This document is part of the Annual Global Report (AGR) 2024 of the DeSIRA INITIATIVE

Annex II – A description of innovations under development or developed for farm-level use and for use beyond farm level, for each DeSIRA project (mostly as of December 2023)

LIST OF DeSIRA PROJECTS INCLUDED IN THE ANNUAL GLOBAL REPORT (AGR) 2024

The implementation of activities was still ongoing at the time of the data collection for the AGR 2024.

At the time of data collection for the AGR 2024, the implementation of activities was over. This document captures and summarizes the full contribution of the project to the DeSIRA initiative, in terms of innovation.

ABEE
ABRIGUE
ACCEPT
ACCESS
AGRO-INNOVA
AGROFORESTRY RWANDA
AMINATA
APSAN
ARTEMIA4BANGLADESH
ASSET
BIORISKS
BIOSTAR
CASSECS
<u>CDI-RWANDA</u>
CLIMA-LOCA
CLIMATE SMART INNOVATION COSTA RICA
CLIMATE SMART INNOVATION MALAWI
COCOA4FUTURE
CSARIDE
DARE
DINAAMICC
<u>ECOFOODSYSTEMS</u>
ESSA
FAIR-SAHEL
FIVE GREAT FORESTS
<u>FO-RI</u>
GRAPE
ICSIAPL
IDEAS
INACC
INNOVAC
INNOVATION FAREI
INNOVATION UNIVERSITY OF MAURITIUS
INV-NIGER
IRFFS
IRRINN
LEG4DEV
LIDISKI
LIPS-ZIM

LSC-IS
MAKIS
MALMON
MARIGO
MAS
OBSYDYA
ONE PLANET
PRISMA
PROSILIENCE
RAIZ
RE-FARM
REDIAL
<u>RESI-NOC</u>
ROBUST
SAFEVEG
SANKURU AGROFOREST
SANTES-TERRITOIRES
SIRGE
STAR-FARM
STREAM
SUPPORT TO CAADP AR&EO/AFAAS
SUPPORT TO CAADP AR&EO/ASARECA
SUPPORT TO CAADP AR&EO/CCARDESA
SUPPORT TO CAADP AR&EO/CORAF
SUPPORT TO CAADP AR&EO/FARA
SUPPORT TO GFAR
SUPPORT TO TAP/AIS
SUSTENTA E INOVA
SUSTLIVES
SYRIMAO
TAERA
TRANSITIONS Project 1 Metrics
TRANSITIONS Project 2 ATDT
TRANSITIONS Project 3 PSii
UAKIS
WATDEV
WE4F
WOMEN, COFFEE AND CLIMATE
YAYU COFFEE FOREST ETHIOPIA
Z4ABC

Annex II describes innovations under development or developed by each DeSIRA project. Illustrating Global DeSIRA Indicator GDI#22, it reports on innovations at initial research stage (i.e. the emergence of a new concept and the design processes leading to the development of a new product, technology, service, etc.) and/or at testing/assessment phase (i.e. establishment and documentation of its value, technically, socially, economically, environmentally). It also describes innovations, which have been fully developed and are already implemented (used).

Annex II reports on innovations that have been entirely conceived and developed by the project, as well as on products, technologies, practices (etc.) which already exist (i.e. not developed by the project) but are new in the project context. For instance, before it is introduced in a new agroclimatic area, a variety or an agronomic practice typically undergoes a testing/assessment phase before smallholder farmers can take it up.

For each DeSIRA project, and as relevant, Annex II describes:

- Innovations for use at farm level: products, technologies, models, systems, strategies;
- Innovations for use at farm level: services & decision-making tools, governance mechanisms;

- Innovations for use beyond farm level: innovative/new institutional tools to assist institutions in the strengthening of agriculture innovation systems ; innovations for use by private sector actors.

Information is sourced and synthetized from progress reports, interviews with project teams, project websites (including Capacity4dev). Some paragraphs are excerpts from the progress reports. The projects belong to two main categories (Pillar I : research an innovation; Pillar II: institutional capacity strengthening). Pillar I projects are further divided into groups. Projects from Group 1 and Group 2 have been included in the Global Monitoring and Evaluation Framework (GM&EF) of the DeSIRA initiative since, respectively, 2022 and 2023. Group 3 projects were included in the GM&EF for the first time in 2024.

Pillar I	Group 1	Projects from CID 2018	Included in the GM&EF since 2022
	Group 2	Projects from CID 2019 (*)	Included in the GM&EF since 2023
	Group 3	Projects from CID 2020	Included in the GM&EF since 2024
Pillar II		Projects from CID 2018	Included in the GM&EF since 2022

CID : Commission Implementing Decision

(*) Except for one project, IRRINN, which is part of CID 2018

GM&EF: Global Monitoring and Evaluation Framework of the DeSIRA Initiative

KEY INFORMATION PROVIDED FOR EACH DeSIRA PROJECT (format)

	Pillar X – Group X							
PROJECT SHORT NAME (CRIS number)								
MAIN IMPLEMENTING PARTNER (Full name)								
Project Title								
Start date: Month 20XX								
End date (official): Month 20XX								
End date (likely): Month 20XX (X-month no-cost extension	on requested or under discussion)							
Countries of implementation								
LIST OF PROJECTS								
	Data on likely end date updated on: XX/XX/20XX							
	Data on Innovations updated as of: Month 20XX							
Project purpose								
Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems								
Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms								

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

LIST OF DESIRA PROJECTS INCLUDED IN THE ANNUAL GLOBAL REPORT (AGR) 2024

Period of implementation covered by the Annual Global Report (AGR) 2024, for each DeSIRA project

-Start Date of implementation of activities (Month/Year)

-Official End Date of implementation of activities (Month/Year)

-Likely End Date of implementation of activities (Month/Year), subject to a no cost extension, requested or under discussion with the EU at the time of the interview with the project team.

-TBD: Likely End Date yet to be determined at the time of the interview with the project team.

Source: official and likely end dates, as informed by the project team at the time of the data collection meeting with each project.

PROJECT	START	2023	2023	2023	2023	2023	2023	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024	BEYOND) OCT 2024
SHORT NAME	DATE	JUL	AUG	SEP	ОСТ	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	END OFFIC.	end Likely
ABEE	SEP 19															09-24			12-25
ABRIGUE	JUN 21																	11-25	
ACCEPT	NOV 19																10-24		
ACCESS	JUL 21																	07-25	
AGRO-INNOVA	ост 19																10-24		
AGROFORESTRY RWANDA	JAN 20																	01-25	TBD
AMINATA	FEB 22																	01-26	
APSAN	ост 19																10-24		12-25
ARTEMIA4BANGLADESH	MAR 20													07-24					
ASSET	JUL 20																	09-25	02-26
BIORISKS	JAN 20																	12-24	12-25
BIOSTAR	FEB 20																	02-25	08-26
CASSECS	DEC 19																	12-24	
CDI-RWANDA	FEB 21																	01-25	
CLIMA-LOCA	DEC 19																	12-24	12-25
CLIMATE SMART INNOVATION COSTA RICA	ост 21																	06-26	
CLIMATE SMART INNOVATION MALAWI	dec 19																	12-24	09-25
COCOA4FUTURE	FEB 20																	01-26	
CSARIDE	FEB 20																	09-25	
DARE	JUL 20																	06-25	
DINAAMICC	JAN 22																	01-26	
ECOFOODSYSTEMS	SEP 22																	09-26	
ESSA	DEC 20																	12-24	08-25
FAIR-SAHEL	JAN 20																	12-24	
FIVE GREAT FORESTS	JUL 21																	06-25	
FO-RI	JAN 22																	12-26	
GRAPE	MAY 21																	03-25	

PROJECT	START	2023	2023	2023	2023	2023	2023	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024	BEYOND	OCT 2024
SHORT NAME	DATE	JUL	AUG	SEP	ОСТ	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	END OFFIC.	end Likely
ICSIAPL	JAN 21												06-24						06-25
IDEAS	DEC 20																	05-25	
INACC	AUG 21																	03-25	
INNOVAC	DEC 21																	12-25	
INNOVATION FAREI	NOV 19					11-23													
INNOVATION UNIVERSITY OF MAURITIUS	dec 19						12-23												
INV-NIGER	JAN 20											ш 						12-24	TBD
IRFFS	JAN 20	07-23	mannmaa	immunm	hamman	ummun ni	hmuunnuu	İIIII (IIII)	immun	manni	immunm	iannaan i		maanmaa	munni	mmmi	munnu	minimu	minimum
IRRINN	FFB 21								 			μ						01-25	
LEG4DEV	NOV 20																	11-25	11-26
LIDISKI	DEC 19																	12-24	
LIPS-ZIM	JAN 20																	12-24	
LSC-IS	JAN 21																	12-24	12-25
MAKIS	FEB 22																	01-27	v
MALMON	JAN 20																	12-24	06-25
MARIGO	DEC 20																	12-24	06-25
MAS	MAR 22																	03-25	
OBSYDYA	APR 22																	03-26	12-26
ONE PLANET	JUN 19																10-24		-
PRISMA	JAN 22																	12-25	
PROSILIENCE	JUN 21																	03-25	
RAIZ	DEC 21																	12-25	12-26
RE-FARM	JUL 22																	06-26	
REDIAL	JUL 20																10-24		
RESI-NOC	ост 20															09-24			12-24
ROBUST	DEC 21																	11-25	06-26
SAFEVEG	NOV 20																	10-25	
SANKURU AGROFOREST	NOV 21																	11-25	05-26
SANTES-TERRITOIRES	MAY 21																	05-26	12-27
SIRGE	JAN 21									03-24	mann			manna	mmmm	mmmi	munnmu		manmani
STAR-FARM	JUL 23																	04-27	
STREAM	MAY 21										04-24								
SUPPORT TO CAADP AR&EO/AFAAS	NOV 19																	02-25	TBD
SUPPORT TO CAADP AR&EO/ASARECA	NOV 19																	02-25	TBD
PROJECT	START	2023	2023	2023	2023	2023	2023	2024	2024	2024	2024	2024	2024	2024	2024	2024	2024	BEYOND OCT 2024	

SHORT NAME	DATE	JUL	AUG	SEP	ОСТ	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	END OFFIC.	end Likely
SUPPORT TO CAADP AR&EO/CCARDESA	NOV 19																	02-25	TBD
SUPPORT TO CAADP AR&EO/CORAF	NOV 19																	02-25	TBD
SUPPORT TO CAADP AR&EO/FARA	NOV 19																	02-25	TBD
SUPPORT TO GFAR	FEB 20							01-24											
SUPPORT TO TAP/AIS	aug 19													07-24					12-24
SUSTENTA E INOVA	JUL 21																	07-25	07-26
SUSTLIVES	aug 21																	07-25	
SYRIMAO	SEP 20															09-24			02-26
TAERA	DEC 19																	12-24	
TRANSITIONS PROJECT 1 METRICS	SEP 22																	09-26	
TRANSITIONS PROJECT 2 ATDT	JAN 22																	12-24	
TRANSITIONS PROJECT 3 PSI	JAN 22																	09-26	
UAKIS	NOV 21																	09-25	
WATDEV	JAN 22																	12-25	06-26
WE4F	JAN 20																	12-24	
WOMEN, COFFEE AND CLIMATE	dec 21																	01-25	
YAYU COFFEE FOREST ETHIOPIA	aug 21																	09-25	
Z4ABC	APR 22																	03-26	TBD

ABEE (410172)

CORAF (Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles)

Renforcement des réseaux et des capacités institutionnelles en amélioration des plantes pour le développement de cultures résilientes répondant aux besoins des paysans d'Afrique de l'Ouest - West African Breeding Networks and Extension Empowerment

Start date: September 2020

End date (official): September 2024

End date (likely): December 2025 (15-month no-cost extension requested)

Burkina Faso, Niger, Senegal

LIST OF PROJECTS

Data on likely end date updated on: 13/05/2024

Data on Innovations updated as of: April 2024

The project strengthens breeding programmes in the three partner countries to efficiently develop and promote improved and resilient varieties. The objective is for small-scale producers to gain access to, adopt, and use new, higher-performing varieties that meet local needs and market demand.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• As of April 2024, the project has developed **327 varieties of 5 different crops**: niebe, groundnut, sorghum, mil and fonio. There are two types of innovations: 1/ "lineages" are under development; they stem from ongoing breeding programmes and are unlikely to be certified before the end of the project; 2/ "varieties" are already registered but are new in the project context (new agroclimatic area and/or new target beneficiaries, exchange of existing varieties between the 3 targeted countries); they result from selection programmes, which took place before the start of the project. The exact number of varieties versus lineages being tested by the project is not known. Through demonstration tests in Burkina Faso, Niger and Senegal, 6,325 farmers have already been exposed to 97 varieties proposed by the project.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **Twelve climate resilient plant breeding programmes are being upgraded.** A breeding programme seeks to develop a variety adapted to an agroecological zone, taking into account the needs of the users (including consumers). It involves a diversity of scientists including geneticists, agronomists, socio-economists, entomologists (etc.) and field technicians. 12 selection programmes already existed for 4 products (niebe, groundnut, sorghum, mil) in 3 countries (Burkina Faso, Niger, Senegal). The project is strengthening and modernising them. The diagnosis aimed at determining the gaps and needs for each programme has been completed and validated.

• A regional charter for the exchange of data and germplasm has been developed. It aims at allowing the exchange and evaluation of varieties between the national agricultural research systems in the 3 countries.

• **"E-chain" is a knowledge management platform** managed by the Integrated Breeding Platform (IBP), carried by AfricaRice, a CGIAR centre based in Côte d'Ivoire. Developed by the project, it is based on information technology. It aims at connecting players of a given seed value chain by integrating information on varieties, local producers' needs, traceability and availability of seeds in the market.

Pillar I – Group 1

ACCEPT (404348)

IRED (Institut de Recherche en Elevage pour le Développement)

Adapter l'accès aux ressources agro-pastorales dans un contexte de mobilité et de changement climatique pour l'élevage pastoral

Start date: November 2019

End date (official): October 2024

Chad

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project co-develops innovations in order to adapt access to agro-pastoral resources in a context of mobility and climate change for pastoral livestock farming in Chad.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

About 700 pastoralists, agro-pastoralists, and farmers have adopted at least one of the innovative practices proposed by the project.

• **Feed formulas based on maralfalfa**, an improved Pennisetum (a fodder grass) that has excellent nutritional characteristics. Two formulas, adapted to agroecological zones, have been developed for the rations of large ruminants. Targeted livestock owners have taken them up.

• **A "nutritional block"** made from crop residues and by-products of food processing (e.g. molasses, brewers' grains, post-harvest residues of cowpea, etc) is available and used by farmers. This is a new product aimed at helping farmers to feed their cattle during the lean season, i.e. the period of the year when forage and water resources are scarce, leading to reduced availability of feed for livestock. The composition of the nutritional block depends on the targeted zone and has been co-developed by the project.

• **New forage crops** have been tested. Among them 5 irrigated and 6 rain-fed crops. This includes undervalued local varieties and imported varieties such as maralfalfa, imported from Mali. Despite its water requirements, maralfalfa is favoured by farmers because it allows for multiple harvests without the need for resowing, significantly reducing labour. At least 4 varieties of dual-purpose legumes (livestock feed and human food) have also been taken up.

• **Underground dams** are an innovative water access system for herds in bedrock areas, where access to the water table is impossible. A hole is dug, plastic is laid, and -during the rainy season- the water flow is blocked upstream. A well is then installed in the water retention area. The project has built several dams, which are used by agro-pastoralists.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project has supported the development of a production and marketing capacity for the provision of nutritional blocks. This service is now available to farmers during the lean season, which reduces the need for transhumance.

• Regarding access to water points, the project has secured existing infrastructure that was poorly managed: the innovation is in **governance mechanisms known as « Agreement and Mediation Committee »** (Comité d'Entente et de Médiation). Existing committees have been completely restructured and strengthened, supported by several **decision-making tools for better prevention and management of conflict risks.** For instance : the Good Mediator's Manual, an intuitive guide on best practices for preventing and managing conflicts; the Agricultural or Pastoral Inspection Report, a standardized document listing the factual elements opposing the parties on an agricultural or pastoral site; the Community Engagement Report, a template for recording the points of agreement to be included in local conventions on the use of shared agropastoral resources.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has helped design and develop three categories of **tools to process forage crops**: chopping straw, manufacturing equipment for nutritional blocks, balers. In doing so, the project has supported four local private entrepreneurs who, now, make these tools.

AGRO-INNOVA (410203)

IICA (Instituto Interamericano de Cooperación para la Agricultura)

Sistemas Agroforestales Adaptados para el Corredor Seco Centroamericano

Start date: October 2019

End date (official): October 2024

Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panamá

LIST OF PROJECTS

Data on Innovations updated as of: April 2024

The project aims to increase productive development, improve climate resilience, and/or strengthen food security for small producers in the Central American Dry Corridor (CADC).

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• With farmers' organisations from 6 countries, the project has validated 24 scaling **models of AgroForestry (AF) systems** adapted to the specific conditions of the targeted territories within the CADC. The models integrate trees, crops, and/or livestock. Some focus on timber trees, while others use fruit trees or a combination of both. The systems integrate a diversity of crops, which can include basic grains (maize, beans), cash crops (coffee or banana), vegetables and tubers. Some systems include livestock (e.g., goats, poultry or cattle), while others are purely focused on crops. Where livestock is present, the systems often include improved pastures or forage banks. Some systems are designed for small-scale, backyard gardens (e.g., for household food security), while others are aimed at larger agricultural plots. For instance: AF system with trees in lines or dispersed, associated with bananas and pollinators; AF System with timber trees in lines, associated with basic grains and tubers; Home garden and/or backyard system in AF systems with poultry (etc.). The number of models of AF systems varies for each country.

• Besides, the project has developed 20 production/management models promoting innovative technologies or practices linked to AF systems. As of April 2024, 4012 small farmers had implemented at least one of them. For instance: Seed bank model for agricultural seed varieties; Integrated pasture management model for animal consumption; Coffee nursery model and reproduction of timber and woody species; Organic input production model for soil and crop improvement; Harvesting, water collection and irrigation model for water resource management; Silage management model for animal feed; Reforestation model.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project has developed a specific **training model** adapted to small and medium-sized producers within organizations and national partners.

• In Panama, the project is developing an **extension model for strengthening the dissemination of dairy and beef cattle production technologies**, integrated into agro-silvopastoral systems.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The regional **Innovation Hub** is an institutional innovation designed to serve as a centralized repository and collaboration platform for national research institutions, producers and organizations in the region. The project has identified 300 technical resources, including guides, manuals, methodologies, videos, and courses, aimed at supporting the adoption and scaling of sustainable agricultural and AF innovations. The hub is the responsibility of IICA, both in its establishment and sustainability as a regional public good. Despite its potential, the hub faces challenges such as limited technical capacity and digitalization among partners.

• The project is developing an **online agricultural extension monitoring and tracking** for the National Center for the Agricultural and Forestry Technology of El Salvador (CENTA). It integrates tools to design, pilot, and implement forms for monitoring various agricultural activities. The system is tailored to evaluate indicators aligned with CENTA's Annual Operational Plan, consolidating data such as technical assistance, agricultural census information, pest monitoring, cost and production records, farm locations, etc.

• The project has designed an interactive application for the exhibit of the Earth Observation Component of the European Union's space program (Copernicus) at CIMAG (Centro de Interpretación del Mañana de la Agricultura). This is a permanent exhibit housed at IICA to demonstrate the potential of innovative digital technologies to transform agriculture in the region.

Agroforestry Rwanda (412627 & 412408)

ENABEL & IUCN (Belgian Development Agency & International Union for Conservation of Nature)

Improving resilience of farmers' livelihoods to climate change through innovative, research proved climatesmart agroforestry in the Eastern Province and peri-urban areas of Kigali city

Start date: February 2020 (ENABEL) & January 2020 (IUCN)

End date (official): January 2025 (ENABEL) & December 2024 (IUCN)

End date (likely): August to December 2025 (7 and 12-month no-cost extensions requested respectively by ENABEL and IUCN)

Rwanda

LIST OF PROJECTS

Data on likely end date updated on: 14/06/2024

Data on Innovations updated as of: December 2023

The DeSIRA project is the research component of a larger development intervention "Transforming the Eastern Province through Adaptation to Climate Change" (TREPA), implemented by several partners, including IUCN and ENABEL. Innovations relate to AgroForestry (AF) and Improved Cooking Stoves (ICS).

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• **IUCN assesses and studies the performance of seven types of agroforestry** on the farmlands of the Eastern Province of Rwanda. For instance: Internal boundary, mainly used for fencing the house and separating plots within the farm; External boundary, mainly used to delimitate the farm area and control cattle ranging; Scattered trees on the plot, mainly aiming at firewood and fruit production. AF landscapes were developed under a previous project. Now that the trees have grown, the project is testing the impact of the introduction of different AF types on biodiversity, livelihood, agriculture. The project works with small groups of farming households to test the impact on productivity and on biodiversity.

• **A package of AF practices** (how to use inputs, how to plant crops in a rotation system, how to manage soil, etc.) supports IUCN's research on AF types and contributes to promoting AF.

• **One innovative AF production system** is being tested by ENABEL: 560 households were sampled; each farmer received a set of 50 seedlings of different AF trees (e.g. avocado, mango).

• **ENABEL has tested nine ICS models**, based on availability and accessibility of biomass for cooking, and selected 2 models for design improvement (mobile stove, fixed mud stove). In 2023, 10332 units of the 4 best models were disseminated, 67% of them under the TREPA project. All ICS users are small farmers.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

Project partners have developed a diversity of AF monitoring tools to support the restoration of AF landscapes. A set of M&E tools has been incorporated into the Forest Monitoring and Evaluation System (FMES) of the Rwanda Forestry Authority and are used under the TREPA project for monitoring AF landscape under restoration. The innovation is based on a digital solution including GPS tablets, which allow field teams to easily map and register data about AF blocks restored in the field. The Rwanda Tree Finder, developed by World Agroforestry, is a GIS-based application to assess the density and distribution of trees in a landscape. It allows users to select suitable tree species based on potential natural vegetation. A modelling tool for carbon sequestration in AF landscapes of Rwanda is based on above-ground biomass, carbon sequestration and allometric (i.e. the growth of tree parts at different rates) equations of 5 dominant trees species in AF systems typology. IUCN is also testing its "Land Health Monitoring Framework" to assess functional and habitat diversity in agroecosystems and to assess whether its indicators can be used to determine the impact of, inter alia, the restoration of AF landscapes. ENABEL has designed AF incentives to help extension services to facilitate the adoption of AF by smallholder farmers. One analysis model of biomass supply/demand, based on an existing software (LEAP, Low Emission Analysis Platform) used by the Ministry of Infrastructure, was customised for the Eastern province. It has been improved to orient policy and technical decision-making: e.g. improvement in the quality of the data, addition of missing components (crop residues, export/import to/from neighbouring provinces) etc. Two types of sensors have been introduced and are used by the staff of the Rwanda Standards Board to assess the efficiency of ICS. New manufacturing process-related innovations are used by the private sector: e.g. refractive ceramic liner to improve the efficiency and chimney of the ICS to reduce the amount of indoor smoke.

APSAN (407715)

ICRISAT (International Crops Research Institute for the Semi-Arid Tropics)

Enhancing crop productivity and climate resilience for food and nutrition security in Mali

Start date: October 2019

End date (official): October 2024

End date (likely): October 2025 (12-month no-cost extension requested)

Mali

LIST OF PROJECTS

Data on likely end date updated on: 20/06/2024

Data on Innovations updated as of: October 2023

The project aims to develop and register varieties for the following crops: sorghum, millet, cowpea (niebe) and groundnut.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• As of October 2023, the project has **tested/developed 48 varieties (existing/new varieties).** They are all climate-resilient varieties with genes for resistance to biotic stress (caused by pests and diseases) and abiotic stress (caused by climatic events such as drought). More than 10,000 small-holder farmers were using these new varieties.

• The project also promotes **good agronomic practices**: Soil fertility management practices; Integrated Pest Management (IPM, i.e. a sustainable approach to managing pests by combining biological, cultural, physical and chemical methods to minimize economic, health, and environmental risks); Post harvest management practices; Natural resources management practices, including soil conservation practices such as cereal/legume rotation, application of organic fertilizer (animal manure and plant waste); Water conservation practices.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• Access to seeds and other inputs is an innovative service for the members of several seed production cooperatives the project works with. The project is developing a pre-order system that allows cooperatives to express their requirements for first-generation seeds to meet their members' needs for high-quality seeds; the order is then placed with the first-generation seed supplier (a research institution). The profits generated by the cooperatives are used to purchase additional inputs, such as fertilizers, which are provided to members on credit and repaid with interest. This innovative service improves the seed supply chain and enhances the availability of high-quality seeds, while supporting good practices among cooperative members. The project has also strengthened the service for cooperatives, which already know and use the system.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The innovation is a **strengthened seed supply system**, which benefits 5 seed companies (private sector companies) and improves the flow of seeds. Production and purchase contracts for seeds have been established between the farmers' organisations (cooperatives), strengthened by the project, and seed companies. The former provides sorghum, cowpea, millet and groundnut seeds to the latter.

Pillar I – Group 1

BIORISKS (411531)

CORAF (Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles)

Anticiper et gérer les risques biologiques pour renforcer la résilience des agriculteurs au changement climatique en Afrique de l'Ouest et du Centre

Start date: January 2020

End date (official): December 2024

End date (likely): December 2025 (12-month no-cost extension requested)

Benin, Burkina Faso, Cameroun, Côte d'Ivoire, DRC, Gabon, Ghana, Nigeria, Sierra Leone, Togo

LIST OF PROJECTS

Data on likely end date updated on: 21/05/2024

Data on Innovations updated as of: March 2024

The project purpose is to anticipate and manage biological risks to strengthen the resilience of farmers to climate change in West and Central Africa.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

At farm level, the project addresses the issue of cassava-related viral diseases by developing and promoting two techniques.

• **The production/supply of healthy cassava seedlings**; reducing the number of cases of disease requires healthy plants to be available; this innovation is based on a well-known tissue culture technique used to propagate root vegetables; the innovation is in the fact that the technique is tested in a new context.

• **One cultural practice called "roughing**", which consists of unearthing sick cassava seedlings, rather than letting them in place. The technique is already known but is an innovation for cassava.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **A new tool/service is available on a mobile application** called "Plant Village Nuru", which enables farmers to identify viral diseases in cassava and contributes to real-time participatory monitoring of diseases in cassava plantations. 1460 persons (51% women and 27% young people), including 1319 smallholder farmers and 141 extension agents, have been trained in using the service. The mobile application is not new, but the service is. Based on artificial intelligence, it can identify diseases and send advice to farmers. For people who can't read or write, an audio option is available. Farmers who do not have smartphones have received "image boxes" containing pictograms.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• A standardised sampling and diagnostic protocol for cassava diseases, common to all targeted countries, has been developed and is tested in 4 countries in the targeted zone.

• A surveillance, early warning and monitoring system for cassava virus diseases has been developed by the project, for use at institutional level. This system encompasses the service available under the application "Village Plant Nuru", the sampling and diagnostic protocol and the National Response Plans at country level. Extension agents have been trained to identify the symptoms and play a key role in implementing the system. National Response Plans for epidemic have been drawn up at country level and validated by the ministries responsible for agriculture. These policy mechanisms already existed in the 10 countries, prior to the project. Under the project, they are being tested and the process for setting up Emergency Operations Centres has started.

