GFA CONSULTING GROUP

The DeSIRA Global Monitoring and Evaluation Framework

Annual Global Report 2023 of the EU-funded initiative "Development Smart Innovation through Research in Agriculture" (DeSIRA)

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DeSIRA PARTNERSHIPS FOR INNOVATION

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Annual Global Report 2023 of the EU-funded initiative "Development Smart Innovation through Research in Agriculture" (DeSIRA)

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AE	AgroEcology
AEAS	Agricultural Extension and Advisory Services
AFAAS	African Forum for Agricultural Advisory Services
AFD	Agence Française de Développement
AIS	Agricultural Innovation Systems
AKIS	Agricultural Knowledge Innovation System
AR&EO	Agricultural Research and Extension Organisations
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CAADP	Comprehensive Africa Agriculture Development Programme
CAADP AR&EO	Agricultural Research and Extension Organisations
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
CD	Capacity Development
CDAIS	Capacity Development for Agricultural Innovation Systems
CGIAR	(formerly) Consultative Group on International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CID	(EU) Commission Implementing Decision
CIP	International Potato Centre
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CORAF	Conférence des Responsables de Recherche Agronomique Africains (or WECARD)
CC	Climate Change
CSA	Climate Smart Agriculture
DARS	Department of Agricultural Research Services (Malawi)
DeSIRA	Development Smart Innovation through Research in Agriculture
ECOWAS (CEDEAO)	Economic Community of West African States
DG INTPA	Directorate-General for International Partnerships of the European Commission
ENABEL	Belgian Development Agency
FAO	Food and Agriculture Organisation
FARA	Forum for Agricultural Research in Africa
FO	Farmers' Organisation
GDI	Global DeSIRA Indicator

GFAR	Global Forum on Agricultural Research and Innovation
GM&EF	Global Monitoring and Evaluation Framework (of the DeSIRA initiative)
IFAD	International Fund for Agricultural Development
IICA	Inter-American Institute for Cooperation in Agriculture
ILRI	International Livestock Research Institute
INTPA (DG)	Directorate-General for International Partnerships of the European Commission
IICA	Instituto Interamericano de Cooperación para la Agricultura
IUCN	International Union for Conservation of Nature
KM	Knowledge Management
LFM	Logical Framework Matrix (or Logframe Matrix)
LIFT	Leveraging the DeSIRA Initiative for Agri-Food Systems Transformation (DeSIRA LIFT)
M&E	Monitoring & Evaluation
MSME	Micro, Small & Medium Enterprise
MSIP	Multi-Stakeholder Innovation Platform
NARI	National Agricultural Research Institute
NARS	National Agricultural Research System
P-I / P-II	Pillar I / Pillar II (DeSIRA initiative)
R&I	Research and Innovation
STI	Science, Technology and Innovation
TAP	Tropical Agricultural Platform
TEAGASC	Agriculture and Food Development Authority (Ireland)
UOM	University of Mauritius
WECARD	West and Central African Council for Agricultural Research and Development
WUR	Wageningen University & Research

1 Executive summary

The objective of the DeSIRA initiative is to contribute to the climate-relevant, productive and sustainable transformation of agriculture and food systems in low and middle-income countries in Africa, Asia and Latin America. The initiative aims at supporting Research and Innovation (R&I) projects and strengthening research capacities and governance, involving key actors at the national and international levels. It is comprised of 80 projects, with an estimated EC contribution of € 340 million and € 60 million in funding from EU Member States.

The Directorate-General for International Partnerships of the European Commission (DG INTPA) has developed a Global Monitoring and Evaluation Framework (GM&EF) for the DeSIRA initiative. The GM&EF is a methodological tool to identify and inform **initiative-level** Global DeSIRA Indicators (GDIs). Its purpose is to steer and monitor the DeSIRA initiative, in order to determine the extent to which its overarching objectives are being achieved, and to report and communicate effectively on new approaches to agricultural R&I.

The GM&EF comprises 6 outputs, 4 outcomes and the stated impact, and 28 GDIs. The GM&EF is not relevant at project level and is not designed to reflect the diversity of projects or the complexity of innovation processes at the project level. Owing to the diversity of DeSIRA projects, each project contributes to certain global results (i.e. at initiative level), but not to all.

Based on the GM&EF, a first Annual Global Report (AGR 2021) was produced in 2022, covering the period 2019-2021 and including 29 DeSIRA projects having at least 2 years of implementation. AGR 2023 is based on the results of 46 DeSIRA projects having at least 2 years of implementation as of 12/2022. This includes 39 Pillar I, and 7 Pillar II projects from the 2018 and 2019 Commission Implementing Decisions, including the 29 projects (22 Pillar I and 7 Pillar II) already covered by AGR 2021. Pillar I projects are divided into Group 1 (G1, 22 projects already covered by AGR 2021) and Group 2 (G2, 17 projects included in AGR 2023 for the first time. It encompasses 39 R&I projects and 7 projects focused on strengthening the institutional capacities of regional and international organisations engaged in agricultural research and innovation. Data was collected in 2023, based on the latest available annual progress reports, and interviews with each project Implementing Partner (IP).

As of spring 2023, at least 1564 researchers were involved in the implementation of activities, including 1024 from target countries, of which at least 190 are women. Many organizations (761) played a key role in implementation, including 221 research institutes, 136 non research organisations (e.g. ministries), 113 NGOs, 161 Farmers' Organisations (FOs), 72 private sector entities, and 56 networks. For the "oldest" R&I projects, the number of researchers and organisations (of all categories) involved in the implementation of DeSIRA projects has increased since the last reporting period, indicating that activities have picked up.

Output 1 focuses on multi-stakeholder mechanisms (including Multi-stakeholder innovation platforms or MSIPs), aimed at facilitating interaction between actors and the joint design of climate-smart and agroecological innovations. MSIPs, a highly flexible concept in terms of structure and operation, demonstrate the capacity of research bodies to work and interact with a diversity of actors at different levels. At national level, they focus on stakeholder coordination, information sharing, and strategy validation. At local level, they focus on stakeholders' involvement (including FOs, NGOs) and the co-creation of innovations.

Over the reporting period, 21 R&I projects have supported a cumulated total of 234 MSIPs (7, 33 and 194 respectively at international, national and local/subnational levels). Since the last reporting period, the overall number of MSIPs developed or strengthened by the oldest R&I projects has increased from 40 to 99. Of the 39 R&I projects, 11 do not have a formal multi-stakeholder strategy while 7 have one but are yet to formalize it. The pathway towards the sustainability of multistakeholder mechanisms is unique to each project, with mechanisms pre-existing DeSIRA projects having advantages over new ones. The role multistakeholder mechanisms play in creating the conditions for the dissemination and/or scaling of innovations is a key factor contributing to the success of projects. In this regard, many mechanisms put in place are yet to be reinforced to be fully effective and sustainable.

The institutional projects have contributed to 83 MSIPs, comprising 22 international, 58 national and 3 subnational MSIPs. The 58 national MSIPs are either policy-oriented or focused on value chains. One large institutional project targets Agricultural Research and Extension Organisations (AR&EOs) in Africa and predominantly accounts for these numbers. For these institutional projects, multistakeholder mechanisms emphasize regional dialogue with a policy or Capacity Development (CD) focus on topics like Climate Smart Agriculture (CSA) and Knowledge Management (KM).

Output 2 focuses on the development and availability of innovations at farm level and beyond farm level, including institutional innovations. The support to innovation, including co-design and deployment, is a key feature of DeSIRA projects. The number of innovations is very significant; most R&I projects reported innovations for both levels, mainly on farm level (952 innovations). The diversity of farm level innovations is large (products, technologies, agricultural practices, farming systems, services, decision-making tools, etc.), with new seed varieties being one of the most common innovations claimed by projects (at least 500 crop varieties identified). Innovations beyond farm level are related to natural resource management and value chains. Many projects introduce and/or adjust known innovations to new contexts, with a participatory approach, often with the support of global research institutions. Furthermore, many DeSIRA projects aim to bring earlier innovation efforts that were not successful due to time limits, to the next level. The climate-relevant approach is explicit in most projects. Besides, 24 projects promote agroecological innovations, though their commitment to the agroecological concept and principles vary widely.

Institutional innovations (mainly aimed at strengthening partner organisations) are often implicit and not described in project reports in spite of their value and growing number (179 for all R&I projects). This trend indicates growing support for organisations supporting farmers or value chains actors. It also indicates a potential step towards a progressive transfer of the innovation support functions to local/national actors. Institutional projects have reported a rise in institutional innovations from one in AGR 2021 to 11 in AGR 2023.

Output 3 examines the extent to which farmers are reached by R&I initiatives and individual capacities are developed beyond farm level, including at institutional level. Overall, DeSIRA is making significant steps in supporting smallholder farmers and facilitating access to technical and scientific knowledge. Approximately 250,000 smallholder farmers have been reached by DeSIRA projects. One R&I project with a strong development dimension has reached nearly 170,000 farmers. However, most projects reached fewer than 500 farmers, given that the primary objective of most R&I projects is to produce knowledge and co-design innovations and not to scale these innovations. Many projects focus on training motivated farmers to promote farmer-to-farmer extension, as well as supporting organisations (FOs, local NGOs, advisory services) to play an extension role.

Efforts were accelerated in 2022 to compensate for delays in the implementation of capacity development (CD) plans during the COVID-19 pandemic. As of 12/2022, DeSIRA projects are estimated to have contributed to strengthening the capacity of at least 2,626 researchers and 11,956 technical or development staff. Training on data collection, management and analysis is central to many CD plans. Not all projects have specific CD plans for researchers, but the latter nevertheless enhance their skills and broaden their perspectives through their active role in project implementation. While capacity changes in researchers are not systematically measured, implementing partners reflect positively on the individual-level changes they have observed. Training for technical staff of non-research organisations encompasses a broad range of subjects, including technical and non-technical topics. Sex-disaggregated data is not systematically reported, but estimates suggest that 525 women researchers have been capacitated under DeSIRA. The percentage of women in technical staff roles is generally low, with some exceptions.

Post-graduate students, either professionals seeking higher degrees or younger individuals, play a crucial role in project implementation, while pursuing academic degrees. Backed by research institutions, including 42 European and 99 African institutions, R&I projects supported 338 Master and 203 PhD students, including at least 113 women (54 Master and 49 PhD). The vast majority of students are from DeSIRA target countries, mainly in Africa.

Under Output 4: Several Pillar I projects play a role in developing or upgrading curricula or training packages. The contribution to education is often implicit but underlines the potential value of DeSIRA in an area which is not an explicit objective of the initiative. The current education-related outputs of the DeSIRA initiative are developed by 11 projects and include the revision or addition of 22 academic modules and the development of 12 items of training or education material from scratch, catering to a diversity of beneficiaries. Updating curricula commonly involves incorporating training topics such as climate adaptation and mitigation, along with agroecology and knowledge management.

Under Output 5: The production of science-based knowledge and evidence for a diversity of actors is increasing significantly, demonstrating the full deployment of the DeSIRA initiative. The total number of communication products stands at 538 for R&I projects and 288 for institutional projects. Technical products stand at 145 for R&I projects (many Master theses are yet to be reported) and 229 for institutional projects. R&I projects produced 131 guides/manuals. Efforts were also made to facilitate access to scientific knowledge via databases (30 databases). The cumulative number of scientific publications over the implementation period is 54, but not from PhD students, as most theses are yet to be completed. Knowledge products should increase when the projects come to an end. Key challenges inherent to DeSIRA include the complexity of translating research into accessible and useful knowledge products for various audiences and ensuring sustainable and efficient knowledge management systems for dissemination.

Output 6 focuses on policy outputs. The level of policy engagement at output level varies across DeSIRA projects: seven projects have no policy activities and no policy objectives, 7 projects are engaged in policy activities with no specific policy objective, 28 projects have a policy objective, explicit or implicit. R&I projects had produced policy outputs (25 policy briefs and 29 policy dialogues) as of 12/2022. The diversity of the topics is linked to the diversity of innovations under co-development. Policy-related activities are expected to intensify as the need to scale solutions through an enabling environment becomes more pressing. However, there is a risk that the policy activities of R&I projects could be side-lined due to the need to build capacities in policy engagement. Two institutional projects have increased their outputs by 90% for policy briefs (38) and 78%

for policy dialogues (32) since the last reporting period. Policy topics focus on Climate Smart Agriculture and Knowledge Management. Agroecology, despite rising interest, is not yet a key policy topic within these projects.

Outcome 1 captures the transformation of outputs into changes at farm level, focusing on the capacity and resilience of smallholder farmers as they take up new climate-smart or agroecological products, technologies, models or services. As of 12/2022, it was estimated that 187 climate-smart or agroecological innovations had been taken up by smallholder farmers, which accounts for about 20% of all innovations under development or developed by the 39 R&I projects since the start of the DeSIRA initiative. The oldest R&I projects reported a significant increase from the previous period (34 to 151). Slow innovation development mostly accounts for 17 projects not contributing to Outcome 1 yet for different reasons. Keeping in mind that the objective of a large majority of R&I projects is not to reach a large number of farmers directly, the total number of smallholder farmers using these innovations and reported by the R&I projects reached 91,213. This is a sharp increase over the 1800 farmers reported in AGR 2021. The number of beneficiary women farmers is not systematically reported. Changes at farm level are confirmed by implementing partners, but progress reports lack detailed analysis of changes and sustainability prospects.

Dissemination and scaling strategies of R&I projects are highly relevant to the overall objective of DeSIRA. As of 12/2022, 18 projects reported a strategy, relying on various methods, partnerships and support to policies to increase the effectiveness of dissemination and to scale innovations. However, 18 R&I projects were either still in the process of developing strategies or lacked one.

Outcome 2 focuses on strengthening institutional and innovation capacity at the organisation level. While almost all DeSIRA projects strengthen researchers' capacities in partner countries, some of them also contribute to the institutional capacities of research organisations. A majority of projects strengthen the capacities of FOs, NGOs or advisory services. As of 12/2022, it was estimated that DeSIRA projects were in the process of contributing to the enhanced capacities of around 575 organizations, including 150 national research entities, 157 FOs and about 75 local NGOs and community-based organisations, in addition to technical and development organisations (extension services, ministries, etc.). National research entities, for instance, have improved research capacities through training and participation in research activities using up-to-date methods, enabling advanced scientific achievements. Their participation in DeSIRA also reshapes research approaches by placing more attention on stakeholder interactions. Institutional partnerships emerging from project activities also contribute to institutional CD. However, for R&I projects, attribution remains difficult and their true influence at institutional level cannot be fully captured because institutional CD is often more implicit than explicit and because most implementing partners do not have the right methodology to measure institutional changes.

One institutional project aims to build institutional capacity in 5 key African AR&EOs, including 4 regional organisations and one pan-African organisation. Capacities are measured annually and show significant structural and operational progress, facilitated by improved cooperation among them. Institutional strengthening of these AR&EOs is also evidenced in multi-stakeholder partnerships. Besides, their capacity to support other regional organisations, as well as national (member) entities, by promoting the use of institutional tools and good practices has also increased, though the outcome of this support is not reported.

Outcome 3 on support targeted at the private sector and value chains, is clearly addressed by some R&I projects. However, the main focus of a majority of R&I projects is on sustainable production or natural resource management. Even if value chain related activities were yet to start for several projects, the current number of R&I interventions targeting downstream and upstream actors is

limited, potentially restricting the deployment of innovations at scale. As of 12/2022, 16 Pillar I projects were supporting a total of 58 Value Chains (VCs), with 182 agriculture and food-related MSMEs strengthened or created, and 57 innovations developed. This includes improved processing equipment, innovative technologies, new products, as well as new business models linked to financing mechanisms in order to facilitate access to services by smallholder farmers. Project approaches to value chain support differ and are either holistic i.e. consider the whole value chain (including dialogue with all value chain actors, access to markets and services) or are more narrowly targeted at specific value chain segments (including support to incubators for start-ups, support to SMEs).

Outcome 4 examines the extent to which projects are able to transform policy products (dialogues, briefs) into tangible outcomes (policy, strategy, or plan under development, or endorsed). Policy involvement is increasing, with a significant number of DeSIRA projects aiming to improve the enabling environment for scaling the innovations they promote. The institutional projects clearly address this dimension, with 22 policy outcomes reported, primarily at the national level. For R&I projects, 14 projects influenced a total of 42 policies, mainly at national level. For many R&I projects, either the policy dimension is not relevant for the topic they address, or the policy objective was not included in their design. Often, the science-policy interface and related skills at project level are yet to be strengthened to support policy innovation or to inform policies. For all categories of projects, policy objectives and outcomes achieved by partner organisations were not consistently emphasized or sufficiently documented in project reports, making it difficult to draw conclusions and to fully capture the policy influence of the DeSIRA initiative.

Impact prospects are difficult to frame at the scale of the initiative because of the projects' diversity and because innovation processes take time. Besides, participatory R&I initiatives facilitate the deployment of innovations but depend upon development actors to scale and disseminate those innovations. The few projects claiming a significant contribution to impact usually include a strong development component or have the capacity to cover broader areas through the involvement of key value chain or territorial actors. For most R&I projects, the contribution to socio-economic changes at farm level was still limited, with 5 projects reporting a gain in terms of resilience to climate change by nearly 21,000 farmers. Seven R&I projects reported improved agroecosystems, promising future economic and resilience gains at farm level. Promising wider impact, seven R&I projects collectively reported over 310,000 potential beneficiaries, i.e. smallholder farmers who might benefit from the dissemination or scaling of innovations beyond project target groups, owing to partnerships, communication campaigns, etc. The objective of promoting gender equality has not been sufficiently mainstreamed in the design of many R&I projects. Consequently, the contribution of the DeSIRA initiative to women's empowerment is currently, and likely to remain, too low and poorly documented, in spite of a few well-designed gender-focused initiatives.

Over the long term, most likely after their completion, several DeSIRA projects have the potential to influence agriculture and food systems, the overall objective of the DeSIRA initiative. Organisations strengthened by DeSIRA projects are expected to achieve a positive impact on system transformation. While significant policy shifts, especially concerning new development models like agroecology, require more time, it should be possible to identify and document the positive impact that multi-stakeholder policies, strategies or plans supported by DeSIRA have on agriculture and food systems at national or international level. However, rigorous impact assessment should go beyond project assessment and should be carried out for groups of projects contributing to a trajectory of change with a long historical perspective. Innovation is a long process!

2 Background

The objective of the DeSIRA initiative (Development Smart Innovation through Research in Agriculture) is to contribute to the climate-relevant, productive and sustainable transformation of agriculture and food systems in low and middle-income countries in Africa, Asia and Latin America. The initiative aims at supporting research and innovation projects and strengthening research capacities and governance, involving key actors at the national and international levels. It was launched in 2017 at the One Planet Summit and has been operationalised through three Commission Implementing Decisions (2018, 2019 and 2020). The first contracts were signed in 2019. The total number of projects to date is 80, with an estimated EC contribution of 340 million Euros, and 60 million Euros of EU Member State funds. Information on the DeSIRA initiative and projects already under implementation can be found at https://europa.eu/capacity4dev/desira.

2.1 The three pillars of the DeSIRA Initiative

There are three categories of DeSIRA projects clustered under "Pillars".

Pillar I - Research and innovation in agricultural and food systems (Source INTPA/F3)

Pillar I encompasses projects focused on research and innovation in agricultural and food systems. These projects target a variety of production systems (crop and animal production, agroforestry) and natural resources (forest, pasture, water, soil), and associated services (innovation support services, advisory services), many of them with a value chain perspective and/or agroecological approach, in the context of climate change. In line with the underlying principles of the DeSIRA initiative, these projects have common characteristics: they strive to address major economic, social and environment-related challenges with a view to promoting Food and Nutrition Security and Sustainable Agriculture (FNSSA); they design and promote innovation processes via a multi-stakeholder approach that builds on science and brings together communities of farmers, the private sector, research institutions, technical and development bodies and grassroots organisations; they aim at increasing knowledge, changing behaviours, skills and technical and management practices, and contributing to policy making.

