CGIAR Research Initiative on
Excellence in Agronomy

Annual Technical Report 2023

Disclaimers

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Table of contents

CGIAR Technical Reporting 2023

CGIAR Technical Reporting has been developed in alignment with the CGIAR Technical Reporting Arrangement. This Initiative report ("Type 1" report) constitutes part of the broader CGIAR Technical Report. Each CGIAR Research Initiative submits an annual "Type 1" report, which provides assurance on Initiative-level progress towards End of Initiative outcomes.

The CGIAR Technical Report comprises:

- Type 1 Initiative, Impact Platform, and Science Group Project (SGP) reports, with quality assured results reported by Initiatives, Platforms and SGPs available on the CGIAR Results Dashboard.

- The Type 3 Portfolio Performance and Project Coordination Practice Change report, which focuses on internal practice change.

- The Portfolio Narrative, which draws on the Type 1 and Type 3 reports, and the CGIAR Results Dashboard, to provide a broader view on Portfolio coherence, including results, partnerships, country and regional engagement, and synergies among the Portfolio's constituent parts.

The CGIAR Annual Report is a comprehensive overview of CGIAR's collective achievements, impact and strategic outlook, which draws significantly from the Technical Report products above. For 2023, the Annual Report and Technical Report will be presented online as an integrated product.
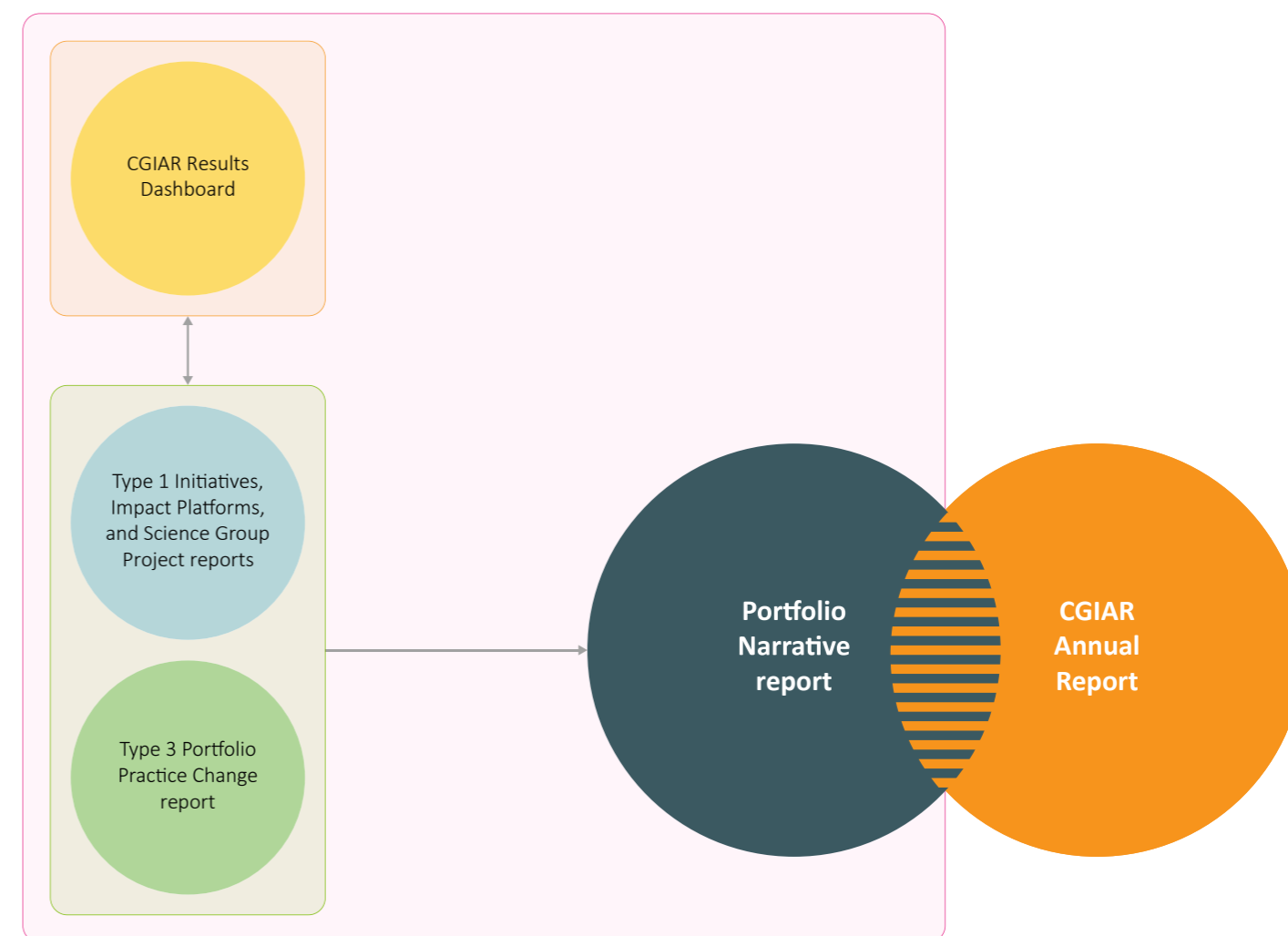
Section 1: **Fact sheet and budget**

Initiative name	Excellence in Agronomy for Sustainable Intensification and Climate Change Adaptation
Initiative short name	Excellence in Agronomy
Initiative Lead	Bernard Vanlauwe (b.vanlauwe@cgiar.org)
Initiative Co-lead	Job Kihara (j.kihara@cgiar.org)
Science Group	Resilient Agrifood Systems
Start – end date	01/01/2022 − 31/12/2024
Geographic scope	**Regions targeted in the proposal:** Central and West Asia and North Africa · East and Southern Africa · Latin America and the Caribbean · South Asia · Southeast Asia and the Pacific · West and Central Africa **Countries targeted in the proposal:** Bangladesh · Cambodia · Cameroon · Colombia · Côte d'Ivoire · Egypt · Ethiopia · Ghana · India · Indonesia · Kenya · Malawi · Mali · Mexico · Morocco · Mozambique · Nepal · Nigeria · Peru · Philippines · Rwanda · Senegal · United Republic of Tanzania · Democratic Republic of the Congo · Viet Nam · United Arab Emirates · Uganda
OECD DAC Climate marker adaptation score[1]	**Score 2: Principal** The actity is principally about meeting any of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation and climate policy — and would not have been undertaken without this objective.
OECD DAC Climate marker mitigation score[1]	**Score 1: Significant** The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation and climate policy — even though it is not the principal focus of the activity.
OECD DAC Gender equity marker score[2]	**Score 1A: Gender accomodative/aware** Gender equality is an objective, but not the main one. The Initiative/project includes at least two explicit gender-specific outputs and (adequate) funding and resources are available. Data and indicators are disaggregated by gender and analyzed to explain potential gender variations and inequalities.
Links to webpage	https://www.cgiar.org/initiative/11-excellence-in-agronomy-eia-solutions-for-agricultural-transformation/

[1] The Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) markers refer to the OECD DAC Rio Markers for Climate and the gender equality policy marker. For climate adaptation and mitigation, scores are: 0 = Not targeted; 1 = Significant; and 2 = Principal.