BIOSTAR (410794)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Sustainable Bioenergy in Small and Medium Agri-food Enterprises in Western Africa

Start date: February 2020

End date (official): February 2025

End date (possibly): August 2026 (18-month no-cost extension under discussion)

Burkina Faso, Senegal, Mali, Niger, Côte d'Ivoire

LIST OF PROJECTS

Data on possible end date updated on: 26/04/2024

Data on Innovations updated as of: February 2024

The project aims to promote sustainable development of agri-food processing Small and Medium size Enterprises (SMEs) in rural areas through innovation in the production of sustainable bioenergy and the optimisation of food processing. The innovations primarily focus on technologies for producing renewable energy from processing residues and models for sustainably sourcing of agri-food residues.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Twelve technologies/equipment for producing renewable energy from processing residues

Different categories of technologies are reported:

-Bioenergy production technology: a process that valorises agri-food processing residues to produce energy, in the form of electricity, motive power, or heat (some of these processes are connected to the grid, others do not require electricity);

-Bioenergy production technology, coupled with a photovoltaic solar installation, which allows the bioenergy production process to operate;

-Solar installation, producing renewable energy from a solar source only.

At least 9 technologies are entirely co-designed and developed by the project. Three technologies are existing (commercial) solutions, promoted by the project, intended for new users. The implementation of each technology in 16 agro-food SMEs (all partners of the project) requires adaptations (thus further innovations) at the level of each SME.

• **Sixteen models of sustainable sourcing of agri-food residues at the SME level** (thus specific to each pilot SME/unit) are under development. With support from the project, local actors co-design and/or strengthen the mechanisms for sustainable supply (in terms of quantity, quality, and costs) of biofuels. Agri-food processing residues can be economically valorised, with varying degrees of complexity. Some models are simple, for instance when an SME uses its own residues. Other models are more complex: e.g. residues from the cashew sector are utilised to dry mangoes. These models are developed with a view to be replicated by other SMEs.

• **A model for designing technological innovations** is under development. The project is documenting the process of developing a technological innovation, i.e. the specific approach allowing the co-construction of technical innovations/solutions. Even though adaptations are needed for implementing a given technology at SME level, there is a common co-design framework for all technologies, which is the subject of capitalisation work, with a view to scale out technologies, via inter-professional bodies.

CASSECS (410169)

ISRA (Institut Sénégalais de Recherches Agricoles)

Carbon sequestration in sylvopastoral ecosystems in Cilss States

Start date: December 2019

End date (official): December 2024 (including a 12-month no-cost extension already granted)

Senegal, Burkina Faso, Niger, Chad, Mali, Mauritania

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The objective is to improve the assessment of carbon footprint of Sahelian agro-silvopastoral ecosystems in order to better quantify their impacts on climate change.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

Under the project, a group of 150 agropastoralists co-designs, tests, and validate innovative options for sustainable Greenhouse Gas mitigation in two areas:

• Animal feeding - Eight feeding practices have been tested. Each practice is based on natural (local) forage in combination with other feedstuffs. The research has two objectives: improving the production (milk) and reducing the environmental impact (i.e. reducing enteric methane emissions, produced by the normal digestive process of ruminants), while remaining economically viable. The innovation is in testing the proportions of different feedstuffs incorporated in the ration (e.g. maize; millet; cowpea; cottonseed cake).

• **Silvopastoralism** - As of December 2023, **six silvopastoralist techniques** were being experimented at farm level, with a view to protect trees from livestock and promote natural regeneration, to enable reforestation. For instance: use of large sleeves, to protect the trees from animal teeth; mycorrhizal inoculation, to accelerate the growth phase of trees and facilitate soil restoration; hydro-retentive gel, to ensure survival during the dry period, by capturing water around the roots.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

The project has reinforced **11 national and regional tools and devices** in order to produce reference data to assess the ecosystem carbon balance (emissions and sequestration) of Sahelian (agro)pastoral livestock farming. Examples of these tools include : a GreenHouse Gas (GHG) Flux Tower System, to ensure the availability of information with a view to capture the temporal variability of emissions characterizing the ecosystems; a Ruminants' Ingestion Level Evaluation System, to accurately evaluate the main element, which influences enteric methane emissions; a Demographic Monitoring System of Around Fifty Cattle Herds, to produce variation parameters of herd demographics, useful for inventories; a Root and Trunk Growth Monitoring System, to quantify the carbon storage potential in trees.

• **Two multi-scale tools for carbon balance evaluation** have been updated with knowledge from research activities. They contribute to the drafting of IPCC (Intergovernmental Panel on Climate Change) reports and livestock development policies :

- FAO's GLEAM tool (Global Livestock Environmental Assessment Model). The project contributes references (GHG emissions, ingestion, demographic parameters) measured on agro-pastoral and pastoral livestock systems. It has replaced the model's default parameters by real data. The users are the national GHG inventory officials.
- **Forage Balance Sheet tool**: the tool is used by livestock ministries in each targeted country, at the end of the production campaign, to anticipate possible forage deficits and develop strategies to assist herders.

• **References for new GHG emission factors** are considered innovations. Four emission references are being developed: enteric methane emissions; soil emissions; ecosystem emissions (including 2 references, one for agro-pastoral systems and one for pastoral systems), for use by decision-makers and inventory officials.

Pillar I – Group 1

CLIMA-LOCA (407158)

CIAT (International Center for Tropical Agriculture)

Fostering CLIMAte-relevant and LOw Cd innovations to enhance the resilience and inclusiveness of the growing cocoa sectors

Start date: December 2019

End date (official): December 2024 (including a 12-month no-cost extension already granted)

End date (likely): December 2025 (a second one-year no-cost extension has been requested)

Colombia, Ecuador, Peru

LIST OF PROJECTS

Data on likely end date updated on: 20/08/2024

Data on Innovations updated as of: November 2023

The project aims at reducing the vulnerability of smallholder cocoa producers to the impacts of new food safety regulation (including a new EU regulation for Cadmium -Cd- in cacao) and climate change.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• **Low Cd accumulating clones and rootstocks** - The innovation consists in testing 29 commercial cocoa clones and rootstocks (the root system that can support the growth of the grafted cocoa plant) to identify and recommend the clones and rootstocks (and combinations of both) that accumulate less Cd.

• **Budding techniques to reduce Cd accumulation in cocoa beans on smallholder farms** - This practice aims at optimizing the quality of cocoa plants. By using a rootstock that naturally accumulates less Cd, and combining it with a bud from a cocoa plant that also has lower Cd accumulation tendencies, farmers can grow cocoa trees that produce beans with lower Cd content.

• **Soil amendments for Cd accumulation reduction and soil health** - Promising soil amendments, tailored to local soil conditions and available resources, are tested in field trials in different agroecological zones. This includes organic and inorganic soil amendments that reduce or have the potential to reduce Cd uptake while improving soil health and cacao productivity (e.g. lime, biochar, micronutrients, etc.).

• Agroforestry (AF) systems for climate resilience – At a research station in Ecuador, a Cd hotspot, treatments with different shade tree species arrangements are compared with monoculture cacao, under different fertilization regimes. The use of shade trees aims at diversifying cacao production systems, while making them more climate resilient and improving ecosystems services.

• **Development of genetic material with low Cd accumulation and/or drought tolerance** - Genotypes determine various traits such as growth rate, yield, resistance to diseases, and quality of the cocoa beans. In Colombia, cacao pods were collected from 126 hybrid trees. A low Cd accumulation tree has not been identified yet. In Ecuador, high and low accumulator trees have been identified. This genetic material is under propagation to be introduced in the National Genebank. In Peru, seeds from 15 trees were collected and are being grown in a Cd-rich soil to enable a more controlled comparison of Cd accumulation.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **A website with public access to data on climate change and Cd levels** - The Alliance Bioversity-CIAT has developed the online tool "Cacaodiversity" (<u>https://cacaodiversity.org/</u>). It provides location-specific information about how to improve sustainability of cacao farms, information on the future impact of climate change on cacao cultivation as well as on AF systems adapted to different agroecological conditions and farmer objectives. It guides the selection of appropriate propagation material for climate change adaptation. The tool also includes information on the likely Cd content in soil and cacao beans.

• Molecular markers - The project introduced molecular markers for specific genes.

• **Technology for measurement of Cd** - Introduction of X-Ray Fluorescence (XRF) equipment and other techniques for rapid and low-cost analysis of Cd in beans to support strategies to comply with Cd regulations in cacao importing countries. These innovations mostly target private sector actors and researchers.

• **Drought tolerant, disease resistant and low Cd genotypes** - The introduction of genotypes in collection plots of research centres, with the cooperation of gene banks, is an institutional innovation. Research centres in the region maintain gene banks and genetic collections used for breeding and improvement, and those collections will be enriched with new genetic materials (under development) with potential to reduce Cd uptake or increase drought tolerance in future rootstocks and clones.

CLIMATE SMART INNOVATION MALAWI (413081)

CIP (International Potato Center)

Climate smart innovations to improve productivity, profitability and sustainability of agriculture and food systems in Malawi through multidisciplinary research

Start date: December 2019

End date (official): December 2024

End date (likely): September 2025 (9-month no-cost extension requested)

Malawi

LIST OF PROJECTS

Data on likely end date updated on: 09/07/2024

Data on Innovations updated as of: December 2023

The project aims to develop climate-resilient integrated technological innovations and to enhance understanding of the opportunities and constraints for uptake of these innovations by farmers.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The project has developed 47 technology innovations for farmers to use. Assessments were conducted both onstation, for most of them. 70% of these innovations also underwent on-farm evaluations. As of December 2023, **28 integrated technology options** have been validated and were set for release in 2024. None has been taken up by farmers yet, but as on-farm testing continues, more innovations could be validated in 2024. These innovations belong to the following categories.

• **Climate-resilient varieties**: maize (10 tested, 2 validated); groundnut (12,2), common bean (62,3); potato. None of these varieties were used in Malawi before the project. They were tested across several agroecological zones to evaluate their adaptability.

• **Climate-smart intercropping systems**: in the context of climate change adaptation, several (10) spatial arrangements of crops were tested to improve intercropping systems such as cereal-legume (e.g. maize/common bean), doubled-up legume intercropping (i.e. two legumes grown together), potato and sweet potato-legume intercropping (e.g. sweet potato with soybean or pigeon pea) and cassava-maize-cowpea intercropping. Six intercropping systems were eventually validated.

• **Soil fertility management options**: for instance, the project conducted experiments to evaluate the effect of soil amendments on the incidence of bacterial wilt and yield of potato.

• **Crop-aquaculture integrated technology,** such as integrated fish-rice systems.

• **Crop diversification options**, for intensive crop production/seed multiplication around the fishponds.

• Alternative fish feed sources, such as cassava chips and agricultural by-products (maize bran, soy cake, sweet potato peels).

• Integrated pest and disease management strategies, such as timeliness of planting, control method against indigenous Fall ArmyWorm (FAW, a pest that attacks cereal crops), combination of effective pesticides and resistant bean varieties to enhance the control of the Bean Stem Maggot (BSM, an insect that targets leguminous crops, particularly common beans).

Post-harvest management technologies for table potato storage at farm level.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Six dynamic programming **models of constraints to agricultural technology adoption** by smallholder farmers in Malawi were under development, one for each agroecological zone of Malawi. The models are targeted at the researchers and policy makers, and aim at increasing the uptake of agricultural technologies by identifying and analysing the barriers to adoption and the conditions for uptake.

• An android-based **application for early detection and control of fish diseases and parasites** is a decision-making tool under development by WorldFish, targeted at extension staff and the private sector.

COCOA4FUTURE (412132)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Sustainability of production systems and new dynamics in the cocoa sector

Start date: February 2020

End date (official): January 2026 (including a 12-month no-cost extension already granted)

Côte d'Ivoire, Ghana

LIST OF PROJECTS

Data on Innovations updated as of: January 2024

The project aim is to contribute to the agro-ecological and organizational transition of cocoa production by triggering a shift towards production systems that are in tune with environmental sustainability, economic sustainability, social responsibility, and quality standards, including ethical imperatives.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The development of **sustainable and resilient cocoa agroforestry systems** is at the heart of the project. Technical itineraries are being co-constructed with farmers based on a multi-criteria analysis of existing agroforestry systems. The evaluation of these systems is part of the innovation process, as it identifies the levers to improve their performance. Systems offering the best compromises relative to various criteria/objectives will be proposed to farmers (e.g. sustainability, cocoa productivity, economic performance, diversification, with some systems associated with fruit or forest productions).

• The following practices are innovative for the targeted producers as well as for cooperatives and agricultural support services:

- Assisted Natural Regeneration - Cocoa producers are supported in better managing spontaneous trees that grow on their own in cocoa plantations. The project has produced a list of recommended forest tree species.

- **Establishment of plant barriers** around cocoa plantations to combat the Cocoa Swollen Shoot Virus (CSSV, a virus that destroys cocoa trees, carried by scale insects). The barriers consist of plants that are not sensitive to CSSV. This control method is an alternative to uprooting cocoa trees.

• Farm-level innovations are developed by the NGO "APDRA pisciculture", a project partner, to support the diversification of the production systems :

- A more durable monk (fish farming water management structure) replaces traditional wooden planks.

- **Feeding technique for tilapias,** based on the rachis of cocoa pods (i.e. the part of the pod to which the beans are attached).

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The NGO Nitidae (a project partner) is supporting 90 cocoa farmers in the rehabilitation of their cocoa farms. It assists the cooperative, of which these farmers are members, in **developing and implementing support services** (such as the provision of seedlings, fertilizers, etc.) that are innovative for the cooperative and its members. These services are expected to be maintained by the cooperative after the project ends.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

Several decision-making tools are under development, intended for support services and cooperatives:

• A model of the spatio-temporal dynamics of CSSV disease for agroforestry cocoa systems in Côte d'Ivoire: the development process involves collecting data on a wide range of parameters and factors to better understand the CSSV complex, the diversity of its various components, the virus, the vector scale insects, the ants, and the natural enemies of the scale insects, and the interactions among these components.

• Based on this model, a **CSSV risk prediction tool** is being developed, based on plant diversification; users will be able to predict the risk of CSSV development and develop control strategies.

• The project has developed and was testing, as of January 2024, a **multi-criteria assessment tool (DEXiCacao) to assess the sustainability of cocoa farms**: social, environmental, and economic sustainability (for instance, some cocoa farms are environmentally sustainable but not economically viable).

• A model for assessing the productivity of trees associated with cocoa farms, also fully developed by the project, intended for forestry support services (existing models were developed in forests, but the tree behaves differently within a cocoa farm); this model will allow the exploration of future climate scenarios on the ecosystem services provided by the cocoa farms.

CSARIDE (411806)

TEAGASC (Agriculture and Food Development Authority)

Climate Smart Agriculture Research and Innovation Support for Dairy Value Chains in Eritrea

Start date: February 2020

End date (official): September 2025 (including a 15-month no-cost extension already granted)

Eritrea

LIST OF PROJECTS

Data on Innovations updated as of: February 2024

The project promotes an inclusive, sustainable and climate-relevant transformation of the Eritrean dairy value chain, targeting resource-poor livestock farmers, private and cooperative dairy value chain actors, as well as key public sector support agencies.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The project is testing several innovations related to the production of forage, breeding, feeding strategies, animal health treatments, milk cooling, in support of the dairy value chain in 3 regions of Eritrea.

• The Hamelmalo Agricultural College (HAC) has organized trials for **11 species of forage**. The most promising species with high forage yield and nutritive value were selected for multiplication in small plots.

• Research was ongoing at HAC to discover the **crop ratio** (intercropping between maize and legumes, between sorghum and legumes) that gives the best combination as animal feed.

• **Compost making**, based on local materials, is already taken up by targeted dairy farmers.

• **Three feeding strategies/techniques** include: 1/ a calf starter, on trial by the National Agricultural Research Institute (NARI) and now being tested at farm level; 2/ silage making for forage conservation (mainly maize and legume forages); 3/ the use of a hand-held scale to weigh animal feed.

• A production management technique: **scoring of body condition,** based on measurement.

• A health management technique: identification and treatment of mastitis (breast inflammation).

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **Improvement of the public Artificial Insemination (AI) service:** introduction of new breeds (Jersey, Holstein) to increase the milk production, via crossbreeding with local breeds; purchase of straws of bull semen from Ireland; procurement (ongoing as of February 2024) of a small liquid nitrogen plant at the National Insemination Center of the Ministry of Agriculture, to allow the conservation and storage of frozen semen. More than 1100 dairy farmers have benefitted from this improved AI public service.

• Two new extension services have been introduced by the project and taken up by dairy farmers:

- The **Farmer Field School (FFS)** is a new concept; the project has trained officers to independently plan and execute on-farm dairy training sessions in the form of FFS;

- The **Lead farmer is** another concept ; the project has identified and trained 6 lead farmers; all training activities for extension staff and farmers are conducted on the farms of the lead farmers.

• A zero-energy cooling chamber: the technique uses the circulation of water to keep the milk cool; the chamber is built with local materials (bricks, sand), and can be used at both farm and processing levels.

• The project team has developed a **feeding calendar**, enabling dairy farmers to make feeding decision based on the status of animals (e.g. pregnancy, lactation). The feeding calendar has been shared with farmers.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **Five new products** (and associated production processes) are in being developed, including yogurt, cheese, and products for the hospitality sector, with a view to push the consumption of dairy products.

• The use of additives to extend the shelf life of the dairy products is an innovation for Eritrea (for instance two natural preservatives to yoghurt, Nisin and Natamycin).

• The project has also introduced **food safety processes** for the processing companies it supports; to maintain proper standards within the industry, the project has trained both the Ministry of Agriculture food regulatory staff and processors. As a result, 7 processors have put in place a food safety officer at each plant.

Introduction of the **cream separator** (to separate the milk from the cream) used by processors.

• **Cooling system** and heater for milk collection centres, using solar energy or electricity from the grid.

FAIR-Sahel (412095)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Fostering an Agroecological Intensification to improve farmers' Resilience in Sahel

Start date: January 2020

End date (official): December 2024 (including a 12-month no cost extension already granted)

Burkina Faso, Mali, Senegal

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project aims to implement significant changes at various levels of intervention to promote agroecological intensification, whether at the national, territorial, or local level.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

More than 350 farmers are involved in the development/testing of innovative intensification techniques.

• **Diversification with new crops in rotation (innovative practices and crops)** - The project, together with farmers, has tested several rotation options to help them to better manage soil fertility while contributing to the improvement of livestock feeding. This includes 3 innovative rotations with service plants (i.e. a plant grown to benefit the ecosystem, such as soil fertility, and enhance agricultural productivity): Crotalaria (a legume) for soil fertility in Burkina Faso ; Intercropping Crotalaria with potato and cabbage for its dual effect in Senegal ; Mucuna (a legume) in millet/peanut rotation in Senegal.

• **Diversification with crop associations (innovative practices)** - Several cereal-legume crop association options (e.g. Millet/sorghum association with cowpea) have been tested with farmers to better manage soil fertility while contributing to mitigating the effects of climate risk on productivity.

• **Forage crops (innovative crops)** - The tests aim at identifying quality forage production options adapted to their context and to test rations based on forages for sheep or livestock fattening. For instance, In Burkina Faso, several species of forage have been tested (Brachiaria and Mucuna, two forage plants with high nutritive value) as well as dual purpose crops (sorghum, millet, cowpea, peanut).

• **Bio-inputs and efficiency of mineral fertilizers (innovative products and practices)** - With a view to propose efficient practices for the use of organic manure, tests have been conducted to evaluate the combined effect of the dose and timing of organic manure application on crop yield and to identify the most efficient combination. This includes the production of organic fertilizers and biofertilizers, for instance enriched compost in Senegal or phosphate-enriched compost in Burkina Faso. The efficiency of mineral fertilizers was tested in Senegal. Biopesticides have been tested in Mali and in Senegal (e.g. effect of aromatic medicinal plants on cotton and millet pests).

• Water and Soil Conservation (innovative WSC practices) - The objective is to contribute to the improvement of soil fertility to ensure sustainable production in the context of climate variability. For instance, the Zaï practice is a traditional method used to improve water retention and soil fertility in arid or semi-arid zones, in certain regions of Africa. It involves digging holes 20 to 40 cm in diameter and 10 to 15 cm deep to collect runoff water (as well as organic matter) and allow it to infiltrate around the plant. The practice of Zaï has been tested in Burkina Faso to determine its effects on the physico-chemical, biological, and chemical parameters of the soil; to evaluate its effects on cotton yields; to assess its economic profitability of cotton cultivation using the Zaï technique.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has developed or adjusted **several evaluation tools** for use by extension staff and small holder farmers. They can be used to compare the performance (technical, environmental, economic, and social) of technical systems at farm level, based on a single criterion or multiple criteria. For instance, **CoProdScope** allows to perform an assessment and to provide a management advice of by-products at the farm level. It responds to the observation that the utilization of agricultural and livestock by-products is very low in agropastoral farms in sub-Saharan Africa even though there are potential sources of forage, organic manure, and mulch available for free on the farm. A mobile version of the tool was under development to facilitate its use in the field by an extension specialist. In another example, **Biofunctool** is a low-cost methodology used to assess soil health based on carbon dynamics, nutrient cycle and soil structure.

INNOVATION FAREI (406180)

FAREI (Food and Agricultural Research and Extension Institute)

Enhancing FAREI's R&D Capacity for Sustainable and Modern Agriculture

Start date: November 2019

End date (official): November 2023 (including a 12-month extension)

Implementation was over at the time of data collection (07/2024)

Mauritius

LIST OF PROJECTS

Data on Innovations updated as of: November 2023

The main objective of the project was the consolidation of the R&D capacity of the Food and Agricultural Research and Extension institute (FAREI) to address climate change challenges and development of climate smart practices for sustainable production.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• Several projects by and at FAREI (on model farms) have been upscaled or developed to promote innovative practices and extend them to farmers. For instance: good husbandry practices in pig farming; innovative water and energy saving technologies.

• In view of extending the range of fruit species and varieties grown on a commercial scale, FAREI has introduced planting materials of a range of **new fruit species and varieties** (lichi, avocado) as well as a **strain of Button mushroom** from South Africa and India for evaluation under local conditions, prior to dissemination.

• The project also focused on reducing chemical inputs by optimising existing Integrated Pest Management (IPM) tools and developing new IPM packages for farmers. This includes innovations in **biological pest control** and the use of sustainable rearing techniques: e.g. insecticide application is reduced by 60% by using an IPM package targeting the diamondback moth in cabbage.

• The project upgraded its lab and nursery infrastructure to optimise the protocol for the production of **virus-free planting material of promising local garlic accessions** for dissemination to farmers.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• FAREI has strengthened its early disease warning unit and its plant diagnostic facility by developing **a disease forecasting system**, integrated into automatic weather stations, on research stations and model farms. Farmers are informed, via smartphones, about favourable conditions for disease development.

FAREI set up a new soil water and plant analysis laboratory facility, to support farmers.

• The LASER2 software (developed by CIRAD) was introduced as a tool for efficient livestock data management and performance monitoring. It was initially implemented for goat herds at FAREI research stations, with a pilot phase involving a dozen goat farms.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

Key innovations strengthen the institutional capacity of FAREI to provide extension services to farmers.

• A new research programme has been initiated in the field of AgroForestry (AF) to develop AF systems which are bio-physically and economically suitable and sustainable in the local landscapes. The programme focuses on setting up AF pilot plots and evaluating the productive capacity, environmental benefits, biodiversity conservation, soil health improvement, as well as the climate change mitigation potential related to carbon dioxide sequestration potential.

• In addition, FAREI has **reviewed and re-oriented six research programmes, using the opportunity to introduce several innovations**. This includes: 1/ Introduction and evaluation of improved germplasm; 2/ Crop variety development ; 3/ Integrated Pest and Disease Management ; 4/ Climate Smart Technologies (e.g. model vertical farming system); 5/ Sustainable agriculture practices (e.g. aquaponics); 6/ Feed and fodder development (e.g. Near Infra-Red Spectroscopy for rapid analysis of feed and fodder in real time). For instance, the research programme on "Crop variety development" has been re-oriented towards climate resilient crops. **Molecular and physiological markers** and other technologies are being used for the screening of breeding lines in view of identifying the promising ones. FAREI has acquired a **walk-in growth chamber**. This facility shortens the time taken for evaluation of breeding lines, hence providing better varieties of vegetables crops to the farming community at a faster rate. **INNOVATION UNIVERSITY of MAURITIUS (406182)**

UoM (University of Mauritius)

Enhancing climate resilience in agriculture for improved food and nutrition security through research, innovation and training in the Republic of Mauritius

Start date: December 2019

End date (official): December 2023 (including a 12-month no cost extension) Implementation was over at the time of data collection (07/2024)

Mauritius

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The overall objective of the action was to strengthen the capacity of the Faculty of Agriculture in research and training to promote sustainable agriculture for improved food security in response to climate change.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The Faculty of Agriculture of the University of Mauritius has tested climate smart agriculture technologies to contribute to sustainable production methods and to reducing the carbon footprint of local crop agriculture. The research activity was mostly conducted on an organic plot of land at the AgriTECH Park of the University of Mauritius (i.e. not at farm level).

• As a climate smart agriculture technology, the development of **a model aquaponics unit** was successfully implemented and tested. Aquaponics is a sustainable farming method that combines aquaculture (raising fish) and hydroponics (growing plants without soil) in a symbiotic system where fish waste provides nutrients for plants, and plants naturally filter the water for the fish.

• Different agroecological technologies for leguminous crops under organic, sheltered and conventional farming systems were tested: low-cost mulching techniques in reducing weed growth and propagation; liquid biofertilisers using the leaves of pigeon pea and aquaponics waste water to increase soil fertility; vermicompost and worm-tea (vermiwash) to increase soil fertility, biodiversity and promote crop growth; different formulations of commercially available biofertilisers under low external input sustainable agricultural production system; green manuring; microbial inoculants to increase soil fertility; legume crop (pigeon pea) for increasing soil fertility via soil rhizobacteria in an alley cropping system; family drip systems for deficit irrigation for production of a named legume crop in view of reducing water use without compromising crop yields; approved biopesticides to control specific pests of selected legume crops; traps and baits for the control of slugs, snails, fruit flies and fire ants.

• In addition, several experimental trials aimed at developing **efficient water use technologies** for small scale farmers were conducted to assess the impact of different drip irrigation systems on legumes production.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The Food Processing and Quality Control Laboratory of the Faculty of Agriculture has been upgraded with the acquisition of **new equipment** for teaching, research and consultancy purposes (e.g. chloride analyser, infrared moisture analyser, kjeldahl analyser used to determine the nitrogen content or organic and inorganic samples, etc).

• The project has supported the development of **four analytical methods for molecular pest & disease characterisation** in Mauritius, for instance a molecular marker for the identification of a pest affecting cruciferous crops.

• It has also developed **three value-added dairy products** : drinking yoghurt , clarified butter with infused herbs and low-fat paneer (a sort of cottage cheese).

• Besides, the project has showcased **the innovative potential of the Internet of Things (IoT)** in agriculture . **A Smart Irrigation System** was developed, featuring sensors to monitor soil data (moisture, temperature, humidity, etc.), a gateway for transmitting this data to the cloud, and a mobile app for real-time viewing. Long-range data transfer enhances the system's efficiency, compared to traditional methods. While full deployment at the AgriTECH Park was still pending infrastructure upgrades, the system demonstrates IoT's role in smarter irrigation.

Pillar I – Group 1

INV-NIGER (411732)

AECID (Agencia Española de Cooperación Internacional para el Desarrollo)

Innovations pour l'intensification durable de systèmes agricoles irrigués résilients face au changement climatique au Niger

Start date: January 2020

End date (official): December 2024

End date (likely): To be determined (temporary suspension of activities since July 2023)

Niger

LIST OF PROJECTS

Data on likely end date updated on: 05/07/2024

Data on Innovations updated as of: July 2024

The project objective is to enhance governance and management of water resources and irrigated agrosystems while promoting agroecological intensification. As of July 5, 2024, project activities remained temporarily on hold. Potential innovations had been identified, but their development had not started yet.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• Innovations will pertain to two categories of irrigation systems:

- **Small Private Irrigation** : small-scale private irrigation systems for individuals or small groups of producers, involving pumping equipment and water distribution.

- **Community-led Collective Irrigation** : small-scale community irrigation for villages or large groups of producers organized into user organizations, managing pumping equipment and water distribution, as well as access structures.