Pillar II - Research infrastructure conducive to innovation (Source INTPA/F3)

Pillar II interventions focus on strengthening the capacities of regional and international organisations that play a key role in research and advisory services, especially in Africa: Conférence des Responsables de Recherche Agronomique Africains (CORAF), Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA), Forum for Agricultural Research in Africa (FARA), African Forum for Agricultural Advisory Services (AFAAS). They contribute to the capitalization of experiences related to innovation systems (the Global Forum on Agricultural Research -or GFAR-) or to building research capacities through the training and mentoring of young African researchers (One Planet Fellowships). Each project is designed and monitored with an impact pathway approach for research institutions based on a plausible theory of change with a climate change perspective.

Pillar III - Knowledge and evidence to feed policy design (Source DeSIRA LIFT)

Pillar III is comprised of two interventions, the DeSIRA Global Monitoring and Evaluation Framework (GM&EF) and DeSIRA LIFT "Leveraging the DeSIRA Initiative for Agri-Food Systems Transformation" which provides services to DeSIRA Initiative's implementers under three service areas:

Service Area 1 - Support to the country-based DeSIRA projects to enhance their impact by promoting Agricultural Innovation Systems (AIS) thinking and the use of developmental evaluation approaches.

Service Area 2 - Support to African apex organisations for research on agricultural development, extension and higher education, and add value to the global initiatives TAP (Tropical Agriculture Platform) and GFAR.

Service Area 3 - Support to co-create knowledge and evidence to feed policy dialogues and programming on agri-food systems in the Global South.

2.2 The theory of change of the DeSIRA Initiative

Responsible innovations for the productive, green and inclusive transformation of food systems in low and middle-income countries must build on both science and local knowledge. The theory of change of the DeSIRA initiative postulates that by mobilising academic research and participatory action research, and by valuing local knowledge, evidence is generated to inform future interventions and policies, and to co-design and disseminate new climate-smart and agroecological solutions that will be taken up by farmers and organisations. Strong partnerships between multiple stakeholders, the openness of farmers to new ways of working, engagement by the private sector, and interactions with policy makers are the core assumptions required to translate this knowledge into action and to support innovation. Multi-stakeholder approaches developed by DeSIRA projects bring together communities and farmer organisations, grassroots organisations, NGOs, private sector actors, research institutions, and technical and development bodies in pursuit of the common goal of Sustainable Aquatic and Agri-food Systems (SAAFS). The initiative draws on mechanisms for inter-institutional cooperation supported by European, international, and national expertise, that underpin the joint design and development of climate-smart and agroecological innovations, at farm, territorial and value chain levels, targeting a diversity of production (crops and animal production) and farming systems (mixed farming, agroforestry, pastoralism, etc.). Specific attention is paid to landscapes/territories with a view to improving natural resource management, to value chains to facilitate access to markets, and to policies to foster a more enabling environment. Capacity development is the essence of the DeSIRA initiative. Interventions to support innovation are complemented by the strengthening of technical and functional capacities, at the individual and organisational levels, and the strengthening of relevant education and training programmes. This strategy is expected to contribute to reinforcing the links between research and innovation, and to stimulate and develop the capacity to innovate of a large range of actors.

Positive changes are expected at multiple levels. At farm level, the capacity and resilience of smallholder farmers will improve as they make better informed, evidence-based decisions, and take up new climate-smart or agroecological products, technologies, models or services. At institutional level, the innovation capacities of research, technical and development institutions, of farmers' organisations, and of private sector actors to support agricultural innovation processes will be strengthened. A key actor in the functioning of value chains, a strengthened private sector is expected to facilitate the uptake of innovations by farmers and scale up their use among farming communities. These organisations are expected to continue working together and innovating once projects are over, thus ensuring sustainability. Institutional partnerships on agriculture and food systems are also expected to multiply, triggered by DeSIRA projects. The institutional capacity development of regional agricultural research and extension organisations, more specifically in Africa, will enhance the governance of research and extension services. Support to regional and international research and innovation networks, fora or platforms will boost the capitalization and sharing

of experiences and the elaboration of policies, with an Agricultural Innovations Systems perspective. In parallel to research and innovation processes, policy-related activities involve subnational and national stakeholders with a view to increasing their ability to design or improve relevant integrated policies, strategies and plans to address the transformation of food systems, including mitigation and adaptation to climate change and the agroecological transition.

At multiple levels, the DeSIRA initiative is expected to contribute to impact regarding the climate-relevant, productive, and sustainable transformation of food systems in low and middle-income countries. At farm level, target groups will benefit from socio-economic gains and a positive impact on agroecosystems, and they will be better equipped to cope with climate change-related shocks and make use of agroecological or nature- based solutions; the status and role of smallholder female farmers or female food entrepreneurs will improve and through dissemination and a diversity of scale up strategies, smallholder farmers who are not part of target groups will benefit from innovations developed by DeSIRA projects. At territorial level, agroecosystems will benefit from the introduction of sustainable innovative practices, including institutional arrangements, on agricultural and pastoral land and related to soil and water management. At institutional level, a growing number of organisations involved in the implementation of DeSIRA projects will be able to demonstrate a positive impact on the transformation of agriculture and food systems at national or international level. The policy environment will improve as a result of the endorsement and implementation of relevant policies, strategies or plans supported by DeSIRA projects.

3 Overview of the methodology underlying the global Monitoring and Evaluation Framework

From October 2021 to November 2022, with the technical assistance of ASRAFS (Advisory Services for Resilient Agri-Food Systems, GFA Consulting Group), the Directorate-General for International Partnerships of the European Commission (DG INTPA), developed a Global Monitoring and Evaluation Framework (GM&EF) for the DeSIRA initiative. The GM&EF is a methodological tool to identify and inform initiative-level indicators, also called Global DeSIRA Indicators (GDIs). Its purpose is to steer and monitor the DeSIRA initiative, in order to determine the extent to which its overarching objectives are being achieved, and to report and communicate effectively on new approaches to agricultural innovation and research. The main beneficiary and user of the GM&EF is DG INTPA (F3). Projects and EU Delegations are also potential users.

The GM&EF operates **at Initiative level**, i.e., it is not relevant to individual projects but rather aims to capture what the EU is achieving at global level through the combined efforts of **all DeSIRA projects**. It consists of a global Logframe Matrix (LFM), which comprises a results chain (see figure below), as well as 28 GDIs at output, outcome, and impact levels, designed through a bottom-up approach. The GM&EF provides a definition for each GDI.

A brief summary of the methodology for the data collection is as follows: every year, project progress reports are examined to determine whether, and to what extent, a given project contributes to the GDIs. This exercise is carried out without the need for any additional data collection by Implementing Partners (IPs). Subsequently, for each DeSIRA project, an interview is conducted with the main IP. If the project contributes to a GDI, a link is created between the project and this GDI. Links can be explicit (a project indicator is the same as, or similar to the GDI), or implicit (the project contributes to a GDI, but this is not captured by an indicator at project level). Each project is thus linked to the GM&EF through a specified number of links aimed at capturing the project results -

explicit or implicit- that contribute to expected results at global/initiative level. **Each project contributes to X number of GDIs, not to all GDIs**. For instance, a project that does not have a policy dimension is not linked to any of the GDIs on policy and is not expected to contribute to these policy related GDIs. For each link, a quantitative value is attributed. This is the quantitative contribution of a given project to a given GDI. Qualitative information is also collected, mainly through interviews, to put the quantitative data into context and clarify the link between the result (project level) and the GDI (initiative level). At GM&EF level, the GDI value is the sum of all project-level contributions to this GDI. Project-level data and GDI values are recorded in the GM&EF. The Annual Global Report of the DeSIRA initiative is then prepared, based on these values and qualitative information gathered during interviews. It is a progress report at Initiative level; it is not an evaluation of the projects. The complete methodology that underpins the development of the GM&EF and its implementation (i.e. the collection of data to inform the GDIs) is available at: "https://capacity4dev.europa.eu/library/methodology-global-monitoring-and-evaluation-framework-desira_en".

It is important to note that the Global Monitoring and Evaluation Framework is not a tool to monitor projects on an individual basis and is not meant to support project-level monitoring processes. Besides, it is not designed to reflect the diversity of projects or the complexity of innovation processes at the project level, even less the complexity of innovation processes related to agriculture and food systems at country or regional levels. Global DeSIRA Indicators do not substitute project-level indicators and are not mandatory at project level.

The collection of data for the GM&EF has its challenges. The quality of the quantitative data at initiative level is tied to the quality of the data at project level, since it sourced from the project's progress reports and monitoring systems. Furthermore, the data needed for informing the GDIs is not always available in projects' progress reports. For instance, results may exist -from an initiative perspective- but may not be properly documented in progress reports. This is why an annual meeting with the IP is needed during the data collection phase to confirm the relevance of a GDI vis-à-vis project results, to identify the relevant data, to capture implicit results and to complement the data with qualitative elements. Besides, certain projects weigh more (quantitatively) than others on the GDI value and may overshadow the results of other projects, which is always highlighted in the detailed analysis (though not in the executive summary).

The figure below shows the results chain (outputs, outcomes, impact) at DeSIRA initiative level as well as the articulation between these different results levels.

IMPACT
The DeSIRA initiative contributes to the climate-relevant, productive, and sustainable transformation of agriculture and food systems in low and middle-income countries

All Outcomes together contribute to Impact.
Each Output contributes to one or more Outcomes (shape symbol).
Outputs mutually reinforce each other.
Outcomes mutually reinforce each other.

OUTCOME 1 ▬	OUTCOME 2 ▲	OUTCOME 3 ★	OUTCOME 4 ●
The capacity and resilience of smallholder farmers improve as they take up new climate-smart or agroecological products, technologies, models or services	Innovation capacities of research, technical and development institutions as well as capacities of farmers' organisations to support agriculture innovation processes are strengthened	Private sector capacities and value chains of agri-food systems are strengthened	The agriculture and food systems policy environment is improved at national or international level

OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5	OUTPUT 6
▬▲★	▬▲★	▬▲★	▬▲★	▬▲★●	▲●
The mechanisms for inter-institutional cooperation and the joint design of climate-smart and agroecological innovations are developed	Innovations linked to agri-food systems are developed and made available at farm and institutional levels	Farmers are reached by research and innovation initiatives and individual capacities are developed beyond farm level, including at institutional level	Education and training programmes responsive to capacity development needs for agricultural innovation at national level are strengthened	Science-based knowledge and evidence are generated and made available to inform research for innovation in agriculture, institutional cooperation and the dissemination of new climate-smart and agroecological solutions	Science-based policy briefs are produced and dialogues on agriculture and food policy development and reform are organized

Based on data collected via the GM&EF, a first Annual Global Report (AGR 2021), covering the implementation period 2019-2021, was produced in 2022. 29 DeSIRA projects having at least 2 years of implementation as of December 2021 were included in AGR 2021. This second report (AGR 2023) covers the implementation period 2019-2022 and the 46 DeSIRA projects having at least 2 years of implementation as of December 2022. This includes 39 Pillar I, and 7 Pillar II projects from the 2018 and 2019 Commission Implementing Decisions, including the 29 projects (22 Pillar I and 7 Pillar II) already covered by AGR 2021. Pillar I projects are divided into Group 1 (G1, 22 projects already covered by AGR 2021) and Group 2 (G2, 17 projects included in AGR 2023 for the first time). Among the 39 Pillar I projects, 33 are in Africa, 3 are in Latin America, 2 are in Asia, and one is covering 9 countries in Africa, Latin America and Asia. Among Pillar II projects, a large project is further divided into 5 'sub-projects', for analytical purposes. Not all ongoing DeSIRA projects are

included in AGR 2023, given that some of them did not have 2 years of implementation by the cut-off point of December 2022.

The GDI values presented in the report are cumulative for the period 2019-2022, with the understanding that the period of implementation covered is not the same for all projects: mostly 3 years for Pillar I Group 1, and 2 years for Pillar I Group 2. The data was collected from April to July 2023 based on the latest available annual progress report for each project, and an interview with each project IP. To allow for a year-on-year comparison, the data is presented for each group of projects (Pillar I Group 1, Pillar I Group 2 and Pillar II) and for both implementation periods: 2019-2021 as of December 2021; 2019-2022 as of December 2022 (except for input-related data, as of spring 2023). Projects included in AGR 2023 are listed in Annex I. The numbering of the Tables in the executive summary corresponds to the numbering of the Tables in AGR 2023 (the detailed analysis).

4 Implementation (input-related data): Researchers and Organisations involved in the DeSIRA Initiative

Implementing Partners have faced a diversity of challenges during the global reporting period 2019-2022; all projects were delayed by the COVID-19 pandemic, which adversely affected the planning up to and including 2022, and strained cooperation efforts among partners. Other challenges included the disruptions caused by the Russian invasion of Ukraine and the ongoing war (e.g., rising prices, availability issues), as well as the deteriorating political and security environment in the Sahel (negative impact on local and regional mobility). At the time of data collection, (April-July 2023), several projects had obtained a no-cost extension and more were in the process of requesting one.

As of Spring 2023, the 46 projects covered by this report indicated that at least 1564 researchers (compared to 834 in the previous reporting period) were involved in the implementation of activities, including 1024 from target countries, of which at least 190 are women (refer to Table 6, next page). Many organisations (761) played a key role in implementation: 221 research institutes (145 in the previous reporting period), including 44 European bodies, 136 non research organisations (e.g., ministries, UN agencies) against 51 last year, 113 NGOs (52 last year), 161 Farmers' Organisations (51 last year), 72 private sector entities (25 last year), and 56 networks (28 last year). Among research organisations, 44 European and 99 African research institutions were involved in the implementation of at least one DeSIRA project. For Pillar I Group 1 projects, the number of researchers and organisations (of all categories) involved in the implementation of DeSIRA projects has increased since the last reporting period. This shows that activities have picked up and more partnerships have been formed. Synergies between DeSIRA projects are multiplying and becoming more structured thanks to the efforts of international research organisations (e.g., Centre de Coopération Internationale en Recherche Agronomique pour le Développement, CIRAD), implementing agencies (e.g. Gesellschaft für Internationale Zusammenarbeit, Agence Française de Développement), and global platforms (e.g. Tropical Agricultural Platform - TAP; Global Forum on Agricultural Research and Innovation). Besides, DeSIRA-LIFT supports DeSIRA projects to manage for impact by reinforcing the projects' synergies through a dedicated Community of Action and Reflection.

The following section provides a summary of the progress of the 46 projects towards the planned results of the DeSIRA initiative i.e., 6 outputs, 4 outcomes and the stated impact.

Table 1: Researchers and Organisations involved in the implementation of the DeSIRA Initiative

Researchers and Organisations (per category) involved in the implementation (Spring 2023) TOTALS (no duplicates)									
Annual Global Report (AGR)	**AGR 2021**	**AGR 2021**	**AGR 2021**	**AGR 2021**	**AGR 2023**	**AGR 2023**	**AGR 2023**	**AGR 2023**	**AGR 2023**
Category of project Pillar I (P-I); Pillar II (P-II); Group 1 (G1); Group 2 (G2)	**P-I / G1**	**P-II**	**Dupli-cates***	**TOTAL**	**P-I / G1**	**P-I / G2**	**Pillar II**	**Dupli-cates***	**TOTAL**
► Researchers from DeSIRA target countries	**484**	**134**	**0**	**618**	**590**	**269**	**165**	**0**	**1024**
► Other Researchers	196	20	0	**216**	279	239	22	0	**540**
TOTAL RESEARCHERS	**680**	**154**	**0**	**834**	**869**	**508**	**187**	**0**	**1564**
Including women researchers (at least)	*145*	*17*	*0*	*162*	*189*	*99*	*26*	*0*	*314*
► Research organisations EU-based	46	10	23	**33**	48	29	13	46	**44**
►Research organisations Not EU-based	98	47	33	**112**	118	85	63	87	**179**
► UN Agencies	3	4	5	**2**	3	4	7	10	**4**
► Non Research Organisations (except NGOs, CSOs, FOs) EU based	4	2	1	**5**	3	6	3	3	**9**
► Non Research Organisations (except NGOs, CSOs, FOs) Not EU based	41	6	3	**44**	42	57	37	13	**123**
► NGOs	47	8	3	**52**	69	37	16	9	**113**
► Farmers' Organisations	43	10	2	**51**	45	87	33	4	**161**
► Private sector entities	24	1	0	**25**	33	21	18	0	**72**
► Networks, Fora, Platforms	10	29	11	**28**	10	4	62	20	**56**
TOTAL ORGANISATIONS	**316**	**117**	**81**	**352**	**371**	**330**	**252**	**192**	**761**

(Source: Global M&E Framework of the DeSIRA initiative, spring 2023)
Group 1 (G1) = 22 Pillar I projects (from Decision 2018 only), already covered under AGR 2021
Group 2 (G2) = 17 Pillar I projects (from Decision 2019 + one project from Decision 2018), not covered under AGR 2021
Pillar II = 2 projects, plus 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021
(*) Assumption (not verifiable): there are no duplicates among researchers; Duplicates among organisations have been eliminated

5 Progress towards Outputs

5.1 Output 1 - The mechanisms for inter-institutional cooperation and the joint design of climate-smart and agroecological innovations are developed

Table 2: List of global DeSIRA Indicators attached to Output 1

GDI #21	Number of multi-stakeholder innovation platforms/mechanisms developed or strengthened #21A (International level) #21B (National level) #21C (Subnational level)

The definition of "innovation platform" varies across DeSIRA projects. Multi Stakeholder Innovation Platforms (MSIPs) have different scopes, levels of implementation (local to international), stakeholder composition, interaction modes (degree of participation of non-research actors, degree of formalisation, regularity of meetings, etc.), and focuses (thematic, mandate), highlighting the concept's flexibility. MSIPs at national level focus on stakeholder coordination, information sharing, and strategy validation, often through technical groups that do not always include farmers. MSIPs at local level focus on stakeholders' involvement and co-creation of innovation.

21 **Pillar I projects** have supported a cumulated total of 234 MSIPs (7, 33 and 194 respectively at international, national and local/subnational levels), including 100 local MSIPs from a single Pillar I Group 2 (P-I/G2) regional project. Since the last reporting period, the overall number of MSIPs developed or strengthened by P-I/G1 projects has increased from 40 to 99, with a significant increase for each category of MSIP. As compared to P-I/G1 projects, P-I/G2 projects, designed later and based on clearer terms of reference, tend to emphasize multistakeholder innovation mechanisms as a specific result in and of themselves, rather than simply as project-related processes. Of the 39 Pillar I projects, 11 do not have a formal multi-stakeholder strategy. Seven (7) do have one but are yet to formalize it, which questions the benefits of late-starting multi-stakeholder approaches, and points to the challenge of managing a multistakeholder mechanism in the context of a project. Innovation mechanisms are typically built or strengthened via thorough consultation with a diversity of stakeholders and demonstrate the capacity of research to work and interact with different types of actors at different levels (local, national, global), which is key to addressing complex issues. Properly developed multistakeholder mechanisms, even though their implementation process has been time-consuming and prone to delays, promise better MSIP sustainability which, as projects progress, becomes a pressing issue. The pathway towards the sustainability of multistakeholder mechanisms is unique to each project, with mechanisms pre-existing DeSIRA projects having advantages over new ones. The role multistakeholder mechanisms play in creating the conditions for the dissemination and/or scaling of innovations is a key factor of sustainability of the projects' results. Several projects work at community, as well as at larger/upper administrative levels to assess the potential for scaling innovations, emphasizing a holistic approach, and to take account of sustainability issues.

Over the reporting period**, Pillar II** has contributed to 83 MSIPs, comprising 22 international, 58 national and 3 subnational MSIPs. One Pillar II project, with 5 'sub-projects' targeting Agricultural Research and Extension Organisations (AR&EOs) in Africa, predominantly accounts for these numbers. Since the last AGR, the growth in the number of MSIPs (all categories) supported by Pillar II

projects has been limited (80 to 83) due to the elimination of duplications in two 'sub-projects'. Every AR&EO backs a regional multi-stakeholder mechanism, contrasting with the dominance of Pillar I in local and national innovation platforms. Mechanisms under Pillar II emphasize regional dialogue with a policy or Capacity Development (CD) focus on topics like Climate Smart Agriculture (CSA) and Knowledge Management (KM). The 58 national MSIPs contribute to building capacities at country level and are either policy-oriented or focused on value chains. Innovation mechanisms focused on commodities are expected to multiply but their capacity, sustainability and outcomes are not yet known. DeSIRA LIFT provides support to projects to help them to navigate the diverse and complex mechanisms aimed at supporting innovation.