[2] The CGIAR Gender Impact Platform has adapted the OECD gender marker, splitting the 1 score into 1A and 1B. For gender equality, scores are: 0 = Not targeted; 1A = Gender accommodative/aware; 1B = Gender responsive; and 2 = Principal.

These scores are derived from Initiative proposals, and refer to the score given to the Initiative overall based on their proposal.

EXECUTIVE SUMMARY

During 2023, Excellence in Agronomy (EiA) continued advancing development of gender- and youth-responsive agronomic solutions that are widely applicable and locally relevant for achieving agronomic gain. Progress was made toward realizing agronomic gains, measured by key performance indicators (KPIs): productivity, profitability, resource use efficiencies, and soil health. Implementation of 20 demand-led use cases continued testing a range of solutions across various topics (fertilizer recommendations, planting date advisories, variety choice, mechanization management, yield gap analysis, extension system management, and best practices and climate adaptation scenarios for perennials) that have progressed along a seven-step use case/innovation development process. The use cases are with partners across governments, private sector and NGOs and together had 40,000 farmers take up various agronomic solutions provided in piloting and pre-scaling activities. To broaden further its impact, EiA has proposed a new model of engagement/delivery, transitioning from one demand partner use cases to Agronomy Science Scaling and Acceleration Platforms (ASSAPs), where solutions can be developed benefiting several partners.

EiA is unlocking the power of modern data and analytics through its data pool (over 600,000 observations), improved high-performance computation infrastructure (known as "CG Labs") in low-bandwidth environments (285 users), and the AgWise analytics and modelling framework. The workflow is generalized for quick adaptation and deployment in response to new demand. Such new demand for EiA solutions was in 2023 expressed by a range of partners, including the Technologies for African Agricultural Transformation (TAAT) programme, the World Bank, and some local partners.

Scientists from five advanced research institutions and 24 national agricultural research and extension system (NARES) partners strengthened their collaboration with EiA scientists across six strategic R&D projects focusing on climate change, soil health, agronomic fortification, mechanization, yield at scale, and behavioral change. Through these projects, 19 MSc and PhD students (9 being women) are supported to pursue various research topics. A framework for identifying new strategic R&D projects for a healthy pipeline is in place.

During 2023, EiA made progress in developing solutions that can benefit CGIAR and its partners such as the Prioritizing Agronomy in a Changing Environment (PAiCE) applied already in all the operational regions, a robust agronomic gain KPI applied for quantifying changes from interventions in on-farm trials and long-term experiments, and a monitoring, evaluation, learning and impact assessment (MELIA) framework applied in documenting the baselines and tracking piloting activities. The EiA one-stop shop for agronomy solutions, also achieved in 2023, includes assembly of curated capacity building content and a hub for validated solutions available for scaling. In expanding its influence, EiA has collaborated with 12 global Initiatives and with all 6 Regional Integrated Initiatives through the engagement of Work Package teams and has partnered with a total of 257 partners to collectively contribute to 460 results.

A communication strategy for the Initiative was developed and various communication materials and knowledge products produced, webinars conducted (reaching 600 people between September and December 2023), and social media engaged (growing to 5000 followers between January and December 2023) to connect with diverse audiences. On culture change, the EiA community has advanced positively around the Initiative's six dimensions of modern agronomy: a globally organized R&D community, an R&D agenda driven by demand, open data and tools, integration of technological advances, application of a KPI framework for agronomic gain, and informed decision-making processes.

	2022	**2023**	2024
PROPOSAL BUDGET	$17.00M	**$26.88M**	$31.12M
APPROVED BUDGET [1]	$15.45M	**$23.33M [2]**	$17.80M [3]

[1] The approved budget amounts correspond to the figures available for public access through the Financing dashboard.
[2] This amount includes carry-over and commitments.
[3] This amount is an estimation of the 2024 annual budget allocation, as of the end of March 2024.
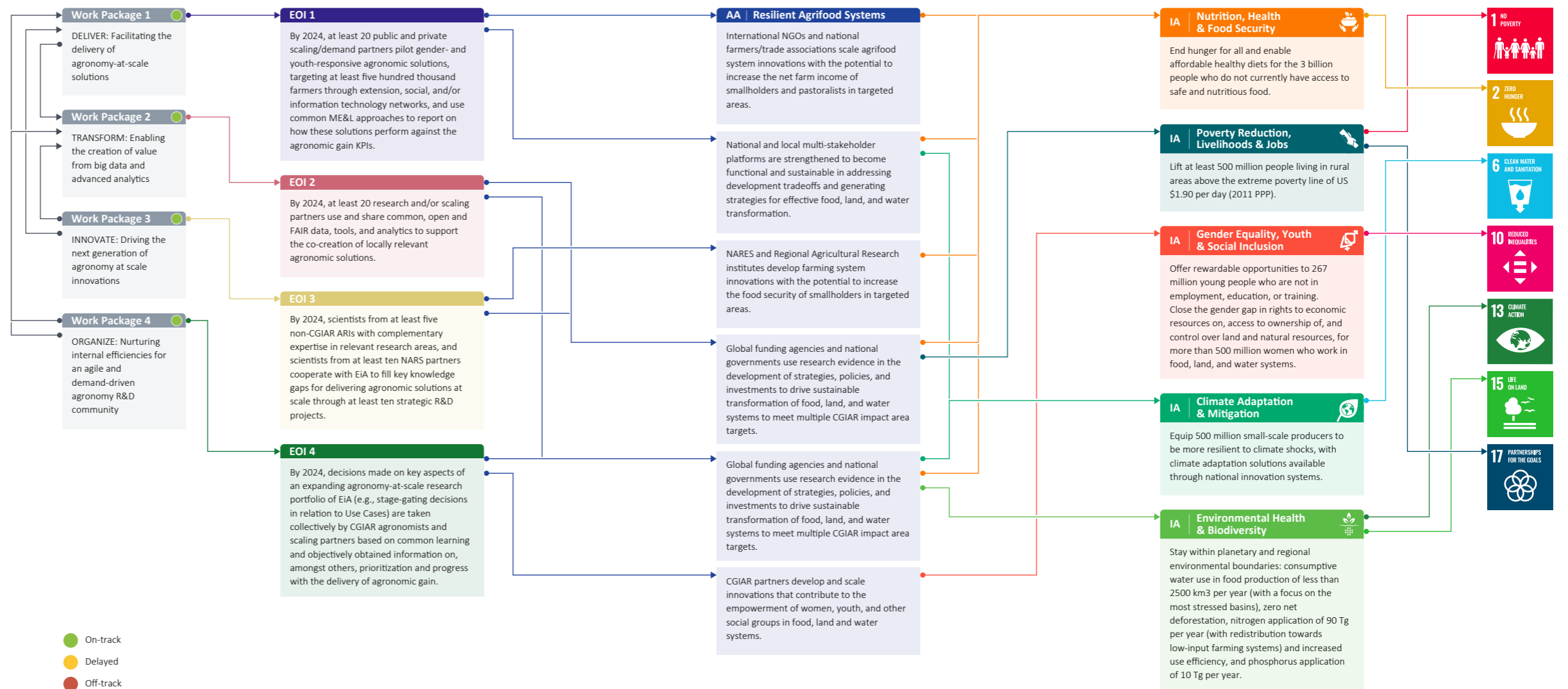

Use Case teams and demand partners gathered in October 2023 for a transformative training on gender and youth-responsive agronomic solutions! This collaboration between GREAT and EiA equips researchers to develop inclusive and sustainable agricultural practices. Credit: Excellence in Agronomy Initiative

Section 2: **Progress on science and toward End of Initiative outcomes**

Initiative-level theory of change diagram

This is a simple, linear, and static representation of a complex, non-linear, and dynamic reality. Feedback loops and connections between this Initiative and other Initiatives' theories of change are excluded for clarity.