Innovations will introduce good practices, including agroecological practices, and technologies in market gardening (equipment, automation, ferti-irrigation, water management).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The development of a **Dynamic Geographic Information System** (GIS) will be a key innovation in Niger and one of the major activities of the project, but not until the suspension of activities is lifted. The GIS aims to create a database identifying irrigated agrarian systems. The user will be the SPIN secretariat (Strategy for Small-Scale Irrigation in Niger), a governmental structure under the Ministry of Agriculture.

• Another key (planned) innovation will be a **governance structure for aquifers**. Such a structure does not exist yet. The technical focus of the project is on aquifer recharge. This is because the content of the aquifers in the two targeted regions of Niger is known from previous studies, but the recharge mechanisms are not known. The project intends to study the recharge mechanisms and the governance structure is expected to guide future investments (e.g. to prevent investments doomed to fail if the water supply is not sufficient).

IRFFS (412107)

AFRICA RICE

Integrated Rice-Fish Farming: A Research and Extension Development Based Initiative to Improve Food Security and Nutrition in Liberia

Start date: January 2020

End date (official): July 2023 (including a 6-month no cost extension)

Implementation was over at the time of data collection (07/2024)

Liberia

LIST OF PROJECTS

Data on Innovations updated as of: July 2023

The overall objective of the project was to enhance the rice and fish value chains for improved food, nutrition, and economic security for all, through targeted research and extension approaches.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The development of an **Integrated Rice-Fish Farming System** (IRFFS) is the main innovation. This dual production system, where rice paddies are used not only to grow rice but also to raise fish, capitalizes on the symbiotic relationship between the two. Fish help to control pests in the rice fields by eating insects and weeds, which reduces the need for chemical pesticides. Their waste, in turn, serves as fertilizer for the rice. The rice plants provide shade and habitat for the fish, promoting their growth. As a result of the project, 377 farming households were implementing the IRFFS by mid-2023, including 186 women-headed households. In July 2023, beneficiaries reported an increase in yield and income, as well as improved food security.

• To support the IRFFS, the project has introduced the following technologies: - An **improved rice variety** that mature within 100-115 days in addition to its tolerance to iron toxicity, height and yield (out of three rice varieties tested by the project, one was preferred by farmers);

- **Rice ratooning technology** that enables a farmer to harvest twice from the same rice plant; - **Improved Nile tilapia species** that are tolerant to iron in the Liberian water bodies and with good growth performance;

- Climate smart technologies in rice field preparations and pond construction to safe guide the ponds from erosion or collapsing.

• The project introduced, tested (on-station) and out-scaled **mechanical equipment** for rice production (e.g. power tiller used to build fish habitats and prepare land for rice production,); rice post-harvest processing (e.g. rice thresher, rice mill); fish feed production (e.g. feed mill, pelletizer machine); fish processing (multipurpose smoking kilns). Mechanical equipment was fabricated and distributed to farmers' groups.

• In addition, as part of efforts to unlock the potential of aquaculture in Liberia, the project tested several local inputs, including Moringa (a local plant) to produce **floating fish feed** (feed floatability is a desirable characteristic in aquaculture). It tested and compared different **fish diets**, based on several combinations of local inputs.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• WorldFish introduced an innovative approach: the **on-farm fingerlings and broodstock production**, in which farmers get initial broodstock from specialized centres. The approach reduces mortality due to transportation. The technology is in use with at least one example of a farmer who became a fish seed producer and supplier. This service supports the development of the IRFFS.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project developed **a pond-based (outdoor) hatchery** to produce Nile tilapia (*Oreochromis niloticus*) fries and fingerlings in the Central Agriculture Research Institute (CARI). This is the first time a functional hatchery has been built in CARI. In Liberia, the two known hatcheries built earlier by the National Fisheries and Aquaculture Authorities were no longer functional due to poor maintenance.

• The project fabricated a series of prototypes of small mechanization and processing equipment that was distributed to farmers' groups (see above). It also introduced **innovative equipment processes** to agro-equipment fabricators (artisans), who were trained to make rice grader, rice parboiler and pellet machines.

LIDISKI (410957)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Livestock Disease Surveillance Knowledge Integration

Start date: December 2019

End date (official): December 2024 (including a 12-month no cost extension already granted)

Nigeria

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The main specific objective is to improve surveillance and control of Peste des Petits Ruminants (PPR) and Newcastle Disease (NC) affecting the livestock of smallholder farmers in a context of climate change.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

The following two services constitute innovations for farmers, who use them. Activities related to these services are completed. The project is in the evaluation phase to formulate recommendations with a view to ensure their sustainability and propose improvements.

• **Epidemic Surveillance** - If an animal is sick, the farmer can contact the Community Animal Health Worker (CAHW) to report the symptoms. Through the CAHW report, the information goes up to the veterinary services and triggers an action (or not). The epidemic surveillance and control system developed by the project (see below) works, even though there is still room for improvement.

• Access to Vaccines - In the 3 targeted States, there are areas where veterinary services do not go or are rarely present. Owing to the strengthening of the network of CAHWs (more CAHWs trained) and capacity development (new skills), new farmers have been reached and the needs of those who already had access to vaccines are better met. Besides, access to vaccines has been quantitatively and qualitatively reinforced, owing to the strengthening of production, storage and distribution capacities of the National Veterinary Research Institute (systemic/institutional strengthening).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

Several decision-making tools are under development and include innovations in the following areas: risk mapping (a tool to produce risk maps); participatory epidemiology (a methodology based on communities' knowledge and expertise, aimed at characterizing a disease without collecting samples); socio-economics of animal health (an innovative methodology supported by a model for farm-level economic impact analysis for PPR); conventional epidemiology (new statistical tools to support animal health epidemiological sampling campaigns); Information Technology (tools to support the collection and reporting of data); Genetic data for disease surveillance and control (the use of genetic data on pathogens is not new; the innovation is the use of these data to enhance surveillance and control strategies); Community-based surveillance (community-based surveillance tools did not exist: e.g. an electronic form allowing CAHWs to report on suspicious cases). Webbased surveillance system: a web-based surveillance system is under development and was almost ready for testing as of December 2023. The objective is to present the beta version to stakeholders by the end of the project (December 2024). Co-developed with stakeholders, this system is to be used as a centralized tool, integrating many of the above innovations. It will provide four types of information services with specific access rules, collectively defined: (1) a map-based rapid alert system, (2) investigation/intervention capacity, (3) tools dedicated to risk assessment for policy making, (4) a platform for Science-Society dialogue. The purpose is to facilitate the flow of information between stakeholders (including private veterinarians) and the return of information to communities and CAHWs, to sustain their interest in participating in surveillance by reporting on suspicious cases.

• In addition to the above tools and methods, the National Veterinary Research Institute (NVRI) introduced vaccine production technologies and methods based on the project's recommendations to strengthen vaccine production capacity. For instance, to enhance the efficiency of cell culture, the project recommended a bioreactor culture system (i.e. a system that provides a controlled environment for large-scale cell growth and vaccine production, making the process more efficient and scalable). Solar panels in NVRI production sites and state-level outposts are another key technical innovation, allowing for proper storage of vaccines and samples. Nigeria has 36 states, and NVRI has one outpost in each State. In total, 16 NVRI outposts have been equipped with solar panels, including 5 outposts with DeSIRA funds.

Pillar I – Group 1

LIPS-ZIM (413069)

ILRI (International Livestock Research Institute)

Adoption and scaling up of improved livestock production systems

Start date: January 2020

End date (official): December 2024 (including a 12-month no cost extension already granted)

Zimbabwe

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project aims to promote and scale up climate-adapted, cost-efficient, and science-based livestock production systems, and to reduce climate change-related diseases causing lower productivity and higher livestock mortality.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• **Fifteen climate change compliant forage varieties** have been introduced by the project and piloted by farmers, who are using them for the first time to feed livestock. This includes legume species and grasses. It also includes dual purpose crops, such as maize and sorghum, which can be used for both human and animal consumption. In this case, it is the use as feedstuffs that constitutes the innovation. It is estimated that 5000 farmers have used these varieties (except for 2 legume species).

• Five livestock feed formulas have been developed (and taken up) and **3 more were being developed**, as of December 2023. A feed formula is typically a mix of legumes, grasses, salt and minerals. Farmers' groups have formed and set up small business to produce and commercialize feed formulas.

• **Four animal husbandry practices** have also been introduced and taken up by livestock farmers. This includes artificial insemination (an innovation for goats), the use of plastic for mulching, acaricide foot baths for goats and cattle to control ticks (also called "dipping"), and improved goat housing. A survey of 1252 households revealed that 76% of them have piloted techniques for herd management.

• The above products, techniques and practices, complemented by community management of natural resources and new marketing practices (see below), together form **an innovative goat production system**, which aims at increasing the productivity of the small farmers and strengthening the goat value chain.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **The practice of weighing goats and sheep** has been introduced in the marketing centres (before, only cattle were weighed). It contributes to setting a fair price for the farmer.

• **The concept of "community pasture management scheme"** has been developed and replicated across 4 communities. Communities assess the condition and size of their rangeland. With support from extension staff and researchers, they develop a rangeland improvement strategy. They establish a committee, typically comprised of 7 to 10 people, while the community encompasses about 60 to 70 households.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The Gendered Feed Assessment Tool (G-FEAST) is an institutional innovation developed by ILRI, but not under this project. Introduced by the project in the targeted districts, the tool is used to provide a description of an existing forage situation (supply versus demand) and to suggest options for improved feeding. The tool is mostly used by trained technical staff, as well as lead farmers who participate in the data collection. Evaluations are conducted at community/landscape level and can also be used by grazing committees. "G" means that women can collect the data.

• The project has developed a matrix to facilitate inter-cooperation across four laboratories of the **Department of Veterinary Services** (2 at provincial level, 2 at national level). The matrix allows to identify and standardize operations procedures. It improves the flow of resources between the laboratories, by comparing the needs and resources. It provides results-based statistics, which are used for decision making.

• **Six innovative business models** have been developed as collective actions by groups of farmers, who - together- have created small private enterprises around the following business concepts: feed manufacturing; seed production; hay making equipment; goat multiplication; tillage equipment; cattle fattening.

MALMON (412700)

Instituto Agronomia Lisboa

Mangrove, mangrove rice and mangrove people - sustainably improving rice production, ecosystems and livelihoods

Start date: January 2020

End date (official): December 2024

End date (likely): June 2025 (6-month no cost extension requested)

Guinea Bissau

LIST OF PROJECTS

Data on likely end date updated on: 11/06/2024

Data on Innovations updated as of: December 2023

The project introduced innovations in Mangrove Swamp Rice farming systems. Under the project leadership, innovations by farmers were also tested and validated. These are listed below. All practices are taken up by some of the targeted farmers.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• **Pest control practices :** Application of neem leaves and seeds in compost and in watering; Identification and elimination of the hosting plants of nursery pests; Post-harvest treatment package for seed storage (e.g. better post-harvest drying conditions for rice bundles; best granary for disease and pest control).

• **Soils and fertility management practices:** A practice by default that consists in skipping ploughing (innovation proposed by farmers, co-validated with researchers); Rice straw to cover the nursery to prevent the seeds from dying when the rainy season is delayed or when a dry spell starts after sowing (innovation proposed by farmers, co-validated with researchers); Compost making.

• Adaptation of agricultural calendar: Strategic ploughing organisation in function of different factors including the plasticity of the soil, the moisture; it is a climate smart practice that helps farmers to adjust to climate variability and saves time.

• **Reduction of plant density:** At nursery level, reduction of the density in sowing (light sowing); At plot level, reduction in the planting density.

• **Water management practices :** Adjustment in the size and shape of the dykes (innovation proposed by farmers, validated with researchers); Use of neem leaves in the dykes neem to fill holes created by aquatic fauna ; Addition of a structure aimed at stabilising the dykes (innovation proposed by farmers).

• **Rice varieties :** Thirty-eight rice varieties tested in farmers' field; 11 adapted varieties have been adopted by the targeted farmers.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

The following innovations are decision-making tools, for use at farm level, and already taken up by farmers:

• **Research methodology to test innovations at farm level**: farmers have been trained on how to conduct trials, so they can select suitable varieties in the future;

• **The concept and practice of budgeting** has been introduced and farmers were trained to assess production costs, including labour costs, the economic value of an innovation, etc;

• **Register of the rains**: calendar of daily distribution of rainfall, in relation to climate change, but also to compare the register of agricultural calendar (another innovation) with the one of rains distribution to better assess decisions made and improve future decision-making process

• Calendar of farming operations (see above)

• WhatsApp group, as a peer-to-peer knowledge sharing network (involves targeted farmers and researchers).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• To predict tides and rainfalls, **two Early-Warning meteorological and hydrological Systems** (EWS) are under development, using meteorological and hydrological stations. The tide model and real-time EWS utilizes tide data, global ocean and atmosphere hindcast/forecast. The rainfall model cum EWS aims at monitoring the behaviour of the rainy season.

SUPPORT TO TAP (406734)

FAO (Food and Agriculture Organisation)

Developing capacities in agricultural innovation systems: scaling up the Tropical Agriculture Platform Framework

Burkina Faso, Eritrea, Malawi, Rwanda, Senegal, Cambodia, Laos, Pakistan, Colombia

Start date: August 2019

End date (official): July 2024

End date (likely): December 2025 (5-month no cost extension requested)

Burkina Faso, Eritrea, Malawi, Rwanda, Senegal, Cambodia, Laos, Pakistan, Colombia

LIST OF PROJECTS

Data on likely end date updated on: 25/06/2024

Data on Innovations updated as of: October 2023

The project aims at strengthening the capacity to innovate in national Agricultural Innovation Systems (AIS).

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

With EU support, the Tropical Agricultural Platform has strengthened the capacity of many organisations to provide AIS services in 9 countries. In Colombia, two farmers' organisations have been supported to develop innovations for their members: Asociación Campesina Ambiental y Cultural de Boyacá (ASCACB, dairy farmers), Campo Dulce SAS (beekeepers).

• Development of a **digital literacy program** (a service to farmers) to reduce the gaps in access to and facilitate the use and adoption of (existing) digital technologies (e.g. different functions of a smartphone, use of applications such as WhatsApp, Facebook, Play Store).

• Establishment of **Sustainable Production Nodes** for dairy farmers, members in targeted municipalities. A production node is conceived as a space for continuous learning and interaction among the different producers, in addition to generating knowledge aimed at the development of missing skills and abilities, with a view to improve livestock production systems, particularly dairy quality. Each node is formally established and has a focal point.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The Tropical Agriculture Platform Common Framework (TAP CF) "proposes a practical approach to Capacity Development (CD) for Agricultural Innovation that aims at harmonizing, through an Agricultural Innovation Systems (AIS) perspective, the diversity of existing strategies. The Framework provides concepts, principles, methodologies and tools to better understand the architecture of AIS, to assess CD needs and to plan, implement, monitor and evaluate CD interventions ». (source: https://tapipedia.org/framework). Under the DeSIRA project, existing tools have been reviewed or updated, and tested in selected countries. Example : Documenting and scaling.puknowledge.and.innovations-Guidelines.and-templates. The TAP CF is an innovation for 6 of the 9 targeted countries: Pakistan, Colombia, Cambodia, Malawi, Eritrea , Senegal. For countries (Rwanda, Burkina Faso, Lao PDR) in which the TAP CF had been introduced under a previous project (the EU-funded Capacity Development for Agricultural Innovation Systems), the DeSIRA project targeted institutions not previously supported (extension, research). As of October 2023, the project has supported 29 national-level organisations (research, extension, farmers' organisations, etc.).

• In Colombia, Campo Dulce SAS developed a **natural honey sweetening spoon**, which has natural solid bee honey as its main ingredient, including the development of production processes and of technical data sheets for different flavours, for use by processing plant operators.

TAERA (412605)

ENABEL (Belgian Development Agency)

Accompagnement de la Transition Agro-Ecologique par la Recherche Agricole, Benin

Start date: December 2019

End date (official): December 2024 (including a 6-month no cost extension already granted)

Benin

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The objective is to identify and test the conditions for an agroecological transition for rice and vegetable producers.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

Focusing on water management and agroecological practices, TAERA has developed several innovations for rice and and vegetable producers. As of December 2023, over 340 rice producers were implementing at least one innovation (practice or rice variety).

• Four sustainable water management practices are tested, 2 for rice and 2 for vegetable production. For rice, the project is testing different types of irrigation in lowland cultivation combined with different types of fertilizers. Intermittent irrigation combined to organic fertilization yields the best results, but it is too early to claim adoption. An innovative practice involves the creation of small dikes to facilitate water circulation within the rice production perimeter. Target farmers have started applying the technique. For horticulture, some producers have started combining tomato production with onions and applying different types of fertilization, along with a water management system.

• Seven tomato lineages resistant to bacterial wilt are tested in a farming environment. This includes two pure lineages developed at the World Vegetable Center: some farmers have already preserved the seeds (early adoption) and the registration process in the national catalogue is underway.

• **Five aromatic rice lineages** from INRAB (Institut National des Recherches Agricoles du Bénin) are tested in combination with the mineral contribution of a legume-based rotation system. The objective is to identify short-cycle varieties better adjusted to climate change-related issues (e.g. flooding), while maintaining the aromatic characteristic preferred by consumers.

• In addition, **agroecological practices** are tested, for instance nitrogen use efficiency and photosynthetic response in rice plants using neem oil-coated urea. By reducing evaporation and helping plants to fix the urea, the neem oil mixture reduces the usage of urea. This innovation, based on farmers' know-how, is already widely used.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project introduced vegetable producers and rice growers to **the concept of WhatsApp group**. The concept spread in the context of Farmer Field Schools and Innovation Platforms. Initially used to exchange information about project activities, Whatsapp groups are now used to share production-related issues, functioning as a decision-making tool.

• The project has introduced **the Participatory Guarantee System (PGS)** for vegetable growers and rice farmers interested in organic production. The PGS is not new in Benin, but it is an innovation for the targeted farmers. It is a quality assurance system used to certify producers, based on active participation of stakeholders (peer verification to control adherence to the organic production specifications).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has re-introduced the traditional, but abandoned, **concept of "school garden**" to raise awareness of agroecological practices among schoolchildren and their parents, while diversifying extracurricular activities. Five public primary schools have set a school garden and the concept is gaining momentum.

Artemia4Bangladesh (414811)

WORLDFISH

Introducing Circularity Through Climate-Smart Aquaculture in Bangladesh

Start date: March 2020

End date (official): July 2024 (including a 5-month no cost extension already granted)

Bangladesh

LIST OF PROJECTS

Data on Innovations updated as of: February 2024

The specific objective is to increase the productivity of salt producers and aquaculture farmers linked to Artemia-related innovative initiatives in the Cox's Bazar area.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project has introduced **an Integrated Artemia-aquaculture model** for the first time in Bangladesh targeting clusters of salt farmers. Artemia is also known as brine shrimp and is used as feed for aquaculture. As of December 2023, 2805 farmers have been trained, including a core group of 375 individuals who act as demonstration farmers.

• Several technologies have been introduced for Artemia pond culture:

- the project has developed a standard operating procedure for Artemia pond culture, as well as a protocol for processing and packaging of brine stored Artemia cyst;

- Aquaculture in Artemia ponds (i.e. techniques for fish raising, once Artemia has been harvested);

- Improved traditional marine aquaculture (e.g. Tilapia nursing in an enclosure, improved feeding techniques); - Homestead aquaculture (e.g. Carp-Mola-Tilapia polyculture, stocking density);

- Shrimp nursery and shrimp grow-out (these are innovative for the salt farmers);

- Inclusion of Artemia biomass in crab nursing diets;

- Vegetable production in homestead ponds and areas, and in Artemia pond dikes (this is an innovation for the salt farmer families/women)

- Recirculatory Aquaculture System (a new technique targeting shrimp hatcheries);

• In addition, the project has developed a set of Artemia biomass recipes for human consumption.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **One mobile app (OneFish app)** was developed in collaboration with other local projects/funding agencies. The application aims to benefit fish farmers by offering a range of services and features (advisory services, good aquaculture practices, weather updates, emergency fish culture tips, and a feed calculator, etc.) Besides access to information and inputs, it can be used to strengthen linkages among market actors. It includes information on Artemia pond culture.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **A laboratory has been set up to support the artemia value chain**: its purpose is to control the quality of Artemia cyst and biomass, and to detect pathogens. The laboratory is hosted by a private hatchery during project implementation. It is expected to be transferred to the Department of Fisheries before the end of the project.

Pillar I – Group 2

ASSET (415683)

Managed by AFD, implemented by GRET (Agence Française de Développement, Groupe de Recherche et d'Echange Technologique)

Agroecology and Safe Food System Transitions in Southeast Asia

Start date: July 2020

End date (official): September 2025

End date (likely): February 2026 (5-month no cost extension under discussion)

Cambodia, Lao PDR, Vietnam

LIST OF PROJECTS

Data on likely end date updated on: 17/10/2024

Data on Innovations updated as of: December 2023

The project focuses on strengthening the Agroecology Learning Alliance in South East Asia (ALISEA) and on promoting agroecology by developing capacities and co-designing territorial innovations with stakeholders.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

At flagship site level, one in each country, the project supports innovation processes to generate evidence aimed at strengthening strategy and political processes on AgroEcology (AE) at national and regional scales.

• In Cambodia, the research activities focused on **AE-based innovative systems for paddy rice, cassava, cashew nut, and forage production for cattle raising.** This includes tests on, for instance, improved pasture and rotational grazing, the use of red ants for insect-pests control on cashew plantation, etc.

• In Lao PDR, the research activities focused on testing **diversified and innovative agroforestry systems** such as intercropping coffee with banana or fast-growing cover crops to improve soil fertility and provide shade for coffee plants, especially to restore fields exhausted by maize monocropping. In addition, the project supports research on rice-duck integrated system to control pests and provide natural fertilizers.

• In Vietnam, the research activities focused on forage, silage and compost models, coffee-based agroforestry model, coffee hybrid varieties.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The MetKasekor extension model is an officially established initiative designed to promote Conservation Agriculture and Sustainable Intensification (CASI) in Cambodia. While the model was already operational, the project has supported the **development of a digital service.** This enhancement encourages the use of social media and of a mobile application to share knowledge at the farm level, making information more accessible to farmers. The project plans to extend this experience to Lao PDR.

• Supported by the project , **Dei Meas ("Golden Soil") is an innovative initiative aimed at providing financial support to farmers transitioning to AE practices.** Led by the General Directorate of Agriculture and the Department of Agricultural Land Resources Management in Cambodia, co-financed by several organisations, including the NGO Swisscontact (an ASSET partner), the initiative explores various local financing mechanisms to encourage farm-level agroecological transitions.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project is consolidating and integrating existing online resources of ALiSEA into a **Knowledge Hub**, an interactive, collaborative information-sharing platform on AE issues in the Mekong Region. Under development, this digital service will support the production, valorisation and dissemination of knowledge for a wide range of stakeholders in various languages (Khmer, Vietnamese, Lao, English and French).

• Also in support of ALiSEA, the project introduced a **Small Grant Facility**. This institutional tool strengthens partnerships between ALiSEA's members and encourages joint actions. As of December 2023, 16 projects have benefited from this facility: Cambodia (5), Lao PDR (5), Vietnam (5), and Thailand (1). The sustainability of this tool depends on ALiSEA's ability to raise funds beyond the ASSET project.

• The project has supported the development of **ASEAN** (Association of Southeast Asian Nations) **Guidelines on Policies for AE Transition** through a multi-stakeholder consultative process. This tool supports the AE transition in ASEAN countries. Key objectives include developing policies for AE innovation, fostering knowledge-sharing, and strengthening institutional frameworks to support farmers in transitioning to AE.

Pillar I – Group 2

CDI-Rwanda (422165)

FAO (Food and Agriculture Organisation)

Capacity development for innovation in Rwanda: strengthening value chains in six districts

Start date: February 2021

End date (official): January 2025

Rwanda

LIST OF PROJECTS

Data on Innovations updated as of: September 2023

The main objective is to strengthen agricultural innovation partnerships and disseminate best practices and processes that support climate-relevant and sustainable transformation of agriculture systems in Rwanda.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project tests **18 crop varieties** (potato, rice, maize, cassava) , **12 vegetable varieties** (eggplant, onion, cabbage) and **21 fodder species**. The purpose is to enhance the productivity in the face of climate constraints. Factors considered include: resistance to drought, early maturity in country landscapes at the risk of dry spell, disease and pest resistance. For fodder species, additional criteria include the nutrient content and the palatability. The use of these varieties/species by target farmers was yet to be tracked as of September 2023.

• **Five practices for crop production** were still under development (testing stage): cassava planting pit (planting cassava in big holes and in intercropping system, combined with manure application); soil fertility management for 4 crops, including potato, maize, rice and vegetables. Soil fertility management practices consist in testing different regimes and quantity of fertilizers (organic, such as decomposed plant remains and animal manure, or inorganic, in combination or not), at different stages of the growth of the plant.

• **Five practices for animal production** had been tested and all but one were already in use at farm level: 1/ the rearing of Black Soldier Fly larvae (rich in proteins, to create affordable and nutritious pig feeds); 2/ artificial insemination for pigs (with a marked interest for scale up by the district authorities); 3/ fodder production from hydroponic systems, enabling farmers to grow nutrient-rich fodder with minimal water and soil; 4/ hay production from maize stover (the residues of maize grown for grain are dried, for use during the dry season); this is a new technique for the targeted farmers, who used to burn the maize residues. Artificial insemination on cattle was also being tested, but not used at farm level yet (as of September 2023).

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• To facilitate the uptake of innovations, **two complementary innovation support systems/services**, targeted at farmers, are under development:

- Under the Societal University Village Initiative (SUVI) model, twelve young **Innovation Facilitators** have been recruited by the project. SUVI is a rural transformation approach led by the University of Rwanda, a project partner. It consists in encouraging and supporting fresh graduates to return to their communities to transfer their knowledge. Innovation facilitators were trained to support innovation mechanisms (from design to scaling).

- In addition, with project support, the Rwanda Agriculture and Animal Resources Development Board is testing a new approach based on the involvement of farmers in experimentation processes. By increasing the interaction between farmers and researchers, the objective is to enable farmers to make an informed decision when they adopt an innovation, thus to facilitate the adoption of practices and products. This is also an innovation for researchers, who are not used to tracking the performance of products beyond its research stations. There is an intention to continue this service when the project is over, though perhaps not at the current scale.

DARE (415029)

UNICEF (United Nations International Children's Emergency Fund)

Developing innovative food solutions to increase quality of nutritious foods for young children, adolescent girls, pregnant and lactating women, Ethiopia

Start date: July 2020

End date (official): June 2025 (including a 12-month no-cost extension already granted)

Ethiopia

LIST OF PROJECTS

Data on Innovations updated as of: June 2024

The project aims at developing innovative, safe, nutritious and locally accepted animal-sourced and fruit products, targeting children aged 6-23 months and pregnant women. It focuses on introducing new products, new processes and equipment, and new strategies for the commercialization of these products.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Innovative products - The project has developed 3 prototypes:

-**Egg powder**; made from fresh eggs, it combines the benefits of high animal-source nutrient density, stability (shelf life), addressing both protein malnutrition and micronutrient deficiencies associated with stunting;

-**Dry papaya powder**; the papaya fruit has a high carotenoid content and is rich in vitamin A, but it is highly perishable; the powder can be incorporated into diets to combat vitamin A deficiency.

For both products, the prototypes are ready and the project is working on scaling up the production. These innovations also involve the development of affordable packaging to increase the shelf life of powdered food products and the creation of context-specific recipes (and testing of their acceptability). As of June 2024, a booklet of recipes based on egg powder was under completion. The project was developing papaya powderenriched complementary porridge recipes.

- Yeast-enhanced injera; injera is a traditional Ethiopian flatbread involving a fermentation process; the new yeast is a special strain that can produce more folate (vitamin B9), and thus increase bioavailability of folate within cereals-based products. The prototype was developed at laboratory level by the Addis Ababa University. The transfer of technology to local level injera producers for commercial and household consumption was under discussion as of June 2024.