LIPS-ZIM "Adoption and scaling up of improved livestock production systems"; implemented by ILRI (International Livestock Research Institute) in Zimbabwe (Pillar I / Group 1)
27 multi-stakeholder innovation mechanisms have been formed at local level over the reporting period. The project supports 3 kinds of mechanisms. At ward level, Innovation Communication Platforms (ICPs) are farmer-led and aim at co-designing innovations related to animal health. At district level, Innovation Platforms (IPs) promote technology adoption and facilitate access to markets. IP meetings are attended by farmers, staff from the Department of Agricultural, Technical and Extension Services (Agritex), staff from the Department of Veterinary Services (DVS), local leadership, agro-dealers, local NGOs, private sector (etc.). Also at district level, livestock feed and forage committees functioning as arms of MSIPs have been formed to "*lead the development and adoption of appropriate forage/livestock husbandry and marketing innovations*". The decentralization of these committees to ward level was ongoing (as of December 2022).

SAFEVEG "Safe locally-produced vegetables for West Africa's consumers"; managed by the Netherlands Ministry of Foreign Affairs, implemented by WORLDVEG in Benin, Burkina Faso, Mali (Pillar I / Group 2)
The project intends to create or support 220 Vegetable Business Networks (VBNs) with a sustainability objective. It created 20 VBNs in 2021 and 80 more in 2022. VBNs are local clusters of value chain actors and support services, bringing together business champions selected by the project, producers, market players, extension agents and consumers. These are considered innovation mechanisms as their aim is to develop, pilot and scale new tools and technologies with a focus on the production, storage and processing of vegetables.

Table 3: Summary of cumulative values 2019-2022 for GDIs attached to Output 1

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
12	8	**11**	**21A**	Number of multi-stakeholder innovation platforms/mechanisms developed or strengthened (International level)	3	6	1	**7**	15	**22**
19	6	**12**	**21B**	Number of multi-stakeholder innovation platforms/mechanisms developed or strengthened (National level)	12	24	9	**33**	64	**58**
24	8	**17**	**21C**	Number of multi-stakeholder innovation platforms/mechanisms developed or strengthened (Subnational level)	25	69	125	**194**	1	**3**
				TOTAL	40	99	135	**234**	80	**83**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.
Group 1 = 22 Pillar I projects, already covered under AGR 2021
Group 2 = 17 Pillar I projects, not covered under AGR 2021
Pillar II = 7 projects (2 projects + 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021).

5.2 Output 2 - Innovations linked to agri-food systems are developed and made available at farm and institutional levels

Table 4: List of global DeSIRA Indicators attached to Output 2

GDI #22	Number of climate-smart or agroecological innovations under development #22A (At farm level: products, technologies, models, systems, strategies) #22B (At farm level: services, decision making tools, governance mechanisms) #22C (Beyond farm level, including at institutional level)

Innovation is an idea put into action that can be technical or social, incremental or radical. Over the reporting period, all but three projects developed innovations at farm and/or beyond farm level. Most Pillar I projects reported innovations for both levels. It is challenging to identify all innovations under development and caution needs to be exercised when aggregating quantitative data about innovations, owing to their diversity (e.g., crop varieties, financing mechanisms), and inconsistencies in reporting on the nature of innovations across projects. Additional innovation is a complex process, which takes place in a trajectory, with a project contributing to this trajectory at one or several phases of the innovation process (initial concept/idea, prototyping, development, dissemination). That said, compared to AGR 2021, innovations under development have roughly tripled for Pillar I projects. As of December 2022, a few Pillar I projects had not started co-development due to delays. The development stage of many innovations is not known, except for those already adopted or undergoing official registration at national level. 952 innovations at farm level (such as products, technologies, agricultural practices, farming systems, services, decision-making tools,) were generated by Pillar I projects over the reporting period. The diversity of innovation is large. Annex II provides the list of innovations per project. Seed varieties is one of the most common innovations claimed by projects, with at least 500 crop varieties identified; either new varieties from DeSIRA-supported breeding programmes, or existing varieties tested in new contexts. Many projects introduce and/or adjust known technologies, practices, systems or services to new contexts, with a participatory approach, underscoring DeSIRA's significant role in adapting innovations developed elsewhere to local contexts, often with the support of global research institutions. Furthermore, many DeSIRA projects aim to finalize or strengthen earlier innovation efforts that were not successful due to time limits.

The climate-relevant approach is explicit in most projects. In addition, 24 projects promote agroecological innovations, though their commitment to the concept and principles that underpin agroecology vary widely. Some projects adapt existing practices for changes at farm level while others co-develop comprehensive agroecology strategies for changes at system level. Among the innovative support services, tools and mechanisms under development at farm level (58 out of 952), many combine financing with marketing and/or input supply. There have been many examples of this since the last reporting period (see the examples below). There is a noticeable increase in the number of P-I/G1 projects claiming a contribution to innovation beyond farm level, including institutional innovations. This indicates growing support for stakeholders supporting farmers or value chains, which may be perceived as a step towards a progressive transfer of the innovation support functions to local/national actors. Some of these innovations are suitable for both smallholder farmers and other stakeholders. Pillar II projects have reported a rise in institutional innovations from one in AGR 2021 to 11 in AGR 2023. The majority of these innovations are identified through implicit links i.e., not explicitly emphasized by the projects themselves.

ABEE "West African Breeding networks and Extension Empowerment"; implemented by CORAF (Conférence des Responsables de Recherche Agronomique Africains) in Burkina Faso, Niger and Senegal. (Pillar I / Group 1). ABEE is strengthening and upgrading 12 existing breeding programmes (4 products, 3 countries), which are considered institutional innovations (for use beyond farm level). Another institutional innovation is the variety exchange charter, expected to facilitate exchanges between institutions in the 3 countries. As of December 2022, the diagnosis of 10 programmes had been validated and was still ongoing for 2 programmes. The charter was ready and in the process of being revised/validated in each country. Innovations at farm level include: 1/ varieties stemming from the breeding programmes supported by the project (unlikely to be released before the end of the project); 2/ varieties developed before the start of the project and already in use by non-project farmers; the most promising varieties, in the context of the DeSIRA project, are identified and tested by targeted farmers before seed multiplication and dissemination. According to the 2022 progress report, 238 varieties (sorghum, millet, cowpea, fonio, groundnut) were being tested as part of the regional varietal material exchange network.

IRRINN "Intensification of agricultural production through upscaling of innovative adapted irrigation practices and technologies" managed by CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement) in Burkina Faso (Pillar I / Group 2) Two main types of irrigation solutions/innovations have been developed: runoff collection basins (or BCER, Bassins de Collecte des Eaux de Ruissellement) and small-scale private irrigation (or PIP, Petite Irrigation Privée). Half a dozen technologies have been tested for the PIP, but the solar pump is best suited to the demand, and therefore to scaling. The BCER is a complementary innovation to mitigate drought episodes which occur during the rainy season and is a radical innovation for Burkina Faso. Services developed include a direct contract between suppliers and smallholder farmers who have purchased a solar pump, based on partial credit repaid directly to the supplier and a 70% subsidy from the project. The contract includes follow-up and after-sales service and if the loan is not repaid, the supplier can recover the pump. This is innovative because equipment manufacturers normally work with larger farmers. As of December 2022, 64 smallholder farmers had benefited from irrigation solutions, among them 50 women (a group of 47 women + 3 individual women).

SYRIMAO "Système Régional Innovant de contrôle des Mouches des fruits en Afrique de l'Ouest"; managed by AFD (Agence Française de Développement); implemented by ECOWAS (Economic Community of West African States) in Benin, Burkina Faso, Cap Vert, Ivory Coast, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo. (Pillar I / Group 2) As of December 2022, innovative organic products were still in the development phase for the protection of mangoes: the essential oil of an endogenous plant called "Plant Y" as a sexual attractant; yeast waste as food bait and an endogenous strain of entomopathogenic nematode formulated as a compost against fly larvae and pupae. As for innovative services, the project has co-developed a new model for access to services: a partnership/contract between mango producers and exporters, whereby access to inputs is guaranteed in return for the delivery of mangoes. Even though such mechanisms already exist elsewhere, it is an innovation for these actors. In Mali, 255 small mango producers have signed a partnership agreement with an exporter (as of December 2022). In addition, the regional fruit fly management system is an institutional innovation; it consolidates, extends and perpetuates the achievements of the Regional Fruit Fly Management Plan for West Africa previously developed by ECOWAS and its partners in West Africa. It comprises 14 national surveillance plans with an alert component. Under the first phase of SyRIMAO (2015-2019), 8 plans were developed. Under this second phase, those 8 plans have been updated and 6 new ones were created..

Table 5: Summary of cumulative values 2019-2022 for GDIs attached to Output 2

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
34	14	31	22A	Number of climate-smart or agroecological innovations under development (At farm level: products, technologies, agricultural practices, farming systems)	211	639	255	**894**	X	**X**
22	5	20	22B	Number of climate-smart or agroecological innovations under development (At farm level: services, decision making tools, governance mechanisms)	8	29	29	**58**	X	**3**
39	12	35	22C	Number of innovations under development (Beyond farm level, including at institutional level)	44	136	43	**179**	1	**11**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.
Group 1 = 22 Pillar I projects, already covered under AGR 2021
Group 2 = 17 Pillar I projects, not covered under AGR 2021
Pillar II = 7 projects (2 projects + 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021).

(X) No expected contribution

5.3 Output 3 - Farmers are reached by research and innovation initiatives and individual capacities are developed beyond farm level, including at institutional level

Table 6: List of global DeSIRA Indicators attached to Output 3

GDI #23	Number of smallholder farmers reached by research & innovation initiatives
GDI #24	Number of individuals whose capacities are developed #24A (Researchers) #24B (Technical or Development Staff)
GDI #25	Number of individuals supported to earn a post-graduate diploma #25A (Master) #25B (PhD/Doctorate)

It is estimated that approximately 250,000 smallholder farmers have been reached by DeSIRA research and innovation projects, including over 47,000 who were reached by P-I/G1 projects (against 7,000 in AGR 2021). One P-I/G2 project has reached nearly 170,000 farmers and a few have reached around 10,000 farmers. However, the majority of projects directly reached fewer than 500 farmers. The number of farmers reached directly (which includes farmers trained) is larger than the number of farmers engaged in co-developing innovations and in multi-stakeholder innovation mechanisms, which is not tracked in a systematic way. It must be emphasized that the first objective of research and innovation projects is to produce knowledge and to co-design innovations and not to scale these innovations. However, some DeSIRA projects have an explicit development objective. Furthermore, the number of farmers reached is vastly underestimated because of monitoring and reporting limitations at project level: Challenges include difficulties in estimating the number of farmers reached and especially women farmers, double counting, and limited disaggregated data.

The geographical scope of projects does not necessarily correlate with the number of farmers reached. Overall, DeSIRA is making significant steps in supporting smallholder farmers and facilitating access to technical and scientific knowledge. The high number of farmers reached by projects is a result of the participation of development organisations (including farmers' organisations) within the project consortium, the inclusion of digital tools, or the release of seeds on a large scale. Many projects focus on training motivated farmers to promote farmer-to-farmer extension, as well as supporting organisations (farmers' organisations, local NGOs, advisory services) to play an extension role, rather than maximizing the number of beneficiary smallholder farmers. Projects are progressively ddeveloping dissemination and/or scaling strategies. However, the effects of Capacity Development (CD) remain unverified until innovations are deployed by farmers.

Regarding other categories of actors, efforts were accelerated in 2022 to compensate for delays in the implementation of CD plans during the COVID-19 pandemic. As of December 2022, P-I/G1 projects reported engaging in the CD of 711 researchers and 1,436 technical/development specialists, a notable increase from 139 and 557, respectively, in 2019-2021. P-I/G2 projects engaged in the CD of 135 researchers and 8,669 technical staff. The contribution of Pillar II projects includes at least 1,780 researchers and 1,489 technical/development staff. Overall, across all DeSIRA projects, the DeSIRA initiative is estimated to have strengthened the capacity of at least 2,626 researchers and 11,956 technical or development staff.

Training on data collection, management and analysis is central to many CD plans, including for researchers. Not all projects have specific CD plans for researchers, but the latter nevertheless enhance their skills and broaden their perspectives through their active role in implementing project activities. While capacity changes in researchers are not systematically measured, implementing

partners reflect positively on individual-level changes they have observed. Training for technical staff encompasses a diversity of topics, including technical and non-technical topics such as effective extension service delivery, innovation platform establishment and operation, food safety risk assessment, marketing and e-commerce, conservation agriculture, agroforestry, organic agriculture, agroforestry, public policy cycle, social and behaviour change communication and gender.

Sex-disaggregated data is often available but not systematically reported, making it challenging to assess the representation of women accurately. Estimates suggest that 525 women researchers have been capacitated under DeSIRA, though this number may be underestimated, with varying percentages of women researchers across different project teams. The percentage of women in technical staff roles is generally low, with some exceptions.

Post-graduate students play a crucial role by contributing to project activities, including research, innovation-related tasks, fieldwork, and knowledge production, enhancing their scientific skills while pursuing academic degrees. Most Pillar I projects support students, on average 10 Master students (ranging from one to 33) and 6 PhD students (ranging from 1 to 19) per project. Since the last reporting period, the number of students supported by P-I/G1 projects was multiplied by 3 for Master students (from 83 to 248) and increased by 40% for PhD students (from 111 to 151, including at least 49 women). Students can be professionals seeking higher degrees or younger individuals. The vast majority of students are from DeSIRA target countries, mainly in Africa (most Pillar I projects included in AGR 2023 are located in Africa). Research institutions, including 42 European and 99 African institutions, play a significant role in developing the capacities of students and researchers, with several institutions involved in more than one DeSIRA project.

CDI-Rwanda "Capacity development for innovation in Rwanda: strengthening value chains in six districts"; implemented by FAO (Food and Agriculture Organisation)
(Pillar I / Group 2).
Research & innovation activities supported by DeSIRA have reached 8,618 farmers at the time of reporting, including 5,745 men and 2,873 women farmers (no double counting). Through a multitude of cooperatives, the project works with all categories of farmers, not only smallholder farmers, though a majority of farmers in Rwanda cultivate small plots of land. Furthermore, twelve young individuals (9 men, 3 women) were supported as Innovation Facilitators, under SUVI (Societal University Village Initiative), a rural transformation approach supported by the University of Rwanda, which encourages and supports graduates to return to their communities to transfer their knowledge. These Innovation Facilitators/SUVI champions were recruited and given induction training to start supporting 8 innovation partnerships from September 2022 onwards; innovation partnerships are multi-stakeholder mechanisms at district level and are aimed at streamlining climate-smart agriculture best practices. They include district authorities, farmers' organisations, local or international NGOs (as value chain actors), financial institutions, and other private actors from the different value chains such as input dealers, market operators sourcing agricultural products for processors (etc). The project also trained 12 veterinarians (5 females and 7 males) to support cattle farmers (artificial insemination). Six research exchange programmes have been established between the University of Rwanda, the Rwanda Agriculture and Animal Resources Development Board and Ecole Supérieure d'Agro-Développement International. As of September 2022, they had involved 4 MSc students from Rwanda and 2 MSc students from France. In addition, the proposal for one PhD female student from the University of Rwanda had been finalized and validated.

Table 7: Summary of cumulative values 2019-2022 for GDIs attached to Output 3

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
37	15	34	**23**	GDI #23 Number of smallholder farmers reached by research & innovation initiatives	7032	47357	202580	**249937**	0	**338**
37	13	36	**24A**	GDI #24A Number of individuals whose capacities are developed (Researchers)	139	711	135	**846**	49	**1780**
42	12	33	**24B**	GDI #24B Number of individuals whose capacities are developed (Technical or Development Staff)	557	1436	8669	**10105**	0	**1851**
30	14	29	**25A**	GDI #25A Number of individuals supported to earn a post-graduate diploma (Master)	83	248	90	**338**	X	**X**
29	15	29	**25B**	GDI #25B Number of individuals supported to earn a post-graduate diploma (PhD/Doctorate)	111	151	52	**203**	X	**X**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.
Group 1 = 22 Pillar I projects, already covered under AGR 2021
Group 2 = 17 Pillar I projects, not covered under AGR 2021
Pillar II = 7 projects (2 projects + 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021).
(X) No expected contribution.

5.4 Output 4 - Education and training programmes responsive to capacity development needs for agricultural innovation at national level are strengthened

Table 8: List of global DeSIRA Indicators attached to Output 4

GDI #26	Number of curricula or training packages developed or upgraded

Even though education is not a DeSIRA objective in and of itself, given the instrumental role of education in building individual capacities, 20 projects, including 15 from Pillar 1, have plans to develop training/education programmes. Among them, 11 have contributed positively to this output over the reporting period. The contribution of Pillar II projects to Output 4 was limited, though some linkages between projects and educational outcomes were implicit (and not well-documented). Some projects were in the early stages of initiating these activities or had not yet started.

These outputs, mostly by-products of research activities, include the revision or addition of 22 academic modules and the development of 12 pieces of training or education material from scratch. These outputs cater to a diversity of beneficiaries, such as farmers, technical staff, scientists, bankers, and policymakers, with an emphasis on sustainability to ensure continued use. Non-academic training programmes covered a wide range of topics and audiences, from agribusiness curriculum development for farmers to training in experimental design and data collection for researchers. Support for academic programmes focuses on incorporating concepts related to CSA, agroecology, and Knowledge Management (KM) into curricula.

Additionally, the COVID-19 pandemic played a role in shaping the education and training efforts of DeSIRA projects, leading to the development and mobilisation of online training in response to pandemic-related constraints while highlighting the continued value of in-person education. The current education-related outputs of the DeSIRA initiative demonstrate the value of knowledge and innovations produced and highlight the educational potential of DeSIRA and the role it can play in supporting education to transform agriculture and food systems at national level, owing to the strong partnerships developing between European and African Research and Education institutions.

IRFFS "Integrated Rice-Fish Farming: A Research and extension development based initiative to improve food security and nutrition in Liberia"; implemented by AFRICA RICE (Pillar I / Group 1)

IRFFS contributed to the Master's degree syllabus proposed by the University of Liberia, by developing the extension component on Climate Smart Agriculture (this was achieved before December 2022). The MSc programme started in March 2023. This activity was implemented by FAO.

UOM INNOVATION & TRAINING "Enhancing climate resilience in agriculture for improved food and nutrition security through research, innovation and training in the Republic of Mauritius"; implemented by the University of Mauritius
(Pillar I / Group 1)

One of the project objectives of the University of Mauritius was to be "*viewed as an institute championing the delivery of market-driven courses, developmental research and outreach programmes centered around the SDGs*". To this end, an MSc in Food Technology and Innovation was developed. This was made possible by the substantial improvement in the infrastructure of the Food Technology laboratory of the Faculty of Agriculture. Equipment purchased with EU support is used by academics in Food Science and Technology, undergraduate and postgraduate students (around 80% of students enrolled in Food Science courses at the faculty are females) to develop and test innovative food products. The MSc is a two-year, part-time, fee-paying postgraduate course. A first round of the programme was offered in academic year 2020-2021 (15 students) and the second round was due to be offered in 2023-2024. *"This programme is designed to develop an understanding of emerging food safety hazards and incidents, new food ingredients, innovative food product formulation and processing methods, smart postharvest technology and food packaging, contemporary approaches to food safety management and food entrepreneurship. It focuses on engaging learners in the creative use of scientific knowledge to formulate and manufacture safe, healthy and environment-friendly food products. It also aims at building competencies to enhance employability, increase confidence in scientific and business skills, promote women's entrepreneurial empowerment and contribute to food innovation for sustainable socio-economic growth*" (Source: interim narrative report, March 2023.

Table 9: Summary of cumulative values 2019-2022 for GDIs attached to Output 4

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
20	4	11	**26**	Number of curricula or training packages developed or upgraded	6	22	8	**30**	0	**4**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.

Group 1 = 22 Pillar I projects, already covered under AGR 2021

Group 2 = 17 Pillar I projects, not covered under AGR 2021

Pillar II = 7 projects (2 projects + 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021).

