROPPA, IPES-Food, CIRAD, AFSA, Enda Pronat, and Action Contre la Faim. Through a series of concrete and concerted actions, 3AO purposes to create synergies between different scales and organisations to strengthen research and advocacy efforts in favour of agroecology while providing greater visibility to the agroecological movement in West Africa. It was formed through a multi-stakeholder meeting organised by IPES-Food and ROPPA in Dakar, and the Alliance includes farmer organisations, research institutes/universities, international NGOs and social movements. Some examples on activities and innovations that 3AO promotes include actions and innovations for: reforestation beyond the recovery of degraded land (the *zai arboré*), optimising natural resource management, increasing agricultural and forestry production while improving the quality of the households; water and soil conservation actions coupled with agroforestry, e.g. to tackle land degradation, yield reduction, loss of livestock and bio-diversity with concrete measures in the field in Sudan; and combining a range of practices for the conservation, protection and restoration of water/soil in Niger

Permanent Interstates Committee for Drought Control in the Sahel (CILSS) was created in 1973 following the great droughts that hit the Sahel in the 1970s. It currently has thirteen (13) member states, eight coastal states (Benin, Côte d'Ivoire, Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal, and Togo), four landlocked states (Burkina Faso, Mali, Niger, and Chad), and one island state (Cape Verde). Its headquarters is based in Ouagadougou, Burkina Faso. The objective of CILSS is to invest in the search for food security and in the fight against the effects of drought and desertification for a new ecological balance in the Sahel. It leads this objective through (i) formulation, analysis, coordination and harmonization of strategies and policies, (ii) strengthening of scientific and technical cooperation, (iii) collection, processing and dissemination of information, (iv) capacity building of the various actors, including the private sector (v) capitalization and dissemination of experiences and achievements, and (vi) support in the implementation of strategies, policies and programs. At the organizational level, CILSS is structured in three sites: 1) Executive Secretariat (based in Ouagadougou, Burkina Faso); 2) Sahel Institute (based in Bamako, Mali); 3) AGRHYMET Regional Centre (based in Niamey, Niger). CILSS is member and coordinating the dP ISA, specialised on food systems.

Mali

The **Institut de Recherche et de Promotion des Alternatives en Développement en Afrique (IRPAD)**, Mali, collaborates with the IDRC, the NGO ENDA PRONAT in Senegal and CEDRES in Burkina Faso in the programme "Agroécologie et Systèmes Alimentaires Durables en Afrique de l'Ouest" (ASADAO). The ASADAO programme funds collaborative research projects by members of the Agropolis Foundation network on the costs and benefits ("trade-offs") related to agroecology in (francophone) West Africa. IRPAD is an African policy Think Tank that promotes a

multidisciplinary research and practice approach to social issues. Some of its activities involve: promotion of activities around multidisciplinary participatory action research at different levels (local, national, regional, pan-African and international); the promotion and development of knowledge, skills, know-how and know-become through training, education and awareness; the promotion and enhancement of scientific, technical, sociological, economic, educational in the field of agriculture, livestock, fisheries, arboriculture, economy and development of social life in Mali and Africa; promoting alternatives from research to better socialise with a larger number of men and women for socio-economic development and self-centred policies in Africa; and advocacy and political influence to change policies and practices.

Niger

The **Federative Structure for Research, Training and Expertise for Development on Climate Resilience of Agroecosystems and preservation of natural resources and Ecological Intensification in the Sahel (SFR RACINES)** based in Niamey (Niger), is a non-profit organization, federating institutions and researchers involved in research for the development on issues related to the resilience of Sahelian agroecosystems to climate and uses. The strategies and aim of SFR RACINES include: Sustainable management of agricultural systems and Sahelian ecosystems; Strengthening the resilience of producers to the climate and the environment through Co-designing of ecologically intensive and climate-resilient cropping systems, Strengthening climate resilience of pastoral systems and Climate-smart agricultural systems and to improve the visibility of research actions and their promotion in training actions through research, the dissemination of scientific information and popularization. Its partners include ICRISAT, The French Institute of Research for Development (IRD), The African Science Service Centre on Climate Change and Adapted Land Use (WASCAL), French Development Agency - AFD Niamey and the French Cooperation - SCAC Niamey.

3.4 STI organisations in Southern Africa

No national agricultural research organisations were identified that conduct research on agroecology in Southern Africa. Several universities, however, conduct research on agroecology.

3.4.1 National research institutes in Southern Africa

Madagascar

FOFIFA is the most important institution for applied research in rural development in Madagascar. Its areas of intervention are implemented by the research departments and cover all sectors of rural development (plant and animal production, forestry, socioeconomics, etc.) and the main scientific disciplines (plant breeding, agronomy, agroecology, etc.). In addition, it is established in the various agroecological regions of Madagascar via several research centres and stations. It therefore has specialised human resources with proven experience in the various socio-ecosystems. FOFIFA's long-standing collaboration with national and international development NGOs and national and international research centres makes it a key player in the development of agroecology. FOFIFA is partner in the dP on Forests and biodiversity in Madagascar (F&B) and Highland production systems and sustainability (SPAD).