Work Package 1
DELIVER: Facilitating the delivery of agronomy-at-scale solutions

Work Package 2
TRANSFORM: Enabling the creation of value from big data and advanced analytics

Work Package 3
INNOVATE: Driving the next generation of agronomy at scale innovations

Work Package 4
ORGANIZE: Nurturing internal efficiencies for an agile and demand-driven agronomy R&D community

EOI 1
By 2024, at least 20 public and private scaling/demand partners pilot gender- and youth-responsive agronomic solutions, targeting at least five hundred thousand farmers through extension, social, and/or information technology networks, and use common ME&L approaches to report on how these solutions perform against the agronomic gain KPIs.

EOI 2
By 2024, at least 20 research and/or scaling partners use and share common, open and FAIR data, tools, and analytics to support the co-creation of locally relevant agronomic solutions.

EOI 3
By 2024, scientists from at least five non-CGIAR ARIs with complementary expertise in relevant research areas, and scientists from at least ten NARS partners cooperate with EiA to fill key knowledge gaps for delivering agronomic solutions at scale through at least ten strategic R&D projects.

EOI 4
By 2024, decisions made on key aspects of an expanding agronomy-at-scale research portfolio of EiA (e.g., stage-gating decisions in relation to Use Cases) are taken collectively by CGIAR agronomists and scaling partners based on common learning and objectively obtained information on, amongst others, prioritization and progress with the delivery of agronomic gain.

AA | Resilient Agrifood Systems
International NGOs and national farmers/trade associations scale agrifood system innovations with the potential to increase the net farm income of smallholders and pastoralists in targeted areas.

National and local multi-stakeholder platforms are strengthened to become functional and sustainable in addressing development tradeoffs and generating strategies for effective food, land, and water transformation.

NARES and Regional Agricultural Research institutes develop farming system innovations with the potential to increase the food security of smallholders in targeted areas.

Global funding agencies and national governments use research evidence in the development of strategies, policies, and investments to drive sustainable transformation of food, land, and water systems to meet multiple CGIAR impact area targets.

Global funding agencies and national governments use research evidence in the development of strategies, policies, and investments to drive sustainable transformation of food, land, and water systems to meet multiple CGIAR impact area targets.

CGIAR partners develop and scale innovations that contribute to the empowerment of women, youth, and other social groups in food, land and water systems.

IA | Nutrition, Health & Food Security
End hunger for all and enable affordable healthy diets for the 3 billion people who do not currently have access to safe and nutritious food.

IA | Poverty Reduction, Livelihoods & Jobs
Lift at least 500 million people living in rural areas above the extreme poverty line of US $1.90 per day (2011 PPP).

IA | Gender Equality, Youth & Social Inclusion
Offer rewardable opportunities to 267 million young people who are not in employment, education, or training. Close the gender gap in rights to economic resources on, access to ownership of, and control over land and natural resources, for more than 500 million women who work in food, land, and water systems.

IA | Climate Adaptation & Mitigation
Equip 500 million small-scale producers to be more resilient to climate shocks, with climate adaptation solutions available through national innovation systems.

IA | Environmental Health & Biodiversity
Stay within planetary and regional environmental boundaries: consumptive water use in food production of less than 2500 km3 per year (with a focus on the most stressed basins), zero net deforestation, nitrogen application of 90 Tg per year (with redistribution towards low-input farming systems) and increased use efficiency, and phosphorus application of 10 Tg per year.

SDGs:
- 1 NO POVERTY
- 2 ZERO HUNGER
- 6 CLEAN WATER AND SANITATION
- 10 REDUCED INEQUALITIES
- 13 CLIMATE ACTION
- 15 LIFE ON LAND
- 17 PARTNERSHIPS FOR THE GOALS

Legend:
- 🟢 On-track
- 🟡 Delayed
- 🔴 Off-track

EOI	End of Initiative outcome
AA	Action Area
IA	Impact Area
SDG	Sustainable Development Goal

Note: A summary of Work Package progress ratings is provided in Section 3.

Farmers are happy with the performance of the Location Specific Fertilizer Recommendations Kore District, Orom. The farmers are participants in the Ethiopia Digital Green Use Case supported by EiA and Supporting Soil Health Initiatives (GIZ). Credit: Alliance of Bioversity and CIAT

Summary of progress against the theory of change

In 2023, Excellence in Agronomy (EiA) enhanced its development of gender- and youth-focused agronomic solutions, leveraging the latest in data science, geospatial analytics, remote sensing, and behavioral sciences. EiA expanded its contributions to 15 Sustainable Development Goals (SDGs), focusing primarily on 7, in line with its theory of change. It also advanced its impact in CGIAR's five key areas, notably in climate adaptation and mitigation (74 percent); nutrition, health, and food security (75 percent, with a significant focus on food security); and environmental health and biodiversity (54 percent). These efforts encompassed advancements in agronomic solutions, in open, findable, accessible, interoperable, and reusable (FAIR) data, in research development, and in policy and capacity strengthening.

The DELIVER Work Package engaged 20 partners in piloting gender- and youth-responsive agronomic solutions, reaching over 154,000 farmers (35 percent women) in eight countries through standardized performance assessment methods. This Initiative saw more than 40,000 farmers (25 percent women) take up various components such as site-specific fertilizer recommendations, best planting practices, scheduled planting, from three agronomic solutions: a next-generation agroadvisory system, cassava site-specific recommendations in Nigeria and landscape fertilizer recommendations. The gains from these advisory solutions range from 25 percent yield improvements with context-specific fertilizer recommendations with use cases in Ethiopia and 10–20 percent reduction in nitrogen application rates for similar or greater rice yields in Viet Nam compared to national blanket recommendations and farmer practices. The success of these pilot and scaling efforts has drawn new partnerships, including with Green Agro Solutions PLC for crop insurance in Ethiopia. Further assessment of uptake across other agronomic solutions is planned for 2024.

Currently, 18 agronomic solutions for 13[2] crops are being co-developed across 24 countries with partners from government, the private sector, and NGOs. These solutions offer various advisories, including fertilizer recommendations, optimal planting dates, and

conservation agriculture practices. Their development stages vary, with one in the proof-of-concept phase, eight in prototyping and controlled testing, and four in uncontrolled testing phases. In 2023, two new solutions were introduced: one addressing acid soils in Tanzania through site-specific liming recommendations with the Farm to Market Alliance, and another promoting collaborative action in Kenya with The Nature Conservancy's Central Highlands Ecoregion Foodscape, focusing on water efficiency and agronomy for potatoes, forages, and sorghum.