• **Innovative production processes and equipment** - The production processes for egg powder and for dry papaya powder are new in Ethiopia. The project is supporting 3 private companies (2 for egg powder, 1 for dry papaya powder). The transfer of technology is completed. The project is currently addressing production issues (equipment-related) with a view to improve the pasteurisation process for egg powder and to start the production at scale, which requires a capacity to handle to 170,000 eggs per day (against 15,000, currently). Similarly, the project is improving the papaya drying process to allow for production at scale. To this end, it has introduced the refractive window dryer (a drying technology that uses infrared radiation to the papaya pulp), a new equipment adapted to Ethiopia and taken up by a company developing a manufacturing pipeline for a local papaya powder dryer.

• **Innovative strategies for commercialization of animal-sourced foods and fruits** - The market approaches are developed and will be implemented once production at scale can start.

- Strategy to distribute egg powder through the Productive Safety Net Programme, a government facility targeting vulnerable consumers in selected districts (woredas) and using food vouchers. The programme will start in 2025 and egg powder will be eligible.

Commercialization through a branded market (an innovative approach for Ethiopia); the project has hired a private sector company, which has developed mock up branding for both egg powder and papaya powder.
Institutionalization of the egg powder through standard delivery platforms (e.g. as part of a product portfolio for conflict areas or school feeding programme). This is also scheduled for 2025.

ESSA (418132)

University of Helsinki

Earth observation and environmental sensing for climate-smart sustainable agro-pastoral ecosystem transformation in East Africa

Start date: December 2020

End date (official): December 2024

End date (likely): August 2025 (8-month no cost extension requested)

Kenya, Ethiopia

LIST OF PROJECTS

Data on likely end date updated on: 17/05/2024

Data on Innovations updated as of: December 2023

The project aims to advance climate-smart agro-pastoral systems through increased scientific knowledge, strengthened national agricultural innovation systems, and frameworks for sustainable livelihood transitions.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project has introduced **modern beekeeping** in both countries as a new business model and a way to diversify the livelihoods of 137 pastoralists. Techniques and practices introduced are linked to apiculture (honeybee) and to meliponiculture (stingless bee).

• It has developed **a livestock feed supplement**, based on fodder and Prosopis pods meal, for male weaner goats. This is aimed to address the issue of the cost of feed for livestock in the target communities and to better manage Prosopis, an invasive species.

• It has also developed two products aimed at fetching high income to address food security and nutrition challenges facing communities living in the rangelands: a **functional nutritious food** by supplementation with Baobab fruit pulp and an **aloe vera-based functional beverage** supplemented with Moringa and baobab powder.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The Kenya Agricultural and Livestock Research Organisation (KALRO), a key project partner, has developed a **farmer-friendly mobile App**, which provides services for farmers. Considered a "one-stop shop" for farmers, the App includes information on a variety of agricultural topics, good agricultural practices, natural resource management, market information and factsheets/manuals. It also includes interactive features and a section on weather updates. It can also be used by scientists.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Project partners have developed **four Earth observation methods,** including new methods and improved existing ones. These are Remote Sensing methods for assessing points of change in semi-arid and arid lands. The first method is for detecting woody cover changes in pastoral and agro-pastoral environment. The second method is for mapping land cover types. The third method is for measuring the climatic impacts of land cover and management change. The fourth method is for monitoring Tree-Based Systems Disturbance (TBSD) in a mosaic landscape (i.e. forest, thicket, bushland, woodland). As of December 2023, the 4 methods were described in manuscripts and published.

ICSIAPL (421388)

The Netherlands Ministry of Foreign Affairs and SNV (Netherlands Development Organisation)

Integrated & Climate Smart Innovations for Agro-Pastoralist Economies and Landscapes in Kenya's ASAL Start date: January 2021

End date (official): June 2024 (6-month no-cost extension already granted)

End date (likely): June 2025 (12-month no cost extension requested)

Kenya

LIST OF PROJECTS

Data on likely end date updated on: 15/07/2024

Data on Innovations updated as of: December 2023

The project aims to enhance livelihoods of agro-pastoralists communities through improved forage production and livestock husbandry, building on commercialization of climate smart innovations and sustainable landscape management in selected counties.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The project targets: 1/ Smallholder farmers, including dairy farmers (2/3 cows) and pastoralists (20 to 100 ruminants); 2/ Ranches: the smallest ranch in the target counties has 50,000 acres and at least 200 heads; it has improved breeds, watering points; some ranches have a feedlot infrastructure or a wildlife component in addition to cattle ranching (« conservancies »). The project considers ranches as SMEs (private sector actors).

• The project has tested **21 improved (high performing and drought tolerant) forage varieties**. Ten varieties have been taken up by both small farmers and ranches, and are produced at scale (e.g. legumes such as cowpea, desmodium; grass varieties such as Boma Rhodes (Chloris gayana), Sugargraze (Sorghum bicolor)).

• Innovative Climate Smart Agriculture (CSA) practices introduced at farm level include (for instance): water harvesting practices (e.g. cut-off drains, ponds) taken up by all categories of farmers; rotational cropping with legumes as a soil management practice, taken up by small farmers, especially dairy farmers, as well as feedlots (conservancies) which need a mixed ration of legumes/grasses.

• **Innovative CSA practices at landscape level** include reseeding, i.e. introducing new seeds in the rangelands, a practice taken up by medium to large ranchers to improve large, open and degraded areas.

• Also at landscape level, **holistic rangeland management** (or controlled grazing) is an innovative concept for the targeted counties, taken up by all categories of farmers; this is a production system that encompasses a governance mechanism (a landscape management plan, see below), CSA practices (including reseeding) and participatory rangeland monitoring done by stakeholders (e.g. community forest associations, cooperatives, community-based organisations, NGOs, county departments, water user associations etc.).

• Other innovations include **minimum tillage equipment**, **silage making for forage conservation**, **as well as mixed sward**, a feeding technology that involves planting and maintaining a diverse mixture of plants.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• Stakeholders have developed 33 **community level grazing plans.** This innovative concept includes a governance mechanism. Each plan is community specific. At community level, the grazing plan focuses on community needs, localized herd mobility, and sustainable use of nearby fodder resources.

• Ration balancing, targeted at feedlots and zero grazing units (dairy farmers), is not a new concept but the use of **an open-source application (Rumen8)** is innovative for extension specialists and large-scale producers. It is a decision-making tool to help farmers to create optimal rations based on available feedstuffs.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Stakeholders have co-developed **landscape management plans**, an innovation for the targeted communities. Each plan is landscape specific and involves a governance mechanism. It integrates multiple communities, facilitating long-distance herd mobility, and coordinating the use and conservation of widespread fodder resources across the landscape. It covers entire rangelands that support both wildlife and livestock. A model landscape management plan is under co-development to serve as a blueprint for ranches and conservancies, facilitating streamlined and sustainable management practices across the region. It incorporates grazing plans, invasive species management, and water catchment restoration.

IDEAS (418193)

ONFA (Office National des Forêts Andina)

Strengthening governance towards Stabilization of the Agricultural Frontier and Sustainability in post-conflict territories of Colombia

Start date: December 2020

End date (official): May 2025

Colombia

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project aims to strengthen participatory local governance and sustainable production with innovative data management systems and scientific knowledge in two municipalities.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project has installed **biodigesters** in 25 farms. This is an innovative technical solution allowing the recovery of pig and cow manure to produce (through anaerobic fermentation): 1/ combustible gas (biogas and biol) with a view to replace the use of wood, whose exploitation can lead to forest degradation, and whose smoke in kitchens leads to respiratory issues; and 2/ organic fertiliser.

• The Amazon Research Institute (Instituto Amazónico de Investigaciones or SINCHI, Guaviare department) has developed **community-based agroforestry systems**. These production systems are proposed to farmers (e.g. livestock farmers, coca farmers) established illegally in reserve forests, with a view to sustain livelihoods while preventing further deforestation. The implementation of the innovation is underpinned by access to plants in local or community nurseries, technical support and community-based monitoring.

• In the area of Non-Timber Forest Products (NTFP), the project introduced and distributed **harvest kits** for palm trees and trained beneficiaries to use this innovation, adapted to the local rural context.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has introduced **Forland, a territorial management and decision-making tool.** This is an open-source (online) platform based on the digitisation of data, collected for any relevant indicator. It allows the assessment of present resources and their use (e.g. land use planning figures, collective territories, forest management plans etc.), as well as the test of scenarios. This contributes to the understanding and anticipation of territorial dynamics. In the context of the project, the platform has been tailored to two administrative entities: the department of Guaviare and the municipality of Vigia del Fuerte. For instance, the mapping of 39 international cooperation projects in the department of Guaviare has been completed.

Pillar I – Group 2

IRRINN (421401)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Intensification of agricultural production through upscaling of innovative adapted irrigation practices and technologies

Start date: February 2021

End date (official): January 2025

Burkina Faso

LIST OF PROJECTS

Data on Innovations updated as of: January 2024

The project promotes two types of small irrigation systems: supplemental irrigation from Runoff Water Collection Basins (BCER) and Smallholder Private Irrigation (PIP). It aims to identify and promote effective solutions to overcome the main obstacles to the adoption of these irrigation techniques.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• These two types of irrigation already exist locally. The project improves existing systems by experimenting with the following technologies:

Improvement of the waterproofing of the BCER and installation of a wire fence to prevent drownings.
 Solar-powered irrigation kit (PIP): solar irrigation is not an innovation, but the design of a kit including all the necessary equipment is a novelty; thus, the farmer no longer has to buy the irrigation system piece by piece.

• Another innovation is at the production system level, with **trials of double cropping during the rainy season** (one crop following another). This practice is an innovation for the targeted area, made possible by supplemental irrigation (thanks to the BCER) that occurs during the dry periods within the rainy season.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **An innovation support service** is coupled to the provision of the solar irrigation kit (see above). Codesigned by the project and the stakeholders in the framework of innovation platforms, this service allows farmers to receive advice on choosing their equipment, along with installation and maintenance. It is linked to a financing mechanism that enables smallholder farmers to purchase an irrigation kit on credit, with the cost shared between the farmer and the project (50/50 in 2023, compared to 70/30 in 2022). Thanks to this service, the demand for irrigation kit is high.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

For use beyond the farm level, the project has developed **two decision making tools**:

• Fondation Practica, a project partner, has developed **a mobile application for irrigation systems**, to help to determine the size of the solar pumps and choosing irrigation equipment. The intended user is the technician (private sector or extension services). The application is already in use and available on Playstore (Android).

• The Leibniz Centre for Agricultural Landscape Research (ZALF), another project partner, has adapted its **Qualitative Assessment Tool** to the needs of the project. The tool was initially designed to assess the likelihood of adoption of conservation agriculture practices (QATOCA). Under IRRINN, it was adapted (QAT'IRRINN) and applied to the irrigation solutions promoted by the project. This tool uses a variety of theories on adoption and innovation to identify factors facilitating or hindering the implementation of an innovation. Multiple criteria are considered, such as simplicity, replicability, cost, etc.

LEG4DEV (418901)

Galway University

Legume-based agroecological intensification of maize and cassava cropping systems in Sub-Saharan Africa for water-food-energy nexus sustainability, nutritional security & livelihood resilience

Start date: November 2020

End date (official): November 2025

Ethiopia, Malawi, Tanzania, Zambia

LIST OF PROJECTS

Data on Innovations updated as of: November 2023

The project develops innovations (technologies, methodologies, equipment, decision making tools etc.) to support the agroecological intensification of legume-based production systems in four targeted countries.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• Innovations focused on climate-resilient productivity -Trials are underway in Tanzania and Malawi to identify the combinations of legume/bio-inoculant that provide the best performance, in terms of productivity and in the context of climate change. A bioinoculant is a formulation containing one or more beneficial micro-organisms (e.g. bacteria, fungi) that are applied to seeds, plant surfaces, or soil to promote plant health and growth. The users will be the farmers, supported by extension specialists.

• **Innovations focused on rural energy and labour efficiency** - In Malawi, participatory research focuses on labour saving technologies and equipment for legumes production and post-harvest processing. The objective is to identify, test and deploy affordable and scalable mechanisation options for cultivation and processing by women smallholder farmers (i.e. small-scale planters, weeders, harvesters and threshers to reduce drudgery and improve precision). Ongoing research aims at reducing the burden of shelling groundnuts and maize and/or threshing of soybeans. Based on existing technologies, designed and used by local farmers, these innovations are improved and introduced to farmers who grow legumes, more specifically.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Innovations focused on climate-resilient productivity – For instance, the project builds on current bio-economic models to develop four improved climate models (one for each target country). They will be used to conduct modelling of climate change impacts on maize and cassava systems and to develop modelling-based prioritised legume-maize/cassava scaling options for climate resilience. The users will be the National Agricultural Research System (NARS) in each country. Also, a **site-specific nutrient application** has been developed and deployed in Tanzania, for use by extension agencies. This is a rapid and cost-effective nutrient management tool (accessible via a mobile phone) that can be used for precision legume-based agroecological intensification at different geospatial scales (landscape, farm). The project is also developing a new methodology to measure the footprint of cropping systems (with and without legumes), based on consequential Life Cycle Assessment (LCA) approach. This approach focuses on the broader environmental consequences of decisions or changes within a system and looks at the indirect effects of changes in production and consumption patterns. It is applicable across all target countries and is adaptable to various legume species. The purpose is to identify legume integration options that have a low footprint and are associated with the highest nutritional and income benefits, as well as land-sparing benefits. The project is also developing a crop irrigation drought simulation platform in Zambia.

• Innovations focused on water use efficiency - The project applies an existing methodology to measure of the water footprint of different legume species in mixed cropping systems, under current and future climate change and water stress scenarios. The methodology has never been used in the 4 countries.

• **Innovations focused on rural energy and labour efficiency** - For instance, a methodology has been (fully) developed and deployed in Malawi and Tanzania, to measure rural energy access, using household surveys combined with national-scale satellite remote sensing. The purpose is to inform priority locations to improve rural energy access. The intended users are the ministries of agriculture and the ministries of energy.

• **Innovations focused on enabling the institutional environment** - The project has developed a tool to map and analyse the legume stakeholder network and the relationships between the different actors in each country. This decision-making tool, useful for conducting workshop and planning, targets the NARS in each country and the ministries of agriculture.
LSC-IS (419433)

Managed by the Netherlands MoFA (Ministry of Foreign Affairs), implemented by WCDI/WUR (Wageningen Centre for Development Innovation of Wageningen University & Research)

Land Soil Crop Information Hubs to support rural transformation and Climate Smart Agriculture in Ethiopia, Kenya, and Rwanda

Start date: January 2021

End date (official): December 2024

End date (likely): December 2025

Kenya, Ethiopia, Rwanda

LIST OF PROJECTS

Data on likely end date updated on: 18/11/2024

Data on Innovations updated as of: December 2023

The project aims to develop sustainable land, soil, and crop information hubs in national agricultural research organizations to enhance the effectiveness of national Agricultural Knowledge and Innovation Systems in Ethiopia, Kenya and Rwanda and contribute to rural transformation and Climate Smart Agriculture in East Africa.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has introduced **the innovative concept of Land, Soil and Crop Hub** (LSC Hub). The LSC Hub is an easy-to-access online platform enabling stakeholders to access information on soil, crops, land and climate. Data from many sources are being consolidated into a hub where these data can be stored, processed and visualized. The LSC hub offers a diverse range of datasets, maps and documents, including observational data from field studies (e.g., soil and water samples, crop yields), aerial and space observations, administrative boundaries, economic data (price development), predictive model outputs (soil, weather, yields), and population statistics. The hub also supports diverse practices, which help the agricultural sector to adapt and to build resilience to climate change. The LSC Hub is designed based on stakeholder and user needs, which are gathered through local workshops and co-developed with stakeholders. It supports innovation and improved decision-making for climate-smart agriculture at national, regional and local levels. The focus of the hub is on soil fertility management and soil water conservation.

The LSC Hub may contain the following functionalities: LSC data catalogue (to find relevant open data); LSC predictive model description (overview of technical models for assessing soil fertility and soil water conservation); LSC information services (listing of existing projects, initiatives, apps, services and tools); LSC use cases (description of the use cases and how to use the available information for the two use cases, i.e. soil fertility management and soil water conservation); LSC hub community (to find other stakeholders).

The project aims at supporting the enabling environment, it does not work at farm level and it does not focus on the last mile communication (e.g. mobile application for the farmer). The model is to support the organisations which support the farmers (extension staff, technical staff from farmers' organisations, private sector companies, etc.), who can turn information available in the hub into practical advice and recommendations. The LSC Hub is thus an institutional innovation, given that the main user and host of the hub is a national agricultural research institute. The project is in the process of developing 3 hubs (prototype stage as of December 2023), one in each target country, embedded in and managed by the following national partners:

- the Ethiopia Institute of Agricultural Research (EIAR), <u>https://lsc-hubs.org/hubs/ethiopia/</u>
- the Kenya Agriculture and Livestock Research Organisation (KALRO) <u>https://lsc-hubs.org/hubs/kenya/;</u>
- the Rwanda Agriculture Board (RAB), <u>https://lsc-hubs.org/hubs/rwanda/</u>.

MARIGO (419988)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Maraichage Agroécologique périurbain

Start date: December 2020

End date (official): December 2024

End date (likely): June 2025 (6-month no cost extension requested)

Côte d'Ivoire

LIST OF PROJECTS

Data on likely end date updated on: 24/05/2024

Data on Innovations updated as of: November 2023

Targeting vegetable producers in peri-urban areas of 4 cities, the project develops and tests agroecological innovations. It mostly relies on existing techniques and products, which are new for the beneficiaries.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• **Two innovative technologies to improve sol quality** tested at farm level (not yet used by farmers):

poultry manure and biochar on aubergines (recycling and recovering organic waste products);
rotation of beans, aubergines and okra.

• Five innovative plant protection products and techniques:

- Association of so-called "service plants" (e.g. lemongrass against insects, tobacco leaves as biopesticide);

- Insect net, a technique applied to fruit vegetables (e.g. cucumber, tomato, beans, peppers, zucchini, etc.);

- Plant diversification (one of the fundamental practices in agroecology);

- Biofertilizer (such as Crotalaria, compost, Beneficial Indigenous Microorganisms); Crotalaria is a leguminous plant that acts as a nematicide and bactericide;

- Biopesticides (neem oil, carapa oil);

Except for the insect net (under test), all innovations were used by targeted farmers. Besides, a private company, Agrifer, which supplies vegetable growers, uses the insect net and the biopesticides.

• Two innovative post-harvest technologies were at testing stage:

- a UV box for vegetable storage;

- a bioresources-based treatment: a coating made of plant oils (neem and carapa) mixed with cocoa pod ash.

• **The association of beekeeping and horticulture** is under experimentation, with a view to determine how beekeeping can be a lever for the development of agroecology.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **An organic certification scheme/label by peers** is in place. 65 vegetable producers have defined a set of specifications for organic vegetable production. International certification being too expensive and in the absence of a national certification, the scheme is based on a Participatory Guarantee System, i.e. each farmer is monitored by his/her peers to ensure compliance with the Charter, which they have validated. The scheme is comprised of a control system (labelling procedure) and labelling tools adopted by producers (farm description form, farm diagnosis form, farm inspection form, operator's logbook, commitment letter).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **Researchers and technicians use "Biofunctool" to assess soil health analysis.** Developed before the project, the tool was mainly used for perennial crops on fairly homogeneous soils. The French-based Institut de Recherche pour le Développement and the University Nangui Abrogoua have adapted it to horticulture, which involves small areas and a diversity of soils, due to the contribution of organic matter. It is the first time the tool is used for tropical market gardening systems to characterise soils dynamically.

• **A seed bank of local vegetables and service plants** is under development, to reconstitute the seed bank (destroyed in 2002) of the National Centre for Agronomic Research. The project develops a catalogue of plants (inventory of 140 varieties for 10 crops, as of November 2023), but the bank itself will not be set up during the project's life.

Pillar I – Group 2

ReDIAL (416435)

FoN (Friends of the Nation)

Research for Development and Innovation Agriculture and Learning Project

Start date: July 2020

End date (official): October 2024 (including a 3-month no cost extension)

Implementation was over at the time of data collection (11/2024)

Ghana

LIST OF PROJECTS

Data on Innovations updated as of: October 2024

Targeting 5 districts and at least 10 communities in each district, the project aimed at reducing land degradation and biodiversity loss, while increasing resilience to climate change.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project has introduced known **Climate Smart Agricultural (CSA) practices**. However, each practice is an innovation for at least one of the targeted communities. As of October 2024, an estimated 4126 smallholder farmers (50% women) had taken up at least one of the following innovations: agroforestry and alley farming; nitrogen fixation; minimum tillage and direct planting; crop rotation and intercropping; climate smart seed varieties; water management in rice farming; pest and disease management.

• The project also conducted research to assess **alternatives for improved soil fertility** and has supported the introduction of two organic fertilizers. It trained 3242 farmers on the production of either liquid fertilizer or compost. To facilitate the demonstration, the project set up 25 pilot organic compost sites.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• Village Savings and Loans Association - To support income diversification and to facilitate access to low-interest loans for livelihood investment, the project introduced an innovative resource mobilisation mechanism: "Village Savings and Loans Association". It facilitated the formation of 19 groups, with a total membership of 581 (including 409 women) who were trained on financial literacy and livelihood diversification skills (e.g. bee keeping, bread making, piggery). A group averages 30 self-selected members, meets and saves weekly, gives low-interest loans to members and shares total contributions annually.

• **Multi-Crop Thresher service available to farmers** - To reduce post-harvest losses in grain threshing and to save time spent by farmers (mostly women) in threshing, the project introduced and piloted a service to farmers based on the Multi-Crop Thresher technology (also see below). The technology was handed over to « Post Redial Management Committees (PRMC)". One PRMC committee was established in each of the five targeted districts, and 2 threshers were provided to each committee, for them to provide a service to the farmer, on a fee-basis. The threshers were operationalised and made accessible to smallholder and marginalised farmers, who can thresh maize, rice, cowpea, sorghum, soya beans. During the project implementation, the service was provided for free and reached a total of 927 farmers (including 563 women).

• **Soil testing service available to farmers** - The project introduced an innovative soil testing service based on the FarmSense technology (see below). It procured 30 FarmSense devices, including 3 to each PRMC committee. Extension officers use the devices to conduct soil testing for farmers during their routine field visits to farmers. The service also contributes to strengthening data collection and knowledge on soil fertility.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• At private sector level, the multi-grain threshing technology is not innovative (though the threshing service is innovative for communities, see above). What is new is the source of energy for powering the thresher: two Ghanaian companies worked together to produce a **solar powered threshing machine**, the first of its kind locally. One of the threshers handed over to the PRMCs was retrofitted with solar-powered technology, which the project introduced as a pilot. It was operating when the project implementation ended.

• At institutional level, **FarmSense** is an innovative technology. Extension agents use it to provide farmers an innovative soil testing service (see above). Developed by a Ghanaian start-up company, this technology uses a sensor to detect and estimate the quantity of specific nutrients within a soil, particularly nitrogen, phosphorus, potassium, pH, salinity, and humidity. The data gathered is analysed by specialists and recommendations are made concerning crop cultivation and soil nutrient enrichment options.

ReSI-NoC (416105)

CIFOR-ICRAF (Centre for International Forestry Research - World Agroforestry)

Renforcer les systèmes d'innovation agricole en vue de promouvoir des systèmes de production agricole et d'élevage économiquement rentables, écologiquement durables et socialement équitables dans la région du Nord au Cameroun

Start date: October 2020

End date (official): September 2024

End date (likely): December 2024 (3-month no cost extension about to be requested)

Cameroon

LIST OF PROJECTS

Data on likely end date updated on: 28/05/2024

Data on Innovations updated as of: September 2023

The project aims to strengthen agricultural innovation systems to promote economically viable, environmentally sustainable, and socially equitable agricultural and livestock production systems. It targets rural communities living close to protected areas in the Northern Region of Cameroon.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project tests existing techniques, practices and products in a new agroecological context. For instance, **grafting**, a tree propagation technique, is new and is already in use in 3 Rural Resource Centres (RRC) developed by the project (see below). **Assisted Natural Regeneration**, a flexible and low-cost technique aimed at protecting young regrowths of local species in order to re-densify a field with trees (without planting new trees), was at the demonstration stage. **Four species of fodder crops** (available in Cameroon but not known by the target groups) were under demonstration to identify the most suitable species for the local context. **New varieties of annual crops** (e.g. maize, upland rice) have been tested. Among them, multipliers were producing seeds of a variety of maize and a variety of upland rice.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• At community level, the project has developed **an advisory support service for farmers** (Rural Resource Centre), to demonstrate and promote agroforestry practices (via tests, trainings), as well as to facilitate access to improved varieties. Four RRCs have been set up near protected areas, to support the conservation of national parks. The project supports the transformation of RRC into cooperatives, for them to have a legal base and an authority on the land where they have been set up. Another ICRAF project (Cameroun Septentrion Vert) will continue supporting them once the DeSIRA project ends.

• **The "CoProdScope" tool (CPS) is an advisory tool** (decision support tool) for improving the use of plant and animal co-products in the form of fodder, organic manure and mulch. The tool is under experimentation. It aims at providing agro-pastoralists with an inventory of all the by-products they can use to fertilize the fields and feed the animals. An application will be developed for the extension worker.

• **A co-management model** focused on land use near protected areas builds on existing governance mechanism between the farm/community level and the institutional level . The project contributes by setting up the RRCs, which are already accepted within the co-management system.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **The concept of "innovation niche"** and the approach that underpins the concept are new. This is a mechanism by which an innovation, typically promoted by a development partner such as an NGO, becomes the focus of a group of stakeholders who identify and research the constraints that prevent this innovation from being scaled up or disseminated more widely. For each niche, a diagnosis and an action plan are prepared. The process includes a capacity assessment and trainings (how to search for funds, for partners, conflict management, etc),) in order to strengthen the capacity of the niche players involved. This is an innovation support mechanism. Some of the innovations identified by the project are at a fairly advanced stage, while others are at a more embryonic stage, depending on the players involved. The concept of niches applies to 8 innovations. Examples of innovation niches include: Raising public awareness of the management of natural resources and biodiversity; Promotion of non-timber forest products.

SAFEVEG (417876)

Managed by the Netherlands' Ministry of Foreign Affairs, implemented by WorldVeg (the World Vegetable Center)

Safe locally-produced vegetables for West Africa's consumers

Start date: November 2020

End date (official): October 2025

Benin, Burkina Faso, Mali

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project tests agricultural and post-harvest practices and technologies, as well as new varieties, with a view to contribute to increased vegetable production in urban and peri-urban areas in the three countries.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• **25** practices and technologies are under development to address microbiological and pesticide residue contamination in vegetables. Tests focus on innovative approaches and alternative methods to the use of chemical products to improve soil fertility, manage pests, and postharvest issues. For instance, handmade and manufactured biopesticides (e.g. neem based), resistant varieties and biological control agents were tested to manage arthropod pests. Cover crops (e.g. such as crotalaria and mucuna species) and beneficial indigenous micro-organisms were tested to manage nematode infestations and reduce damages due to a bacterial wilt (a plant disease) in vegetable production. Besides, cover crops have the potential to improve soil fertility, which the project also investigates. To address post-harvest diseases of tomato fruits, the project has experimented innovative strategies based on the use of natural secondary metabolites: these are organic compounds with active properties (antimicrobial, antifungal, or insecticidal), making them eco-friendly solutions to maintain the quality and extend the shelf life of tomatoes without relying on synthetic chemicals.