5.5 Output 5 - Science-based knowledge and evidence are generated and made available to inform research for innovation in agriculture, institutional cooperation and the dissemination of new climate-smart and agroecological solutions

Table 10: List of global DeSIRA Indicators attached to Output 5

GDI #27	Number of knowledge & communication products developed #27A (Communication products) #27B (Technical reports) #27C (Guidance manuals) #27D (Databases) #27E (Scientific publications)

Knowledge production and dissemination is at the heart of DeSIRA projects. P-I/G1 projects have shown a significant increase in all knowledge and communication product categories (including seminars, videos, briefs, technical reports, practical manuals, databases, scientific publications and flyers), since the last reporting period, though some have been delayed due to COVID-19. The total number of communication products stands at 538 for Pillar I and 288 for Pillar II. Technical products total 145 for Pillar I and 229 for Pillar II. The value is underestimated for Pillar I as many Master theses are yet to be reported. Pillar I and II produced 131 and 7 guidance manuals respectively. Database creation stands at 30 for Pillar I and 2 for Pillar II. There is evidence of efforts to facilitate access to scientific knowledge via databases (see the examples below), which requires specific interfaces and equipment.

The cumulative number of scientific publications over the implementation period is 54. The majority are from Pillar I, but not from PhD students, as most theses are yet to be completed. With 203 PhD students presently supported, a significant increase in scientific publications is expected in the next reporting period. Additional contributions to sharing of scientific knowledge include participation in national and international scientific conferences or political events like COP27.

Knowledge products should increase when the projects come to an end and complete their activities. Knowledge products illustrating the contributions of projects to the deployment of innovations take time to develop, as innovation is a long-term process. Besides, key challenges inherent to DeSIRA include the complexity of translating research into accessible knowledge products for various audiences and ensuring sustainable and efficient Knowledge Management (KM) systems for dissemination. Some of the strategies deployed to overcome these challenges include creating KM systems from scratch, delegating KM to national partners, or integrating project products into existing platforms. DeSIRA LIFT helps projects to communicate more effectively (e.g. participatory videos, stories of change).

CLIMA-LOCA "Fostering CLIMAte-relevant and LOw CAdmium innovations to enhance the resilience and inclusiveness of the growing cocoa sectors in Colombia, Ecuador, Peru"; implemented by CIAT (International Centre for Tropical Agriculture)
(Pillar I / Group 1)

In 2022, the research results related to the impact of climate change on cocoa production in Colombia, Ecuador and Peru' were published in Dataverse https://doi.org/10.7910/DVN/LXBZMU. This data set is considered a scientific publication because it is an official repository. *"These data contain spatial information on agro climatic zones for cocoa farming in Colombia, Ecuador, and Peru, as well as impact gradient layers that illustrate the effect that climate change might have on cocoa crops in the same three countries."* Based on this dataset, tools were developed "www.cacaodiversity.org" to "*provide location-specific information about how to improve sustainability of cacao farms in South America. The tool gives information about the future impact of climate change on cacao cultivation and guides the selection of appropriate propagation material for climate change adaptation. The tool also includes information on the likely cadmium content in soil and cacao beans*".

ESSA "Earth observation and environmental sensing for climate-smart sustainable agro-pastoral ecosystem transformation in East Africa"; implemented by the University of Helsinki, in Kenya and Ethiopia
(Pillar I / Group 2)

In the category of communication products, eight seminars/workshops were organized for AKIS actors and other beneficiaries in Ethiopia and Kenya over the reporting period. They were organized to convey information about the project, engage with stakeholders, and/or present preliminary results.

As of December 2022, earth observation methods and techniques had been developed and existing ones had been improved. These are remote sensing products & methods for points of change assessment and local scientific evidence for environmental footprints of semi-arid and arid lands. Capacity building of professional staff in remote sensing and geographical information systems was also being developed. "*By the end of 2022, the ESSA project has 22 MSc students (14 male and 8 female) and five PhD researchers (3 male and 2 female) conducting their thesis research in the Addis Ababa University, University of Helsinki, University of Nairobi, University of Eldoret and IHE Delft.*" (Source: project Year 2 report). As a result of this research, a lot of data were being generated but the full extent to which this will be turned into a "knowledge product" was yet to be determined by the project team. That said, as of December 2022, seven MSc theses were finalized and eight scientific papers had been published in international peer-reviewed journals (an additional one was still under review).

Table 11: Summary of cumulative values 2019-2022 for GDIs attached to Output 5

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023 (*)
46	15	40	**27A**	Number of knowledge & communication products developed (Communication products)	123	372	166	**538**	2	**288**
37	10	30	**27B**	Number of knowledge & communication products developed (Technical reports)	19	79	66	**145**	297	**229**
25	4	18	**27C**	Number of knowledge & communication products developed (Guidance manuals)	11	101	30	**131**	2	**7**
32	3	17	**27D**	Number of knowledge & communication products developed (Databases)	11	22	8	**30**	0	**2**
40	7	18	**27E**	Number of knowledge & communication products developed (Scientific publications)	14	35	14	**49**	0	**5**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.
Group 1 = 22 Pillar I projects, already covered under AGR 2021
Group 2 = 17 Pillar I projects, not covered under AGR 2021
Pillar II = 7 projects (2 projects + 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021)
(*) For Pillar II, the contribution to GDI #27 is dominated by the 5 sub-projects, which -in between the two reporting periods- clarified the definition of its different categories of knowledge products: as a result, a year-on-year comparison per category/GDI is not relevant (i.e. several products were wrongly reported under GDI #27B in AGR 2021 and are now correctly reported under GDI#27A in AGR 2023). Therefore the year-on-year comparison is only relevant for all product categories combined: this project has contributed 438 products in AGR 2023 against 297 for AGR 2021.

5.6 Output 6 - Science-based policy briefs are produced and dialogues on agriculture and food policy development and reform are organized

Table 12: List of Global DeSIRA Indicators attached to Output 6

GDI #28	Number of policy-related outputs #28A (Documents) #28B (Dialogues)

There are three categories of DeSIRA projects, based on the level of policy engagement at activity/output level and expectations at outcome level: *1/ Projects with no policy activities and no policy objectives (*7 projects, mostly from Pillar I Group 1); *2/ Projects engaged in policy activities with no specific policy objective (7 projects, all Pillar I), 3/ Projects having a policy objective, explicit or implicit (*28 projects). Thus a majority of DeSIRA projects have planned policy activities/objectives. In Pillar II, six projects are active in policy work, having increased their output by 90% for policy briefs (38) and 78% for policy dialogues (32) since the last reporting period. Policy topics focus on Climate Smart Agriculture in relation to the Malabo/CAADP framework. At a more global/continental level, Knowledge Management is a key focus of policy efforts, with numerous policy briefs stemming from an annual pan-African initiative on Knowledge Management for Agricultural Development (KM4AgD). Agroecology, despite rising interest, is not yet a key policy topic within Pillar II.

Pillar I Group 1 projects show less policy engagement, with only 8 out of 22 projects having produced policy outputs within the reporting period. Policy-related activities are expected to intensify as the need to scale solutions through an enabling environment becomes more pressing. However, two conditions are required: research results need to lend themselves to being translated into policies, which is not always the case, and implementation partners need to have the required knowledge and skills to engage in policy activities, which is a point of attention. Projects benefitting from a no-cost extension have an opportunity to increase their policy engagement. However, a lack of policy indicators in many projects indicates a secondary focus on policy outcomes.

Comparatively, Pillar I Group 2 projects are more policy-active, with all having a policy plan and 8 producing outputs (7 policy briefs and 18 policy dialogues) as of December 2022, after two years of implementation. Within this grouping, the scope of the policy dialogues varies for each project: they may engage stakeholders at local levels (district, province), national levels, or regional levels (multiple countries). The diversity of the topics is linked to the diversity of innovations under co-development (e.g., a brief on rice production and consumption, on clean cooking technologies, on agroforestry and the use of biomass, disease surveillance and control, etc.). Very few Pillar I projects have a holistic integrated approach to agroecology, but among those which do, agroecology is the focus of their policy advocacy activities.

There is a risk that the policy activities of Pillar I projects could be side-lined due to the need to build capacities in policy engagement. DeSIRA LIFT provides support to DeSIRA projects interested in building their capacities in this domain. DISSEM-INN, funded by AFD and managed by CIRAD, also contributes to Output 6 by supporting nine Pillar I DeSIRA projects in policy advocacy. CIRAD's long-term position in the Sahel enables this support, not easily replicable elsewhere.

SUPPORT TO TAP "Developing capacities in agricultural innovation systems: scaling up the Tropical Agriculture Platform Framework"; implemented by FAO (Food and Agriculture Organisation) in Burkina Faso, Eritrea, Malawi, Rwanda, Senegal, Cambodia, Laos, Pakistan, Colombia
(Pillar I / Group 1)
As of October 2022, policy dialogue processes were either completed (Cambodia and Lao PDR) or ongoing (Burkina Faso, Colombia, Eritrea, Malawi, Rwanda and Senegal) except in Pakistan, where the project started later.
Two policy briefs were produced at national level during the reporting period:
1/ In Cambodia "Bottom-up solutions to promote conservation agriculture in Cambodia; Results from a multistakeholder policy dialogue process"; the policy dialogue was led by CASIC (Cambodia Conservation Agriculture Sustainable Intensification Consortium), a national multistakeholder platform established under the Ministry of Agriculture, Forestry and Fisheries; the dialogue involved representatives from the government, international organizations (including CIRAD, GIZ and Swisscontact), the European Union, farmer organizations and the private sector.
2/ In Lao PDR "Maximizing benefits from agriculture exports for smallholder producers"; the policy dialogue was led by the Department of Planning and Cooperatives and included, among others, representatives from the private sector, agriculture cooperatives, the Lao Farmer Network, the Lao National Chamber of Commerce and Industry, universities, other EU-funded projects and government officers from relevant ministries.

SUPPORT TO CAADP AR&EO "Comprehensive Africa Agriculture Development Programme (CAADP) ex-Pillar IV- Africa Regional and Sub-regional organisations for Agricultural Research and Innovation"; managed by IFAD (International Fund for Agricultural Development), implemented by AFAAS (African Forum for Agricultural Advisory Services), ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa), CCARDESA (Centre for Coordination of Agricultural Research and Development for Southern Africa), CORAF/WECARD (West and Central African Council for Agricultural Research and Development) and FARA (Forum for Agricultural Research in Africa)
(Pillar II)
Together, the 5 organisations held 29 dialogues and produced 37 policy briefs over the reporting period. For instance, AFAAS supported policy processes and the production of briefs in several countries: e.g. a position paper on standardized and harmonized extension delivery in Malawi; two policy briefs on youth and private sector engagement in extension in Kenya and a policy brief on strengthening capacities for climate resilient agricultural extension service delivery in Uganda.
A FARA initiative "Knowledge Management for Agricultural Development (KM4AgD) Challenge" has yielded several policy briefs: e.g. "Organizational Knowledge Management Professionalization" and "Strengthen Knowledge Management Competence Centres to drive the Transformation of African Countries into Knowledge Societies".

Table 13: Summary of cumulative values 2019-2022 for GDIs attached to Output 6

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
36	5	18	**28A**	Number of policy-related outputs (Documents)	0	18	7	**25**	20	**38**
26	7	15	**28B**	Number of policy-related outputs (Dialogues)	1	11	18	**29**	18	**32**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.

Group 1 = 22 Pillar I projects, already covered under AGR 2021

Group 2 = 17 Pillar I projects, not covered under AGR 2021

Pillar II = 7 projects (2 projects + 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021).

6 Progress towards Outcomes

6.1 Outcome 1 – The capacity and the resilience of smallholder farmers improve as they take up new climate-smart or agroecological products, technologies, models or services

Table 14: List of global DeSIRA Indicators attached to Outcome 1

GDI #8	Number of climate-smart or agroecological innovations taken up by smallholder farmers #8A (Products, technologies, models, systems, strategies) #8B (Services, decision making tools, governance mechanisms)
GDI #9	Number of smallholder farmers who have taken up at least one climate-smart or agroecological innovation
GDI #10	Number of DeSIRA projects for which the expected rate of implementation of innovations by targeted farmers has been met
GDI #11	Number of DeSIRA projects having at least one documented strategy to disseminate or scale up innovations beyond the project's target groups of smallholder farmers

Outcome 1 captures the transformation of outputs into sustainable changes. Such changes are supported by project activities (and give indications on the project's performances) but also require an enabling environment (innovation support services, markets, policies), which are outside of the projects' control. As of December 2022, it was estimated that 187 climate-smart or agroecological innovations had been taken up by smallholder farmers, which accounts for about 20% of all innovations under development or developed since the start of the DeSIRA initiative. This is based on the analysis of progress reports and verbal claims by implementing partners, who have been careful to only report innovations for which they have evidence that they have been taken up by farmers with an intention to continue using them without project support. These are conservative estimates due to underreporting, as some projects did not provide exact uptake numbers. Besides, the implementation of innovations at system level (e.g. agroecological systems) is expected to be slower as it is more complex than the implementation of a given technique (e.g. composting) or product (e.g. new variety) but may generate greater changes (income, sustainability, resilience). Projects from Pillar I Group 1 reported the largest share of innovations taken up so far (80%), and a significant increase from the previous period (from 34 to 151).

Out of 36 Pillar I projects expected to contribute to Outcome 1, only 19 (12 from Group 1, 7 from Group 2) reported at least one innovation adopted by farmers. Projects from Group 2 were less affected by delays due to COVID-19 and were comparatively more advanced as of December 2022, than projects from Group 1 as of December 2021, in terms of progress towards Outcome 1 measured after two years of implementation.

The total number of smallholder farmers using these innovations reached 91,213. Excluding a project claiming 86% of this figure, the number of farmers reached 12,331, with Group 1 contributing 88%. This is a sharp increase over the 1800 farmers reported in AGR 2021. The number of beneficiary women farmers is not systematically reported. Changes at farm level are confirmed by IPs, but progress reports lack detailed analysis of changes and sustainability perspectives. In order to capture the effectiveness of innovations from a "use" standpoint, several projects focus on the rate of implementation rather than the number of farmers, with two claiming to have met their target rates

(others had not measured this rate yet). Slow innovation development mostly accounts for 17 projects not contributing to Outcome 1 yet (8 from Group 1, 9 from Group 2). However, except for some DeSIRA projects with a development perspective and including cases where the project organisations are able to reach a large number of farmers, many DeSIRA projects research and innovation projects are yet to develop or strengthen their partnerships with development organisations (e.g. NGOs, UN organisations, extension services) with a view to scale innovations by directly disseminating them to a wider group of smallholder farmers, or by putting in place the conditions for scaling (involving new actors, strengthening capacities at scale, or contributing to setting up an enabling environment).

The AGR 2021 report did not capture the scaling and dissemination strategies of P-I/G1 projects. It is important to note that dissemination builds on knowledge and communication to spread awareness and information and to ensure that the target audience has access to the information. Scaling goes beyond dissemination by ensuring that innovations are expanded and integrated into regular practice on a broader scale; it includes scaling out with more farmers involved and larger areas covered, scaling up to address the institutional changes required to scale innovation, with the involvement of more organisations in the process, and scaling deep, which assesses the change in actors' values required for the deployment of the innovation. A newly introduced GDI tracks projects with documented strategies for spreading innovations beyond their direct smallholder farmer targets. As of December 2022, 18 projects reported a strategy, relying on various methods and partnerships to increase the effectiveness of dissemination. Among them, only 11 projects had a scaling strategy, more complex to conceive and to implement than a dissemination strategy. Some had started implementing their scaling strategy, including two projects, which are both integrated into larger development programmes, and two other projects nearing completion. However, 18 Pillar I projects were either still in the process of developing strategies or lacked one.

WE4F "Water and Energy for Food – East Africa Hub"; implemented by GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) in Kenya, Uganda, Rwanda, Ethiopia, Tanzania (Pillar I / Group 2)

23 innovations are reported by this project and belong to the following categories: energy, water, digital and finance solutions. Some are technologies (solar-powered irrigation) and some are services (digital affordable loans to farmers). Some are targeted at farmers (e.g., solar dairy cooling) and some target processing companies (e.g., smart metering and process monitoring in agro-processing facilities). For instance, six financing mechanisms have been developed to provide smallholder farmers or end-users with access to innovative technologies at an affordable price. The innovators use different variants of pay-as-you-go systems, tailored to the needs of their clients. Based on a sampling methodology, "*78,882 smallholder farms introduced climate-friendly and energy and/or water-saving innovations in 2022. These farms were reached primarily through collaboration with and through SMEs. One innovator in particular, Emata, reached more than 10% of the smallholder farms by offering digital solutions. Farms acquired also new technologies, such as solar pumps, subscription to solar cooling service or apps with agricultural extension services but also credit products. Additionally, 24,200 (32%) of the smallholder farms reached were run by women.*" (Source: 2022 report).

ReDIAL "Research for Development and Innovation Agriculture and Learning Project"; implemented by Friends of the Nation in Ghana
(Pillar I / Group 2)

The project is active in five districts and targets at least 10 communities per district. It has introduced CSA practices and products. Some communities already use certain CSA practices but each practice introduced by the project is new for at least one of the communities. The most popular innovations already taken up by farmers are:

- (*) Organic fertilizer (compost, mulch etc.)
- (*) Nitrogen fixation practices
- (*) Minimum tillage and direct planting techniques
- (*) Crop rotation and intercropping techniques
- (*) Climate smart seed varieties

In addition, the project has introduced two innovative services, one is to support soil fertility enhancement and the other is a technology for reducing post-harvest losses in grain threshing. According to the Year 2 report, "*A total of 488 farmers (280 males, 208 females) are applying various forms of climate smart agricultural practices due to their participation in the training organized by the project*". Besides, as of July 2022, 360 farmers (145 male, 215 females) had become members of a Village Savings and Loans Association (VSLA), another innovative service introduced by the project, and were engaging in off farm activities with a view to diversifying their income. Beneficiaries of VSLAs and of CSA practices are different groups of farmers.

Table 15: Summary of cumulative values 2019-2022 for GDIs to Outcome 1

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
34	2	15	**8A**	Number of climate-smart or agroecological innovations taken up by smallholder farmers (Products, technologies, agricultural practices, farming systems)	29	135	27	**162**	X	X
20	3	12	**8B**	Number of climate-smart or agroecological innovations taken up by smallholder farmers (Services, decision making tools, governance mechanisms)	5	16	9	**25**	X	X
36	3	17	**9**	Number of smallholder farmers who have taken up at least one climate-smart or agroecological innovation	1800	10822	80391	**91213**	X	X
15	0	2	**10**	Number of DeSIRA projects for which the expected rate of implementation of innovations by targeted farmers has been met	0	2	0	**2**	X	X
36	0	18	**11**	Number of DeSIRA projects having at least one documented strategy to disseminate or scale up innovations beyond the projects' target groups of smallholder farmers	na	10	8	**18**	X	X

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.
Group 1 = 22 Pillar I projects, already covered under AGR 2021
Group 2 = 17 Pillar I projects, not covered under AGR 2021
Pillar II = 7 projects (2 projects, plus 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021)

6.2 Outcome 2 – Innovation capacities of research, technical and development institutions as well as capacities of farmers' organisations to support agriculture innovation processes are strengthened

Table 16: List of global DeSIRA Indicators attached to Outcome 2

GDI #12	Number of organisations increasing their capacity to innovate in the area of agriculture and food systems #12A (International) #12B (National or subnational research institutions) #12C (National or subnational technical/development institutions) #12D (National or subnational FOs, NGOs, CSOs)
GDI #13	Number of new institutional partnerships on agriculture and food systems triggered by DeSIRA projects

The "capacity to innovate" refers to the capacity to identify constraints and opportunities and to mobilise resources to adapt and respond to challenges. It includes technical and functional capacities at individual, organisation and system levels. Institutional capacities refer to the capacity of organisations to manage resources to achieve their objectives. Outcome 2 focuses on innovation capacity at the organisation level. An increase in capacity should be the result of strengthening activities in at least one capacity area with project support (e.g. organisation, networking/collaboration, human resources, technical expertise, internal policies, governance, finances, management, monitoring & learning expertise, advocacy, strategic thinking, etc.). In practice, very few Pillar I projects assess (or even plan to assess) the effects of capacity building at organization level and most projects implicitly assume that training and other types of institutional support lead to increased institutional capacities and/or capacities to innovate and act accordingly. The contribution of Pillar I projects to the strengthening of institutional capacities and/or innovation capacities is therefore assessed through the verbal declarations of implementing partners and facts (mostly from progress reports) supporting these declarations.