Also, new demands for agronomy solutions have been made by TAAT and other projects, extending the reach of these solutions. The implementation of use cases has influenced policy change, such as in implementation of the Morocco Country Strategy (Generation Green 2030), which is targeting one million hectares of cereals under conservation agriculture and has already reached 85,000 hectares. The Vietnamese government has endorsed the project "Sustainable Development of One Million Hectares of High-Quality and Low-Emission Rice Associated with Green Growth in the Mekong River Delta by 2030". And inspired by EiA's Viet Nam use case, the Philippines government is adopting drone technologies to disseminate precision agriculture to smallholder farmers.

The agronomic gains KPI framework has also been applied through the MELIA framework in conducting baseline studies of four use cases to set the benchmark against which progress will be measured. In addition, the framework has been applied in the stage-gating of two individual agronomic solutions, termed use cases here (in SAA-Nigeria and the RiceAdvice Lite of ATAFI-CARI), indicating their readiness to move from validation to piloting stage.

The TRANSFORM Work Package highlights the importance of advanced data science, analytics, and infrastructure in advancing agronomic solutions, emphasizing the use of open, FAIR data and collaborative tools. Since 2022, 285 users across 10 partner organizations have utilized the upgraded CG Labs computation infrastructure, even in low-bandwidth settings. A proof-of-concept data pool, utilizing cutting-edge graph database technology, was

created in late 2022, with an alpha version launched in 2023, currently serving 25 users. This database enables searches for gender-disaggregated data, aiding in the analysis of gender-specific agricultural trends. Additionally, in 2023, soybean planting date advisories for an El Niño year were developed for the Chinyanja Triangle, leveraging crop models and machine learning with historical data. This advisory is now aiding 12 researchers from various institutions.

To achieve the outcomes above, several outputs were enhanced during 2023, including DataScribe, which facilitates open and FAIR data collection, Carob workflow and FAIRscribe, enabling standardization of legacy data, and GARDIAN Maps and CG Labs. The AgWise generalizable decision-support framework was used to develop maize and potato fertilizer recommendations for county governments and extension agents in Kenya and Rwanda, respectively. To enable and support the use of these tools, three expert support groups (data management, analytics & modelling, and field validation of recommendations/solutions) are operating effectively, facilitating data and analytics tasks across various use cases. A data sharing policy has been developed, although incentives are required for sharing standards-compliant data in near real-time among colleagues and partners. In 2023, a comprehensive training initiative involved 259 participants from partner organizations, such as the Viet Nam Ministry of Agriculture and Rural Development; the Bihar Rural Livelihoods Project, locally known as JEEViKA, the Indian Council of Agricultural Research, the Kenya Agricultural and Livestock Research Organization, Solidaridad Network, and Digital Green. This training aimed to further develop capacity for improved FAIR data management.

The INNOVATE Work Package aims to bridge critical knowledge gaps and spur innovation in agronomy research. This is pursued through six internal strategic R&D projects covering areas such as climate change, soil health, agronomic fortification, mechanization, yield optimization at scale, and behavioral change. In 2023, this effort was bolstered by collaboration with five advanced research institutions—Cornell University, ETH Zurich, Wageningen University, CIRAD, and the Busara Institute for Behavioral Economics—along with 24 NARES partners.

To avoid opportunistic selection of strategic R&D projects, a comprehensive framework was introduced. This framework, crafted with stakeholders, lays out selection criteria for R&D initiatives, delineates the responsibilities of working groups, and outlines the processes and timelines for preparing and initiating a second phase of strategic R&D projects. Furthermore, steps were taken to establish a global agro-typing network aimed at expediting technology testing and enhancing the collection of quality data. This includes the development of a tool for spatial delineation.

Nineteen students — 9 women and 10 men at 10 different universities — are actively involved in Excellence in Agronomy

research projects across 6 African countries. This work is fostering a new generation of agronomists. The students include eight doctoral and nine master's degree candidates, one undergraduate, and one postdoctoral researcher.

The ORGANIZE Work Package drives collective decisions between CGIAR agronomist and scaling partners based on common learning. With regards to innovation use, the agronomic gain key performance indicator (KPI) framework and toolkit were developed and employed by six cohort I use cases during the validation stage to quantify and evaluate agronomic gain. These assessments served as the foundation for the CGIAR agronomy team and scaling partners to determine the readiness for advancing to the piloting stage through a stage-gating process. Stage-gating of the remaining use cases will continue in 2024. A MELIA framework is being used across the use cases in documenting the baselines and tracking piloting activities for further MELIA studies. A number of outputs have also been developed, including; integrated survey and toolkit, Prioritizing Agronomy in Changing Environment (PAiCE), Landscape Scale Crop

Equipping farmers with the right tools is key to a successful harvest. That's why we're providing training on the EiA's innovative GeoAgro MiSR app. This app offers a powerful suite of solutions, directly addressing the challenge of limited extension agents in Egypt. Credit: ICARDA

Assessment Survey (LCAS), and 14 standard operating procedures associated with the KPI framework. The PAiCE tool has been validated through workshops by 288 partners in 18 priority countries and 8 farming systems.

Key findings suggest that EiA's demand-driven approach effectively addresses critical agronomic needs, yet a shift towards combined solutions for multiple partners could enhance impact and efficiency across similar agroecologies. Consequently, the proposal for Agronomy Science Scaling and Acceleration Platforms (ASSAPs) has been put forward. This strategy advocates moving from isolated solutions to integrated agronomic approaches within ASSAPs, targeting specific agroecologies, crops, and partner networks. This method aims to localize solution development and enable widespread deployment of EiA tools and solutions.

[1] Ghana, Nigeria, Mali, Burkina Faso, Ethiopia, Tanzania, India and Mexico. [2] cassava, cocoa, coffee, cowpea, fava, maize, potato, rice, sorghum, soybean, teff, wheat, yam.

Progress by End of Initiative outcome

EOIO 1: By 2024, at least 20 public and private scaling demand partners pilot gender- and youth-responsive agronomic solutions targeting at least 500,000 farmers through extension, social, and/or information technology networks and use one common monitoring, evaluation and learning approach to report on how these solutions perform against the agronomic gain KPIs.

By the end of 2023, the Initiative had launched 20 use cases in collaboration with a mix of public, private, and civil society organizations to craft agronomic solutions made sensitive to gender and youth issues through collaboration with the CGIAR Gender team. All use cases underwent gender transformative approaches training to design solutions mindful of gender dynamics. Out of these, 13 use cases validated their solutions, with 8 starting piloting activities. Scaling activities for the more advanced use cases are expected by the end of 2024. The MELIA team has introduced tools for tracking performance and impact, aiming for all use cases to report standardized data by the end of 2024.