• The project is testing **61 improved vegetable varieties** from the WorldVeg gene bank, introduced for the first time in the targeted countries : onion, amaranth, pepper, tomato, okra, African eggplant, habanero pepper, hibiscus rosa, corchorus, etc. All the varieties are adapted to climate change. Their registration was ongoing in each country.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

The project has developed two concrete solutions :

• A solution to make vegetables more accessible and more acceptable: 53 street food vendors (mainly female) were involved to stimulate the consumption of green leafy vegetables by low-income consumers in cities of Burkina Faso and Benin. The main dish is usually rice-based, without vegetables. The food vendors have agreed to introduce leafy vegetables into the menus and to promote the benefits of vegetables. The experiment is closely followed by surveyors, who analyse the consumption of vegetables and their impact at customer level.

• A solution to increase consumer trust in local vegetables, by labelling the vegetable according to their geographic origin. In Bamako (Mali), people are afraid of consuming vegetables due to low-quality (potentially toxic) inputs. This lack of consumer trust in the safety of vegetables is an important constraint to enhanced consumption. The project aims to reassure consumers about the traceability of the supply chain. In a pilot, street vegetable vendors labelled vegetables with certificates of origin, to show they source vegetables from producers who use agroecological practices or follow good production practices. Similarly, in Benin, the approach of showing the origin of vegetables on labels was tested.

SIRGE (418764)

ACTED

Strengthen an Innovative System for the reduction of Greenhouse Gas Emissions and environmental impacts of the nascent beef industry in Uganda in support to rural sustainable transformation

Start date: January 2021

End date (official): March 2024 (including a 3-month no-cost extension)

Implementation was over at the time of data collection (08/2024)

Uganda

LIST OF PROJECTS

Data on Innovations updated as of: March 2024

The project introduced several technologies to reduce GreenHouse Gas (GHG) emissions and environmental impacts of the nascent beef industry in Uganda.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• **Livestock Identification and Traceability System** (LITS) - The Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) gave the project permission to import and pilot LITS in two districts of Uganda. The system enables to centralize information on ownership, place of origin and destination, type of species/breed and state of health of the cattle. Farmers were provided with Radio Frequency Identification ear tags, applicators, and readers. The system, which did not exist in Uganda, has been adopted by a few livestock farmers, most of them large farmers (200+ cows).

• Artificial insemination is an innovation for the targeted farmers in two districts of Uganda. Semen was imported for the purpose of breed improvement. By the end of the project, the technology was mostly taken up by large farmers. However, the uptake was low due to AI cost.

• **Improved pasture species** - Most livestock farmers depend on natural pasture, the production of which depends on the weather pattern. Improved pasture species (Chloris Gayana and Nappier grass) were introduced for their resistance to drought and their digestibility (associated to lower GHG emissions). Besides, they can be conserved and stored for use during prolonged periods of drought. Seeds were distributed to develop early maturing and nutritious low GHG emitting pastures with a view to promote feed improvement. The highest percentage of uptake is among large farmers.

• **Innovative feed formulation** - Cattle exclusively fed on pastures takes time to rich maturation stage, as compared to cattle supplemented with lipids, which grows faster. Innovative feed formulation allows to reach market weight faster and to reduce GHS emissions. The technology was adopted by the large farmers.

• **The technique of over-sowing natural pastures** with forage legumes was tested on farm and taken up, mainly by large scale farmers. Seeds (including soybeans, sorghum, maize, sunflower) were provided to farmers to increase the vegetation cover on the rangelands.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project developed a forecasting model for livestock GHG emissions. It integrates into the Intergovernmental Panel on Climate Change (IPCC) and is compliant with GHG Inventory and Measurement, Reporting and Verification (MRV) frameworks to address current gaps in the livestock sector data. It generates information on livestock production systems, cattle numbers and rangeland emissions, on which forecasts and predictions can be based. The purpose is to inform policy and decision-making on livestock production, illustrate the status of GHG emissions, and suggest mitigation measures. The model is functioning. It is hosted by the Ministry of Agriculture, Animal Industries and Fisheries. The Climate Change Department of the Ministry of Water and Environment is another user.

• **A stocking density map** was developed for the first time in Uganda. Using Artificial Intelligence and machine learning algorithm, a script was developed and translated into a Google Earth Engine Application Interface (API), where a user can generate pasture maps of the area of interest to establish the relationships between overgrazing, rest periods and livestock population. The map shows the spatial distribution of livestock and allows localized assessments of GHG emissions. The interface can also be used to analyse stocking density and inform mitigation and adaptation measures. The stocking density map complements the forecasting model for livestock GHG emissions.

Pillar I – Group 2

SyRIMAO (417085)

Managed by AFD (Agence Française de Développement), implemented by ECOWAS (Economic Community of West African States)

Système Régional Innovant de contrôle des Mouches des fruits en Afrique de l'Ouest

Start date: September 2020

End date (official): September 2024

End date (likely): February 2026 (17-month no cost extension requested)

Benin, Burkina Faso, Cap Vert, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo

LIST OF PROJECTS

Data on likely end date updated on: 20/05/2024

Data on Innovations updated as of: December 2023

Building on a former project supporting its regional plan for the fight and control of fruit flies and to extend the surveillance system to all its member states, ECOWAS has established the Regional Innovative System for the Control of Fruit Flies in West Africa (SyRIMAO).

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project has developed and tested **pest control technologies** to protect the mango crop from the fruit fly. For instance: a mass trapping strategy "Sen-Biotrap", using an essential oil attractant (from a shrub) and an insecticide-free trap; a food attractant formulation "Mango Protect", which can be used for all species of fruit flies, in particular females. Both Sen-Biotrap and Mango Protect have been approved in Côte d'Ivoire.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **A model partnership/contract between producers and exporters** has been developed to guarantee access to pest control products in return for a delivery of mangoes. The concept is new and already in place in Mali, Côte d'Ivoire, Burkina Faso.

• The project has modified/improved a **surveillance system** providing alerts at a certain level of infestation by fruit flies (developed and operational). This tool is deployed in pilot mango orchards and used to monitor neighbouring orchards as well. Flies are trapped. Every week, technical staff count the flies in the traps, report the information in a database, that generates maps and alerts (SMS, Whatsapp) according to the level of infestation. The grower receives advice on the product to be used and the potential gain if the product is used. This system works from the orchards to the packing stations and is used by other players in the value chain (e.g. exporters). It is operational in 36 production zones (out of 37) and 14 member countries of the regional community (out of 15), reaching an estimated 60,000 smallholder mango farmers.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• At least eight research protocols have been developed at national level, and taken over by the regional level, which validates and adjusts the protocols so they can be tested in other countries (multi-local tests). For instance, the initial research behind Sen-Biotrap (see above) took place in Senegal and the formulation of Mango Protect was done in Burkina Faso, but protocols are now available at regional level. Large-scale tests are underway, but the technologies are not registered in all targeted countries yet.

• **The Regional Fruit Fly Management System in West Africa is innovative and operational**. With project support, the Burkina-Faso based National Centre of Specialisation for Fruits and Vegetables of ECOWAS has become a regional centre of excellence (CRE). The CRE develop research strategies to control the fruit fly and coordinates the research protocols at regional level through a network of researchers/research centres/ It uses the surveillance system to monitor the territory for rapid action in the event of pest invasion.

• An export levy mechanism to ensure the sustainability of the surveillance system and access to control products for producers has been developed. It is a sector-wide funding mechanism that applies to production, processing, export. As December 2023, 5 national funding mechanisms for the mango sector had been set up. Two (in Burkina Faso and Senegal) operated during the 2022-2023 mango season.

• **An essential oil production unit** has been set up within the Senegalese Department of Plant Protection, with project funds and in coordination with the National Committee for Fruit Fly Control in Senegal and the Cheikh Anta Diop University in Dakar. The objective is to transfer the unit to the private sector.

WE4F (419478)

GIZ (Gesellschaft für Internationale Zusammenarbeit GmbH)

Water and Energy for Food – East Africa Hub

Start date: January 2020

End date (official): December 2024 (6-month no cost extension already granted)

Kenya, Uganda, Rwanda, Ethiopia, Tanzania

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The objective is the upscaling of climate-friendly energy and water-efficient innovations in food value chains, while increasing the innovative potential of small and medium sized enterprises for more productive and environmentally sustainable food production.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• It is estimated that more than 110,000 farmers (32% of whom are women) have taken up **innovative** energy and water technologies and practices introduced by the project in East Africa, most of them based on solar energy. For instance (the list is not exhaustive): solar-powered reverse osmosis; solar dairy cooling; climate-resilient farming practices & organic certification; hydro-powered irrigation; hydroponic technics; Internet of Things (IoT)-enabled solar irrigation (i.e. an advanced agricultural technology that combines solar-powered irrigation systems with IoT devices such as sensors, controllers, communication devices, in order to optimize water usage, improve crop yields, and enhance overall farm management); solar powered water treatment; green house and micro climate management systems for small and urban farming.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project has developed **nine financing mechanisms** for the application of climate-friendly, energy and/or water-efficient innovations by the target groups, mostly smallholder farmers but also small and medium size enterprises. Among them, the "pay-as-you-go" (PAYGo) model is a payment method where users pay for services or products based on their actual usage rather than a fixed fee or upfront cost. It enables smallholder farmers "without access to formal banking services to acquire a variety of products and services. One of its most transformative impacts has been in the energy sector, where it has facilitated solar power access for off-grid communities. The PAYGo model breaks down the barrier of high initial costs, making vital resources more accessible to a broader audience." (Source: Annual Progress Report 2023). Other examples of financing mechanisms include:

- Contract farming: e.g. smallholder farmers are provided with irrigation equipment support, agronomic services, and product marketing in exchange for a share of their produce and a bonus after the sale;

- Contractual partnerships with cooperatives to provide loans to smallholder farmers;

- Productive Use Energy Loan (e.g. used to introduce innovative technologies in solar irrigation systems).

- Energy Service Company (ESCO) model, which ties credit to energy savings: the ESCO carries out energy audits, based on which energy saving projects are implemented; the ESCO model assumes that the costs of the audits and their implementation are recovered through actual energy saving.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **Eleven business models** have been developed by innovators (small and medium-size food processing enterprises) for the marketing of climate-friendly, energy and/or water-efficient innovations. To each business model corresponds a new financial/economic approach, as well as an innovative technology. These models build on business development support, product development, strategic market analysis. They typically lead to a business expansion into new areas, including different countries or regions. For instance, the company Innovex Uganda Limited offers digital solutions for transforming the distribution of off-grid solar systems and equipment. It was initially established in Uganda. With project support, it has broadened its operations to include countries like Kenya, Tanzania, and even India.

• **New climate-smart food processing technologies** have been taken up by processing companies such as: low-tech wood shade, smart metering and process monitoring, biogas digester with focus on circular economy modelling, refrigeration optimisation, renewables, lighting, boiler optimisation/insulation, rainwater harvesting, waste water management, motor upgrade, voltage optimisation.

FIVE GREAT FORESTS (423227)

WCS (Wildlife Conservation Society)

5 Great Forests of Mesoamerica: A regional initiative for climate, biodiversity, and people

Start date: July 2021

End date (official): June 2025

Belize, Guatemala, Honduras, Nicaragua, Panama, Costa Rica, and El Salvador

LIST OF PROJECTS

Data on Innovations updated as of: June 2024

The project targets Mesoamerica's five great forests and their vulnerable forest communities in indigenous territories, with a view to mitigate climate change, to protect biodiversity protected and to improve livelihoods. The livelihoods are diverse, ranging from full reliance on forest products to full time farming, depending on the community. At beneficiary level, the project promotes and disseminates activities that together release the pressure on the forests, while helping to sustain livelihoods. Most of the farming technologies promoted by the project are not innovative: they already exist in the context where they are promoted.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The main innovations are in the area of community patrolling, a governance mechanism that involves local communities actively participating in the protection and oversight of natural resources, including monitoring forest fires, deforestation and illegal cattle ranching. In Honduras, the project introduced the concept of community patrolling for the first time in some communities (e.g. in areas, which are home to populations of scarlet macaw, an endangered species known for its cultural significance among Indigenous populations). In Guatemala, it introduced the systematic use of drones in community patrolling. In Honduras, it extended the use of SMART to communities, for which it is an innovation. Developed by WCS (before the project), the SMART platform consists of a set of software and analysis tools designed to help conservationists manage and protect wildlife and wild places.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• In Mesoamerica's five great forests, WCS monitors (among others) forest cover and deforestation, wildlife populations, illegal activities, forest fire, carbon sequestration and storage, habitat fragmentation, climate data, etc. These indicators provide WCS with the data needed to make informed decisions about conservation strategies, advocate for stronger forest protection policies, and collaborate with governments, local communities, and other stakeholders to preserve the great forests of Mesoamerica. The monitoring system is not new. In the context of the DeSIRA project, the innovation is in **the strategic use and communication of the data** to support coordinated regional governance, policy-making, and public engagement.

ABRIGUE (423487)

Instituto SINCHI (Instituto Amazónico de Investigaciones Científicas SINCHI)

Strengthening territorial capacities to foster innovations in agroecology, artisanal fishing and circular bioeconomies for climate change adaptation and mitigation in Colombia's coastal zones and forest frontiers

Start date: June 2021

End date (official): November 2025 (18-month no-cost extension already granted)

Colombia

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The objective of the project is to strengthen agriculture, forestry, among other land uses, and artisanal fishing sectors within agroecological systems and bioeconomies to increase their competitiveness, productivity, resilience and efficiency.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

To improve local food value chains, the project has introduced 30 innovative agroecological practices, evaluated on pilot farms. Each practice is linked to a specific value chain, in one of the three targeted areas. As of December 2023, 586 households were implementing at least one of these practices.

• In the Amazon region (Department of Caqueta) - Cacao chain: e.g., biofertilization of cacao agroforestry systems through the expansion of composting sheds and vermicomposting; Functional and productive restoration of secondary forests; Increased diversity of commercial crop species. Copoazú (a fruit) chain: e.g. productive ecological restoration: enrichment with Amazonian fruit trees such as copoazú, Brazil nut, açaí; Agro-food connectivity corridors with Amazonian fruit trees. Dairy production chain: e.g. Mixed forage banks; Pasture fertilization with vermicompost. Canangucha chain (a palm tree native to the Amazon rainforest): Conservation areas for biodiversity use compensation; Restoration of cananguchales (swampy areas dominated by canangucha) through isolation and enrichment.

• In the Pacific region (Department of Choco) - Vanilla chain: e.g. Integrated management of phytosanitary issues using plant extracts with fungicidal action, seed germination, vanilla curing. Coconut chain: e.g. trapping systems for monitoring and integrated management of the palm weevil (a beetle that burrow through the heart of trees); Rescue and conservation of regional germplasm material. One responsible artisanal marine fishing practice: a fish aggregating device made from natural ingredients (e.g. coco leaves) to attract the fish closer to the shore.

• In the Orinoquia region (Department of Meta), innovative practices are being evaluated: e.g. Agroforestry systems with coffee as the main crop; Conversion of pastures to agro-silvopastoral system.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• In Chocó (Pacific region), a local multi-stakeholder innovation platform supported by the project is designing a participatory certification for a « ZEPA » label (Exclusive Artisanal Fishing Zone), in response to the demand from families involved in marine artisanal fishing. This tool promotes sustainable practices.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has introduced **TAPE (Tool for Agroecology Performance Evaluation)**, a tool designed by the FAO. The methodology has been adapted to the local context by the stakeholders. TAPE evaluates agroecological transitions by assessing strengths and weaknesses across various elements, such as diversity, resilience, recycling, and social values. Twenty variables create a framework to measure progress toward agroecological practices at both the institutional and farm levels. This participatory methodology engages local actors, including organizations and farmers, in tracking their agroecological performance and in measuring the project's impact on their agroecological transition, facilitating targeted support and monitoring.

• Besides, the project develops and tests new value chains based on agroecological products with commercial potential. This includes the development of processing, marketing, and business management strategies. The research targets **five value chains** and focuses on the production of inputs and processing of raw materials. These are: new food products derived from cacao leachates (liquid extracts or run-offs from cacao processing); solid biofertilizers from copoazú husks; feedstuffs for fish and pigs from canangucha pulp residues (canachuga is a Non-Timber Forest Product); innovative curing and drying processes of vanilla to improve sensory quality and volatile profile ; establishment of a community coconut processing plant.

ACCESS (414694)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Accélérer les dynamiques d'innovation dans le secteur Agro-alimentaire par le renforcement des Services Support à l'Innovation

Start date: July 2021

End date (official): July 2025

Burkina Faso

LIST OF PROJECTS

Data on Innovations updated as of: June 2024

The specific objective is to contribute to a more efficient national agricultural innovation system. The project introduces new support approaches for innovators and providers of innovation support services (see below) in the following areas: agro-food processing, agroecology, and digital agriculture. It operates at multiple levels. At the micro level, it supports two types of innovation carriers: Multi-actor Innovation Partnerships (PIMs) and innovative entrepreneurs. By applying new support approaches to existing innovation processes carried out by PIMs and entrepreneurs, it contributes to the development of innovations for use by smallholder farmers and private actors in food value chains.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

In this context, the project supports two innovation processes carried out by PIMs, which focus on services for small producers or agropastoralists (the other two target the private sector, see below):

• **A Participatory Guarantee System (BioSPG) Label for organic agriculture** - The innovation carrier is CNABIO, the National Council of Organic Agriculture, which brings together farmers' organizations, NGOs, companies, farmers, researchers (etc.) working to promote the BioSPG label. The goal is to scale this label.

• **An integrated digital platform** - The innovation carrier is the Ministry of Agriculture and Animal and Fisheries Resources, which is leading a digital services project, particularly a platform integrating an interactive call centre, an interactive voice server, and a database for the agropastoral sector. The project supports the innovation process in establishing a viable business model, formulating a common vision among the stakeholders, ensuring accessibility through telecommunications networks, and pooling other digital services.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Building on the work of the TAP (Tropical Agricultural Platform), the project designs, experiments with, and evaluates **support approaches for innovators and Providers of Innovation Support Services (FFSI)**, adapting them to the context of Burkina Faso and to different beneficiaries: entrepreneurs, PIMs, and FFSIs. For entrepreneurs, the approach is centred on individual support, assisted by a coach. For PIMs, the approach is supported by one or two innovation facilitators and allows for the continuation and/or completion of existing innovation projects. Concretely, the support of PIMs aims to strengthen their functional capacities to collaborate, experiment, learn, and manage innovation processes through various activities (diagnosis of capacity building needs for innovation, development of a support plan, involvement of researchers in the implementation of collaborative projects, etc.). For FFSI, the approach is focused on redefining the vision of the targeted organization and strengthening its capacity to provide adapted support services. An institutional facilitator and an innovation facilitator support the process.

• As part of its support to entrepreneurs, the project contributes to several **innovation processes related to products for human consumption, agricultural inputs, and services**: e.g. nutritional supplements for athletes; teas and infusions made from local plants; baby puree made from local products; eco-friendly charcoal made from agricultural or agro-food waste; traditional drinks made from local raw materials.

As part of its support to PIMs, the project strengthens two innovation processes (**local milk processing**, **parboiled rice from Bama**) implemented by value chain actors. For instance, innovation carriers are private actors (e.g. Cooperative of Local Milk Processors of Banfora) and institutional actors working on transforming local milk into new products. The project supports the innovation process to facilitate the supply of raw materials, improve market access and facilitate access to financing.

Pillar I – Group 3

AMINATA (415751)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

AMélioration de l'accès aux INnovations Agricoles pour la Transition Agroécologique

Start date: February 2022

End date (official): January 2026

Mali

LIST OF PROJECTS

Data on Innovations updated as of: January 2024

The purpose of the project is to strengthen the capacity of Malian producers to adapt their production systems. The project is primarily focused on agricultural innovation support mechanisms.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• To test and improve these mechanisms, it has introduced and tested 13 **innovative agroecological practices** at the farm level, in the Kita region. Among them:

- Practices aimed at **improving crop productivity and soil fertility**, such as: cotton plant topping; crop associations (e.g. sorghum-cowpea or mucuna-maize); introduction of soybean cultivation in rotation (alternating crops); production of Bokashi compost (a fermentation-based method of composting organic waste, faster and less labour intensive than the traditional method which relies on oxygen).

- Practices for **forage production and management for livestock feeding**, such as leguminous plants and sheep fattening using the residues of mucuna pruriens (a leguminous plant), during the dry season; production of dual-purpose sorghum (for both animal and human consumption).

- **Diversification practices**, such as integrated poultry-fish farming (chickens raised in cages above fish ponds, where fish feed on leftover chicken feed).

The project has trained at least 573 smallholder farmers.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• In line with its focus on agricultural innovation support mechanisms, the project has designed a prototype of a **system and method to facilitate access for producers to innovations**. The prototype, developed by the Institut d'Economie Rurale (IER) with the support of CIRAD, relies on a dual-entry system with two axes for each entry: a virtual axis based on a WhatsApp application and a physical axis based on direct exchanges of several kinds (Producers/Producers, Producers/Advisors, Advisors/Advisors, and Advisors/Researchers). Two organizational innovations underpin this prototype:

- a **coordination and sharing framework** around producers' access to innovations has been established in a region of Mali (Kita); based on this experience, a model for a coordination and sharing framework at the subnational level, intended to be extended to other administrative divisions, will be developed;

- a **platform for training and sharing information on innovations** is under construction; the model experimented in the Kita region (as of January 2024), was to be extended to another administrative zone in 2024, with the idea of later proposing a coordination framework at the national level.

Climate Smart Innovation in Costa Rica (424794)

GIZ (Gesellschaft für Internationale Zusammenarbeit GmbH)

Climate intelligent agriculture and value chains in Costa Rica

Start date: October 2021

End date (official): June 2026

Costa Rica

LIST OF PROJECTS

Data on Innovations updated as of: August 2024

The project objective is to support Costa Rica's national transition to low-emission, climate-resilient and sustainable agricultural production systems, in the selected key agricultural sectors of Musaceae, coffee, and livestock.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

To support the sustainable transformation of three agricultural productive sectors (coffee, livestock and Musaceae, including banana and plantain), the project organizes calls for proposals, to extend small grants.

• As of August 2024, the partner ICAFE (Instituto del Café de Costa Rica) had signed contracts with 21 beneficiaries, whose proposals foster innovation and the uptake of **methods**, technological solutions and good practices targeting the coffee value chain. Examples of innovations include: Renovation of coffee plantations using climate-resilient varieties resistant to pests and diseases; Implementation of agroforestry systems, reforestation, and organic fertilizer use to enhance sustainable coffee cultivation; Production of bioinputs for coffee cultivation with the use of microalgae to treat coffee pulp; etc.

• For the livestock sector, small grants were yet to be awarded, but the project was supporting 306 cattle rangers to access starting capital for implementing a **rational grazing scheme.** This innovative practice optimizes the use of pastures and improves soil and animal health. It involves dividing grazing areas into smaller paddocks and rotating livestock to allow pastures to rest and regenerate between grazing periods.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• Among the 21 beneficiaries of the coffee value chain, two are developing **digital tools to support decision-making** for a more efficient production: for instance, the development of a digital tool and of a model for coffee plant counting, to help to monitor crop health and density and evaluate productivity.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Other beneficiaries of small grants are coffee value chain actors whose proposal/project focus on **innovations stemming from the use of byproducts from coffee processing.** For instance: generation of high-nutritional food subproducts from coffee pulp; Laboratory and production plant for inoculated biochar from coffee byproducts; Production of edible fungi using coffee husk as a substrate; Alternative wastewater management for coffee processing; Production plant for pellets from coffee husks.

• The **development of a national standard for eco-labeling of meat products** is underway, carried out in collaboration with value chain stakeholders and Costa Rica's Technical Standards Institute. The eco-labelling standard is based on criteria for low-carbon agricultural production and primarily targets meat processors.

• The project supports livestock-related Nationally Appropriate Mitigation Actions (NAMAs) by testing a new financing/incentive scheme. NAMA is a mechanism under the UN Framework Convention on Climate Change (UNFCCC) to encourage developing countries to reduce greenhouse gas emissions. NAMAs are supported by the Adaptation Fund, implemented in Costa Rica by Fundecooperación para el Desarrollo Sostenible, a national NGO with which the project has developed a matching fund scheme. 306 livestock farmers were expected to receive support (in kind subsidy) to initiate their farms transformation to a low carbon and resilient production system (see above, i.e. the rational grazing scheme).

• Upon request from ICAFE (a public-private organization that oversees and supports Costa Rica's coffee value chain) and private sector actors, the project is developing a **manual for regenerative coffee**. Under development, this manual will address both technical and financial aspects, serving as an institutional innovation by establishing benchmarks and standards for the entire industry. "Regenerative coffee" is a holistic approach to coffee production that focuses on restoring and enhancing soil health, biodiversity, and ecosystem functions while producing high-quality coffee.

Yayu Coffee Forest Ethiopia (423558)

HRNS (Hanns R. Neumann Stiftung)

Supporting sustainable coffee production and conservation of forest ecosystem through climate-relevant and integrated landscape management of the Yayu Coffee Forest Biosphere Reserve

Start date: August 2021

End date (official): September 2025

Ethiopia

LIST OF PROJECTS

Data on Innovations updated as of: August 2024

The project targets farming households in the Yayu Coffee Forest Biosphere Reserve, introducing sustainable and climate smart crops (spices, vegetable and fruits & others), practices and production systems. The project aims at improving nutritional security, diversifying income by optimizing the use of the land at household level.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

As of August 2024, the project had reached over 7700 smallholder farmers, including over 2900 who were already implementing innovations introduced via Farmer Field Schools (see below). All innovations can be simultaneously implemented by a single farmer.

• Fourteen **good coffee production practices** have been introduced. This includes (among others) nursery establishment and management; intercropping / cover cropping; composting and organic fertilizers; proper harvesting and post-harvest handling (etc.). Among these practices, the rejuvenation of old coffee refers to the practice of revitalizing aging or declining coffee plants to restore their productivity: this includes pruning old or dead branches, replanting or grafting disease-resistant varieties of coffee onto older rootstocks, improving soil health as well as pest and disease management.

• The Jimma Agriculture Research Center, a project partner, has introduced four **new coffee varieties**, more productive and eco-friendly.

• The project has introduced **modern beekeeping practices**. New production techniques, such as proper site selection and shade construction, make it easier for women to engage in honey production, compared to traditional systems where hives hang high in trees. Similarly, innovative **good management practices for small scale poultry production** (such as day-old chick, protected management, chicken feed etc.) depart from the traditional scavenging system. Besides, the project introduces **garden agroforestry options** such as selected varieties of grafted avocado, banana, papaya as well as new certified varieties of vegetables (carrot, cabbages, beetroots, potato, onion), which are more productive and have a shorter growing season.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• A Farmer Field School (FFS) is an innovative extension approach in the target area. Originally developed by the FAO, this is a participatory learning approach where farmers (groups of 20 to 25 in this case) are trained in sustainable agricultural practices through hands-on experience and group discussions in their own fields. The project has established and is strengthening the functional capabilities of 133 FFS groups. Farmers are also supported with inputs such as improved coffee seedlings and shade trees through 54 FFS coffee nursery sites established with project support.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

The project is developing **scalable landscape management models** for the Yayu Coffee Forest Biosphere Reserve. Six replicable agroecological models have been identified through mapping and analysis. As of August 2024, they were still under development and validation, aiming to create landscape management systems adapted to natural settings and climate conditions. These models integrate sustainable forest management, participatory resource mapping, biodiversity conservation, agroecological practices (e.g., forest honey and coffee production), integrated management of multi-functional landscape, mainstreaming biodiversity in sectoral plans, participatory action research, integration of conservation values in promotion and marketing.

DINAAMICC (422791)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Démarches INtégrées et Accompagnement pour une Agriculture familiale à Madagascar Innovante et résiliente aux Changements Climatiques

Start date: January 2022

End date (official): January 2026

Madagascar

LIST OF PROJECTS

Data on Innovations updated as of: May 2024

The project aims to reduce the vulnerability of family farms in the highlands of Madagascar to climate and environmental changes by diversifying agricultural activities, promoting agroecological practices, and improving the management of natural resources.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The research focuses on various themes, underpinned by studies, experiments, evaluations. A study does not necessarily predict the outcome of the research, as it may lead to nothing, to the formulation of recommendations or (and) to the development of an innovative practice. As of May 2024, about 2200 family farms had implemented at least one of the new practices or varieties promoted by the project. Among them, 1100 farmers had taken up rice-fish farming practices. New varieties of rainfed rice were also popular. The following practices were studied and/or co-developed with farmers, producer organizations and researchers.