As of December 2022, it was estimated that DeSIRA projects were in the process of contributing to the enhanced capacities of around 575 organizations, largely Farmers' Organisations (FOs) and NGOs, through Pillar I, and national research entities via both Pillars I and II. For all categories of organisations targeted by P-I/G1 projects, there has been a significant increase in the number of entities supported since the last reporting period. There is evidence of improving institutional capacity across various organizations involved in Pillar I projects, in spite of the lack of an assessment methodology. While information on institutional change is limited and fragmented, interviews with Implementing Partners often confirm that CD enhances institutional and innovation capacities, but this does not fully capture the true, complex and extensive influence of DeSIRA at institutional level, especially of Pillar I projects for which the objective of institutional CD is often more implicit than explicit.

According to the implementing partners, an estimated 157 FOs were either in the process of being strengthened or had been created with DeSIRA support. Several projects claim that the FOs they work with better understand their environment and have developed skills to support farmers to innovate, especially in the area of agroecology when projects tackle this issue (see the examples below). Local NGOs (about 75, including community-based organisations) are also gaining from project involvement with new knowledge and methods to support farmers. National research entities (an estimated 150 organizations) have improved research capacities through training and participation in research activities using up-to-date methods, enabling advanced scientific achievements. Their participation in DeSIRA also reshapes

research approaches by placing more attention on stakeholder interactions. Furthermore, the individual capacities of researchers are enhanced, often with support from European research and education institutions, thus indirectly reinforcing the institutional capacity of their own institutions. Institutional partnerships emerging from project activities also contribute to a growing capacity, with the number of such collaborations by P-I/G1 projects having doubled (18 to 39) since the last reporting period. Such partnerships may underscore a trend towards more sustainable collaborative initiatives, which may contribute to a better co-design of innovation and their scaling. Interestingly, Pillar I also induces change in several international organizations (e.g. France-based CIRAD, Costa-Rica based CATIE), strengthening their capacity to support transformative research in agri-food systems (Innovation System thinking, agroecological approaches, etc.).

As of December 2022, 139 Africa-based research institutions were involved in DeSIRA projects, with 40 institutions partnering in more than one project and 18 in at least three projects. While institutional CD is not always coordinated among projects supporting the same organisation, cumulative benefits from multiple engagements may point at a broader institutional gain for the targeted institution. A few actors play a crucial rural in developing links between the DeSIRA projects in which they participate, strengthening the capacity of the institutions to contribute to changes at scale (CIRAD, GIZ). In addition, DeSIRA LIFT manages a Community of Action and Reflection, which brings together team members of the Research and Innovation projects of the DeSIRA Initiative.

A large Pillar II project aims to build institutional capacity in five key African AR&EOs, including 4 regional organisations and one pan-African organisation. Capacities are measured annually and show significant progress, facilitated by improved cooperation among them. All five organisations are becoming more robust and effective in fulfilling their mandate, even though there is still room for improvement. Owing to enhanced capacity in resource mobilization, these organizations are increasingly involved in major projects with global partners, with a focus on agroecological transition, CSA, and food and nutrition security. Besides, their capacity to support other regional organisations, as well as national entities, by promoting the use of institutional tools and good practices has also increased. The outcomes of their support to national level member organisations (typically research and/or extension organisations) are not reported in progress reports but these AR&EOs have noticed improved participation and monitoring capacities among their members and they report that a few regional FOs are active in CSA alliances, contributing technical expertise. However, the challenge for the AR&EOs now lies in enhancing benefits for members, fostering ownership, and securing member-generated resources. Besides, there is a risk that institutional changes induced by the support from AR&EOs to their national members may be underreported due to implicit, rather than explicit, capacity gains.

Institutional strengthening of these AR&EOs is also evidenced in multi-stakeholder partnerships despite a reported decrease in numbers since the last reporting period. Among them, several partnerships are built with international organisations implementing other DeSIRA projects (e.g. CGIAR, FAO, GFAR, WUR, IICA), reinforcing the overall effectiveness of the DeSIRA initiative.

ABEE "West African Breeding networks and Extension Empowerment"; implemented by CORAF, in Burkina Faso, Niger, Senegal
(Pillar I / Group 1)

Three national research institutes are being targeted and are in the process of increasing their capacity: INRAN (Institut National de la Recherche Agronomique du Niger); INERA = Institut de l'Environnement et de Recherches Agricoles (Burkina Faso) and ISRA = Institut Sénégalais de Recherches Agricoles.
The following examples illustrate the institutional capacity development process (source: Narrative Report 2022):
- 11 breeders, including one woman, now use molecular markers in their breeding programmes in the five programmes in each country.
- 22 breeders, including 5 women, are using and have mastered the Breeding Management System (BMS) by designing trials using the BMS and collecting data using tablets. All the data have been migrated to the server.
In addition, the following hypothesis has been verified: « commitment of breeders to change the way they define their breeding priorities ». Priorities or « product profiles » are defined with ALL stakeholders and taken into account by breeders to create a variety that meets everyone's needs.
In addition, institutional partnerships are forming between the research institutes of the three countries to exchange plant material and use identical plant material evaluation procedures. There are 4 programmes in each country (groundnut, sorghum, millet, niebé), which makes a total of 12 partnerships.
Six Producers' Organisations (POs) are heavily involved in the implementation of the DeSIRA project: 3 in Burkina Faso, 1 in Senegal and 2 in Niger. This involvement translates into technical capacity building, in terms of seed production. For instance, coaching of POs by research institutes on how to set up trials and management of funds under contracts (strengthening of internal procedures), which will enable them to attract more funding and work with other organisations.

TAERA "Accompagnement de la Transition Agro-Ecologique par la Recherche Agricole"; implemented by ENABEL (Belgian Development Agency) in Benin
(Pillar I / Group 1)

The project contributes to strengthening the capacities of the following organisations:
-Institut National des Recherches Agricoles du Bénin (INRAB) by strengthening three research-development sites in the country (training of at least one researcher per centre, provision of small equipment, coordination of an innovation platform based on project results in each centre). Changes observed at research level by the implementing partner include a reinforcement of data collection, monitoring of experiments by INRAB researchers, and management of databases.
- Conseil de Concertation des Riziculteurs (CCRB) & Fédération Nationale des Organisations des Maraîchers du Bénin (FeNOMa) by strengthening these Farmers' Organisations (FOs, agreements are in place) by facilitators who support them in implementing activities, including farmers' field schools, and thematic training on participatory research/action and on agroecological innovations. The effectiveness is expected to be seen through the implementation of agroecological innovations by farmers and their impact on production and incomes. According to the implementing partner, the capacity of FOs to work with researchers has improved and their capacity for innovation has been strengthened. They are currently able to organise actions to disseminate agroecological innovations.
- 2 universities (Abomey-Calavi and Parakou): the project works with the university laboratory, contributing to improve the skills of laboratory staff who can be employed as research assistants on the project. Both universities are now working with FOs, in the context of the project. Besides, the University of Abomey-Calavi has started working with an FO focusing on horticulture, but not targeted by the project. This partnership demonstrates a strengthening of institutional skills in the field of cooperation and can be attributed to the project.

SUPPORT TO CAADP AR&EO "Comprehensive Africa Agriculture Development Programme (CAADP) ex-Pillar IV- Africa Regional and Sub-regional organisations for Agricultural Research and Innovation"; managed by IFAD (International Fund for Agricultural Development), implemented by AFAAS (African Forum for Agricultural Advisory Services), ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa), CCARDESA (Centre for Coordination of Agricultural Research and Development for Southern Africa), CORAF/WECARD (West and Central African Council for Agricultural Research and Development) and FARA (Forum for Agricultural Research in Africa) (Pillar II)

The outcome is illustrated for ASARECA and CORAF.

As a result of EU support, ASARECA claims an improvement of its staff capacity (through short term training) in many areas; a better management of resources, with a plan to set up a digital filing system for all information for the past 28 years (knowledge products, finance records, administrative records) and an ability to mobilize resources to develop new projects and new partnerships as a result of EU support: e.g. with Geosciences Australia (an agency of the Australian Government, focused on geoscientific research) and Digital Earth-Africa. In the case of the latter, ASARECA developed a partnership to enhance utilization of Earth Observation, climate relevant data and information for climate change mitigation interventions and improve food and nutrition security (a one-year project closing in July 2023, targeting member states).

CORAF claims an improvement in the management system and the elaboration of reports (particularly financial). As a result, audits are facilitated, so is the management of human resources. Much greater speed in administrative execution is observed. CORAF also claims the focal points (of the National Agricultural Research System) are much more responsive, that they work with more flexibility, produce better quality reports and provide better inputs.

Table 17: Summary of cumulative values 2019-2022 for GDIs attached to Outcome 2

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II	PI + PII	% (**) duplic.
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023	AGR 2023	AGR 2023
20	13	19	12A	Number of organisations increasing their capacity to innovate in the area of agriculture and food systems (Interna-tional)	15	26	14	**40**	43	**68**	108	30%
41	27	37	12B	Number of organisations increasing their capacity to innovate in the area of agriculture and food systems (National or subnational research institutions)	50	95	55	**150**	51	**63**	213	30%
30	10	19	12C	Number of organisations increasing their capacity to innovate in the area of agriculture and food systems (National or subnational technical/development institutions)	9	24	61	**85**	37	**48**	133	10%
32	12	23	12D	Number of organisations increasing their capacity to innovate in the area of agriculture and food systems (National or subnational FOs, NGOs, CSOs)	77	180	42	**222**	22	**15 (*)**	237	2%
27	14	21	13	Number of new institutional partner-ships on agriculture and food systems triggered by DeSIRA projects	18	39	2	**41**	95	**74**	115	na

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	GDI Title	AGR 2021	AGR 2023	*(X): no expected contribution*

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.
(*) For one Pillar II project, the contribution to GDI #12D was overestimated in AGR 2021; value rectified in AGR 2023, based on the list of beneficiary organisations.
(**) Estimated percentage of duplicate beneficiary organisations (to be applied to the figures in the "PI+PII" column".
Group 1 = 22 Pillar I projects, already covered under AGR 2021
Group 2 = 17 Pillar I projects, not covered under AGR 2021
Pillar II = 7 projects (2 projects, plus 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021)

6.3 Outcome 3 – "Private sector capacities and value chains of agri-food systems are strengthened"

Table 18: List of global DeSIRA Indicators attached to Outcome 3

GDI #14	Number of sustainable or climate-smart innovations taken up by agriculture and food-related MSMEs
GDI #15	Number of agriculture and food-related MSMEs which have taken up at least one sustainable innovation
GDI #16	Number of agriculture and food-related MSMEs strengthened or created
GDI #17	Number of food value chains supported
GDI #18	Number of full-time food industry-related jobs created

The number of Pillar I projects contributing to Outcome 3 remains limited because their priority is on research and innovation at farm level or at territorial level. As of December 2022, 16 Pillar I projects (9 from Group 1 and 7 from Group 2) were supporting a total of 58 Value Chains (VCs) in 18 African countries, 3 Latin American, and one Asian one, including 32 VCs from Group 1, a significant increase from the 15 VCs in the reporting period 2019-2021. However, the potential effectiveness of late starting activities is debatable, given that a no-cost extension may not be sufficient to reach sustainability.

Support to VCs may be technical and/or strategic, focusing on the local level or on a broader, national scale. For several projects, VC-related activities are delayed or have still to start. Project approaches to VC support differ and are either holistic i.e. consider the whole chain of value-adding activities, or are more narrowly targeted at specific segments of the VC. For instance, a livestock management project in Eastern Africa (P-I/G1) is piloting new VC models by introducing integrated technological and institutional innovations, targeting all VC actors. This includes product and technology development (e.g. processing and food safety technologies), business models, training and mentoring of selected MSMEs to finalize business plans; it also supports private and public artificial insemination. A P-I/G2 project also has a holistic approach to forage value chains, targeting different categories/sizes of MSMEs, developing forage master plans for some, an innovation fund for others, training MSME leaders on governance and business leadership, and mentoring them on business canvas and leadership. In contrast to these holistic approaches to VCs, targeted VC support may focus on designing and manufacturing new equipment or creating new products. For instance, the introduction or intensification of forage production in pastoral systems requires specific equipment to harvest and process fodder crops.

Over the reporting period, 57 innovations have been taken up by agriculture and food-related MSMEs including 12 developed by two P-I/G1 projects and 45 by three P-I/G2 projects (e.g. forage-related technologies and equipment, business models, energy and water saving technologies for processing companies). For instance, as compared to the last reporting, new business models to strengthen MSME have multiplied (relationships with suppliers, marketing of products, financial flow management). They are often coupled to financing mechanisms in order to facilitate access to services (new inputs or innovative equipment) by smallholder farmers, whose financial capacity is often limited. For instance, in West Africa, two innovative business mechanisms have been designed (P-I/G1): a partnership/contract between producers and exporters as a model for access to services and inputs to better control fruit flies, and an export levy mechanism to ensure the sustainability of surveillance and access to control products for farmers. These innovations are for use at both farm level and beyond since they target both farmers and exporters. A large P-I/G2 project in Eastern Africa (see the example below) focuses on identifying and improving a diversity of business models

to support MSMEs in their marketing of energy and water efficient innovations aimed at smallholder farmers, whose financial capacity is often limited. Among innovations under development and targeting the private sector (but not taken up yet) we find processing equipment, processing technologies and new products. No incubator has been developed under DeSIRA but two existing incubators are supported. In one of them, the project intends to guide start-ups interested in agroecology and associated enterprises (e.g. production of biopesticides).

Agriculture and food-related MSMEs (e.g. production of inputs or equipment, services such as artificial insemination or machinery leasing, agricultural waste processing, food-processing, etc.) that have been strengthened or created (182) encompass MSMEs having taken up at least one innovation (105). The relevance of the GDI on VC-related job creation is debatable considering the absence of contributions from DeSIRA projects or the absence of data collection (at project level) related to this GDI.

The contribution to Outcome 3 from Pillar II stems from a single project, which aims at improving the "effectiveness of African countries' public policies and investments in agricultural research and extension services, and technology development, and for climate change adaptation and mitigation of agriculture and food systems". The contribution from Pillar II is limited to strengthening selected private sector entities (23 so far, against 13 in AGR 2021). The focus is on integrating private sector companies into key roles within national fora and initiatives, by providing targeted training and peer learning opportunities, and by establishing strategies for private sector engagement and innovative partnerships with a view to (for instance) foster cross-border trade and investment in climate-smart technologies, aiming to boost business growth in agriculture.

WE4F "Water and Energy for Food – East Africa Hub"; implemented by GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) in Kenya, Uganda, Rwanda, Ethiopia, Tanzania (Pillar I / Group 2)

Two kinds of innovations target the private sector:

- 9 new business models have been developed for the marketing of climate friendly, energy and/or water efficient innovations by new or already established innovators: supply management with farmers for chilli production and processing in Kenya; partnership model with farmers to collect organic waste for briquettes in Tanzania; expansion of sales of organic fertilizer in Tanzania; Pay As You Go for solar irrigation in Uganda; circular resource use of avocado waste for biogas production in Kenya; ice distribution for local cold food value chains in Kenya; Pay As You Chill for solar cooling in Kenya; Farmer Incubator Model with smallholders in Malawi and Low Carbon Value Chain for tea processing in Tanzania. - 8 new technologies have been taken up by processing companies: Low-tech wood shade; Smart metering and process Monitoring in agro-processing facilities; Biogas digester with a focus on circular economy modelling target; Refrigeration optimisation; Renewables (lighting); Boiler optimisation (insulation); Rainwater harvesting & wastewater management; Motor upgrade (voltage optimisation). "*59 processing companies have introduced climate-friendly innovations in East Africa. The processing companies are mainly in the food industry sectors, including tea, horticulture, rice, oilseed, soy, and dairy but also in the processing of agricultural residues. The innovations being used vary from solar cooling and solar mills to energy management systems and IoT (Internet of Things) monitoring apps. Such innovations are helping to improve the efficiency of water and energy use and reduce the carbon footprint of their operations.*" (Source: 2022 report).

As of December 2022, 4 innovators had established sales structures in a different country of the region based on market/business development strategies (against a target of 1); Innovators who have participated in capacity building activities (including on financial issues) had raised a total of USD 3.6 million in additional funding for the product or market development of their climate-friendly, energy and/or water efficient innovations (against a target of 4 million).

The marketing of innovations and the strengthening of innovators and food/agriculture MSMEs contribute to strengthening the value chains these MSMEs belong to. Some of the processors have a strong presence across the value chain they are a part of, because of their level of integration upstream (supply of raw materials) or downstream (commercialisation of food products). (Source: based on the 2022 report).

BIOSTAR "Sustainable Bioenergy in Small and Medium Agri-food Enterprises in Western Africa"; implemented by CIRAD in Burkina Faso, Senegal, Mali, Niger, Ivory Coast (Pillar I / Group 1)

The overall objective of the BIOSTAR Action is to contribute to energy and food security in West Africa, through the development of a bioenergy sector that meets the needs of agri-food processing SMEs. The project is entirely dedicated to supporting the private sector. BIOSTAR focuses on the production of energy from the processing of residues (some sources of waste can be recovered economically, with varying degrees of complexity). As of December 2022, it was working with 16 pilot SMEs linked to 5 commodity chains (rice, groundnut, mango, shea, and cashew), including 3 commodity chains in Burkina Faso and 4 in Senegal. BIOSTAR develops biomass supply models, technical itineraries and technological innovations. Biomass supply models for agri-food SMEs are co-developed with stakeholders (SMEs, farmers, transporters, etc.) to guarantee the sustainability of the use of agricultural residues for energy purposes. Some models are simple (the SME uses its own waste). Others are more complex (waste from the cashew nut sector is used to dry mangoes). The aim is that these models can be replicated by other SMEs. As of December 2022, 8 technical innovations were under development (some were being finalised, others were being tested). The final number of models and technological innovations retained and adopted by the SMEs will be known at the end of the project only. A great deal of work has gone into co-designing technological equipment (equipment manufacturers were involved), because the existing equipment in the target countries was not suitable. The project also develops technical itineraries: for a given sector, a technical itinerary comprises all the individual stages, from the collection of waste to the end of its processing, with the aim of integrating the recovery of this waste into the more global framework of the processing of a main raw material. The supply model applies to the SME, while the technical itinerary applies to the industry as a whole.

CSARIDE "Climate Smart Agriculture Research and Innovation Support for Dairy Value Chains in Eritrea" implemented by TEAGASC (Agriculture and Food Development Authority, Ireland) in Eritrea (Pillar I / Group 1)

There are three categories of innovations for the private sector, all are still in the development phase: new dairy products (with a view to make them available in retail outlets by end of the project); new technologies, including new processing technologies and new food safety technologies; new business models (feasibility studies conducted for each company).

As of December 2022, 5 dairy MSMEs were in the process of being strengthened (training and mentoring was ongoing to complete business plans) and values chains were being supported in three regions of Eritrea (Debub, Maekel and Anseba) through *"the introduction of integrated technological and institutional innovations aimed at improving capacity of dairy VC actors to participate in improved gender-sensitive and environmentally sustainable VC development models.*" (Source: the Y3 Report).