EOIO 2: By 2024, at least 20 partners use and share common, open and FAIR data, tools, and analytics to support the co-creation of locally relevant agronomic solutions, integrating climate-smart, inclusivity, and sustainability dimensions and assessing their performance using standardized protocols.

The TRANSFORM Work Package significantly advanced its development and implementation of innovative tools such as AgWISE, Data Scribe, and FAIRScribe, in line with its strategic plan and theory of change. These innovations are now being used by eight to ten stakeholders and partners, including ministries and organizations in India, Kenya, Viet Nam and beyond. Given this progress and planned activities for 2024, the Initiative is on track to achieve its stated outcomes.

EOIO 3: By 2024, scientists from at least five non-CGIAR advanced research institutions and ten NARS partners cooperate with EiA in ten or more R&D projects to fill key knowledge gaps for delivering agronomic solutions at scale.

Five advanced research institutions (Cornell, ETH and Wageningen universities, CIRAD, and Busara Institute for Behavioral Economics) are contributing complementary expertise to EiA. Overall, scientists from 24 partners in Africa, Asia, Latin America, Europe and North America are cooperating with EiA to fill knowledge gaps for delivering agronomic solutions through ten strategic R&D projects, so we are fully on track to achieve the outcome by the end of 2024.

EOIO 4: By 2024, decisions made on key aspects of an expanding agronomy-at-scale research portfolio of EiA (e.g.: stage-gating of use cases) are taken collectively by CGIAR agronomists and scaling partners based on common learning and objectively obtained information, among others, prioritization, and progress with the delivery of agronomic gain.

The agronomic gain KPI framework and toolkit were applied to measure agronomic gain in terms of yield, yield stability, resource use efficiency and soil health. Six cohort I use cases at validation stage have assessed the agronomic gain delivered by their minimum viable products (MVP) and the results are shown in the EiA impact dashboard. The results from the agronomic gain assessment obtained during the validation trials of the fertilizer recommendation tools for rice and maize developed by the SAA-Nigeria use case and the RiceAdvice Lite of the ATAFI-CARI use case were used by the CGIAR agronomy team and scaling partners as a basis for the stage-gating process to progress to the piloting stage. Stage-gating of the remaining use cases will continue in 2024.
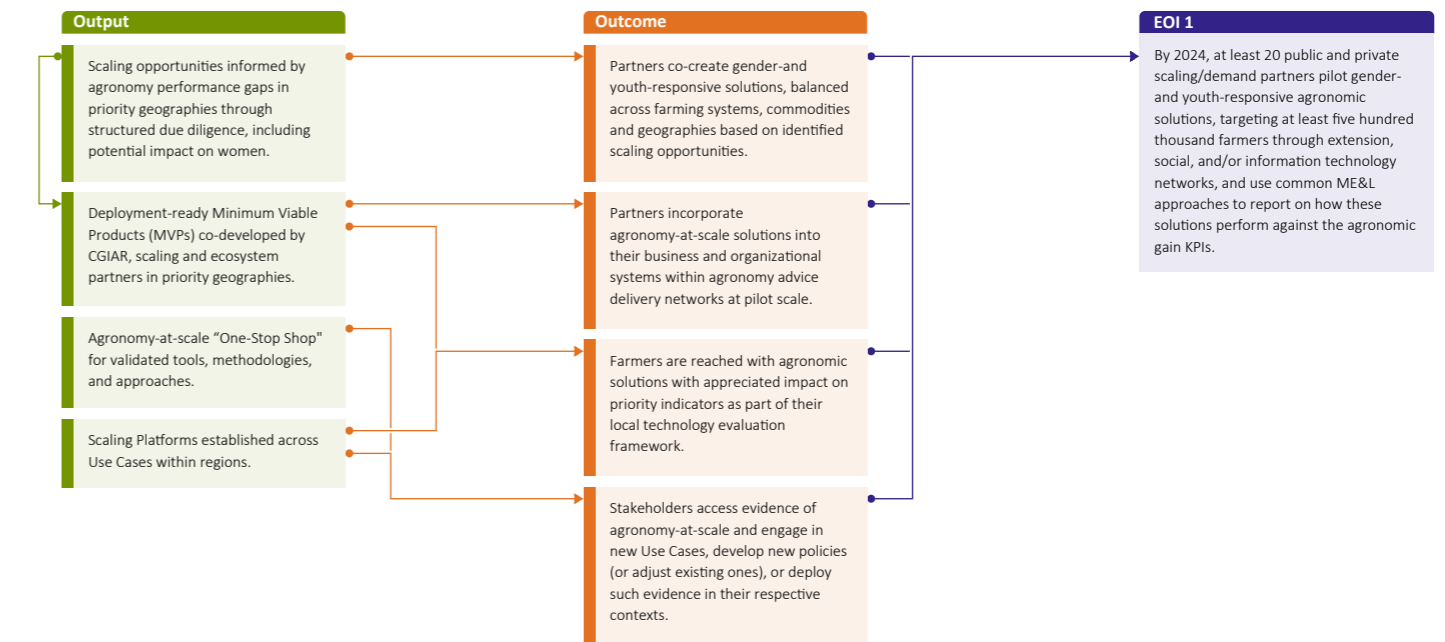

In Jos, Plateau State, Nigeria, farmers are harvesting potato variety trials. This is part of the EiA Use Case in partnership with CIP in Nigeria.
Credit: Kalpana Sharma

Section 3: **Work Package progress**

Work Package 1: DELIVER

● On track

Output	Outcome	EOI 1
Scaling opportunities informed by agronomy performance gaps in priority geographies through structured due diligence, including potential impact on women.	Partners co-create gender-and youth-responsive solutions, balanced across farming systems, commodities and geographies based on identified scaling opportunities.	By 2024, at least 20 public and private scaling/demand partners pilot gender- and youth-responsive agronomic solutions, targeting at least five hundred thousand farmers through extension, social, and/or information technology networks, and use common ME&L approaches to report on how these solutions perform against the agronomic gain KPIs.
Deployment-ready Minimum Viable Products (MVPs) co-developed by CGIAR, scaling and ecosystem partners in priority geographies.	Partners incorporate agronomy-at-scale solutions into their business and organizational systems within agronomy advice delivery networks at pilot scale.	
Agronomy-at-scale "One-Stop Shop" for validated tools, methodologies, and approaches.	Farmers are reached with agronomic solutions with appreciated impact on priority indicators as part of their local technology evaluation framework.	
Scaling Platforms established across Use Cases within regions.	Stakeholders access evidence of agronomy-at-scale and engage in new Use Cases, develop new policies (or adjust existing ones), or deploy such evidence in their respective contexts.	

Work Package 1 progress against the theory of change

The End of Initiative outcome of DELIVER Work Package 1 envisions a tangible shift in how agronomy science research priorities are formulated, validated, and deployed at scale through innovative partnerships within the farmer-facing agronomy ecosystem. The key building blocks that can bring this to reality include a scalable pipeline development workflow that helps to identify demand and supports due diligence with partners.