• **Improvement of knowledge and practices for bio-aggressor control** - The focus is on the management of bio-aggressors and crop protection. The objectives are the implementation of prophylactic measures and awareness-raising, the development of agroecological practices for bio-aggressor control, and deepening knowledge about emerging bio-aggressors (i.e. living organisms that negatively impacts plants, crops, or ecosystems, such as pests, pathogens, invasive species). The main research themes are as follows:

- Integrated management of pests and biological control; studies focus on controlling specific pests and exploring biocontrol strategies, such as the use of plant-based biopesticides and by-products, to reduce the impact of these pests on crops like maize or legumes.

- **Control of bacterial plant diseases ;** a significant portion of the research is dedicated to managing diseases (e.g. rice bacterial blight). Studies aim to understand the aggressiveness of these pathogens and to identify agroecological methods (e.g. the use of essential oils, and improved farming practices), to limit their spread.

- Weed and invasive plant management ; Proposed solutions include simple tools like hand weeders, as well as management practices to control plant overgrowth in rainfed rice and maize cropping systems.

• Identification and promotion of a diversity of varieties of interest - The research focuses on the evaluation and promotion of rainfed rice, lowland rice, and bean varieties adapted to the conditions of the highlands, while exploring the use of mycorrhizal fungi and rhizobium to improve soil fertility (i.e microorganisms that form beneficial relationships with plants).

• **Improvement of the integration of agriculture-livestock-agroforestry** - Many research themes focus on optimizing agricultural and pastoral practices. The studies concentrate, for instance, on improving rice cultivation, particularly through rice-fish farming, evaluating agroclimatic risks, and the resilience of rice systems, soil health restoration and livestock farming. They also explore the pastoral and ecological values of grazing lands while integrating agroecological practices to improve nutrition and sustainability.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project works with the General Directorate of Meteorology to improve meteorological information services for farmers.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• As part of the construction and application of a multi-criteria evaluation framework for agroecological practices, the project relies on **concepts and methodologies** that, locally, are innovative and can used by institutions such as Farmers' Organizations or NGOs. For instance: participatory diagnostic tools (ComMod or Companion Modelling), which encourage participation and discussion among local stakeholders ; Modelling tools, such as GAMS (General Algebraic Modelling System), used to model family farms in the Vakinankaratra region.

EcoFoodSystems (428851)

Managed by IFAD (International Fund for Agricultural Development), implemented by NUIG (University of Galway)

Climate-resilient agroecological transitions of food systems

Start date: September 2022

End date (official): September 2026

Ethiopia, Vietnam, Colombia

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project works closely with food systems stakeholders to co-create research outputs that can enable decision-making by its partners to better transition the diets of consumers, including nutritionally marginalised consumers, towards diets that are more sustainable, healthier and affordable. Targeting 3 cities (Addis Ababa in Ethiopia, Hanoi in Vietnam and Cali in Colombia), it places emphasis on linking national to sub-national food systems (including data systems for decision-support). The purpose is to demonstrate how to generate sustainable data streams for decision-making that are relevant and actionable on both national and sub-national scales.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

Several innovation processes were ongoing at institutional level as of December 2023.

• Designing of a Life Cycle Analysis methodology (similar for all three targeted cities), with a view to measure the environmental footprint of diets consumed at city level.

• Designing city-regional food systems sustainability metrics and decision-support tool/dashboards.

The process has started for three target cities and is tailored to each city's specific context. The sustainability metrics encompass a broad range of environmental indicators, including carbon, water, and land use, alongside health and affordability-related factors. These metrics aim to measure and improve the sustainability of goods and diets consumed. For example, the project will focus on measuring the sustainability of rice production in Vietnam to reduce the environmental footprint of rice-based diets within the country. Additionally, the development of decision-support tools, such as dashboards and applications, has begun.

• Designing **city-regional food systems sustainability metrics** and decision-support dashboards for resilience to biophysical and economic shocks. The focus is on developing innovative tools to support stakeholders during critical situations. As of December 2023, the process had started in Vietnam. Data had been collected at the national level, and knowledge products were available to inform the innovation processes for designing decision-support tools. While the framework is consistent across all cities, each process is tailored to the specific local context.

• Designing **dashboards to track key indicators of food system health.** The purpose is to track health outcomes of different diets to evaluate how to balance sustainability and health impacts, addressing issues such as overnutrition and undernutrition. As of December 2023, a preliminary compilation of data has been completed to feed into a dashboard and decision-support tool. This work has been accomplished for three cities, with processes tailored to each target city's specific context.

Pillar I – Group 3 FO-RI (428932)

Agricord (Agricord Alliance)

Research and innovation and farmers organizations

Start date: January 2022

End date (official): December 2026

Burkina, Mali, Senegal, Cameroon, Burundi, DRC, Madagascar, Tanzania; Philippines; Cook Islands, Fiji, Papua New Guinea, Solomon Islands, Tonga; Haiti; Brazil, Uruguay

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project supports 13 action-research partnerships in Africa, Asia, Pacific Island Countries, the Caribbean and Latin America. They are carried out by farmers' organisations, with technical support from agricultural agencies and research bodies, which design, test and disseminate innovations based on agroecological principles.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

Below is a summary of the innovations developed by the 13 partnerships, which were reaching , as of December 2023, 5950 farmers:

• Burkina Faso - Experiments focus on improving onion production techniques.

- Mali Research aims at optimizing technical itineraries for vegetable seed multiplication.
- **Cameroon** Experiments were yet to begin as of December 2023.
- **Senegal** Identification and multiplication of traditional rice varieties by women farmers.

• **Burundi** - Various experiments on mulching, green manure, pest control in maize, and the use of Tithonia fertilizer for insect control (i.e. a plant-based fertilizer that also repels certain insects).

• **DRC** - Research focuses on soil fertility management, composting techniques, and pest/disease control strategies; this includes experiments on organic and mineral fertilizers, local biopesticides and combination of legumes and maize.

• **Tanzania (partnership 1)** - Agroecological practices were tested for sunflower cultivation: use of farmyard manure, intercropping and use of indigenous sunflower varieties, rich in oil content.

• **Tanzania (partnership 2)** - Experiments focus on the effects of biochar (i.e. a form of charcoal primarily used as a soil amendment) on beans, avocado, and macadamia and on the use of gliricidia trees (nitrogen-fixing trees) to complement maize, beans and sunflower.

• **Madagascar** - Experiments focus on potato fertilization, onion mildew control, fertilization with different types of biochar, tomato varieties, strawberry varieties.

- **Philippines** Farmers experiment with compost and organic inputs for banana production.
- Haiti Agroforestry-related innovations introduced and tested.

• **Brazil/Uruguay** - Horticultural and fruit-growing experiments, including the implementation of nurseries with a variety of shrubs to renovate agroforestry plots or to plant new plots on degraded land.

• **Pacific Islands** - Research was conducted on breadfruit varieties and production techniques, including morphological characterization and propagation techniques.

GRAPE (422982)

Gesellschaft für Internationale Zusammenarbeit (GIZ)

Green Resilient Agricultural Productive Ecosystems in Sudurpashchim province and Karnali province, Nepal Start date: May 2021

End date (official): March 2025 (including a 3-month no-cost extension already granted)

Nepal

LIST OF PROJECTS

Data on Innovations updated as of: April 2024

The project aims to enhance profitable participation in sustainable, climate-resilient value chains and improve the resilience and sustainability of market-oriented agricultural ecosystems.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project conducts action research in partnership with local universities and farmers. They have validated several **Climate Resilient Agriculture (CRA)** solutions as effective. As of April 2024, over 16,000 farmers were implementing at least one innovative technique among the following: **Pest control techniques**, for instance push and pull technology (i.e. the use of plants that repel unwanted insects and attract beneficial ones); traps and lure (a control method using traps to attract and catch harmful insects) ; **Soil fertility and/or quality management techniques**, for instance wermiwash (a liquid fertilizer derived from vermicompost); tricho-compost (manure enhanced with trichoderma -a fungal genus- to boost its nutrient content); **Water management techniques** (e.g. zig-zag irrigation); **Crop management techniques**, such as seedling raising on leaf bag (a nursery management technique for raising vegetables); 3G cuttings (a method involving cutting seedlings three times to encourage more branches and increase flower production in climbing vegetables).

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• With a private company, the project is piloting an indemnity-based **digital climate risk insurance** for potato and citrus crops in 3 municipalities. Digital technology and satellite images are used to monitor the insured crops, eliminating the need for paperwork and travel. The aim is to ease farmers' access to the service by facilitating the process and reducing the cost of the claim settlement (for both parties). The project has enrolled 139 potato and orange farmers (including 72 women), insuring 4,311 orange plants in one district.

• Targeted farmers have access to and use GeoKRISHI, an application introduced (but not developed) by the project. This **digital agriculture platform provides extension services**, including expert services on crop management and market price. Farmers without a smartphone can send an SMS and use the offline mode.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• In the 19 municipalities it works with, the project has introduced several institutional innovations. For instance, **Climate Budget Coding**, already adopted by some municipalities, increases the transparency of budget allocations, by tracking and classifying government expenditures linked to climate change mitigation and adaptation. The **Local and Regional Economic Development (LRED) bottom-up approach** is used for planning processes or implementing activities. It empowers communities to enhance their economic potential by leveraging local resources while being mindful of social and environmental sustainability. **The Participatory Appraisal of Competitive Advantage (PACA) approach** is a participatory tool providing a quick and intensive analysis of the local economy to identify competitive economic sub-sectors with current or future potential.

• Finn Church Aid, a project partner, has initiated a **Community of Practice (CoP) to scale knowledge on Climate Resilient Agriculture** (CRA). As of April 2024, 50 civil society organizations were participating. A digital repository system stores and provides access to knowledge products (<u>www.copforcra.org</u>).

• Two Nepalese NGO partners ANSAB and LI-BIRD (Asia Network for Sustainable Agriculture and Bioresources and Local Initiatives for Biodiversity, Research and Development) have established 9 **CRA technologies demonstration sites** in 9 secondary schools where agriculture is one of the subjects.

• The **Women Leadership Academy** is an innovative network which promotes female leadership in CRA (e.g. CSOs, technical organisations at provincial and municipal level).

• At private sector level, a new product is under development: **sea buckthorn oil**. Berries are collected this shrub), at high altitude (3000 meters). The oil is extracted from the seeds and the plan is to export it to the EU for cosmetic purposes. Until now, berries were collected, juice was extracted but the seeds were wasted.

Sankuru AgroForest (426210)

ENABEL (Belgian Development Agency)

Neutralité Climatique, Conservation et Economie Verte à partir d'une filière Hévéa inclusive dans les territoires de Lomela, Kole et Lodja (province du Sankuru, RDC Congo)

Start date: November 2021

End date (official): November 2025

End date (likely): May 2026 (6-month no cost extension under discussion)

Democratic Republic of Congo

LIST OF PROJECTS

Data on likely end date updated on: 24/10/2024

Data on Innovations updated as of: November 2023

The project aims to establish the conditions for the revival of a sustainable rubber sector by relying on village associations in Sankuru province.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• The project has introduced a **sustainable rubber tapping technique**, to replace "over-tapping", a traditional technique where rubber trees are heavily wounded to extract more sap (latex), often leading to their premature death. With the new technique, the tree is divided into panels. Tapping is done on specific panels in rotation, allowing other sections of the tree to rest and recover. This method ensures that latex can be harvested continuously without killing the tree. The project has trained 570 rubber tappers in the new technique, to apply to existing plantations.

• As part of a strategy for renewing rubber plantations, INERA (National Institute of Agronomic Studies and Research, a project partner) innovates by identifying and using the varieties most suited to local conditions and then grafting them with the most productive clones to supply **new plants to rubber producers**.

• The project also works with 173 Farmer Organizations (FOs), accompanying the transition from slashand-burn agriculture to settled farming. It focuses on the introduction of **new seed varieties** (one per crop: cowpea, rice, maize, soybean, peanut, cassava). Where households used to practice mixed cropping with all crops on the same land, an innovative **crop rotation system** has been introduced where each crop occupies a designated space, with beneficial crop associations and rotations (legume/peanut/cowpea alternating with maize) to better manage soil fertility, pests and diseases.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• To support the agroecological transition, the project is setting up **a quality seed supply service**. It first supported the INERA station in the Sankuru province for the production of first-generation seeds (see below). These seeds were then given to FOs, which multiplied and distributed them to their members for household-level agricultural production. This service is being developed under the supervision of SENASEM (National Seed Service), which oversees the entire seed production process (quality control and certification of produced seeds). To strengthen this service, the project is also training independent seed multipliers so they can produce and sell seeds, allowing for the dissemination of the new varieties in Sankuru province.

• The project facilitates the implementation of a national regulation on local community forest concessions (CFCL) by supporting the **establishment of a local forest governance mechanism.** In Sankuru province, it is an innovation as no community had adopted this government provision. The project assists communities in creating their own CFCL and helps them to establish a management structure (statutes and internal regulations) and sustainable exploitation mechanisms. It includes a forest management plan that outlines land use and organizes resource exploitation. Two concessions are currently being set up.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The establishment of a first generation (R1) seed production capacity for six varieties at the INERA station in Sankuru province is an institutional innovation. Foundation seeds have been sourced from other INERA stations in RDC. The station has been equipped and the staff trained. The capacity is operational, it produced 4,250 tons of R1 category seeds in 2023 for six certified varieties (maize, rice, cowpea, peanut, soybean, and cassava) and began supplying R1 seeds to FOs (see above).

InACC (426080)

GIZ (Gesellschaft für Internationale Zusammenarbeit)

Integrated Approach to Climate Change in Rice Production

Start date: August 2021

End date (official): March 2025 (including a 4-month no cost extension already granted)

Nigeria

LIST OF PROJECTS

Data on Innovations updated as of: August 2023

The project contributes to improving the climate resilience of smallholder rice farmers and agropastoralists in two States of Nigeria by introducing, adapting and promoting climate-smart practices for rice cultivation and innovations in livestock fodder production/management.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

As of August 2023, 8172 smallholder rice farmers and 486 agropastoralists were applying new techniques and production systems described below.

• New agricultural practices – (e.g. rice transplanting of improved seedlings; use of organic manure). New rice production systems – This includes: Rice-agroforestry system (trees provide shade, enhance biodiversity, and contribute to soil fertility through organic matter and nitrogen fixation); Integrated rice & fish production system (rice and fish are grown together in the same paddy fields; the fish benefit from the flooded rice fields, while their excretions help to enhance soil fertility, aerate the water, and control pests); Rice shrubs & vegetable system (the shrubs help in soil fertility management and provide organic matter, while the vegetables offer additional income and food security).

The following **livestock management and fodder production innovations** have been introduced : Silage production (green forage crops are stored in an oxygen-free environment to ferment, making it available for livestock during times when fresh pasture is not available) ; Hay production; Hydroponic fodder production (growing fodder in soilless environment using only water and nutrients, under controlled conditions); Silvo-pasture (agroforestry practice that integrates trees, pasture and livestock on the same land); livestock feed from rice by-product.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

The project has trained rice farmers in **contract farming**. It has introduced this new service between rice farmers and private sector actors (processors) to facilitate market linkages.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• Targeting 60 MSMEs, **five food products and agricultural inputs** were under development as of August 2023:

- Parboiled rice using false bottom technology; Parboiling is the process where raw rice is soaked, steamed, and then dried before milling. This helps improve the nutritional content, reduce breakage during milling, and enhances the texture of the cooked rice. In the false bottom technology, a perforated or mesh layer is installed at the bottom of the parboiling tank. This structure allows water or steam to pass through, evenly distributing heat across the rice, ensuring more uniform parboiling.

- Rice pastries & confectionaries,

- Rice flour,

- Organic manure using rice husks,

- Mushroom production using rice husks.

Pillar I – Group 3

INNOVAC (425650)

CIFOR/ICRAF (Centre for International Forestry Research - World Agroforestry)

Améliorer la résilience au changement climatique des populations du Nord Cameroun

Start date: December 2021

End date (official): December 2025

Cameroon

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project aims to sustainably improve the productivity of agro-sylvo-pastoral systems and rural household incomes while reducing their vulnerability to the effects of climate change.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

It has introduced several innovations in 6 "climate-smart villages" in northern Cameroon. About 250 farmers have taken up at least one of these innovations.

• **Agroforestry (AF)** - The extreme climatic conditions had previously prevented trees from being integrated into local production systems. AF began in 2022 and gained momentum in 2023. It was made possible by integrating diverse tree species (e.g. for nutrition, forest, live hedges, etc.) produced in community nurseries into the landscape.

• The project promotes **Assisted Natural Regeneration (ANR)**, a sustainable technique that encourages tree regeneration by protecting and promoting natural seedlings, while integrating agriculture.

• The project introduced and demonstrated **25 selected varieties** adapted to the specific climatic conditions of the Sudano-Sahelian zone (e.g., shortened production cycle, resistance to diseases and pests) : maize; peanut; soybean; cowpea; forage; sorghum; rice. Except for forage, the crops existed but the varieties are new to the communities and most are already in use.

• **Two new water and soil conservation techniques** existed in other communities but were not widespread. Both techniques involve digging holes to capture and retain runoff water around the plant.

• The project developed **a prototype of improved stove** made from local materials to reduce firewood consumption. The targeted households are building the stoves according to the project's instructions.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The **PICSA approach (Participatory Integrated Climate Services for Agriculture)** combines reliable climate data with adapted agricultural practices while directly involving farmers. It provides decision-making tools to better adapt to climate challenges and strengthen their resilience and productivity, while improving the management of natural resources. The PICSA approach includes the following steps: 1/ Collection of weather data by farmers ; data collection tools have been installed in targeted villages, including rain gauges and automatic weather stations ; they allow farmers to access real-time information such as the amount of rainfall (per day, week, month, season) and temperature, thus facilitating decision-making on crop management; 2/ Analysis and dissemination of the data within the communities; 3/ Informed decisions are made regarding planting dates, phytosanitary treatments, fertilization, and harvesting.

• In collaboration with the National Meteorological Directorate, the project has created a **WhatsApp** group to share 24-hour weather forecasts, in a format that is easily understood by farmers, and technical advice. It comprises 450 members, 75% of whom are farmers, along with facilitators (project staff, extension agents). Several non-targeted villages have requested to join this network. For those without smartphones, the project organizes group discussions at the village level. The service is already operational and in use.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project is introducing **two models aimed at producing quantified evaluations of the different options for intensifying the production system**, to adapt to and mitigate climate change: the SARRA-H model (Regional Analysis System for Agroclimatic Risks) is adapted to analyse the impact of climate on the growth of dry cereals and potential yields in tropical environments ; the DSSAT model (Decision-Support System for Agrotechnology Transfer) is designed to integrate knowledge about soil, climate, and crop management. Both models are new for local institutions. Once modelling and parameterization are completed, targeted stakeholders, such as IRAD researchers, technical staff and academics will learn to use these models.

MAKIS (422432)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement) Malagasy Agricultural Knowledge and Innovation Systems

Start date: February 2022

End date (official): January 2027

Madagascar

LIST OF PROJECTS

Data on Innovations updated as of: January 2024

The project aims at improving the capacities of agricultural development actors to support innovation in rural areas of Madagascar.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

At farm level, the project focuses on three technical innovations.

• **Improved carbonization technique** - Carbonization is a practice for producing charcoal used for cooking, carried out on the outskirts of the capital to supply it with biomass energy. It is a seasonal activity conducted by the poorest rural households. Charcoal producers are also farmers. A dome of earth (a kiln) is built in which eucalyptus wood is placed. To achieve better charcoal yield and enhance the energy efficiency of carbonization, the project has proposed improvements to the kiln structure, the presence of vents, orientation, and wood placement: these proposals, which involve gradual improvements to existing methods, are being implemented by some households.

• **Rain-fed rice variety trials and multiplication** - The innovation process involves two stages. Initially, about twenty varieties are tested to improve and select those that best meet the criteria of producers (fewer inputs, suitability for degraded sites) and researchers (e.g. resistance to climatic uncertainties). In the second stage, the project establishes a multiplication chain for the selected varieties within farming communities: 40 producers are already engaged in multiplication.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

A quantitative model of the economic impact of innovation adoption

The model allows for constructing scenarios and simulating economic outcomes in farms based on a variety of practices (including agroecological innovations/options). This innovative institutional tool will generate knowledge for decision-makers at the Ministry of Agriculture to facilitate the development of public policy instruments supporting agroecology. The model is being developed by the research teams of FOFIFA (National Center for Applied Research in Rural Development), in collaboration with CIRAD. It is co-financed by two DeSIRA projects in which FOFIFA is involved (MAKIS and DINAAMICC). This model will remain with FOFIFA researchers, and its outputs are expected to serve as a basis for discussions with decision-makers at the ministerial level.

• Multi-Agent System (MAS) for support mechanisms

A model for innovation support at the producer level is being developed. This model will help to understand and anticipate the complexity of innovation support : e.g. implications in terms of costs, spatial coverage (etc.) when using technicians or lead farmers to work with farmers on innovations. This institutional tool will generate knowledge for dialogue with NGOs, producer organizations, private actors, and -subsequently- with ministries on issues of extension and agricultural advice to help these organizations to improve the effectiveness of their interventions.

• The project works with 4 NGOs and producers' organizations. It raises their awareness of the complexity of fostering innovation and assists them in a participatory diagnostic of their capacity to support producers. In collaboration with "Expert Synergy Consulting" (a consulting firm based in Burkina Faso), CIRAD has designed a tool for diagnosing organizational capacities to support agricultural innovation in the Malagasy context. The tool includes questionnaires, survey results, and various sequences of collective work with the targeted organization and its close partners. The objective is to develop an action plan to strengthen the organizational capacity and the effectiveness of innovation support. This mechanism is a new institutional approach, and will be backed by a monitoring, evaluation and learning tool. An operational guide will be produced for use by any organization capable of supporting innovation, including outside Madagascar.

MAS (413022)

FAO (Food and Agriculture Organisation)

« Modelos Agroecológicos Sostenibles » : Modelos Pilotos, Horizontales y Sostenibles, de Gestión del Conocimiento y Transferencia de Tecnología en Agroecología

Start date: March 2022

End date (official): March 2025

Cuba

LIST OF PROJECTS

Data on Innovations updated as of: November 2023

The project objective is to develop, strengthen and implement an integrated knowledge management system in the agricultural sector in Cuba.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• In eight municipalities across several provinces, the project introduces **new crop varieties**. It supports a participatory breeding programme, involving farmers, researchers and extension agents. Together, they identify and select crop varieties that demonstrate resilience to local climatic and soil condition. Varieties are also selected for specific traits (e.g. taste, cooking time). The project focuses on 10 grain species and 60 varieties for horticulture, aiming at certification for certain varieties.

• It also introduces **agroecological practices**, for instance: introduction of medicinal and condiment plants, as a diversification strategy and in line with the governmental objective of producing extracts from these plants; soil fertility improvement practices (e.g. incorporation of organic matter, green fertilizers); water management practices (drip irrigation, best possible use of agricultural water in saline conditions); integrated pest management (e.g biological control, use of plant extracts as fungicides, insecticides, etc.); living barriers (farm design and slope management).

• **Innovative livestock production practices** include the integration of protein-rich plants into animal feed, genetic improvement, and pilot initiatives such as rotational grazing systems.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• Eight seed banks are being created. A seed bank is an innovative service for farmers, who can quickly access the seeds they need, e.g. in case of crop destruction due to extreme climatic events. Each bank places an emphasis on maintaining a diversity of seeds of cultivated varieties, suited to diverse ecological zones.

• The project has developed **a mobile application** "AGROTEC", to simplify access to crop technical sheets, providing farmers with quick and easy access to detailed information about crop varieties, planting conditions, irrigation techniques, and fertilization, all in one place. The application also links to a technical network, created by the project, with which farmers can interact. Farmers can also use the application to communicate among them (https://agrotec.upr.edu.cu/searcher).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has established the SAEN + C Observatory ("Observatorio Nacional de Soberanía Alimentaria y Educación Nutricional con Más Ciencia"), a knowledge management platform (https://observatoriosaen.upr.edu.cu/home). The observatory provides tools and resources for municipal-level management and decision-making, aiming to institutionalize agroecological practices and monitor progress in food systems. Though the project targets 8 municipalities, the tools can be used by any municipality. Among the tools developed in collaboration with the University of Pinar del Río:

-ATLAS SSAN, a digital platform to support the implementation and monitoring of Cuba's Law on food sovereignty and food and nutritional security (SSAN). It aims at facilitating the management, analysis, and visualization of information on food systems, agroecology, agricultural initiatives (<u>https://atlas.upr.edu.cu</u>);

-AGROMETRICS, an application designed to retrieve, compile, analyse, and share up-to-date scientific information on various topics related to agroecology (https://agrometrics.upr.edu.cu);

-ECOLREP, a national agroecology repository, which contains a wide variety of resources to promote sustainable and environmentally friendly practices in the agricultural sector (http://ecolrep.upr.edu.cu); -MediaTEKA SSAN, online media library on food production and agroecology (https://mediateka.upr.edu.cu).

Pillar I – Group 3

OBSYDYA (417846)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Observatoire Pilote des Paysages et des Dynamiques Agricoles du Bénin (Zones Nord et Centre)

Start date: April 2022

End date (official): March 2026

End date (likely): December 2026 (8-month no cost extension under discussion)

Benin

LIST OF PROJECTS

Data on likely end date updated on: 14/10/2024

Data on Innovations updated as of: March 2024

The scientific objective of the project is to explore and operationalize the possibilities offered by available satellite images to develop innovative indicators and maps of the dynamics of agricultural systems and landscapes in central and northern Benin.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The operational goal of the project is to create a **pilot observatory of agricultural systems and landscapes**, as a group of stakeholders sharing a service platform dedicated to exploiting spatial information, primarily from satellite data. This platform, an innovation for Benin, is a decision-making tool intended for institutional users: Ministry of Agriculture, Livestock, and Fisheries, especially its Information Systems Directorate and its territorial agricultural development agencies, research institutes, and producer organizations. This platform is expected to strengthen their capacity for infrastructure planning, agricultural advisory services, and coordination within value chains.

The platform is associated with two databases: a cartographic database and a database of indicators on agriculture, pastoralism, and natural environments.

Examples of maps produced by the project:

-Agricultural land use maps for 2022, for three sites targeted by the project;

-Landscape stratification maps (units and zones) for the period 2018-2022 (departmental scale).

Examples of indicators under development:

-Agriculture-related indicators: cultivated areas; road/market accessibility.

-Pastoralism-related indicators: location of water points; average NDVI (Normalized Difference Vegetation Index) anomaly of accessible areas by vegetation type; by measuring photosynthesis anomalies (which indicate stress periods), this indicator helps to identify decreases in grazing productivity and forecast yields compared to an average year.

-Natural environment-related indicators: aboveground carbon stocks and flows; hemeroby (i.e., an indicator evaluating the dynamics of human environmental impacts on agrarian systems and landscapes).

Pillar I – Group 3

PRISMA (425850)

ENABEL, AECID, LUXDEV (Belgian Development Agency; Agencia Española de Cooperación Internacional para el Desarrollo; Luxembourg Development Agency)

Projet de Recherche et Innovation pour des Systèmes agropastoraux productifs, résilients et sains en Afrique de l'Ouest

Start date: January 2022

End date (official): December 2025

Niger, Mali, Burkina Faso

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project contributes to an agroecological transformation of agro-pastoral systems, making them more productive, resilient, and healthy for animals, humans, and the environment.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The project capitalizes on existing pastoral resource management practices. Over a hundred initiatives were identified, with several selected for introduction in countries where they are not yet known. The process has started for the following innovations, all targeted at agro-pastoralists and pastoralists.