Table 19: Summary of cumulative values 2019-2022 for GDIs attached to Outcome 3

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
14	0	5	14	Number of sustainable or climate-smart innovations taken up by agriculture and food-related MSMEs	0	12	45	**57**	X	**X**
13	0	4	15	Number of agriculture and food-related MSMEs which have taken up at least one sustainable innovation	0	20	85	**105**	X	**X**
24	3	16	16	Number of agriculture and food-related MSMEs strengthened or created	1	58	124	**182**	13	**23**
22	6	16	17	Number of food value chains strengthened	15	32	26	**58**	X	**X**
4	0	0	18	Number of full-time food industry-related jobs created	0	0	0	**0**	X	**X**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.
Group 1 = 22 Pillar I projects, already covered under AGR 2021
Group 2 = 17 Pillar I projects, not covered under AGR 2021
Pillar II = 7 projects (2 projects, plus 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021)

6.4 Outcome 4 – The agriculture and food systems policy environment is improved at national or international level

Table 20: List of global DeSIRA Indicators attached to Outcome 4

GDI #19	Number of policies, strategies or plans, fostered by multi-stakeholder processes, under development or endorsed by the relevant authorities
GDI #20	Number of countries or international organisations developing or having endorsed a policy, strategy or plan which increases their ability to sustainably transform agriculture and food systems and/or adapt to climate change

Output 6 measures the number of policy products (dialogues, briefs) linked to the policy dimension of the DeSIRA projects to inform policies and to contribute to an enabling environment for innovations. However, the transformation of outputs into outcomes is a difficult process, as such an objective usually belongs to the sphere of interest of the project but never to its sphere of control. Among the 28 projects which have policy objectives, only 16 claimed a tangible policy outcome (policy, strategy or plan under development or endorsed), including 7 P-I/G1, 7 P-I/G2 and 2 Pillar II projects. Policy objectives and outcomes achieved by partner organisations were not consistently emphasized or adequately documented in project reports, making it impossible to capture all policy influences by DeSIRA.

During the 2019-2022 implementation period, Pillar I projects influenced a total of 42 policies (25 countries and two regional organisations), with Group 1 and Group 2 accounting respectively for 12 and 30 policy outcomes. Pillar II reported 22 policy outcomes. The nature of DeSIRA-supported policy outcomes is broad, and influence is primarily exerted at the national level (e.g. National Plan for the Development of the Cocoa-Chocolate Value Chain, 2030, in Peru; National Strategy for the Development of Agroecology in Burkina Faso), though it is also found at subnational level (e.g. Provincial livestock and forage development strategy, in two provinces of Vietnam), regional level (e.g. Regional charter for the exchange of data and germplasm in Burkina Faso, Niger, Senegal) and global level (e.g. Action Plan for the Promotion of Productive Energy Use technologies of GOGLA, the Global Off-Grid Lighting Association). As of December 2022, in western Africa, three national policies/plans were influenced by DeSIRA projects to better incorporate agroecological principles: National Strategy for the Development of Agroecology in Burkina Faso, Plan Senegal Emergent (PSE) Vert, National Strategy for the Production of Ecological and Organic Agriculture in Benin (SNAEB, 2022-2030).

A few policies, strategies or plans influenced by DeSIRA Pillar I projects are already approved at national level. However, informing policy for influence based on evidence is a long process which takes several years. Besides, the exact status of the policy outcomes of each project is not always known. Information on policy achievements is also lacking for Pillar II projects, which rarely follow up on the outcomes of their support at national level. Therefore their influence is certainly underestimated.

FAIR-SAHEL "Fostering an Agroecological Intensification to improve farmers' Resilience in Sahel"; implemented by CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement), in Burkina Faso, Mali, Senegal
(Pillar I, Group 1)

The policy contributions of this project are as follows (as of December 2022, *Based on the* 2022 report):

- In Senegal, the project has contributed to Senegal's agricultural policy (work in progress on the "Plan Senegal Emergent-Vert"). A major agroecological movement "Dynamic for an AgroEcological Transition in Senegal" (DyTAES) has played a role in putting this issue on the political agenda. DyTAES is a network, which groups farmers', consumers' and rural women's organisations, NGOs, research institutions, civil society networks, a network of local elected representatives and private sector companies. Key members of the project consortium are part of DyTAES. Through DyTAES, opportunities for policy dialogues have been seized. FAIR SAHEL supports the implementation of the DyTAES advocacy strategy. In 2022, members of the project implementation team in Senegal were the main actors and organisers of the DyTAES caravan in project's zones. The caravan took place between February and March 2022 and *"enabled DyTAES to gather policy recommendations from the various stakeholders with a view to scaling up agroecology in Senegal. At the end of the caravan, the project team helped to draw up DyTAES position papers, some of which were shared at the World Water Forum (policy brief on productive water) and at COP15 (policy brief on soil fertility). The other two policy briefs (on food sovereignty and on dependence on chemical inputs) were to be shared at the Agroecology Days scheduled for February 2023."*
- In Burkina Faso, the teams have been heavily involved in supporting the development of the National Agroecology Strategy for Burkina Faso by the Ministry of Agriculture.
- In Mali, the IER (Institut d'Économie Rurale) and AOPP (Association des Organisations Professionnelles Paysannes) were at the heart of new consultations to harmonise approaches to agroecology led by the Ministry of Rural Development.

AGROFORESTRY RWANDA "Improving resilience of farmers' livelihoods to climate change through innovative, research proved climate-smart agroforestry in the Eastern Province and peri-urban areas of Kigali city"; implemented by ENABEL (Belgian Development Agency) & IUCN (International Union for Conservation of Nature) in Rwanda)
(Pillar I / Group 1)

The project contributed to the new ministerial guidelines (Energy Development Cooperation Limited/ Rwanda Energy Group / Ministry of Infrastructure) on clean cooking technologies. The guidelines were signed in December 2022. The project is informing the design of the strategy of Improved Cooking Stoves (ICS) dissemination under the TREPA project (Transforming Eastern Province through Adaptation, which covers 7 districts in the Eastern province of Rwanda), which is considered the pilot case for the implementation of the ministerial guidelines. Therefore the contribution of the DeSIRA project to TREPA can be considered as a contribution to the national strategy on clean cooking technologies.

Table 21: Summary of cumulative values 2019-2022 for GDIs attached to Outcome 4

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
32	2	18	19	Number of policies, strategies or plans, fostered by multi-stakeholder processes, under development or endorsed by the relevant authorities	0	12	30	42	5	22
32	2	18	20	Number of countries or interna-tional organisations developing or having endorsed a policy, strategy or plan which increases their ability to sustainably transform agriculture and food systems and/or adapt to climate change	0	11	23	27 (*)	5	16 (*)

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.

(*) Duplicate countries/organisations have been eliminated.

Group 1 = 22 Pillar I projects, already covered under AGR 2021

Group 2 = 17 Pillar I projects, not covered under AGR 2021

Pillar II = 7 projects (2 projects, plus 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021)

7 Impact prospects

Impact prospects – The DeSIRA initiative contributes to the climate-relevant, productive, and sustainable transformation of agriculture and food systems in low and middle-income countries.

Table 22: List of global DeSIRA Indicators attached to impact prospects

GDI #1	Number of smallholder farmers who claim socio-economic gains, a positive impact on agroecosystems and/or feel better equipped to cope with climate change-related shocks
GDI #2	Number of smallholder farmers expected to benefit from innovations disseminated beyond the projects' target groups
GDI #3	Number of hectares of agricultural or pastoral land where innovative climate-smart or agroecological practices have been introduced #3A (By target groups) #3B (By indirect beneficiaries)
GDI #4	Number of DeSIRA interventions claiming a positive, documented impact on agroecosystems at farm level
GDI #5	Number of DeSIRA interventions claiming a positive, documented contribution to the status and role of smallholder female farmers or female food entrepreneurs
GDI #6	Number of organisations strengthened by DeSIRA projects, able to document a positive impact of the project on the transformation of agriculture and food systems at national or international level
GDI #7	Number of endorsed policies, strategies or plans supported by DeSIRA projects and demonstrating a positive impact on the transformation of agriculture and food systems at national or international level

At the scale of the initiative, it is difficult to frame impact prospects because of the diversity of the projects. Pillar I projects are geared towards contributing to a key GDI at impact level, which measures socio-economic gains and enhanced climate resilience among smallholder farmers who are the direct targets of these projects, especially through the implementation of agroecological practices or systems. Eight projects may not contribute due to their focus on beneficiaries other than smallholder farmers or on innovations that do not translate into measurable farm-level impacts. A few projects claim a significant contribution to impact, usually because they include a strong development component (training of farmers and service provision at scale by involving development organisations in the consortium) or because they have the capacity to cover broader areas through activities involving key value chains actors. However, for the large majority of projects, the quantitative contribution to socio-economic changes at farm level were still limited, as of December 2022. Some explanations need to be provided. First, the capacity to assess impact varies across projects, as measuring impact is often a challenge (complex methods to be developed, resources to be invested). Second, it takes time to generate impact; therefore a project with a fixed duration often does not provide the appropriate scope for evaluating the effects of public investments. It would be more relevant to assess the contribution of a group of projects participating in a trajectory of innovation as innovation takes 10 to 20 years to be developed from the initial idea phase to the dissemination phase. Third, research and innovation projects mainly contribute to change by providing knowledge, methods and technologies. By developing participatory research, by implementing multistakeholder approaches and by designing a clear strategy for dissemination

and scaling, they facilitate the deployment of innovations. Development actors (i.e. other than research organisations and universities) are then able to scale and disseminate these innovations. Having said that, by December 2022, out of 31 projects aiming to contribute to GDI #1, five reported a positive impact on nearly 21,000 farmers, claiming a gain in terms of resilience to climate change with a single project accounting for the majority of this impact. Eight projects had reported innovative practices over 2,159 hectares.

DeSIRA projects generally do not assess wider impacts. However, a GDI was designed to evaluate the extent to which smallholder farmers, beyond the target groups, might benefit from the dissemination of innovations. By December 2022, seven Pillar I projects collectively reported 310,385 potential beneficiaries, beyond target groups, with one project alone contributing 62% of this total. Wider impacts are validated by development partnerships, campaign reach assessments, or a mandate to serve a specific population of farmers.

Twenty-three Pillar I projects claimed they will be able to document -before the project ends- positive effects on agroecosystems. By December 2022, seven reported improved agroecosystems, promising future economic and resilience gains at farm level. Changes in practice (e.g., agroecological practices) are highlighted, though not always the subsequent improvements which will prove the positive impacts (like soil carbon levels or biodiversity changes). However, for most projects, it is too early for impact assessment on agroecosystems. Some projects might face challenging scenarios, like the potential negative effects of solar pumps on water availability, underscoring the strategic complexity and potential dilemmas faced when developing agricultural innovations.

By December 2022, 20 Pillar I projects were linked to impact on the empowerment of women. 20 claimed to have a gender strategy but none reported tangible changes for smallholder female farmers or female food entrepreneurs to date. These projects, recognizing the importance of gender equality, strive to empower women through engagement in leadership roles and decision-making. Some have hired gender specialists. However, the integration of gender varies widely across projects, with only a few projects having comprehensive, gender-focused programs. Overall, the expected contribution of the DeSIRA initiative by Pillar I projects to women empowerment is likely to remain limited: there are a few well-designed gender-focused initiatives, but half of Pillar I projects lack a formal gender strategy and many others, among those which claim a gender strategy, acknowledge difficulties in its implementation.

Two GDIs measure the transformative impact of DeSIRA projects on agriculture and food systems. One GDI focuses on organizations that can prove a positive project impact on system transformation, the other seeks to identify those multi-stakeholder policies that actually transform agricultural systems. Several projects are expected to influence systems, most likely after their completion. As of December 2022, only two recorded institutional impact in the current period. The transformative impact of policy changes was, unsurprisingly, even less tangible, with very few projects claiming such influence. Most implementing partners claim that significant policy shifts, especially concerning new development models like agroecology, require more time.

WE4F "Water and Energy for Food – East Africa Hub"; implemented by GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) in Kenya, Uganda, Rwanda, Ethiopia, Tanzania (Pillar I / Group 2)

The objective of the project is to increase food production and income of smallholder farmers through greater agricultural productivity and more sustainable practices of natural resource uses. For smallholder farmers who have introduced climate friendly, energy and/or water efficient innovations on their farms, the project measures the impact on productivity (production per ha) and on income. For productivity, the project targeted 10,000 smallholder famers (including 30% women) and a 20% increase. For income, the project targeted 9,500 smallholder farmers (including 30% women) and a 10% increase. These are not two different groups of farmers: some of the many innovations introduced by the project aim at improving either productivity, or income, or both. As of December 2022, it was estimated that 20,132 smallholder farmers had increased their income by 10% or more: "*This data was obtained by collecting primary data through field surveys from randomly selected farming households in beneficiary and non-beneficiary communities, purposively selected key informants, focus groups and from the SMEs themselves. As with Impact Indicator 1 (on productivity), the endline data will be collected in 2023. For the purposes of this report, the average incomes of farmers using an innovation were compared with those of the control group and then multiplied by the number of SME clients.*" (Source: the 2022 report).

IRFFS "Integrated Rice-fish Farming: A Research and Extension Development Based Initiative to Improve Food Security and Nutrition in Liberia"; implemented by AFRICA RICE in Liberia (Pillar I / Group 1)

At the time of data collection for the GM&EF, the project was conducting an impact assessment in order to inform the following indicators: "Average income per year of project household small-scale food producers from integrated rice-fish farming systems"; "Annual productivity/yield from integrated rice-fish farming systems of small-scale food producers, in particular women" and "Number of project households that are food secure in the project counties in Liberia". The project was working in 5 counties, targeting 365 farming households. The integrated rice-fish farming system had been taken up on 55 ha (as of March 2023), surpassing the target of 30 ha. The impact on agroecosystems is documented at farm level (biodiversity protection; increase in productivity; reduced use of chemicals). In terms of wider impact, Africa Rice has partnered with ECOWAS (Economic Community of West African States) to develop the rice-fish farming concept in the Bong county of Liberia (not a project county) targeting about 1,300 small holder farmers in a cooperative society. The project was due to start in July 2023.

Table 23: Summary of cumulative values 2019-2022 for GDIs attached to impact prospects

Number of projects contributing to the GDI value			GDI #	Global DeSIRA Indicator	Pillar I Group 1	Pillar I Group 1	Pillar I Group 2	Pillar I G1 + G2	Pillar II	Pillar II
# Links AGR 2023	# Values > 0 AGR 2021	# Values > 0 AGR 2023			AGR 2021	AGR 2023	AGR 2023	AGR 2023	AGR 2021	AGR 2023
31	0	5	1	Number of smallholder farmers who claim socio-economic gains, a positive impact on agroecosystems and/or feel better equipped to cope with climate change-related shocks	0	73	20904	**20977**	X	**X**
19	0	7	2	Number of smallholder farmers expected to benefit from innovations disseminated beyond the projects' target groups	0	299385	11000	**310385**	X	**X**
18	2	8	3A	Number of hectares of agricultural or pastoral land where innovative climate-smart or agroecological practices have been introduced (By target groups)	107	1961	198	**2159**	X	**X**
1	0	0	3B	Number of hectares of agricultural or pastoral land where sustainable innovative climate-smart or agroecological practices have been introduced (By indirect beneficiaries)	0	0	0	**0**	X	**X**
23	0	7	4	Number of DeSIRA interventions claiming positive, documented impact on agroecosystems at farm level	0	7	0	**7**	X	**X**
20	0	0	5	Number of DeSIRA interventions claiming positive, documented contribution to the status and role of smallholder female farmers or female food entrepreneurs	0	0	0	**0**	X	**X**
19	0	2	6	Number of organisations strengthened by DeSIRA projects, able to document a positive impact of the project on the transformation of agriculture and food systems at national or international level	0	2	0	**2**	0	**0**
3	0	1	7	Number of endorsed policies, strategies or plans supported by DeSIRA projects and demonstrating a positive impact on the transformation of agriculture and food systems at national or international level	0	0	14	**14**	X	**X**

(Source: Global M&E Framework of the DeSIRA initiative)

Colour code	**GDI Title**	**AGR 2021**	**AGR 2023**	***(X): no expected contribution***

Each figure is the sum of the values contributing to the GDI by each DeSIRA project.
 # Links AGR 2023 = number of projects linked to the GDI as of 12/2022, i.e. expected to contribute a value, as per their current design (all categories included).
Number of projects contributing to the GDI value (AGR 2021 or AGR 2023) = # of projects (all categories) having contributed a positive value to the GDI, during the reporting period.

Group 1 = 22 Pillar I projects, already covered under AGR 2021

Group 2 = 17 Pillar I projects, not covered under AGR 2021

Pillar II = 7 projects (2 projects, plus 5 'sub-projects' under SUPPORT TO CAADP AR&EO, already covered under AGR 2021)

8 Conclusions

AGR 2023 reports on the extent to which the overarching objectives of the DeSIRA initiative are being achieved as of December 2022, based on the results of 46 DeSIRA projects having at least two years of implementation at that date. The exercise encompassed 39 Pillar I projects, focused on research and innovation in agricultural and food systems, and three Pillar II projects, focused on strengthening the capacities of regional and international organisations.

As expected, owing to the diversity of Pillar I projects, to the difference in nature, scope and objectives between Pillar I and Pillar II, as well as -to some extent- the differences between the objectives of the Commission Implementing Decisions 2018 and 2019, each project contributed to certain global results (i.e. at initiative level), but not to all. Besides, differences between projects strongly weigh on their comparative contribution (quantitative and qualitative) to a given result. The most important difference between DeSIRA projects lies in the balance between research activities aiming at producing scientific knowledge, and development activities aiming at disseminating technologies or strengthening capacities. Furthermore, it emerges from the annual global reporting exercise that many projects contribute implicitly to initiative-level objectives i.e., project activities do lead to changes, which are not captured by project-level indicators and not highlighted in the narrative of progress reports but are nevertheless relevant to the initiative as a whole.

The GM&EF strives to capture and illustrate the broad and potentially far-reaching influence of the DeSIRA initiative. The main conclusions emerging from this report are as follows:

- The production of knowledge products for a diversity of actors is significantly increasing, which demonstrates the full deployment of the DeSIRA initiative;
- The support to innovation including co-design and deployment is a key feature of DeSIRA projects. The number of innovations is very significant and mainly focused on farm level. Innovation for MSMEs or institutional innovation do exist, but to a less extent. The multistakeholder mechanisms (including innovation platforms or living labs) facilitating the interactions between actors are diverse in terms of structure and operation and are increasing in terms of number. The number of farmers' organisations and NGOs participating in these mechanisms is important. However, many mechanisms put in place may need to be reinforced to be fully effective. Compared to innovations developed at farm level, institutional innovations are often implicit, as they are perceived as a side-product for technical innovation deployment, in spite of their value and growing number;
- The capacity strengthening of organisations is an important hypothesis of the DeSIRA initiative to support innovation. Almost all the projects strengthen researchers' capacities in partner countries and some of them contribute to the institutional capacities of research organisations. A majority of DeSIRA projects strengthen capacities of other organisations with specific activities for farmers, farmers' organisations, NGO or advisory services. Pillar I projects have an influence at institutional level, however, most implementing partners do not have a methodology to measure changes in the institutional capacity of organisations involved in the implementation of Pillar I projects. Yet, they claim positive changes and provide concrete evidence of their claims in interviews. But, because changes cannot be determined with precision, attribution remains difficult;
- DeSIRA should play a role in promoting gender equality and women's empowerment as clearly stated in the Commission Implementing Decisions. Nevertheless, this objective has not been sufficiently mainstreamed or made explicit in the design of many Pillar I projects. As a consequence, the contribution of the DeSIRA initiative to women's empowerment, especially in the context of climate change, is currently and likely to remain minimal and/or poorly documented;
- Support to private sector actors and value chains is clearly addressed by some DeSIRA projects. However, due to the fact that the main focus of a majority of projects is on sustainable production,

R&I interventions targeting downstream and upstream actors are less represented, which could limit the deployment of innovations at scale promoted by these projects;

- Policy involvement is increasing with a significant number of DeSIRA projects aiming at achieving policy outcomes mainly related to improving the enabling environment for scaling the innovations they promote. Pillar II projects clearly address this dimension even if the outcomes are not sufficiently documented to draw conclusions regarding impact. Many Pillar I projects do not have such policy objectives: either the policy dimension is not relevant for the topic they address, or the objective was not included in their design. The science-policy interface should be strengthened to support innovation or to inform policies, which requires specific skills at project level;
- Dissemination and scaling strategies of Pillar I projects, are highly relevant to the overall objective of the Initiative and AGR 2023 identifies the prospects of wider impact, i.e. the possibilities that innovations and research-related results will be deployed with the involvement of a greater number of smallholder farmers, value chain and territorial actors (farmers' organisations, NGO, municipalities, etc.) and/or leveraged at an institutional level, with an enabling environment and relevant policies. However, more projects should develop effective dissemination and scaling strategies as R&I projects are not the main actor for scaling innovation but should be part of this scaling process contributing with knowledge, evidence and capacity strengthening activities;
- Several Pillar I projects play a role, in addition to their research and innovation role, in developing or upgrading curricula or training packages: the contribution to education is often implicit but it underlines the potential value of the DeSIRA initiative in an area which is not an explicit objective of the Initiative as a whole.