3.4.2 Universities in Southern Africa

Madagascar

University of Antananarivo, School of Agronomy is a research department on agricultural and forestry in Madagascar, with long experience in participatory research. Other departments that conduct research related to agroecology and organic agriculture include the soil science department, Livestock Department of the Ecole Supérieure des Sciences Agronomiques and LRI laboratory. Collaborative research involves activities from fields and laboratories to integrate farmers and other stakeholders' experiences into research processes. It also involves

participatory decentralized breeding, shared multicriteria evaluation, and innovation platforms. The university is also a founding member of 3 dP (F&B, SPAD and BIOCONTROLE OI) either through its faculties (sciences, law and management) or through its schools (École Supérieure des Sciences Agronomiques) or through its laboratories (LRI, entomology laboratory). The university is member of the dP SPAD (Système de production d'altitude et durabilité). It carries out research with farming communities on agrobiodiversity, focusing on crop rotation and crop associations (Cereals-legumes rotation and association, Vegetable(s)-vegetable(s) rotation and association), Ecosystem services (on fertility, on bio-aggressors attacks like maize and mucuna against fall-armyworm) and biosolutions (Barns improvement and manure improvement, compost, liquid compost, and Vermicomposting). The University has tailored curricula for Master and PhD programs in Agroecology. In particular, it has co-developed and hosts an MSc course on 'Highland sustainable production systems' since 2016. The ambition of this MSc course is to bring the updated and most innovating results in agroecology produced by the dP scientists to promotions of students at the University. Key partners are CIRAD, IRD, AfricaRice, and GSDM (Professionnels de l'Agroecologies).

Mauritius

University of Mauritius is a public university located in Reduit MU. The Faculty of Agriculture host two departments: the Department of Agricultural Production & Systems (APS) and the Department of Agricultural and Food Science (AFS). The research areas based in the Faculty of Agriculture include carbon sequestration & land use change, conversion of wastes into fertilizers/compost, organic farming, plant biodiversity and conservation and sustainable agriculture. The university implements the DeSIRA project UOM: enhancing climate resilience in agriculture for improved food and nutrition security through research, innovation and training in the Republic of Mauritius.

Mozambique

Eduardo Mondlane University is a public university located at Maputo in Mozambique. The University partners with the AGROVEG project, a collaboration between the Royal Museum for Central Africa (RMCA, Belgium, as leading Institution), Eduardo Mondlane University (Mozambique), and Sokoine University of Agriculture (SUA). The project proposes the development of environmental-friendly solutions, along agroecological principles, to mitigate the impact of fruit flies on vegetables such as cucurbits and Solanaceous crops. The project is hosted by the College of Agriculture, Department of Crop Science and Horticulture with funding from the Belgian Development Cooperation.

Zambia

University of Zambia's School of Agricultural Sciences is located in Lusaka. The school offers bachelors, masters and PhD degree in agricultural sciences. The School of Agriculture has several departments supporting agroecological and organic agriculture programs. For instance, the Department of Plant Sciences carries out building capacity for better agriculture, provision of services, and development and release of improved crop varieties and technologies. The Department of Soil Science, Department of Communication and the Department of Agricultural Economics and Extension Education partners with the Organic Resource Management for Soil Fertility (ORM4Soil) Project on farmer-driven organic resource management to build soil fertility and improve food security.

4. Final remarks

This report offers a brief overview of organisations in sub-Saharan Africa within the Science, Technology and Innovation (STI) domain that currently have expertise and experience in agroecology. It is an extract of a substantially longer list including more than 170 research organisations/institutes, universities (and/or their alliances) and/or networks of researchers/research organisations working in the agroecology domain in sub-Saharan Africa. It is by no means a complete list since agroecology activities in Africa are gaining more attention lately from several research and innovation actors in Africa. Therefore, this list should be considered as a living document and updated regularly. Additionally, this extract of the existing longer list might be missing STI actors that have in reality deserved to be placed in the short list in this document (see Chapter 3). This can be attributed to difficulties in finding complete and detailed information (particularly online) on the current status of agroecology initiatives and activities, despite the advice obtained from staff of the Sub-Regional Organisations (ASARECA, CCARDESA and CORAF) and RUFORUM about the existence of such activities and initiatives. Despite the limitations mentioned, the authors believe that the criteria set for this study and the extensive review of STI actors allowed to capture a representative picture of STI actors active in the agroecological research domain in sub-Saharan Africa.

The findings of this study suggest that the majority of STI actors involved in, and having developed expertise in, agroecology are located in (francophone) West Africa. The STI actors strongest in agroecology tend to collaborate with CIRAD and are usually members of the Platforms in partnership for research and training (dPs), some of which have a specific focus on agroecology. This is valid for both national agricultural research institutes and universities. In Eastern and Central Africa, there seems to be a growing number of universities focusing on agroecology activities with some of them having dedicated MSc or PhD programmes. The agroecology activities of national agricultural research institutes in the region seem to be limited, however this has mainly been based on what evidence could be found in the public space. As this is still a relatively new *research* topic in Eastern and Southern Africa, more STI actors may get involved in the near future.

Annex 1. List of Science and Technology and Innovations (STI) actors for sub-Saharan Africa

 [Download the longlist of STI actors in sub-Saharan Africa](#) [Excel file, 100KB].



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