A total of 20 use cases have progressed along the seven-step use case/innovation development process. They have generated significant learnings and data during implementation, partner engagement, MVP design, and field validation. Data and learnings were also obtained about current practices, farmer typologies, climate hazards, gender equality and youth inclusion, and yield gap decomposition. Validation and piloting data for 4 and 8 use cases, respectively, continue to be generated on the efficacy of fertilizer recommendations, planting date advisories, variety choice, mechanization management, yield gap analysis, extension system management, and best practices and climate adaptation scenarios for perennials.
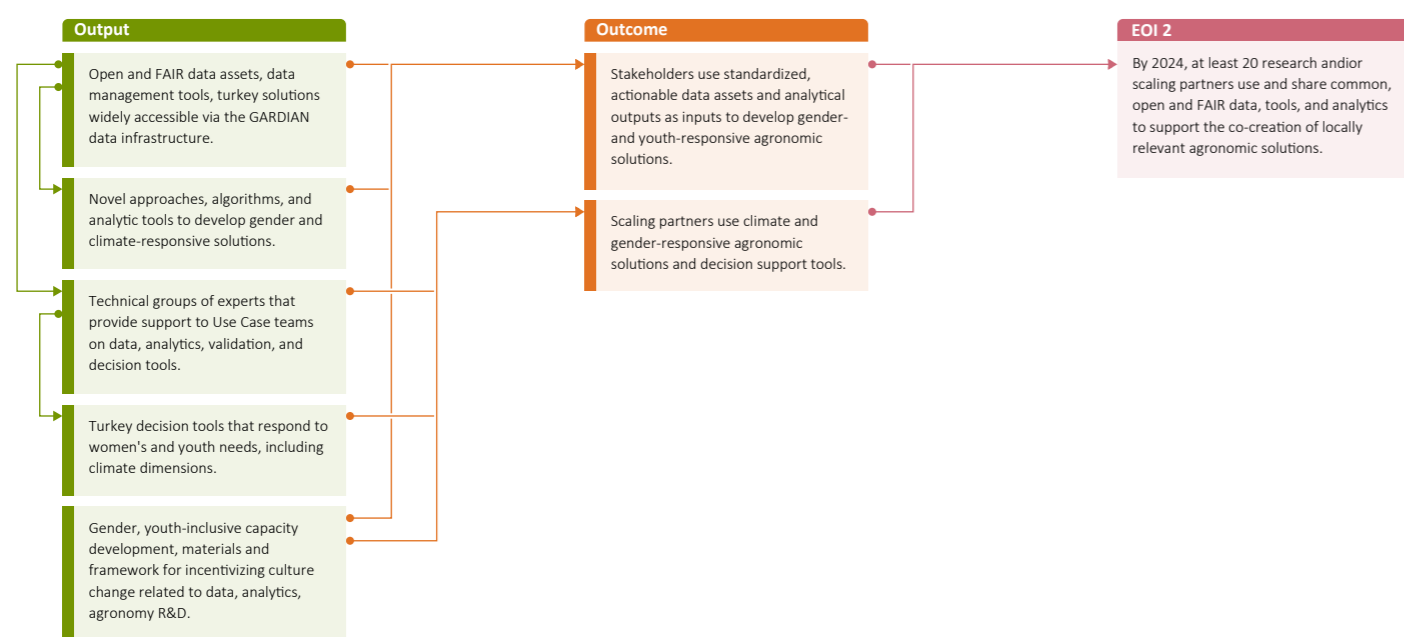
Oline platforms have been assembled for use by the internal Initiative community, for external partners and collaborators to document agronomy conversations and curate capacity building content, and to serve as a hub for validated solutions available for scaling, all part of a one-stop shop for agronomy solutions.

The Initiative has also been building a scaling support infrastructure modelled along the Innovation Packaging and Scaling Readiness principles. A team led by a scaling scientist has developed support interventions for use case teams, focusing on human-centered design, Innovation Packaging, scaling planning, and partnership development and will soon be developing strategies for scaling-ready use cases.

In transitioning to a regionally driven scaling agenda, the Initiative has recruited consultants to develop a playbook for guiding development and operationalization of the ASSAPs.

WP2: TRANSFORM

On track

Output	Outcome	EOI 2
Open and FAIR data assets, data management tools, turkey solutions widely accessible via the GARDIAN data infrastructure.	Stakeholders use standardized, actionable data assets and analytical outputs as inputs to develop gender- and youth-responsive agronomic solutions.	By 2024, at least 20 research andlor scaling partners use and share common, open and FAIR data, tools, and analytics to support the co-creation of locally relevant agronomic solutions.
Novel approaches, algorithms, and analytic tools to develop gender and climate-responsive solutions.	Scaling partners use climate and gender-responsive agronomic solutions and decision support tools.	
Technical groups of experts that provide support to Use Case teams on data, analytics, validation, and decision tools.		
Turkey decision tools that respond to women's and youth needs, including climate dimensions.		
Gender, youth-inclusive capacity development, materials and framework for incentivizing culture change related to data, analytics, agronomy R&D.		

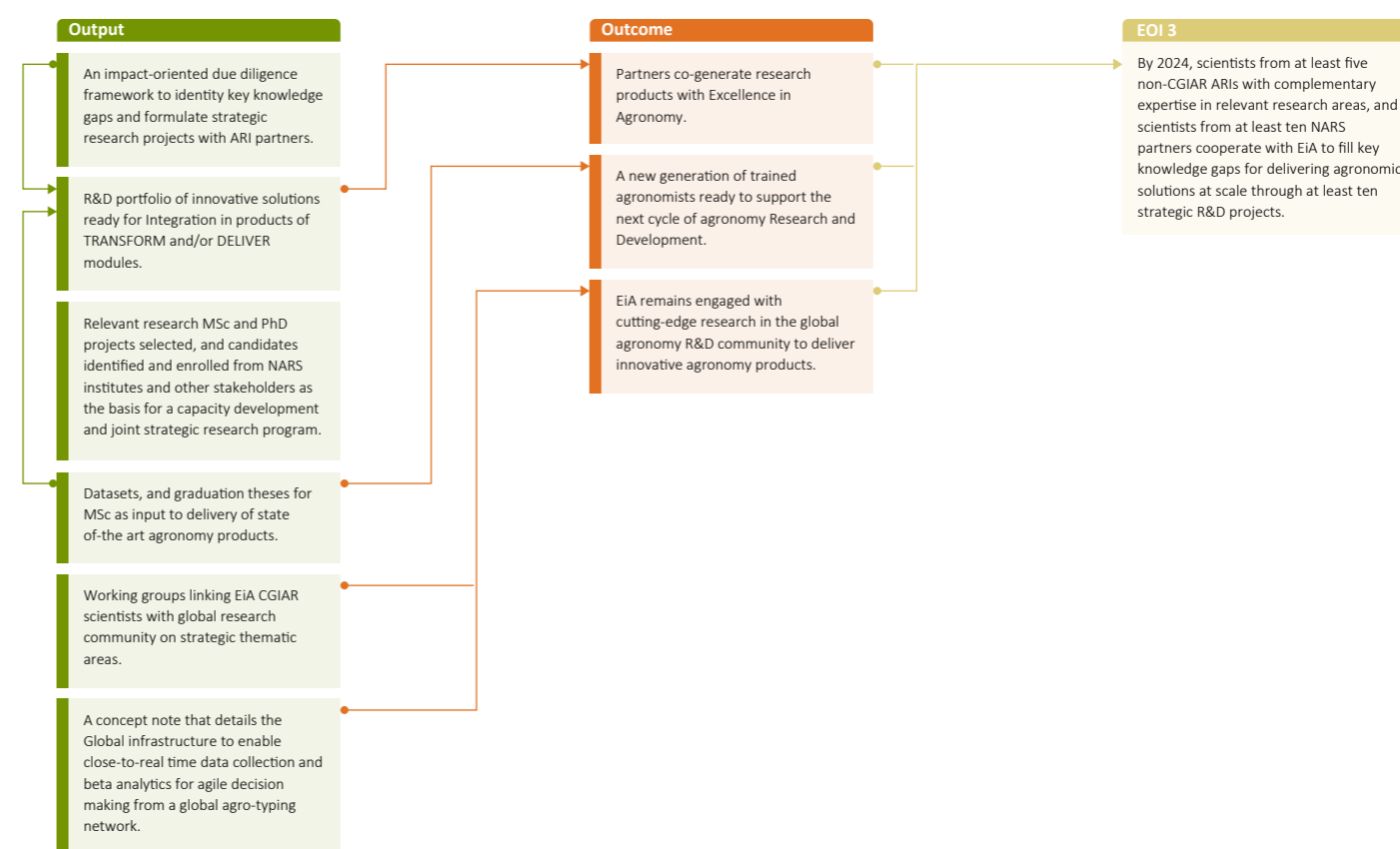### Work Package 2 progress against the theory of change