ANNEX I – DeSIRA projects included in the Annual Global Report 2023

Colour codes for thematic categories of DeSIRA projects

	Agroecology and Sustainable Agriculture		Sustainable Resources Management		Improved Nutrition and Food Security
	Livestock Management and Pastoralism		Research Infrastructure Conducive to Innovation		
	Pre-production and Technology Development		Strengthening of Innovation Support Services		

(Source for categories: https://europa.eu/capacity4dev/desira/wiki/desira-projects)

List of DeSIRA projects included in the Annual Global Report 2023 (implementation period covered 2019-2022)

Project ID #	Group	Project name Contracting entity (CRIS #)	Project full title	EU Delegation (€ EU contribution) • Target Countries
Pillar I #1	GROUP 1	**AGROFORESTRY RWANDA** ENABEL (412627) IUCN (412408)	Improving resilience of farmers' livelihoods to climate change through innovative, research proved climate-smart agroforestry in the Eastern Province and peri-urban areas of Kigali city	EUD Rwanda (€ 4,000,000) • Rwanda
Pillar I #2	GROUP 1	**IRFFS** AFRICA RICE (412107)	Integrated Rice-fish Farming: A Research and Extension Development Based Initiative to Improve Food Security and Nutrition in Liberia	EUD Liberia (€ 3,500,000) • Liberia
Pillar I #3	GROUP 1	**AGRO-INNOVA** IICA (410203)	Sistemas Agroforestales Adaptatados para el Corredor Seco Centroamericano	EUD Costa Rica (€ 6,000,000) • Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panamá
Pillar I #4	GROUP 1	**FAIR-SAHEL** CIRAD (412095)	Fostering an Agroecological Intensification to improve farmers' Resilience in Sahel	EUD Burkina Faso (€ 7,000,000) • Burkina Faso, Mali, Senegal
Pillar I #5	GROUP 1	**MALMON** Instituto Agronomia Lisboa (412700)	Mangrove, mangrove rice and mangrove people - sustainably improving rice production, ecosystems and livelihoods	EUD Guinea Bissau (€ 3,000,000) • Guinea Bissau
Pillar I #6	GROUP 1	**INV-NIGER** AECID (411732)	Innovations pour l'intensification durable de systèmes agricoles irrigués résilients face au changement climatique au Niger	EUD Niger (€ 5,000,000) • Niger
Pillar I #7	GROUP 1	**COCOA4FUTURE** CIRAD (412132)	Sustainability of production systems and new dynamics in the cocoa sector	EUD Ivory Coast (€ 7,000,000) • Ivory Coast, Ghana
Pillar I #8	GROUP 1	**TAERA** ENABEL (412605)	Accompagnement de la Transition Agro-Ecologique par la Recherche Agricole	EUD Benin (€ 1,500,000) • Benin

Project ID #	Group	Project name Contracting entity (CRIS #)	Project full title	EU Delegation (€ EU contribution) • Target Countries
Pillar I #9	GROUP 1	**ACCEPT** IRED (404348)	Adapter l'accès aux ressources agro-pastorales dans un contexte de mobilité et de changement climatique pour l'élevage pastoral	EUD Chad (€ 3,000,000) • Chad
Pillar I #10	GROUP 1	**LIDISKI** CIRAD (410957)	Livestock Disease Surveillance Knowledge Integration	EUD Nigeria (€ 2,500,000) • Nigeria
Pillar I #11	GROUP 1	**LIPS-ZIM** ILRI (413069)	Adoption and scaling up of improved livestock production systems	EUD Zimbabwe (€ 5,000,000) • Zimbabwe
Pillar I #12	GROUP 1	**CASSECS** ISRA (410169)	Carbon sequestration in sylvopastoral ecosystems in Cilss States	EUD Senegal (€ 5,000,000) • Senegal, Burkina Faso, Niger, Chad, Mali, Mauritania
Pillar I #13	GROUP 1	**CSARIDE** TEAGASC (411806)	Climate Smart Agriculture Research and Innovation Support for Dairy Value Chains in Eritrea	EUD Eritrea (€ 4,000,000) • Eritrea
Pillar I #14	GROUP 1	**CLIMAT SMART INNOVATION** CIP (413081)	Climate smart innovations to improve productivity, profitability and sustainability of agriculture and food systems in Malawi through multidisciplinary research	EUD Malawi (€ 6,000,000) • Malawi
Pillar I #15	GROUP 1	**CLIMA-LOCA** CIAT (407158)	Fostering CLIMAte-relevant and LOw CAdmium innovations to enhance the resilience and inclusiveness of the growing cocoa sectors	EUD Colombia (€ 6,000,000) • Colombia, Ecuador, Peru
Pillar I #16	GROUP 1	**ABEE** CORAF (410172)	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	EUD Senegal (€ 8,000,000) • Burkina Faso, Niger, Senegal
Pillar I #17	GROUP 1	**APSAN** ICRISAT (407715)	Enhancing crop productivity and climate resilience for Food and Nutrition Security in Mali	EUD Mali (€ 4,000,000) • Mali
Pillar I #18	GROUP 1	**BIORISKS** CORAF (411531)	Anticiper et gérer les risques biologiques pour renforcer la résilience des agriculteurs au changement climatique en Afrique de l'Ouest et du Centre	EUD Ivory Coast (€ 5,000,000) • Benin, Burkina Faso, Cameroun, Ivory Coast, DRC, Gabon, Ghana, Nigeria, Sierra Leone, Togo
Pillar I #19	GROUP 1	**FAREI** FAREI (406180)	Enhancing FAREI's R&D Capacity for Sustainable and Modern Agriculture	EUD Mauritius (€ 2,500,000) • Mauritius
Pillar I #20	GROUP 1	**UOM INNOVATION & TRAINING** University of Mauritius (406182)	Enhancing climate resilience in agriculture for improved food and nutrition security through research, innovation and training in the Republic of Mauritius	EUD Mauritius (€ 500,000) • Mauritius
Pillar I #21	GROUP 1	**BIOSTAR** CIRAD (410794)	Sustainable Bioenergy in Small and Medium Agri-food Enterprises in Western Africa	EUD Burkina Faso (€ 4,000,000) • Burkina Faso, Senegal, Mali, Niger, Ivory Coast

Project ID #	Group	Project name Contracting entity (CRIS #)	Project full title	EU Delegation (€ EU contribution) • Target Countries
Pillar I #70	GROUP 1	**SUPPORT TO TAP** FAO (406734)	Developing capacities in agricultural innovation systems: scaling up the Tropical Agriculture Platform Framework	INTPA F03 (€ 5,000,000) • Burkina Faso, Eritrea, Malawi, Rwanda, Senegal, Cambodia, Laos, Pakistan, Colombia
Pillar I #24	GROUP 2	**ASSET** AFD (415683) (and then GRET with CIRAD support)	Agroecology and Safe food System Transitions in Southeast Asia	EUD Thailand (€ 7 000 000 • Cambodia, Lao PDR, Vietnam
Pillar I # 6	GROUP 2	**IDEAS** ONF Andina (418193)	Strengthening governance towards Stabilization of the Agricultural Frontier and Sustainability in post-conflict territories of Colombia	EUD Colombia (€ 2 000 000) • Colombia
Pillar I #27	GROUP 2	**LEG4DEV** Galway University (418901)	Legume-based agroecological intensification of maize and cassava cropping systems in Sub-Saharan Africa for water-food-energy nexus sustainability, nutritional security & livelihood resilience	INTPA F03 (€ 6 500 000) • Ethiopia, Malawi, Tanzania, Zambia
Pillar I #28	GROUP 2	**SAFEVEG** NL Ministry of Foreign Affairs (417876) (and then WORLDVEG)	Safe locally-produced vegetables for West Africa's consumers	EUD Benin (€ 8 000 000) • Benin, Burkina Faso, Mali
Pillar I #46	GROUP 2	**MARIGO** CIRAD (419988)	Maraichage Agroecologique périurbain	EUD Ivory Coast (€ 2 000 000) • Ivory Coast
Pillar I #30	GROUP 2	**SIRGE** 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	EUD Uganda (€ 2 000 000) • Uganda
Pillar I #31	GROUP 2	**ICSIAPL** NL Ministry of Foreign Affairs (421388) (and then SNV)	Integrated & Climate Smart Innovations for Agro-Pastoralist Economies and Landscapes in Kenya's ASAL	EUD Kenya (€ 2 500 000) • Kenya
Pillar I #32	GROUP 2	**ESSA** University of Helsinki (418132)	Earth observation and environmental sensing for climate-smart sustainable agro-pastoral ecosystem transformation in East Africa	EUD Kenya (€ 5 500 000) • Kenya, Ethiopia
Pillar I #33	GROUP 2	**SyRIMAO** AFD (417085) (and then ECOWAS)	Système Régional Innovant de contrôle des Mouches des fruits en Afrique de l'Ouest	EUD Nigeria (€ 7 500 000) • Benin, Burkina Faso, Cap Vert, Ivory Coast, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone,Togo

Project ID #	Group	Project name Contracting entity (CRIS #)	Project full title	EU Delegation (€ EU contribution) • Target Countries
Pillar I #34	GROUP 2	**ReDIAL** Friends of the Nation (416435)	Research for Development and Innovation Agriculture and Learning Project	EUD Ghana (€ 2 120 000) • Ghana
Pillar I #39	GROUP 2	**CDI-Rwanda** FAO (422165)	Capacity development for innovation in Rwanda: strengthening value chains in six districts	EUD Rwanda (€ 2 000 000) • Rwanda
Pillar I #22	GROUP 2	**IRRINN** CIRAD (421401)	Intensification of agricultural production through upscaling of innovative adapted irrigation practices and technologies	EUD Burkina Faso (€ 2 400 000) • Burkina Faso
Pillar I #42	GROUP 2	**LSC-IS** NL Ministry of Foreign Affairs (419433) (and then WUR, ISRIC and ILRI/CCAFS)	Boosting Climate Smart Agriculture in East Africa with Land, Soil and Crop Information Services	EUD Kenya (€ 5 300 000) • Kenya, Ethiopia, Rwanda
Pillar I #43	GROUP 2	**ReSI-NoC** CIFOR-ICRAF (416105)	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	EUD Cameroon (€ 2 500 000) • Cameroon
Pillar I #45	GROUP 2	**Artemia4Bangladesh** WORLDFISH (414811)	Introducing Circularity Through Climate-Smart Aquaculture in Bangladesh	EUD Bangladesh (€ 2 500 000) • Bangladesh
Pillar I #47	GROUP 2	**WE4F** GIZ (419478)	Water and Energy for Food – East Africa Hub	INTPA F03 (€ 6 000 000) • Kenya, Uganda, Rwanda, Ethiopia, Tanzania
Pillar I #29	GROUP 2	**DARE** UNICEF (415029)	Developing innovative food solutions to increase quality of nutritious foods for young children, adolescent girls, pregnant and lactating women	EUD Ethiopia (€ 2 000 000) • Ethiopia

Project ID #	Project name Contracting entity (CRIS #)	Project Full Title	EU Delegation / HQ (EU Contribution) • Target Countries
Pillar II	**ONE PLANET** Agropolis Foundation (406569)	One Planet Fellowships Programme (OPFP)	INTPA F03 (€ 3,000,000) • Algeria, Benin, Burkina Faso, Ivory Coast, Ethiopia, Kenya, Malawi, Mali, Morocco, Nigeria, Senegal, Tanzania, Togo and Zambia
Pillar II	**SUPPORT TO GFAR** FAO (410670)	Re-Connecting the world: The GFAR Partnership transforming agri-food research and innovation for development impact	INTPA F03 (€ 5,000,000) • Global
Pillar II	**SUPPORT CAADP PILLAR IV** **5 projects:** **-AFAAS** **-ASARECA** **-CCARDESA** **-CORAF** **-FARA** IFAD (407682)	Comprehensive Africa Agriculture Development Programme (CAADP) ex-Pillar IV- Africa Regional and Sub-regional organisations for Agricultural Research and Innovation **AFAAS** - African Forum for Agricultural Advisory Services **ASARECA** - Association for Strengthening Agricultural Research in Eastern and Central Africa **CCARDESA** - Centre for Coordination of Agricultural Research and Development for Southern Africa **CORAF (WECARD)** - Conférence des Responsables de Recherche Agronomique Africains (West and Central African Council for Agricultural Research and Development) **FARA** - Forum for Agricultural Research in Africa	INTPA F03 African countries under the mandate of each implementing partner. • **AFAAS** (€ 5,110,000) = 12 countries (Kenya, Ghana, Mali, Malawi, Madagascar, Liberia, Nigeria, Uganda, Cameroon, Ethiopia, South Africa, Zimbabwe) • **ASARECA** (€ 5,370,000) = 11 countries (Burundi, the Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, South Sudan, Sudan, Tanzania, Uganda • **CCARDESA** (€ 5,370,000) = 7 countries (Botswana, Eswatini, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe) • **CORAF** (€ 5,770,000) = 23 countries (Benin, Burkina Faso, Cameroon, Cape Verde, Central Africa Republic, Chad, Congo, Ivory Coast, Democratic Republic of Congo, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome & Principe, Senegal, Sierra Leone, Togo) • **FARA** (€ 4,835,600) = continental Africa

(Source: INTPA / F3 & DeSIRA LIFT)

ANNEX II – Innovations under development for farm-level use and for use beyond farm level, including institutional innovations (as of December 2022)

Project Short Name Implementing Partner(s) Project Title Country	GDI #	GDI #22A = Products, Technologies, Models, Systems (etc.) GDI #22B = Services, Decision Making Tools, Governance Mechanisms GDI #22C = Number of innovations under development (Beyond farm level, including at institutional level)
PILLAR I - GROUP 1		
AGROFORESTRY RWANDA ENABEL (412627) IUCN (412408) Improving resilience of farmers' livelihoods to climate change through innovative, re-search proved climate-smart agroforestry in the Eastern Province and peri-urban areas of Kigali city, Rwanda	#22A	▪ (1) Innovative agroforestry production system ▪ (9) Improved cooking stove models based on availability and accessibility of biomass for cooking; 2 of these models have been selected for design improvement ▪ (4) Agroforestry landscapes tested to assess the impact of the introduction of AF landscapes on biodiversity, livelihoods and agriculture ▪ (1) Package of agroforestry practices
	#22C	▪ (1) Agroforestry Monitoring Information System for agroforestry-based landscape restoration ▪ (1) "Tree Finder Tool" to assess tree density and distribution in a given landscape ▪ (1) Modelling tool for carbon sequestration in agroforestry landscapes in Rwanda ▪ (3) Agroforestry mechanisms/incentives tested to facilitate agroforestry adoption: 1/ distribution of free seedlings; 2/ same as 1 + agroforestry training; 3/ same as 2 + rewards (innovation targeted at extension services) ▪ (1) Model of supply/demand (of biomass) analysis: customisation of existing software for the Eastern province ▪ (1) New production process for the improved cooking stoves (for private sector companies)
IRFFS AFRICA RICE (412107) Integrated Rice-Fish Farming: A Research and Extension Development Based Initiative to Improve Food Security and Nutrition in Liberia Liberia	#22A	▪ (1) Integrated rice-fish system ▪ (7) Climate smart technologies including rice varieties, tilapia species, field preparation practices, processing equipment ▪ (8) Technologies (not necessarily CSA) including rice varieties, feed inputs, fish diets
	#22B	▪ (2) Market strategies
	#22C	▪ (15) Mechanical equipment (introduction and testing) for rice production and post-harvest management, fish feed pro-cessing (farmers' organisations)

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AGRO-INNOVA IICA (410203) Sistemas Agroforestales Adaptados para el Corredor Seco Centroamericano Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panamá	#22A	▪ (18) Multi-Strata Agro Forestry Systems, adapted with agricultural technologies (6 countries) ▪ (25) Scaling models for producers' organisations to promote ▪ (84) Agricultural, forestry and/or digital technologies (including 18 crop varieties)
	#22C	▪ (1) Regional digital platform for knowledge management (Instituto Interamericano de Cooperación para la Agricultura) ▪ (1) Extension model for the dissemination and demonstration of agrosylvopastoral technology for the production of dairy cattle and beef cattle (Instituto de Investigación Agropecuaria de Panamá)
FAIR-SAHEL CIRAD (412095) Fostering an Agroecological Intensification to improve farmers' Resilience in Sahel Burkina Faso, Mali, Senegal	#22A	▪ (24) Production systems incorporating sustainable soil, water and plant biodiversity management (12 communities, average of 2 systems per community)
	#22C	▪ (1) Qualitative Expert Assessment Tool (Extension services) ▪ (1) Evaluation Memento on AgroEcology (Extension services) to compare technical systems according to different dimensions of their performance ▪ (1) Tool/game (Tekit) to help farmers assess system performance and think about innovations ▪ (1) A tool called "Biofunctool" which assesses three soil functions: carbon dynamics, nutrient cycle and soil structure
MALMON Instituto Agronomia Lisboa (412700) Mangrove, mangrove rice and mangrove people - sustainably improving rice production, ecosystems and livelihoods Guinea Bissau	#22A	▪ (5) Socially and agro-ecologically adapted rice varieties ▪ (1) Pest Integrated Protection Programme ▪ (11) Farming and water management technologies, 6 of them already taken up by farmers. ▪ (2) Fishing and aquaculture practices
	#22B	▪ (1) Peer-to-peer knowledge sharing network (WhatsApp group) ▪ (1) Register of rainfalls ▪ (1) Register of the calendar of farming operations ▪ (1) Register of labour costs
	#22C	▪ (2) Early-warning meteorological and hydrological systems: one for tides, one for rains (user not determined yet)
INV-NIGER AECID (411732) Innovations pour l'intensification durable de systèmes agricoles irrigués résilients face au changement climatique au Niger Niger	#22A	▪ Possible innovations have been identified, but development has not started yet (as of December 2022). Agroecological practices will apply to water use, energy efficiency, fertilisation, tillage and diversification of irrigation systems.
	#22C	▪ (0) Basket of tools to support the co-construction and dissemination of innovations (support to Multi-Stakeholder Innovation Platforms) – *planning phase* ▪ (0) Dynamic Geographic Information System for irrigated agrarian systems (Ministry of Agriculture) – *planning phase* ▪ (0) Governance structure for aquifers and guidance for future investments – *planning phase*

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COCOA4FUTURE CIRAD (412132) Sustainability of production systems and new dynamics in the cocoa sector Ivory Coast, Ghana	#22A	▪ (1) Sustainable and resilient cocoa agroforestry models ▪ (1) Innovative control methods as alternatives to uprooting cocoa trees (plant barrier against the Cocoa Swollen Shoot Virus)
	#22C	▪ (1) Decision making tools for the fight against Cocoa Swollen Shoot Virus (extension services, cocoa traders)
TAERA ENABEL (412605) Accompagnement de la Transition Agro-Eco-logique par la Recherche Agricole, Benin	#22A	▪ (2) Sustainable water resource management practices ▪ (4) Sustainable agroecological practices (related to the production of rice, tomato and leguminous crops), 3 of them already taken up by farmers
ACCEPT IRED (404348) Adapter l'accès aux ressources agro-pasto-rales dans un contexte de mobilité et de changement climatique pour l'élevage pastoral Chad	#22A	▪ (2) Feed formulas adapted to agroecological zones ▪ (11) Fodder crops (5 irrigated, 6 rain-fed) ▪ (1) Innovative water access system for herds (water points)
	#22B	▪ (1) Installed capacity for the production and marketing of animal feed (nutrition block) to reduce the need for transhu-mance ▪ (5) Decision making tools/ governance mechanisms, for better prevention and management of conflict risks ▪ (1) Agreement and Mediation Committee (Comité Entente et Médiation)
LIDISKI CIRAD (410957) Livestock Disease Surveillance Knowledge In-tegration Nigeria	#22B	▪ (1) Disease surveillance service for livestock farmers, provided by the Community Animal Health Worker ▪ (1) Access to vaccines (provided by the Community Animal Health Worker)
	#22C	▪ (15) Tools to develop control and surveillance strategies, such as: First models of surveillance strategies based on ani-mal mobility data tested; tools for participatory integrative modelling and decision making, electronic forms for surveys on phone apps used by field vets and Community Animal Health Workers improved (innovative tools for use by the Federal government, the State government and the National Veterinary Research Institute).
LIPS-ZIM ILRI (413069) Adoption and scaling up of improved live-stock production systems Zimbabwe	#22A	▪ (4) Climate-change relevant fodder production techniques and practices including 2 practices taken up by farmers ▪ (15) Climate change compliant forage and dual-purpose varieties including 7 varieties already taken up by farmers
	#22B	▪ (4) Community grazing/pasture management schemes (village level)
	#22C	▪ (1) Matrix to facilitate inter-cooperation across laboratories, at national and provincial levels (Department of Veterinary Services) ▪ (1) Gendered Feed Assessment Tool used to assess feed balance / demand for livestock, mostly used at technical level by trained staff (institutional innovation developed by ILRI, but not under this project).