• Among best practices and initiatives to increase the availability of pastoral resources: Forage crops (dual-purpose and soilless, for instance soilless culture is practiced in Burkina Faso but not in Niger and Mali); High intensity pastoral labour was experimented in 2023 in Niger, while this practice is not yet known in Burkina Faso and Mali; Improved pastoral hydraulic system and simplified drinking water supply; Seeding pastures with preferred species.

• For improving accessibility to pastoral resources, a best practice consists in establishing grazing/rest areas along livestock passage corridors, with the aim of supporting pastoralists during transhumance.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

In 2023, the project capitalized on existing solutions, which it plans to scale up in 2024. To improve accessibility to pastoral resources, it focuses on a decision-making tool and a governance mechanism.

• **A pastoralism information system** helps herders to locate pastures, instead of traveling miles in search of grazing land; it also provides information on diseases, warning herders not to pass through disease-affected areas. It is accessible via an application (on smartphones) or by calling a number. This tool is new for the three target countries.

• The project addresses the appropriation of pastoral lands (farmer encroachment) by introducing governance mechanisms based on successful practices already implemented in certain countries. The aim is to encourage wider adoption of conflict mitigation mechanisms between farmers and herders: e.g. establishing social consensus among public and private stakeholders to reach prefectural-level decrees; this mechanism is currently in place in Niger and is being introduced in other countries.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The use of drones for monitoring developments is a decision-making tool for conservation and sustainable management of pastoral resources. It helps to determine the number of completed infrastructures (as there are many) and allows for assessing the level of forage development on restored sites.

• The **Pastoral Week** is a concept developed and led by pastoral NGOs in West Africa to highlight and promote issues related to pastoralism. It aims to bring together herders, public authorities, NGOs, and development partners. It focuses on several themes related to the management of pastoral resources, transhumance, conflict prevention between farmers and herders, and the preservation of pastoral lands. It also provides a platform to exchange best practices, share innovations, and strengthen cross-border cooperation, particularly in the context of transhumance between neighbouring countries. In November 2023, the first edition of the Pastoral Week took place in Niger, supported by the project.

Pillar I – Group 3

Prosilience (424815)

GIZ (Gesellschaft für Internationale Zusammenarbeit GmbH)

Enhancing soils and agroecology for resilient agri-food systems in Sub-Saharan Africa

Start date: June 2021

End date (official): March 2025 (including a 3 month no-cost extension already granted, except for Benin)

Benin, Ethopia, Kenya, Madagascar

LIST OF PROJECTS

Data on Innovations updated as of: November 2023

The specific objective is to enhance the agroecological transition towards sustainable agri-food systems.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The project develops, tests and adapts innovations for AgroEcology (AE). It assesses key factors for their successful implementation at large scale, including their transfer beyond the intervention areas.

• In **Benin**, research activities focus on fodder production and marketing; valorisation of mushroom production residues to improve the production of garden products; growth/performance of fodder grasses under water stress conditions; evaluation of the effectiveness of biopesticides and plant extracts in Terra Preta (fertile soil made by adding biochar, organic matter and nutrients) for the control of the okra and tomato pest complex. The project has trained 3,405 farmers (43% are women) on AE measures.

• In **Ethiopia**, the project has promoted crop rotation, mulching, permanent soil cover, integration of trees and recycling of nutrients. Farmers have chosen to start agroforestry with different grafted fruit trees, to apply Integrated Soil Fertility Management and to plant fodder. To reduce the pressure on woodlands, options for fuel efficient stoves were investigated, including a promising locally produced pyrolytic stove. The project has set up 25 biogas plants on pilot farms in cooperation with the National Biogas Programme.

• In **Kenya**, a theoretic assessment of the business potential of three main AE inputs (Mucuna bean, vermicast and vermijuice, handheld tools for minimum tillage) has been carried out. Vermijuice has been prioritized for commercialization. The project also trained 2,500 farming households on AE technologies.

• In **Madagascar**, research and innovation activities focused on biological pest control, land management practices (e.g. contour farming), agroforestry (e.g. hedgerow planting, tree planting on summit areas), soil fertility management practices (e.g. testing and production of vermicompost, crop associations), pasture management (e.g. hedgerow planting in grazing areas), adaptation to climate change (e.g. new varieties of food or forage crops with short cycles and/or adapted to conditions).

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• In **Benin**, the promotion of the **Participatory Guarantee System (PGS) for AE products and seeds** is integrated into the National Strategy for Ecological and Organic Agriculture. The PGS enables small-scale farmers to verify and ensure the quality of their products and seeds through community-based certification.

• In **Ethiopia**, the project is in the process of scaling out a **mechanization leasing scheme** and the service provider model, to enable access to machinery suitable for AE practices such as liming and (possibly) fodder processing/harvesting in order to reduce women's workload. With project support, community-based organizations have developed and agreed on by-laws to manage their resources collectively. The aim was to limit free grazing (a risk for fodder crops, that could limit their adoption) and crop residues. More than 2,000 ha were closed off by 62 communities for natural regeneration.

• In 3 countries (Benin, Kenya, and Madagascar), farmers have access to a new form of extension service with model farms (or field schools in the case of Madagascar) installed to facilitate upscaling and mainstreaming AE at all levels: 211 model farms in Benin, 343 in Kenya, and 144 fields schools in Madagascar.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project introduced the **Tool for Agroecology Performance Evaluation (TAPE)**, developed by FAO to measure AE transition. In Benin, Ethiopia and Kenya, GIZ supports the World Agroforestry (ICRAF) in implementing its « Measuring Agroecology and its Performance » (MAP) project. MAP aims to build stakeholders' capacity in measuring the impacts of implementing AE (approach and measures) and provides data to inform decisions at all levels. Implemented in close collaboration with FAO, MAP uses TAPE to assess AE impact through field analyses, it tracks progress towards transition, showcases impact at field and farm level, and identifies scaling opportunities. CIRAD is in charge of implementing TAPE in Madagascar.

RAIZ (424933)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Promoting agro-ecological intensification for resilience building

Start date: December 2021

End date (official): December 2025

End date (likely): December 2026 (12-month no-cost extension under discussion)

Zimbabwe

LIST OF PROJECTS

Data on likely end date updated on: 03/10/2024

Data on Innovations updated as of: February 2024

RAIZ seeks to develop and implement scientifically tested agroecological approaches in Zimbabwe to improve agricultural production and resilience to climate change.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• Working with 156 farmers, the project is testing **six agroecological (AE) practices** with most potential in terms of uptake, intensification, adaption and mitigation. These are known by some farmers, but new for others:

- Intercropping maize/legume to provide fodder for livestock and nutritious grains for human consumption;

- Crop residue mulching to preserve water, decrease weed emergence, and sequester carbon;

- Integrated soil fertility management with combined mineral and organic inputs;

- Rotation with intercropped groundnut and pigeon pea to provide fodder for livestock and nutritious grains for human consumption;

- Push-pull maize-desmodium intercropping to combat fall armyworm (i.e. use of plants that repel unwanted insects and attract beneficial ones; Desmodium, a legume, produces chemicals that repel the fall armyworm, notorious for attacking maize).

- Diversification with traditional grains (sorghum) to improve resilience to drought.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project designed and is implementing **a digital climate service** within the framework of the PICSA method (Participatory Integrated Climate Services for Agriculture). The PICSA method aims at providing context specific climate information to help farmers to adapt their farming decision accordingly. Through WhatsApp and text-messaging channels, the Meteorological Department service sends regular weather forecast to ARDAS (Agricultural Rural Development and Advisory Services) and to targeted farmers.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has developed and is disseminating a **standard research methodology**. The research focuses on three scales: field, farm, and landscape. At the field level, research involves on-station trials and trials in farmers' fields to compare management practices across diverse environments. Drivers of agronomic and environmental performance are modelled. At the farm scale, the methodology focuses on understanding farmers' decision-making processes. At the landscape level, it uses satellite imaging, participatory mapping and spatial modelling to identify landscape management options that balance food security with natural resource preservation. The methodology is underpinned by a living lab on agroecology, i.e. a multi-actor approach where farmers, researchers, government (extension services, local authorities, policy makers) and industry co-create AE intensification innovations in the context of semi-arid and subhumid climates.

• To support extension and advisory services on AE, the project is developing a **user-friendly farming system decision support framework**. This tool is a diagnostic and project formulation guide to help farmers to assess their operational flexibility and to identify the best technical solutions for crops and livestock, tailored to their farm's structure, environment, and available human resources, among others.

• The project is introducing **multi-scale simulation models** to assess the potential impact of agricultural policy instruments in support of agroecological intensification, such as subsidy credit, insurance, and inputs. These models will evaluate effects on household income, the attractiveness of agroecological practices, food security, and agricultural production at the regional level.

RE-FARM (429168)

Università degli studi di Firenze

Research on agroecological innovations for increasing resilience to climate change in Cuanza Sul and Benguela

Start date: July 2022

End date (official): June 2026

Angola

LIST OF PROJECTS

Data on Innovations updated as of: June 2024

The project aims at enhancing research and innovation on agroecological practices addressing climate change adaptation and resilience of family farming in two provinces of Angola (Cuanza Sul and Benguela).

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

As of June 2024, the project had engaged 304 farmers.

• The project tests (in-field) and assesses the suitability of a diversity of **agroecological practices** including: Push–pull biological pest control (i.e. the use of plants that repel unwanted insects and attract beneficial ones); Diversified rotations (e.g introducing a legume crop or a green manure crop in the rotation), maize and beans-based agroforestry systems with nitrogen-fixing trees for the restoration of degraded and low-fertility soils (agroforesry used to be practised decades ago but the practice was lost and is thus reintroduced); Introduction of neem plant in the farm plots to create a border line for pest control (neem exists in the wild but was not grown in the farm plots).

• Similarly, the project is testing seven **water management practices**, aimed at improving water conservation, reducing erosion, and enhancing crop production by managing rainfall efficiently. Examples of techniques include: Semi-circular bunds (water-holding barriers built in a semi-circular shape around plants or crops); Contour trench cum Bund (combination of trenches and bunds along the contours of the land, designed to slow down water flow, improve water infiltration, and reduce soil erosion); Earth embankment with ridge planting; Trashlines (lines of crop residues are placed across the slope to slow down water flow, reduce erosion, and enhance water infiltration into the soil). The project is also testing combinations of water harvesting and agronomic practices (e.g. half- moons with manure/compost).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project has introduced an **innovative process for engaging communities and public sector institutions** (including extension services, researchers, and academics) in co-designing and co-deciding on the choice of agroecological (AE) and water management practices to be implemented at the farm level. This process did not exist previously and is being developed as a new approach. Ongoing discussions are focused on how this process can be formalized, so future innovations can be developed using the same collaborative method. The process is a best institutional practice, involving regular field meetings with stakeholders, including farmers, local administrations, and public sector representatives. This approach aims to ensure ownership by the local community and public sectors. An article will be published to share insights on this method and its potential outcomes. A key part of the process includes the gathering of scientific data (such as soil and climate information), which directly feeds into the participatory decision-making process.

Robust (427759)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Robusta coffee agroforestry to adapt and mitigate climate change in Uganda

Start date: December 2021

End date (official): November 2025

End date (likely): June 2026 (7-month no cost extension under discussion)

Uganda

LIST OF PROJECTS

Data on likely end date updated on: 16/09/2024

Data on Innovations updated as of: November 2023

The objective is to support the sustainable economic development of Uganda by promoting and improving the Robusta coffee agroforestry farming system.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• Working with the Uganda Coffee Farmers Alliance (124 cooperatives primarily composed of smallholder farmers), the project is designing an **integrated Coffee-Agroforestry package** promoting coffee and shade tree interactions. The results of the research, combined with existing knowledge, will be used to produce a guide/manual, which will include recommendations in terms of new varieties and practices (agroforestry, as such, already exists). For instance, 10 (known) tree species are being tested for their influence on soil quality and coffee health and yield. The project is also evaluating the performance under shade of **3 coffee varieties** that are new to Uganda, one of which is resistant to Coffee Wilt Disease (CWD).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

The project develops and promotes many innovations for use at institutional level.

• Coffee farmers' cooperatives are organized into operational hubs channelling training, guidance and support. Through a participative approach, the hubs elaborate their own Coffee-Agroforestry (C-Af) **Action Plan**, an innovative concept in support to the adoption of innovations, including Af techniques.

• CIRAD and NaFORI (National Forestry Resources Research Institute) are developing a protocol for a **Participatory Pedoclimatic Monitoring Network (PPMN)**, to track and monitor soil and climate variables in a participatory manner, involving various stakeholders. It is adapted to the scales of hydroclimatic variability of C-Afs in Uganda and to the associated socio-economic landscape.

• In partnership with IRD (Institut de Recherche pour le Développement), NaFORI is **modelling the effects of climate change on a small scale** (at plot/producer level). The aim is to measure soil changes, particularly in terms of mineral content and water balance, as they are expected to evolve with climate shifts.

• In a paradigm shift, moving away from the systematic fight against bacteria and fungi, the project studies the living organisms that are part of a biome (a community of microorganisms that forms a complex and dynamic ecosystem within their habitat), to better explain the plant performance through its microbial environment. The purpose is to develop an innovative surveillance strategy for predicting plant behaviour regarding future pathogen attacks based on plant microbiota monitoring.

• The project not only builds on existing work to complement the on-site core collection of Robusta coffee of NaCORI (National Coffee Research Institute), but also conducts genetic characterization of the collected population, based on **new methodologies for analysis, sequencing, and analysis of DNA sequencing.** Similarly, **new protocols supports the phenotype characterization** of the collected population.

• Building on existing models used in Latin America to predict Coffee Leaf Rust, the project has developed **two conceptual models**, adapted to the Ugandan context, to measure the specific impact of two insects on coffee production. This is an innovation for NaCORI.

• The **ROBUST project web platform**, intended for use by cooperatives and coffee processors, allows compliance with the EU Deforestation Regulation to combat global deforestation and forest degradation. For instance, the production's traceability is ensured via procedures that allow real-time monitoring of production, possibly from the field to the container. A community of 12 cooperatives is already using it.

• An original **landscape characterization tool** (fully developed by the project) has been used to produce the most precise forest cover map currently available for the country.

SANTES-TERRITOIRES (422694)

CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

La santé (des hommes, des animaux, des plantes) comme levier de développement dans le cadre de la transition agroécologique

Start date: May 2021

End date (official): May 2026

End date (likely): December 2027 (18-month no cost extension requested)

Senegal, Benin, Laos, Cambodia

LIST OF PROJECTS

Data on likely end date updated on: 01/10/2024

Data on Innovations updated as of: May 2024

"Health & Territories" aims at designing, testing and evaluating an innovative participatory and inclusive approach to accompany the agroecological transition by improving the health of human, agricultural production systems and the environment conjointly, and then positively and sustainably impact the livelihood of populations in given territories.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

In the 4 target countries, the project is currently working on various innovation pathways:

• In Senegal, within the framework of a Living Lab (LL, see below), the project develops an **integrated agro-ecological (agro-aquacultural) farm ideotype**. This is an ideal concept towards which LL actors are striving, to address the challenges of agroecological transition and health issues in the Lac de Guiers area.

• In Senegal, the project is co-developing a **model for a fodder crop supply chain** to restore soil health and maintain livestock. With the Compagnie Sucrière Sénégalaise, it is setting up fodder crops for the livestock farmers in the targeted zone. The aim is to ease the conflict (competition for land and water) between sugarcane production and milk production, which is tied to traditional extensive livestock farming.

• In Senegal, another innovation pathway involves an **integrated system of domestic uses for the water** of Lac de Guiers, on order to combat bilharzia, particularly among women.

• In Benin, experiments are focusing on **rotational grazing techniques** to resolve conflicts between farmers and herders, on **biopesticides** to replace conventional pesticides, and on the **redox potential of cotton** (or oxidation-reduction potential) to qualify the susceptibility of the plant to diseases.

• In Laos, an experiment focuses on **compost from bamboo waste mixed with cow manure**. The goal is to link and use residues to improve soil and crop health, as well as environmental and human health.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• In Senegal, **better management of the fishery resources** of Lac de Guiers aims at addressing conflicts of use between local and Malian fishermen. The Mbane LL has initiated a participatory modelling process with local stakeholders. The main objective is to co-construct a shared understanding of the fishery systems, better comprehend the economic and social dynamics, and explore, particularly through dialogue between Senegalese and Malian fishermen, practices and regulations to ensure the sustainability of fishing.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The **Living Lab** (LL) is an innovative concept that serves as a platform for dialogue between science and society, anchored in local institutions. Its objective is to bring citizens and scientists together to co-create solutions to agricultural and agri-food challenges.

• For the four target countries, **participatory engineering**, which underpins the operation of a LL, is an institutional innovation, particularly for the researchers of the project partners. It is a set of tools and methods aimed at enhancing citizen participation and supporting innovation processes in agricultural and food systems. The goal is for citizens to be the central actors in developing and selecting solutions that allow them to adapt to ongoing changes and support transitions. Participatory engineering relies on various tools and support approaches aimed at generating scenarios: e.g. Companion Modelling ('ComMod'), a tool for presenting and simulating a situation that encourages discussion among local actors ; Anticipation, i.e. participatory foresight that explores possible futures to identify strategies to avoid undesired developments in the present.

Pillar I – Group 3

STAR-FARM (426790)

FAO (Food and Agriculture Organisation)

Smart Agro-ecological Transformation of Farming Systems towards Resilience and Sustainability in Middle and Coastal Zones of the Viet Nam Mekong Delta

Start date: July 2023

End date (official): April 2027

Vietnam

LIST OF PROJECTS

Data on likely end date updated on: 03/09/2024

The objective is to facilitate smart agroecological transformation of agri-food farming systems of the Viet Nam's Mekong Delta and strengthen resilience to climate change, environmental degradation, and other external shocks.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

No preliminary results as of September 2024: activities were just starting.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

No preliminary results as of September 2024: activities were just starting.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level No preliminary results as of September 2024: activities were just starting.

Pillar I – Group 3

STREAM (423942)

FAO & GIZ (Food and Agriculture Organisation & Gesellschaft für Internationale Zusammenarbeit GmbH)

SusTainable Resilient Ecosystem and Agriculture Management in Mongolia

Start date: May 2021

End date (official): April 2024

Implementation was over at the time of data collection (10/2024)

Mongolia

LIST OF PROJECTS

Data on Innovations updated as of: April 2024

The project has two components, agriculture and forestry. Both aim at increasing the capacity of communities in two provinces to implement sustainable long-term landscape management. This approach includes reducing livestock numbers in the target areas and diversifying production.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• Agriculture component - The project developed concentrate feed pellets and salt mineral blocks based on new formulas. 1600 herders have procured these products, manufactured by a local company, to maintain the production level while decreasing the size of the herds. Agroforestry (AF) is an innovative production system in the targeted areas. The project has established AF pilot demonstration sites, in collaboration with the School of Agroecology of the Mongolian University of Life Sciences. A total of 1449 individuals participated in trainings on agroecology, AF, vegetable cultivation, and tree-planting techniques.

• Forestry component - Sustainable Forest Management (SFM) best practices are the main innovation. The project set up 100 pilot sites in 6 soum (districts) across 2 aimag (provinces) where the stakeholders (150 members of Forest User Groups -FUGs- most of them herders), apply their knowledge: e.g. forest thinning (see below), forest fire management, conservation and utilization of Non-Timber Forest Products. **Beekeeping**, introduced in two soums (Selenge), is also new for the targeted forest users.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **Agriculture component** - **Artificial insemination for sheep** is a new service for the herders. It helps to improve sheep breeds. Laparoscopic insemination equipment was provided to a Suffolk sheep pedigree farm, to generate a larger quantity of purebred rams within a shorter timeframe and to contribute to the accelerated weight gain of cross-bred lambs.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **Agriculture component** - The project supported the development of a **feed production capacity** to produce concentrate feed pellets and salt mineral block to supply local herders. It also supported the development of a **dairy production capacity** (five types of products) run by a female herders' group.

• Forestry component - A model of forest management underpinned by Sustainable Forest Management (SFM) best practices targets forestry experts and Inter Soum Forest Units. In addition to practices targeting FUGs (see above), several practices were introduced: e.g. forest thinning at different levels (a practice that involves selectively removing certain trees to improve forest health, increase resilience, and reduce the risk of wildfire), occupational safety and health in timber harvesting, training in GIS software applications (to manage, analyse, and visualize spatial data related to forest ecosystems), etc.

• The **STREAM store**, developed with Mendel University (Czech Republic), is an innovative decision support tool designed to assist in SFM planning and best practice management. This comprehensive information system stores data from 120 pilot sites, integrating geo-referenced information on site conditions, SFM treatments, and experimental methods to protect trees from livestock, such as repellents, individual fencing, and soil scarification to retain seeds against wind erosion. The database tracks tree survival rates across different species and includes climatic data, forest inventory details and permafrost data.

• An innovative measure is the **provision of local subsidies to assist FUGs in forest thinning,** to address the issue of limited budget at soum level. For example, one FUG received a subsidy and was able to establish a forest enterprise, which is authorized to conduct forest thinning at levels 3 and 4 (allowing the removal of larger, older trees) unlike regular forest users, who are restricted to cleaning and basic thinning (levels 1 and 2). Besides, the FUG was able to send one of its members to university to specialize in forest management.

SUSTENTA e INOVA (423636)

SEBRAE/PA (Serviço de Apoio às Micro e Pequenas Empresas do Estado do Pará)

Sustainable and innovative agriculture and value chains in the Brazilian Amazon

Start date: July 2021

End date (official): July 2025

End date (likely): July 2026 (including a 12-month no cost extension under discussion)

Brazil

LIST OF PROJECTS

Data on likely end date updated on: 25/10/2024

Data on Innovations updated as of: July 2024

The project operates in three distinct territories in the state of Pará:

-Marajó Island is known for its complex ecosystems and the presence of traditional communities; activities aim at landscape restoration and sustainable business development.

-Xingu (Transamazônica): in this area, the project focuses on improving the livelihoods of family farmers through sustainable practices, agroforestry systems, and efforts to increase market access.

- Capim River (Belém-Brasília Highway): activities revolve around policy support, sustainable agro-industrial practices, and innovative business initiatives, engaging cooperatives and rural enterprises.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• In the three territories, the project has introduced **agroforestry** and related practices as a new farming system. To prevent further deforestation and restore already degraded land, targeted communities are supported in reforesting with native Amazonian species, along with high-value crops such as cocoa and açaí (a berry). Agroforestry is considered an innovation, as it was not practiced before the project began.

• In areas where the forest is still present, the project partner EMBRAPA (Empresa Brasileira de Pesquisa Agropecuária) is testing and implementing the **concept of "minimal impact technologies »**, specifically aimed at riverside communities on Marajo Island. The concept is based on key principles such as maximizing the productivity of the forest without using chemicals or introducing non-native species; all species must be indigenous to the Amazon region. Additionally, the approach emphasizes the importance of respecting and preserving the traditional way of life of riverside communities.

• The project has introduced **stingless bee farming**, an innovation for the communities. Bee keeping complements agroforestry by pollinating trees and contributing to increasing the production of açai berries (a Non-Timber Forest Product or NTFP). It is also compatible with the concept of "minimal impact technologies".

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project facilitates connections between smallholder farmers and financial institutions, as many farmers lack the proper land documents needed to access financial services. CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement), a partner, supports the development of a **green financial product linked to sustainable practices and environmental regulations.** Targeting both cattle ranchers and agricultural producers, this product aims to provide an easier-to-access and affordable credit.

• The project has supported the introduction of a **governance mechanism for the collective production of NTFPs**, such as açaí and cupuaçu, both fruits from native species. This mechanism, aimed at preventing further deforestation, promotes minimal impact management techniques at the community level. It is an innovation, as NTFPs were previously harvested individually, sometimes using harmful methods like fire. The mechanism has been co-developed by EMBRAPA and a pilot community on Marajó Island, one of the poorest communities in Brazil. The community is now organized as a cooperative.

• Similarly, to help targeted communities to better organize and manage resources, CIRAD has introduced **collective farming** for regular crops or ranching without the use of fire. This concept stems from multi-stakeholder platforms. A group of small farmers, who have benefited from a land distribution programme collectively invests in an area, works the land, and shares the products of their labour. The project has organized and trained 32 communities in practicing collective farming at a pilot level in the Capim River region. This approach helps to minimize conflicts over the most fertile land.

SUSTLIVES (422681)

AICS & CIHEAM-IAM (Agenzia Italiana per la Cooperazione allo Sviluppo & Centre International de Hautes Etudes Agronomiques Méditerranéennes - Mediterranean Agronomic Institute of Bari)

SUStaining and improving local crop patrimony in Burkina Faso and Niger for better LIVES and ecosystems

Start date: August 2021

End date (official): July 2025

Burkina Faso, Niger

LIST OF PROJECTS

Data on Innovations updated as of: July 2024

The project seeks to diversify production systems by introducing NUS (Neglected and Underutilized Species), resilient and locally adapted species with good nutritional characteristics.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• NUS are the main innovation. Research and innovation activities include a participatory evaluation and selection of accessions, valorisation (processing), and awareness-raising on their use. From a large collection of accessions/varieties, **8 NUS were selected for evaluation**: amaranth, bambara groundnut (legume), cassava, fabirama (carbohydrate-rich tuber), okra, moringa, Guinea sorrel and sweet potato. The evaluation began with characterization and then experimentation (cultivation) under farming conditions. Selection criteria were proposed by both researchers and farmers, particularly women. They can be influenced by the processing conditions of the NUS. For example, for bambara groundnut (also known as voandzou), women suggested the criterion of "cooking time", which affects energy consumption. This approach significantly reduced the number of accessions (initially, there was a collection of 200 varieties or accessions just for bambara groundnut). For each species, at least 3 accessions/varieties were selected. For each NUS, the research process will result in the development of a product specification, supported by an agroecological approach for fertility management, pest control, disease management, etc. As of July 2024, for these 8 NUS, seeds were produced, distributed to and cultivated by 285 beneficiaries (185 in Niger, 100 in Burkina Faso).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

Innovations aim at strengthening the actors in the NUS value chain and the innovation system around NUS.

• Seasonal food availability calendar : A decision-making tool describing the food availability (local/market) throughout the year, aiding farmers, consumers, and development actors. Documented in French and in local languages for 147 species across Niger (70) and Burkina Faso (77), involving 585 participants (277 women) in evaluating the seasonal availability of NUS and their products.

• **Market Data for NUS**: Integration of 6 NUS into market systems, to provide price trends, quantities, and key market data, strengthening supply-demand chains for producers and governments.

• **Product Innovations**: Support for 16 startups transforming local raw materials (e.g. moringa, sweet potato, cassava) into enriched foods, cosmetics, and consumer products.

• **FabLab approach** introduced to the two partner universities as a model for the development and management of business laboratories.

• **Technology Transfer model**: the project strengthened the technology transfer/incubation centres in two universities with models to incubate NUS-focused startups, fostering partnerships, and building an autonomous innovation ecosystem. The innovation consists of a shared construction of the technology transfer model for each incubation centre. Both centres are now equipped to incubate and support startups (business plans, marketing plans, needs analysis, investment strategy, etc.) focused on NUS, which was not previously the case. They managed two calls for NUS startups.

• **Conceptual transition framework for NUS:** it allows to understand the dynamics of NUS integration into local diets and food systems. This framework explains why and how a NUS does or does not become a major crop depending on the institutional and techno-economic context (e.g. competition with other crops).

• **Model for assessing the sustainability of NUS:** a tool to assess NUS sustainability (environmental, socio-cultural, economic) compared to major crops, providing recommendations for research, value chain actors, and policymakers. For each NUS, the model uses a major crop as a reference to determine the substitution potential of the NUS : e.g. in Niger, cassava and sweet potato are studied in reference to potatoes.