Open, FAIR data are the foundation for predictive analytics and agile agronomy at scale. During 2023, EiA's TRANSFORM Work Package continued developing mature products and made strong progress against its theory of change. Output 2.1 has been realized: digital collection of open and FAIR data is facilitated via DataScribe, in testing for ability to achieve impact under uncontrolled conditions (stage 8/9 per CGIAR's innovation readiness scale), and two additional products enable standardization of legacy data for interoperability and reuse. The R programming language-based Carob workflow and fertilizer-focused data product provides access to over 200 standardized datasets and 600,000+ observations (9/9 for innovation readiness), and FAIRscribe, allowing non-coders to standardize legacy data assets. Output 2.2 is similarly strong, with a data-to-analytics infrastructure that includes these data tools feeding a global database or data pool (6/9 for innovation readiness). Other products include GARDIAN Maps, a spatial data cube providing access to 81 soil data, 100 crop production and 13,000+ climatic layers and CG Labs, a flexible high-performance computing solution optimized for low-bandwidth that facilitates analytics (9/9 for innovation readiness).

During 2023, three support groups of experts were fully functional under Output 2.3, helping realize data and analytics activities across Outputs, Work Packages and beyond. Turnkey solutions already operational under Output 2.4 include AgWise, a generalizable decision support innovation already deploying optimized fertilizer recommendations for several crops and countries, and dashboards to assess impact of Use Case solutions and help assure the collection of complete, high-quality data. These efforts are backstopped by SOPs, guidelines (e.g., data sharing agreement template and implementation guide), and training programs to support capacity development and culture change for and with partners under Output 2.5. Progress is good towards Outcomes 2.1 and 2.2- and end-of-initiative Outcome 2- as the team builds awareness, capacity, and culture around open and FAIR data and analytical solutions.

Work Package 3: INNOVATE

On track

Output	Outcome	EOI 3
An impact-oriented due diligence framework to identity key knowledge gaps and formulate strategic research projects with ARI partners.	Partners co-generate research products with Excellence in Agronomy.	By 2024, scientists from at least five non-CGIAR ARIs with complementary expertise in relevant research areas, and scientists from at least ten NARS partners cooperate with EiA to fill key knowledge gaps for delivering agronomic solutions at scale through at least ten strategic R&D projects.
R&D portfolio of innovative solutions ready for Integration in products of TRANSFORM and/or DELIVER modules.	A new generation of trained agronomists ready to support the next cycle of agronomy Research and Development.	
Relevant research MSc and PhD projects selected, and candidates identified and enrolled from NARS institutes and other stakeholders as the basis for a capacity development and joint strategic research program.	EiA remains engaged with cutting-edge research in the global agronomy R&D community to deliver innovative agronomy products.	
Datasets, and graduation theses for MSc as input to delivery of state of-the art agronomy products.		
Working groups linking EiA CGIAR scientists with global research community on strategic thematic areas.		
A concept note that details the Global infrastructure to enable close-to-real time data collection and beta analytics for agile decision making from a global agro-typing network.		

Work Package 3 progress against the theory of change

Scientists from 24 partners in Africa, Asia, Latin America, Europe and North America are cooperating with EiA to fill knowledge gaps for delivering agronomic solutions through 10 strategic R&D projects (End of Initiative outcome). The R&D projects focus on climate change, soil health, agronomic fortification, scale-appropriate mechanization, estimating yield at scale, and behavioral change.

Nineteen students (9 women, 10 men) are participating in EiA research to prepare a new generation of trained agronomists ready to support the next cycle of agronomy R&D (output 3.3, outcome 3.2). Of those students, 8 are working toward a PhD thesis, 9 an MSc thesis, and 1 a BSc, while one is a postdoctoral fellow. They are based mainly in Africa (6 in Ethiopia, 3 in Zimbabwe, 2 in Morocco, 2 in Rwanda, 1 in Kenya) and connected to 10 different universities, which strengthens the EiA network.

In 2023, 22 knowledge products were published that are contributing to R&D solutions (output 3.2, outcome 3.1), including 5 journal papers, 9 reports, 5 databases and 3 conference proceedings. Highlights include a strategic paper on agile agronomy for climate action, a journal paper on estimating nutrient concentrations and uptake in rice, a report on indicator selection for regenerative agriculture, and a database on tractor fuel consumption in different field operations.

Seven working groups are operational (output 3.5) covering the topics of the R&D projects and farming systems research. Webinars from the agronomic biofortification and the farming systems group are available online (e.g., https://hdl.handle.net/10568/132789). The mechanization group had a workshop focusing on climate-smart machinery. In preparation for the renewal of the R&D pipeline, feedback was gathered during the learning event in December on the due diligence framework to identify key knowledge gaps and formulate strategic R&D.