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CASSECS ISRA (410169) Carbon sequestration in sylvopastoral ecosystems in Cilss States Senegal, Burkina Faso, Niger, Chad, Mali, Mauritania	#22A	▪ (1) Innovation related to feedstuffs ▪ (3) Kinds of plantation (agroforestry)
	#22C	▪ (11) Upgrading of 11 national and regional mechanisms for producing reference data on emissions & carbon sequestration in sylvo-pastoral ecosystems ▪ (2) Upgrading of two tools (Global Livestock Environmental Assessment Model or GLEAM) and "The Feed Balance Sheet". ▪ (2) Carbon footprint assessment tools, to contribute to IPCC reports and livestock development policies ▪ (4) Production of knowledge and reference systems on 4 GHG emission factors (the new emission factors are considered to be innovations).
CSARIDE TEAGASC (411806) Climate Smart Agriculture Research and Innovation Support for Dairy Value Chains in Eritrea Eritrea	#22A	▪ (4) Innovations with regard to breeding, feeding strategies, animal health treatments, milk cooling
	#22B	▪ (1) Private artificial insemination service ▪ (1) Access to artificial insemination by farmers ▪ (1) Access to extension services ▪ (1) Decision making tool for farmers (feeding calendar)
CLIMATE SMART INNOVATION CIP (413081) Climate smart innovations to improve productivity, profitability and sustainability of agriculture and food systems in Malawi through multidisciplinary research Malawi	#22A	▪ (26) Integrated technology options (tree-crop-livestock and agriculture-aquaculture systems) ▪ (15) Integrated pest and disease management strategies ▪ (6) Innovative post-harvest management technologies
	#22C	▪ (6) Risk models aimed at increasing the uptake of agricultural technologies, one for each agroecological zone of Malawi (for the national agricultural system and policy makers)

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CLIMA-LOCA CIAT (407158) Fostering CLIMAte-relevant and LOw CAdmium innovations to enhance the resilience and inclusiveness of the growing cocoa sectors Colombia, Ecuador, Peru	#22A	▪ (12) Commercial clones under evaluation ▪ (4) Rootstocks under evaluation ▪ (2) Agroforestry systems (in Ecuador only) ▪ (3) Low cadmium genotypes ▪ (5) Soil amendments (low cadmium and climate-relevant management practices)
	#22C	▪ (1) Website with public access to data on climate change and change in cadmium levels (Peru) ▪ (1) Molecular markers ▪ (1) Technology for measurement of cadmium ▪ (1) Introduction of drought tolerant, disease resistant and low cadmium genotypes in collection plots (research centres)
ABEE CORAF (410172) 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 Burkina Faso, Niger, Senegal	#22A	▪ (238) varieties including varieties resulting from ongoing breeding programmes (unlikely to be certified before the end of the programme) and varieties resulting from previous selection programmes (before the start of the project, number taken up is unknown)
	#22B	▪ (1) Strengthened seed supply system, in particular by strengthening producer organisations (seed production and purchase contracts set up between partner cooperatives and seed companies)
	#22C	▪ (1) Charter for the exchange of data and germplasm between the members of a regional network (Burkina Faso, Niger, Senegal) and of exchange and evaluation of varieties (CORAF and NARS in targeted countries) ▪ (12) Upgrading of (existing) climate resilient plant breeding programmes
APSAN ICRISAT (407715) Enhancing crop productivity and climate resilience for food and nutrition security in Mali Mali	#22A	▪ (37) Climate-resilient varieties (existing and new varieties) including an unknown number of varieties already taken up ▪ (19) New technologies (crop production practices based on climate-resilient varieties)
BIORISKS	#22A	▪ (1) Production/supply of healthy cassava seedlings

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CORAF (411531) Anticiper et gérer les risques biologiques pour renforcer la résilience des agriculteurs au changement climatique en Afrique de l'Ouest et du Centre Benin, Burkina Faso, Cameroun, Ivory Coast, DRC, Gabon, Ghana, Nigeria, Sierra Leone, Togo		▪ (1) Cultural practice (roughing of cassava, an innovation for cassava)
	#22B	▪ (1) Participatory monitoring of cassava diseases via a mobile application
	#22C	▪ (1) Effective surveillance, early warning and monitoring system for cassava virus diseases, FAW (Fall Army Worm) and mango fly ▪ (1) Coordination framework at regional level, under the auspices of the CORAF Executive Secretariat, to effectively manage BIMAF (Biorisk Management Facility, hosted by the International Institute of Tropical Agriculture in Benin).
FAREI FAREI (406180) Enhancing FAREI's R&D Capacity for Sustainable and Modern Agriculture Mauritius	#22A	▪ (4) Climate-smart practices (upscaled projects: livestock production and performance management, utilization of local animal genetic resources. New projects: pressurized irrigation systems, drip fertigation coupled with solar water pump) ▪ (1) Vertical Farming Unit in operation ▪ (1) In-vitro culture technique as a tool for rapid propagation and production of garlic
	#22B	▪ (1) Disease forecasting model (strengthening of the early disease warning unit of FAREI and the plant diagnostic facility for climate change resilience) linked to automatic weather stations.
	#22C	▪ (1) New research programme on agroforestry – *developed and in use* ▪ (6) Research programmes - reviewed and updated, and in use by FAREI
UOM INNOVATION & TRAINING University of Mauritius (406182) Enhancing climate resilience in agriculture for improved food and nutrition security through research, innovation and training in the Republic of Mauritius Mauritius	#22A	▪ (1) Climate Smart Agriculture technologies (model aquaponics) ▪ (13) CSA technologies for leguminous crops under organic, sheltered and conventional farming systems
	#22B	▪ (3) CSA technologies: seed bank of pigeon pea accessions, sensors (decision making tool), drones.
	#22C	▪ (1) Food Processing and Quality Control Laboratory of the Faculty of Agriculture equipped for teaching, research and consultancy purposes ▪ (4) Analytical methods for molecular pest & disease characterisation in Mauritius & Rodrigues (Faculty of Agriculture of the University of Mauritius) – i*n progress* ▪ (2) Value-added products (drinking yoghurt and clarified butter with infused herbs) ▪ (1) A conceptual model for integration of sensors' data such as soil moisture, temperature, humidity and pressure, leaf wetness (with mobile App for displaying the sensor data)
BIOSTAR	#22C	▪ (8) Technologies (agri-food waste processing) ▪ (16) Supply models (at SME level)

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CIRAD (410794) Sustainable Bioenergy in Small and Medium Agri-food Enterprises in Western Africa Burkina Faso, Senegal, Mali, Niger, Ivory Coast		▪ (5) Technical itineraries (at industry/sector level), at least one for each product
SUPPORT TO TAP FAO (406734) Developing capacities in agricultural innovation systems: scaling up the Tropical Agriculture Platform Framework Burkina Faso, Eritrea, Malawi, Rwanda, Senegal, Cambodia, Laos, Pakistan, Colombia	#22C	▪ 1 TAP Common Framework toolbox updated (for use by NARS in targeted countries)
PILLAR I - GROUP 2		
ASSET AFD (415683) (and then GRET with CIRAD support) Agroecology and Safe food System Transitions in Southeast Asia Cambodia, Lao PDR, Vietnam	#22A	▪ (10) Agroecological practices in Cambodia (6), Lao PDR (1) and Vietnam (3)
	#22C	▪ (1) ALISEA knowledge hub (Agroecology Learning Alliance in South-East Asia) ▪ Small Grant Facility to generate AE projects ▪ (3) "Metkasekor", a "climate-smart *extension* service *model*" led by PDAFF (Provincial Department of Agriculture, Forestry and Fisheries) in Cambodia
IDEAS ONF Andina (418193) Strengthening governance towards Stabilization of the Agricultural Frontier and Sustainability in post-conflict territories of Colombia Colombia	#22A	▪ (1) Biodigester (technical solution for recovering organic waste, used to produce a combustible gas and fertiliser through anaerobic fermentation) ▪ (1) Agroforestry systems for livestock farmers (hence an innovation), developed by the Amazon Research Institute (Instituto Amazónico de Investigaciones or SINCHI, Guaviare department).
	#22C	▪ (1) Forland, a territorial management tool adjusted to the local context.
LEG4DEV	#22	▪ Information will be provided in the next Annual Global Report

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Galway University (418901) Legume-based agroecological intensification of maize and cassava cropping systems in Sub-Saharan Africa for water-food-energy nexus sustainability, nutritional security & livelihood resilience Ethiopia, Malawi, Tanzania, Zambia		
SAFEVEG NL Ministry of Foreign Affairs (417876) (and then WORLDVEG) Safe locally-produced vegetables for West Africa's consumers Benin, Burkina Faso, Mali	#22A	▪ (5) Agricultural practices (at least) ▪ (102) Vegetable varieties: chili (17), habanero (2), amaranth (10), okra (17), tomato (22), eggplant (4), roselle (4), pepper (20, onion (6), variety registration is ongoing
	#22C	▪ (2) Concrete solutions (proven interventions and technologies which are documented and validated) to make vegetables more accessible: (i) street food vendors to stimulate consumption of green leafy vegetables by low-income consumers, and (ii) labelling vegetable origin to increase consumer trust.
MARIGO CIRAD (419988) Maraichage Agroecologique périurbain Ivory Coast	#22A	▪ (2) Innovative technologies for recycling and recovering organic waste products (poultry manure + biochar on aubergines; rotation of beans, aubergines and okra). ▪ (4) Agroecological technologies (plant health): intercropping with lemongrass & tobacco; anti-insect netting; biofertilisers and diversification. ▪ (2) Post harvest technologies (UV box for vegetable storage; coating made from a combination of cocoa pod ash, neem oil and carapa oil)
	#22B	▪ (1) Organic certification scheme by peers; a number of producers come together and define a set of specifications, with each farmer being monitored by his peers to ensure compliance with the Charter.
	#22C	▪ (1) Soil diagnostic kit, new in Ivory Coast, developed by IRD and CIRAD before the project ▪ (1) Reconstitution of a seed bank for local vegetables and service plants
SIRGE	#22C	▪ (1) Forecasting model for livestock GHG emissions

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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 Uganda		
ICSIAPL NL Ministry of Foreign Affairs (421388) (and then SNV) Integrated & Climate Smart Innovations for Agro-Pastoralist Economies and Landscapes in Kenya's ASAL, Kenya	#22A	▪ (21) Fodder varieties/ mixed sward with demonstrated benefits (drought- resilient feeding innovations, tested and registered)
	#22B	▪ (11) Business models to provide forage, inputs and technologies to farmers (implemented by MSMEs de-risked with innovation funds) ▪ (1) Community level grazing/landscape plans developed and implemented (1 concept, 40 plans implemented tailored to each community) ▪ (1) Landscape management plan ▪ (1) Forage masterplan (concept) for 6 ranches and conservancies (management of grazing resources among conservancies and ranches)
ESSA University of Helsinki (418132) Earth observation and environmental sensing for climate-smart sustainable agro-pastoral ecosystem transformation in East Africa Kenya, Ethiopia	#22A	▪ (1) Beekeeping as a new business model ▪ (1) Feed formula based on fodder + prosopsis pods ▪ (1) Baobab-based gel (beverage for human consumption)
	#22B	▪ (1) Farmer friendly mobile app (information on a variety of agricultural topics, good agricultural practices (GAP), natural resource management (NRM), market information and fact sheets/manuals (a one-stop shop)
	#22C	▪ (4) Earth observation methods and techniques (new methods and improving existing ones). These are Remote Sensing products & methods for points of change assessment and local scientific evidence for environmental footprints of semi-arid and arid lands.
SyRIMAO	#22A	▪ (3) Pest control technologies (including 1 under development and 2 under certification, e.g. mass trapping product)

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AFD (417085) (and then ECOWAS) Système Régional Innovant de contrôle des Mouches des fruits en Afrique de l'Ouest Benin, Burkina Faso, Cap Vert, Ivory Coast, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo	#22B	▪ (1) Partnership/contract between producers and exporters as a model for access to services and inputs. ▪ (1) An export levy mechanism to ensure the sustainability of surveillance and access to control products for producers.
	#22C	▪ (5) Research protocols (validated) ▪ (1) Funding mechanism ▪ (1) Regional Fruit Fly Management System in West Africa
ReDIAL Friends of the Nation (416435) Research for Development and Innovation Agriculture and Learning Project Ghana	#22A	▪ (12) CSA practices (not developed by the project but introduced for the first time to communities: e.g. crop rotation and intercropping techniques, water management in rice farming, minimum tillage and direct planting techniques, etc.), 6 of them have been taken up by farmers
	#22B	▪ (1) Local resource mobilisation mechanism or strategy (savings/loan mechanism) ▪ (2) Services to farmers based on innovative technologies (fertility enhancement and reduction of post-harvest losses in grain threshing)
CDI-Rwanda FAO (422165) Capacity development for innovation in Rwanda: strengthening value chains in six districts Rwanda	#22A	▪ (18) Crop varieties (beans, rice, potato, cassava, maize, horticulture) ▪ (21) Cattle feeding varieties ▪ (8) Climate Smart Practices (e.g. planting trees to provide shade to crops without competing with crops, trees fixing nutrients, tec.)
	#22B	▪ (1) Innovation facilitation service (builds farmers' capacities to adopt varieties)
IRRINN CIRAD (421401) Intensification of agricultural production through upscaling of innovative adapted irrigation practices and technologies Burkina Faso	#22A	▪ (2) Irrigation technologies (runoff water collection basin and solar powered pump)
	#22B	▪ (1) Innovation Support Service (Financing structure, supply of goods, provision of services)
	#22C	▪ (1) Mobile application for sizing solar pumps and choosing irrigation equipment (for technicians). Application already in use and available on Playstore (Android); over a thousand downloads.

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LSC-IS NL Ministry of Foreign Affairs (419433) (and then WUR, ISRIC and ILRI/CCAFS) Boosting Climate Smart Agriculture in East Africa with Land, Soil and Crop Information Services Kenya, Ethiopia, Rwanda	#22C	▪ (1) Land, Soil and Crop (LSC) hubs embedded in existing national agricultural data infrastructures and agricultural advisory services of NARCs (at national, regional and local levels); this innovation can be used by both farmers and institutions.
ReSI-NoC CIFOR-ICRAF (416105) 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 Cameroon	#22A	▪ (10) Trials for 10 speculations with several varieties for each speculation ▪ (9) Agroforestry techniques, including production of seedlings and natural regeneration
	#22B	▪ (1) Rural Resource Centres (RRCs), an advisory support service for farmers to promote environmentally-friendly agroforestry practices.
	#22C	▪ (3) Support systems attached to 3 innovation niches.
Artemia4Bangladesh WORLDFISH (414811) Introducing Circularity Through Climate-Smart Aquaculture in Bangladesh Bangladesh	#22A	▪ (4) Technologies: artemia pond culture, aquaculture in artemia ponds, shrimp monoculture in salt farms and Recirculating Aquaculture System (RAS, a technique targeting shrimp hatcheries)
WE4F GIZ (419478) Water and Energy for Food – East Africa Hub Kenya, Uganda, Rwanda, Ethiopia, Tanzania	#22A	▪ (17) Energy and water technologies and practices for East Africa, most of them based on solar energy (e.g. irrigation, dairy cooling, water desalinisation for hydroponics, all solar powered)
	#22B	▪ (6) Financing mechanisms for farmers (pay-as-you-go, farm incubator model linked to contract farming, digital cooperative financial loans, credits tied to energy savings etc.)
	#22C	▪ (9) Business models for the marketing of climate friendly, energy and/or water efficient innovations

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DARE UNICEF (415029) Developing innovative food solutions to increase quality of nutritious foods for young children, adolescent girls, pregnant and lactating women, Ethiopia	#22C	▪ (3) Products for consumer use: egg powder (new concept); dry papaya powder (new concept); yeast-enhanced injera to increase bioavailability of folate within cereals-based products (developed at lab level by the project). (2) Marketing approaches: commercialization through a branded market (innovative for Ethiopia); institutionalization of egg powder as part of a product portfolio to be distributed to conflict areas -for instance- or as part of the school feeding programme. ▪ (3) Production processes/equipment for egg powder; papaya powder (first time in Ethiopia), for yeast
PILLAR II		
ONE PLANET Agropolis Foundation (406569) One Planet Fellowships Programme (OPFP) Algeria, Benin, Burkina Faso, Ivory Coast, Ethiopia, Kenya, Malawi, Mali, Morocco, Nigeria, Senegal, Tanzania, Togo and Zambia	#22C	▪ (1) Agricultural model better adapted to climate change (Malawi) ▪ (1) Modelling small ruminant production systems, using Multi-Agent System (MAS) modelling (Sahel)
SUPPORT TO GFAR FAO (410670) Re-Connecting the world: The GFAR Partnership transforming agri-food research and innovation for development impact Global	#22C	▪ (1) Manifesto on "Forgotten Foods: model of how to catalyse pro-poor and by-poor change in agri-food research and innovation systems by leveraging forgotten foods" (for GFAR members and NARS in targeted countries) ▪ (1) Partnership Principles: a tool to assess the quality and the inclusiveness of institutional partnerships ▪ (1) The (implicit) concept of a Collective Action can be considered an innovation.

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SUPPORT TO CAADP AR&EO IFAD (407682) **AFAAS** - African Forum for Agricultural Advisory Services Kenya, Ghana, Mali, Malawi, Madagascar, Liberia, Nigeria, Uganda, Cameroon, Ethiopia, South Africa, Zimbabwe **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 **CCARDESA** - Centre for Coordination of Agricultural Research and Development for Southern Africa Botswana, Eswatini, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe **CORAF (WECARD)** - Conférence des Responsables de Recherche Agronomique Africains (West and Central African Council for Agricultural Research and Development) Benin, Burkina Faso, Cameroon, Cape Verde, Central Africa Republic, Chad, Congo, Ivory Coast, Democratic Republic of Congo, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome Principe, Senegal, Sierra Leone, Togo **FARA** - Forum for Agricultural Research in Africa , Continental Africa	#22C	▪ (1) AFAAS: Tools to enhance M&E systems and their interoperability. ▪ (1) CCARDESA: Guidelines for mainstreaming climate relevant STIs (Science Technology and Innovation Indicators) into National Agricultural Investment Plans (NAIPs) ▪ (1) CCARDESA: Community of Practice for media practitioners on CSA ▪ (1) CORAF: Community of Practice on Knowledge Management ▪ (1) AFAAS, ASARECA, CCARDESA, CORAF, FARA: Agricultural Innovation Systems-Policy Practice Index (AIS-PPI) Tool. This institutional innovation is common to all CAADP Agricultural research and Extension Organisations (AR&EO). It is used to measure progress towards the Malabo-related indicators but also to assess the capacity of a given country in formulating, implementing, tracking the implementation and impact of a policy. ▪ (1) Set of collaboration mechanisms for CAADP AR&EO (tools and good institutional practices to facilitate collaboration, decision-making and the implementation of the EU-funded programme)