TRANSITIONS P1 Metrics (428851)

Managed by IFAD (International Fund for Agricultural Development), implemented by the International Centre for Research in Agroforestry (ICRAF)

Agroecological Transitions for Building Resilient and Inclusive Agricultural and Food Systems Program: Holistic performance metrics - Project 1 (P1)

Start date: September 2022

End date (official): September 2026

Miscellaneous Countries

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The overall objective of the project is to enable agroecological transitions through the adoption of holistic metrics for food and agricultural systems performance.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• As part of its specific objectives, the project is **developing a meta-framework for holistic systems assessment** tailored to the needs of diverse stakeholders. Departing from traditional prescriptive frameworks, this is a flexible and user-centric approach to systems assessment in agri-food systems, emphasizing co-design, inclusivity, and adaptability. It allows users to design their own assessment systems while following clear principles and steps.

The meta-framework includes a comprehensive metrics database, innovative in its breadth and depth of metrics and in its co-design with a diversity of potential metric users. The meta-framework is enhanced by a systematic review process leveraging generative Artificial Intelligence (AI), which -according to the project- is the most extensive review of holistic systems assessments and metrics ever conducted, not only in terms of the number of assessments reviewed but also in the spatial scales considered and geographic scope. In the review process itself, the project has developed and employed a novel approach to screening and labelling large numbers of articles using generative AI/language models, increasing the efficiency of the review process.

The meta-framework is currently being tested in projects with global partners to refine its applicability and effectiveness: the IFAD-funded Global Programme for Small-scale Agroecology Producers and Sustainable Food Systems Transformation Project (GP-SAEP) Component 3 (on Rural Advisory Services) led by GFRAS (Global Forum for Rural Advisory Services); the International Climate Initiative (IKI)-funded "Regenerative Ranching and Agriculture" project led by The Nature Conservancy.

TRANSITIONS P2 ATDT (428851)

Managed by IFAD (International Fund for Agricultural Development), implemented by Bioversity International (Alliance of Bioversity & International Center for Tropical Agriculture - CIAT)

Agroecological Transitions for Building Resilient and Inclusive Agricultural and Food Systems Program: Inclusive Digital Tools - Project 2 (P2)

Start date: January 2022

End date (official): December 2024

Brazil, Vietnam

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The goal of the project is to enable agroecological transitions through adoption of inclusive digital tools.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project has developed innovative tools to bridge the gap between technical advisory services and practical field-level implementation. The tools focus on low-emission practices, agroecological transitions, and climate resilience. Three innovations -FarMoRe, the Water Level App, and Solis- are designed for use by both farmers and extension agents. Farmers are the direct users of the Water Level App (Vietnam) and of Solis (Brazil), with partial use of FarMoRe for performance tracking. The two innovations (Solis and the Water Level App) are reported in this section. Extension Agents are the main users of FarMoRe (reported below, in the section on innovations for use beyond farm level), with supporting roles in Solis to facilitate communication and advice.

• In Brazil, "Solis" is a farmer-facing digital interface that enables smallholder farmers to identify and prioritize the necessary steps to improve their management and production practices towards climate-resilient agroecological outcomes. This technical assistance tool facilitates communication between farmers and extension staff. It replicates the user experience of social platforms used by producers (i.e., WhatsApp), by combining top-down (expert-to-farmer) with bottom-up (farmer-to-expert) & peer-to-peer (farmer-to-farmer) communication to foster the co-creation of locally relevant agroecological practices.

• In Vietnam, the project developed **a Water Level App** that provides farmers with daily SMS alerts of the water level in their rice fields. The purpose is to overcome uncertainties in managing the water for low-emission rice, water savings/efficiency and climate change adaptation.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• In Vietnam, **"FarMoRe" is a farm-activity monitoring and reporting tool,** co-developed with farmers, extension agents, and cooperatives in the Mekong River Delta. It track and assess performance and progress in terms of sustainability and agroecological transitions at both farm and cooperative levels. FarMoRe is integrated into and contributes data to the national Rice Activity Monitoring and Reporting system (RiceMoRe) for carbon accreditation and product certification. RiceMore is governmental digital data platform which records standardized data on rice management that are aligned with global carbon accreditation standards. FarMoRe supports tailored farming advice, emphasizing sustainable practices and agroecological transitions. The primary users are extension agents who can monitor and evaluate farmers' performance over time and provide tailored technical advice based on sustainable practices.

• The project has also developed an **Application Programming Interface (API)** for a rice-specific GreenHouse Gas (GHG) calculator, through which the users receive data on their GHG emissions from farming as well as their benchmarked performance on other practices. This innovation enables digital developers to integrate the rice carbon calculator on different digital platforms. It is integrated into FarMoRe.
TRANSITIONS P3 PSii (428851)

Managed by IFAD (International Fund for Agricultural Development), implemented by Bioversity International (Alliance of Bioversity & International Center for Tropical Agriculture - CIAT)

Agroecological Transitions for Building Resilient, Inclusive, Agricultural and Food Systems Program: Private Sector Incentives and Investments (PSii) Project (P3)

Start date: January 2022

End date (official): September 2026

Vietnam, Peru, Ethiopia

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project is designing private and private-public-sector incentive mechanisms/models to promote the AE transition in selected value chains in 3 countries: the wheat value chain in the Oromia region (Ethiopia), the rice value chain in the Mekong River Delta (Vietnam) and the cocoa value chain in the Amazonas and Ucayali regions (Peru). As of December 2023, innovation processes were ongoing in Ethiopia and Peru. They were yet to start in Vietnam.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

• In the wheat value chain, in the Oromia region of Ethiopia, the project promotes a "bundled innovation", which is a comprehensive package combining AgroEcological (AE) practices, salinity and droughtresistant wheat varieties, and agro-climatic advisory services. This bundled approach is innovative as a whole, even though some individual practices may not be considered innovative on their own. As of December 2023, about 1000 Ethiopian farmers directly benefited from project support and were implementing the following AE practices: Site-specific, optimal use of organic fertilizers (e.g. compost, vermicompost); Crop rotation between fava bean and wheat to improve soil health (the combination is innovative, and fava bean is made accessible and available); Desho grass (a perennial grass) for biological soil conservation, with its dense root system that limits runoff and reduces soil erosion, while also serving as livestock feed; Incorporation of crop residues; Construction of soil bunds for erosion control; Diversification through home gardening.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project develops **market-related incentive mechanisms** (price incentives and input subsidies). In Ethiopia, these mechanisms promote the adoption of no-till conservation agriculture, salinity, and drought-resistant wheat varieties. In Peru, they support zero deforestation cocoa supply chains. For instance, price incentives are an innovation in the cocoa value chain in Peru because the private sector offers a market premium to cocoa producers who adopt AE practices, which was not the case before the project. Subsidising the preparation of the Bokashi compost (a fermentation-based method of composting organic waste) in the cocoa value chain in Peru is aimed at encouraging producers to use it.

• Another key innovative mechanism is a traceability tool that integrates metrics to promote AE practices and zero-deforestation cocoa production and supply chains in Peru. For the first time, a comprehensive set of indicators based on biodiversity, economic, social, and environmental aspects, aligned with AE principles, was developed for the cocoa sector in Peru. The tool tracks the cocoa from production to consumption, with the final product carrying a code that allows consumers to access information on the AE practices used in production and EU Deforestation Regulation (EUDR) compliance. The data collection system, already developed, uses blockchain technology, providing a transparent ledger accessible to all actors in the value chain. Cooperatives and private sector actors are the intended users of the traceability tool, to support Corporate Social Responsibility reporting and to ensure EUDR compliance.

UAKIS (427191)

UNDP (United Nations Development Programme)

Supporting an inclusive transition to "green" economy in the Agrifood sector and a "climate-smart" Uzbek Agriculture Knowledge and Innovation System - fostering investments for climate change adaptation and mitigation

Start date: November 2021

End date (official): September 2025

Uzbekistan

LIST OF PROJECTS

Data on Innovations updated as of: December 2023

The project contributes to a transition to a "green" economy and to the implementation of a "climate-smart" Uzbek Agriculture Knowledge and Innovation System.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The project supports 18 Innovation Groups in 3 regions of Uzbekistan (Tashkent, Fergana, Kashkadrya). The groups test innovations, mostly at farm level, and share the findings and recommendations with farmers.

As of December 2023, they were developing/testing innovations in the following areas:

• New drought and heat-resistant varieties and seed development - For instance: Introduction of two varieties of soft wheat ; Implementation of two new cotton varieties (also pest-resistant); Introduction of a new mungbean variety (also resistant to salinity), and of high-yielding pistachio varieties ; Introduction of a locally developed organic tomato variety, coupled to solar-powered drying technology ; Introduction of promising non-traditional crops (e.g. this is the first time research institutes test okra and artichoke ar farm level) ; Introduction of two durum wheat varieties for pasta production (typically imported) ; Seed production of three new spring wheat varieties, and demanding less water than traditional autumn varieties.

• **Water-saving and irrigation technologies** - For instance: Drip irrigation methods applied to wheat, an innovation in Uzbekistan ; more generally introduction of water saving technologies in water-scarce areas such as production of green manure crops using solar-powered drip irrigation.

• **Livestock and Aquaculture Innovations** – For instance : Introduction of merino sheep breed to improve meat and wool production; this breed has a favourable effect pastures in a semi-desert environment (Merino sheep tend to be selective grazers, often grazing in a way that does not severely damage the root systems of plants); Introduction of two innovative techniques for intensive fish farming in small reservoirs (solar-heated water systems to prolong the growing season; water filtration system to recirculate the water).

• **Soil fertility and land rehabilitation** – For instance: Bioremediation of saline soils (the technology uses microorganisms and organic matter, to reduce salt concentrations.

• Other innovations include the introduction of **vine grafts** (rootstock and scion) and of **biological control methods** against the Whitefly pest on vegetable crops.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• **Innovative cooperative-like approach of collecting milk** from smallholder farmers, organized by women in several collection points.

• Artificial insemination (with semen from Merino sheep breed) as a service to farmers to improve meat and wool production.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• In vitro cultivation technology for vine grafts, an institutional innovation, which aims at producing rootstock and scion for farmers.

• **Pasta processing**; the innovation is for the private sector and it is linked to the introduction of durum wheat varieties (see innovations for use at farm level).

• Introduction of **in vitro microclonal reproduction technology** for high-yielding pistachio varieties.

• The concept of **"innovation group"** is new for Uzbekistan. Innovations groups are typically led by a research institution and involve multiple stakeholders to test innovations at farm level until products, techniques, services can be recommended to farmers and further disseminated.

WATDEV (425767)

AICS & CIHEAM IAMB (Italian Agency for Development Cooperation & Centre International de Hautes Etudes Agronomiques Méditerranéennes - Mediterranean Agronomic Institute of Bari)

Climate Smart WATer Management and Sustainable DEVelopment for food and agriculture in East Africa

Start date: January 2022

End date (official): December 2025

End date (likely): June 2026 (6-month no cost extension under discussion)

Kenya, Ethiopia, Sudan, Egypt

LIST OF PROJECTS

Data on likely end date updated on: 22/10/2024

Data on Innovations updated as of June 2024

The goal is to improve the knowledge and management of ministries and research institutions on water and to develop innovative solutions and skills of farmers and local actors on water management

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

The project has collected and created a repository of 191 Best Management Practices (BMP) available at: https://www.watdev.eu/water-management-knowladge-portal). It defines BMP as an "action, activity, project embedding successful and sustainable water management solutions or water management techniques aimed at increasing agricultural productivity or reducing impact on water resources, soil, ecosystems or mitigating climate». Among the 191 BMPs, farmers and stakeholders have selected and validated 6 BMPs. The project does not experiment BMPs at farm level. Its goal is to simulate the conditions under which their application could prove beneficial. A well-established practice, when used in a new context identified through project simulations, has the potential to become an innovation. Each BMP consists of various options, which may or may not be innovative depending on the context, and which can be applied individually or in combination. Five main BMPs are reported in this section: agroforestry; crop rotation; improved seeds; intercropping; manuring. For instance, agroforestry, as a BMP, promotes the simultaneous cultivation of crops and the management of trees to enhance productivity, conserve natural resources, and improve environmental sustainability. Innovative options refer to the selection of suitable trees, agroforestry design, proper spacing and arrangement, crop selection and rotation of crop species that can thrive in the presence of trees. Crop rotation is another example of BMP. It helps to maintain soil health, managing pests and diseases, optimizing nutrient availability, and achieving sustainable agricultural practices. Innovative options include cover crops, green manure, or legumes. Planning rotations to disrupt pest and disease life cycles while also integrating cropspecific requirements into the design is another option.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• A Water Users' Association is one of the 6 BMP selected in the study areas. It brings individuals and organizations together to ensure equitable water allocation, conservation, and sustainable water management practices. The practice focuses on stakeholder engagement, optimal governance model (i.e. the most suitable organizational structure to unite people and establish the association with operational and financial rules) ; collaborative water management (cooperation and clear rules for effective water allocation), capacity building and integrated water management (i.e. approaches that consider the entire water cycle).

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The project is developing a **water planning and management toolbox.** This key innovation integrates thematic models, indicators, and databases to simulate scenarios and assess the impacts of different Natural Resource Management (NRM) options. It is designed to help local and national decision-makers to make informed decisions about water use in agriculture while balancing trade-offs and improving the sustainability of NRM. The toolbox enables the exploration of "what-if" scenarios through participatory processes, allowing stakeholders with varying interests to collaborate and build a shared understanding of NRM challenges. It incorporates water, soil, crop, and socio-economic data, helping users (e.g. researchers, regional planners) to visualize the effects of resource development and evaluate management strategies. It is co-designed in collaboration with East African partners to ensure it addresses local needs and is widely adopted for long-term use. The toolbox can be used to accelerate the dissemination and replication of the BMPs.

Women, Coffee and Climate (427305)

AECID (Agencia Española de Cooperación Internacional para el Desarrollo)

Women empowerment for socio-ecological resilience of coffee value chain against climate change in Ethiopia

Start date: December 2021

End date (official): January 2025 (including an 8-month no cost extension, already granted)

Ethiopia

LIST OF PROJECTS

Data on Innovations updated as of: November 2023

The project does not work at farm level. Its main objective is to enhance gender equality and sustainability of the Ethiopian coffee value chain.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• As a means to achieve its objective, the project has designed and is implementing an innovative approach based on an **institutional south-south cooperation between coffee producing countries around the** "coffee, women and climate" nexus. This cooperation is embodied in a Community of Practice (CoP) that brings together researchers, coffee producers, government agents, exporters, policy makers, donors from Ethiopia, Honduras and Colombia. The CoP members share knowledge (e.g. on the use of coffee byproducts, on blockchain technology for traceability, on policy aspects), experience and practices through monthly webinars and international events such as cooperation exchanges. The focus is on women leading each step in the coffee value chain. The CoP is already functioning, supported by the Addis-Ababa-based Organization for Social Science Research in Eastern and Southern Africa (OSSREA). In the context of this cooperation, Women in Coffee in Ethiopia (WICE), an NGO, is trying to adapt innovative ideas on the use of by-products in Colombia. Honduras stakeholders, in sustainable practices found in Ethiopia (diversification, soil conservation). The Latin American countries are also inspired by the fact that Ethiopia is not only a major coffee exporter, but also one of the world's largest coffee consumers per capita. **C**offee is deeply rooted in Ethiopian cultural traditions, whereas Honduras and Colombia export most of their production.

List of projects

PoPillar I – Group 3

Z4ABC (429351)

CIFOR-ICRAF (Centre for International Forestry Research - World Agroforestry)

Zambia for Agroforestry, Biodiversity and Climate

Start date: April 2022

End date (official): March 2026

End date (likely): March to September 2027 (12-month no cost extension requested but 18 months could be granted)

Zambia

LIST OF PROJECTS

Data on likely end date updated on: 03/12/2024

Data on Innovations updated as of: March 2024

The project supports the climate-smart, productive, and sustainable transformation of agriculture, forestry, and food systems by enhancing climate change resilience and improving farmers' livelihoods and by improving the relevance of Agriculture and Knowledge Innovation Systems with respect to climate change.

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

Reaching more than 2400 farmers, the project pilots innovative (food and non-food) value chains. It has established pilot sites in cooperation with local community-based organisations and private actors in the Lower Zambezi-Luangwa-Nyika corridor.

• One pilot site focuses on bamboo production and product manufacturing. The innovation is the **introduction of bamboo in the farming systems**, as part of conservation efforts and income diversification. Bamboo grows naturally in the forest, but it has been overharvested. The pilot project responds to a need to increase the availability of bamboo. Farmers are learning production practices (e.g. propagation methods).

• Another pilot site focuses on sustainable harvesting practices for Non-Timber Forest Products (NTFP), including mushrooms (e.g. best harvesting time) and edible wild caterpillars. Community members are trained in post-harvesting practices to increase the market value of NTFP. The project also has an innovative plan for the "mini-livestock" cultivation of edible caterpillars.

• In another pilot site, the project promotes **pigeon pea**, a multi-purpose crop, to combat malnutrition. Pigeon pea, a resilient cash crop, requires long cooking times, unless it is dehulled. A dehuller requires large quantities to justify its use, which explains why the project promotes pigeon pea at community scale and intends to involve a private buyer/processor, thereby establishing a local value chain.

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

• The project addresses the need for high-quality legume seeds (protein foods) by supporting the **development of a seed multiplication business/service** at community level. In cooperation with a private sector partner, the initiative focuses on supplying certified legume seeds to the community. The certification process, which includes government inspection, ensures the quality of the seeds provided to farmers.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• The bamboo pilot site is implemented in cooperation with a community-based organisation run by a group of farmers. The project has supported the group in constructing **a bamboo workshop** and will link the group to the market to sell bamboo products.

• A community forest has been transformed into an eco-tourism site co-managed with a local NGO. The project is developing infrastructure, introducing mountain biking and mapping trails. **Eco-tourism is a new concept** for the community and an opportunity for farmers to diversify their income. A digital app is under development to promote the site. It could be adapted for use by other community-managed tourism sites.

• The project supports the establishment of a **community-led game ranch pilot**, spanning 15,000 hectares. It is an innovative approach to wildlife management, the first of its kind locally. The project supports livelihood activities (e.g. beekeeping, pottery), to ensure the long-term management of the game ranch.

• The project partner HAMK (Häme University of Applied Sciences, Finland), in collaboration with higher learning and vocational training institutions, has developed an **Agriculture Knowledge Information System** (**AKIS**). This system collects and compiles knowledge from higher learning institutions to support the project's activities. The plan is to use it to further enhance university and vocational curricula.

ONE PLANET (406569)

adapt to a changing climate.

Pillar II

Agropolis Foundation One Planet Fellowships Programme (OPFP) Start date: June 2019 End date (official): October 2024 (including a first no cost extension of 12 months, and a second no-cost extension of over 4 months) Algeria, Benin, Burkina Faso, Côte d'Ivoire, Ethiopia, Kenya, Malawi, Mali, Morocco, Nigeria, Senegal, Tanzania, Togo and Zambia <u>LIST OF PROJECTS</u> Data on Innovations updated as of: April 2024 The project enhances the capacity of high potential young scientists working on agriculture and climate change adaptation and mitigation in Africa by building their leadership, scientific research, networking and mentoring skills. It seeks to contribute towards building a robust pipeline of African science leaders in agriculture - climate interface as well as create a vibrant, highly connected, and intergenerational network of

African and European scientists equipped to lead research focused on helping Africa's smallholder farmers

Innovations for use AT FARM LEVEL: products, technologies, agricultural practices, farming systems

No innovations co-developed under this fellowship project

Innovations for use AT FARM LEVEL: services, decision making tools, governance mechanisms

No innovations co-developed under this fellowship project

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level No institutional innovation developed under this fellowship project.

Pillar II

SUPPORT TO CAADP AGRICULTURAL RESEARCH AND EXTENSION ORGANISATIONS (407862)

AFAAS – ASARECA – CCARDESA – CORAF - FARA

Managed by IFAD (International Fund for Agricultural Development)

Start date: March to November 2019

End date (official): February 2025 (including a 12-month no-cost extension)

End date (likely): to be determined (additional extension under discussion)

LIST OF PROJECTS

Data on likely end date updated on: 11/11/2024

Data on Innovations updated as of: December 2023

The focus of this Action is to strengthen the architecture and governance of Africa's continental and subregional agricultural research and innovation organizations, enabling them to effectively support national agricultural research and innovation systems, with the objective of enhancing the performance of these systems towards contributing to the achievement of national food and agriculture development goals and targets.

AFAAS - African Forum for Agricultural Advisory Services

Kenya, Ghana, Mali, Malawi, Madagascar, Liberia, Nigeria, Uganda, Cameroon, Ethiopia, South Africa

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• AFAAS is developing tools to enhance its members' M&E systems and their interoperability. The organisation uses the M&E platform developed for the DeSIRA project and managed by FARA (Forum for Agricultural Research in Africa) at central level to integrate data from the different country fora it supports. Out of 11 country fora targeted by the project, 8 are actively involved. The data they provide is reflected in AFAAS's annual progress report. The M&E system is used beyond the project's reporting needs, as it also gathers data on the performances of the agricultural systems, as per the criteria of CAADP (Comprehensive Africa Agriculture Development Program). This is an institutional innovation for AFAAS and country fora: AFAAS has made it possible for its members to directly access its own institutional M&E system.

ASARECA - Association for Strengthening Agricultural Research in Eastern and Central Africa

Burundi, the Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, South Sudan, Sudan, Tanzania, Uganda

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• ASARECA **adapted and customized the Agricultural Innovation Systems-Policy Practice Index (AIS-PPI) tool,** originally developed by FARA, to better suit the specific needs of National Agricultural Research Institutes (NARIs) in the Eastern and Central Africa countries under its mandate. By refining the level of detail and analytics, ASARECA created a more effective tool for assessing, analysing, and benchmarking agricultural policies in the region. The tool was used to: (i) analyse 28 national and regional policies such as national agriculture policies, national seed policies, climate smart agriculture strategies and national food and nutrition security policies among others; (ii) identify major gaps in formulation and implementation of these policies; and (iii) generate recommendations for policy reform.

CCARDESA - Centre for Coordination of Agricultural Research and Development for Southern Africa

Botswana, Eswatini, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• CCARDESA developed guidelines for mainstreaming climate relevant STIs (Science Technology and Innovation Indicators) into National Agricultural Investment Plans (NAIPs). These indicators are metrics used to measure a country's progress in integrating scientific research, technological advancements, and innovative solutions into national development strategies, particularly in agriculture. The inclusion of STIs into agricultural planning helps countries to foster sustainable development, to enhance agricultural productivity, and to respond to challenges such as climate change and food security. The guidelines ensure that national agricultural plans are not only based on traditional farming practices but also leverage innovations and technological advancements. This is crucial for improving crop resilience, promoting climate-smart agriculture, and boosting overall agricultural efficiency.

• To address the issue that scientific topics are not well covered in media, CCARDESA supports a **Community of Practice (CoP) for media practitioners on Climate Smart Agriculture (CSA),** for them to better understand CSA, better package the information, and reach their audience more effectively. The CoP concept is not new, but a CoP of media people on CSA is an innovation in the region under the mandate of CCARDESA.

CORAF (WECARD) - Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles (West and Central African Council for Agricultural Research and Development)

Benin, Burkina Faso, Cameroon, Cape Verde, Central Africa Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of Congo, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome Principe, Senegal, Sierra Leone, Togo

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• CORAF has participated in the creation of institutional tools such as the set of collaboration mechanisms for CAADP Agricultural Research and Extension Organisations, and also uses the AIS-PPI tool (see below, under FARA).

FARA (Forum for Agricultural Research in Africa)

Continental Africa

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• FARA developed the **Agricultural Innovation Systems-Policy Practice Index (AIS-PPI) Tool**. It is used to measure progress towards the Malabo-related indicators, which are a set of metrics used to monitor and assess the progress of African countries toward achieving the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods, adopted in 2014 by the African Union. In the context of the DeSIRA project, the AIS-PPI tool is also used at national level by all CAADP organisations to assess the capacity of a given country in formulating, implementing, tracking the implementation and impact of a policy, for instance policies on trade and climate-smart agriculture.

• CAADP Agricultural Research and Extension Organisations (AR&EO) have developed and are implementing a set of collaboration mechanisms. It comprises tools and good institutional practices to facilitate collaboration, decision-making and the implementation of the EU-funded programme. Collaboration mechanisms include thematic working groups, guiding mechanisms for planning, for capacity development, etc. IFAD facilitated this process. These mechanisms operationalize the spirit of the collaboration between the five CAADP/XP4 organisations, and can be considered as a key tool for facilitating decision making and running the programme. As a result, the organisations are now working together instead of duplicating efforts and competing against each other for visibility and resources (e.g. joint events). For the future, the use of collaboration mechanisms should continue to provide focus and reduce duplication at continental level. This is a proof of concept that also helps to interact with the African Union and facilitates the work with European partners.

List of projects

Pillar II

SUPPORT TO GFAR (410670)

FAO (Food and Agriculture Organisation)

Re-Connecting the world: The GFAR Partnership transforming agri-food research and innovation for development impact

Start date: February 2020

End date (official): January 2024

Implementation was over at the time of data collection (11/2024)

Global

LIST OF PROJECTS

Data on Innovations updated as of: January 2024

Jointly established by FAO, IFAD, The World Bank and CGIAR, the Global Forum on Agricultural Research and Innovation (GFAiR) is a multi-stakeholder global forum that aims to make research and innovation in agriculture and food more effective, responsive and equitable, towards achieving Sustainable Development Goals.

Innovations for use BEYOND FARM LEVEL, including at institutional level and private sector level

• **Partnership Principles** (PPs), a tool to assess the quality and the inclusiveness of partnerships, underpin GFAiR's work. Developed in collaboration with the Commission for Research Partnerships with Developing Countries (KPFE, under the Swiss Academy of Sciences), the PPs assess and guide the quality of research programs according to co-research and co-innovation approaches. The CGIAR Engagement Framework and the World Rural Forum (the members of which represent more than 35 million family farmers) have taken up the PPs, which GFAiR aims to establish as a global standard.

• GFAiR has developed the concept of **"Collective Action**", an innovative institutional mechanism that seeks to empower farmers and communities at the centre of innovation. A Collective Action is a coordinated effort/initiative by multiple stakeholders to achieve a shared goal, typically addressing complex challenges in agriculture, food systems, or rural development. It leverages the strengths, knowledge, and resources of diverse partners to deliver sustainable and inclusive solutions. In the 4 years of the project implementation, five institutional partnerships, all based on Partnership Principles, have formed to support 5 Collective Actions, underpinned by a set of engagement rules, in the following areas: Forgotten Foods; Inclusive Digital Transformation in Agriculture; Family Farming and Participatory Research; Transformation of Higher Education in Agriculture; Land Tenure and Climate Change.

• The Collective Action on Forgotten Foods is a global initiative aimed at promoting awareness, conservation, and sustainable use of underutilized and forgotten foods. A key achievement of this Collective Action is the global Manifesto on Forgotten Foods, which seeks to highlight their potential to address global challenges, including food security, climate change resilience, and the preservation of cultural heritage. Beyond that, the global Manifesto on Forgotten Foods serves as an adoptable and implementable model of how to catalyse pro-poor and by-poor change in agri-food research and innovation systems. It represents a groundbreaking, systemic initiative co-designed with farmers across three continents. It integrates research, innovation and development in a collective action framework, emphasizing paradigm shifts in governance, methodologies and systemic approaches. It places smallholder farmers at the centre of innovation, recognizing them as custodians of knowledge, agents of change, and co-creators of solutions.

• The **Dhaka Declaration on Mainstreaming Land Rights in the Narrative of Climate Change** was signed under the Collective Action on Land Tenure and Climate Change. It can be considered an institutional innovation due to its transformative approach to addressing the interconnected issues of land tenure security and climate change. It is the first time farmers are brought together, including organisations from South Asia, Southeast Asia and Africa, to agree on a declaration for inclusive climate change adaptation at global level.