Work Package 4: ORGANIZE

🟢 On track
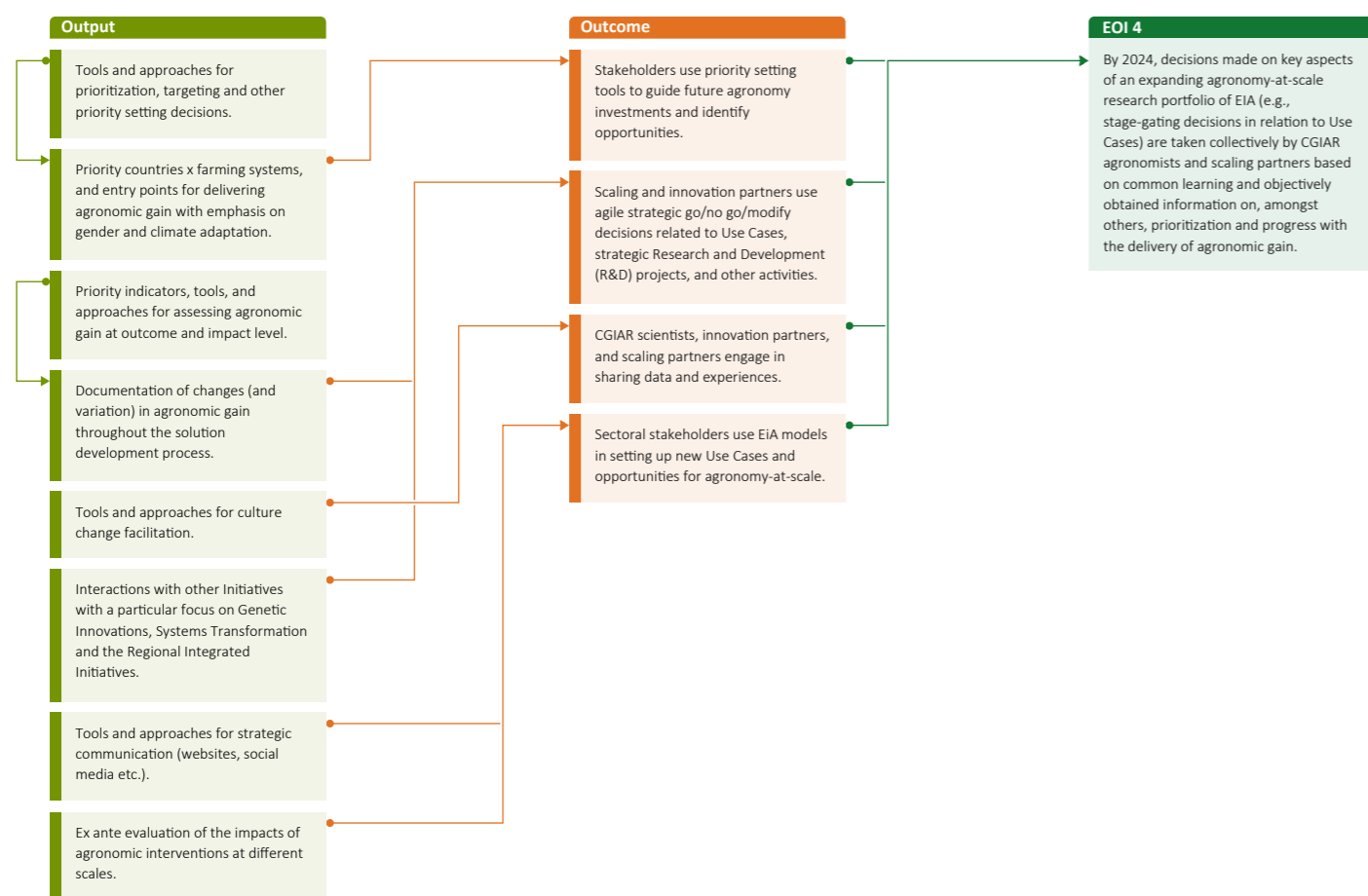
Work Package 4 progress against the theory of change

The ORGANIZE Work Package is advancing toward achieving its End of Initiative outcome. CGIAR agronomists, scaling and innovation partners in two use cases applied the agronomic KPI framework to stage-gate the fertilizer recommendation tools for rice and maize from validation to piloting stage (outcome 4.2). About 200 CGIAR scientists and innovation and scaling partners engaged in sharing results, scaling strategies and experiences from use cases in Southeast Asia and Africa for South-South learning (outcome 4.3). ORGANIZE developed three prioritization and targeting tools and approaches validated by use cases: i) integrated survey and toolkit, ii) PAiCE and iii) LCAS (output 4.1). Through the PAiCE tool, 288 partners in 18 priority countries and 8 farming systems prioritized climate adaptation agronomic strategies to respond to climate change related challenges (output 4.2). The agronomic gain KPI framework and 14 standard operating procedures for annual crops were completed, used to assess agronomic gain in on-farm trials and stage-gate use cases. The MELIA Framework and tools for tracking progress were developed and applied in four panel studies, covering at least 2000 farmers in 4 use cases (outputs 4.3 and 4.4). The

culture change agenda was socialized and four tools were developed to assess culture change within the EiA community (output 4.5). EiA partnered with 18 Initiatives for synergy and complementation of activities and delivery of outputs (output 4.6). ORGANIZE produced various communication materials and knowledge products, conducted webinars and campaigns and used social media to connect with diverse audiences based on our communication strategy (output 4.7). The Ex-ante framework and related standard operating procedures and 8 replicable workflows were developed for ex-ante evaluation of impacts of agronomic interventions at different scales (output 4.8).

The mechanized direct seeding technology (mDSR) was launched by the Vietnamese government for the sustainable development of one million hectares of low-carbon high-quality rice in the Mekong River Delta by 2030 (outcome 4.2). The Philippines government, inspired by Viet Nam's mDSR use case, adopted the Use Case approach to develop the drone-based direct seeding technology for rice farming (outcome 4.4).

Work Package progress rating summary

WORK PACKAGE	PROGRESS RATING & RATIONALE
1	🟢 **Progress rating** The DELIVER work package has made significant progress across all the clusters of activities and has accumulated significant evidence on what it takes to implement a demand-driven agronomy science agenda. It has also built complementary tools and support services for partners. The progress has positioned the Initiative well for transitioning toward a more locally driven model of innovation development from demand discovery to scaling.
2	🟢 **Progress rating** The TRANSFORM Work Package has made strong progress in developing and delivering innovative solutions and products across all outputs, with annual progress aligned with the Plan of Results and Budget and Work Package theory of change. Stakeholders and partners within the Initiative and beyond are starting to use these tools and solutions. With anticipated work in 2024 building on this strong foundation, achieving the End-of-Initiative outcome seems within reach.
3	🟢 **Progress rating** The 10 R&D projects and 7 working groups are operating as planned together with ARIs and NARS to fill key knowledge gaps for delivering agronomic solutions at scale.
4	🟢 **Progress rating** The ORGANIZE Work Package has made substantial progress toward achieving the EOIO. This year, 6 results were reported in outcomes 2, 3 and 4. The Work Package also developed tools and approaches for prioritization and targeting, agronomic gain KPI assessment, MELIA, and ex-ante analytics, all of which had undergone validation by various use cases. Assessment of culture change was initiated within the EiA community, and we are well on the way to assessing partnership efficacy and efficiency. The Work Package is active in engaging with regional and global activities of CGIAR and on track in developing strategic communication materials and using several platforms to amplify EiA's reach to diverse audiences. The Work Package is on track to achieve its EOIO by implementing the remaining activities in 2024.

Definitions

🟢 **On track**

✅ Annual progress largely aligns with Plan of Results and Budget and Work Package theory of change.

✅ Can include small deviations/issues/ delays/risks that do not jeopardize success of Work Package.

🟡 **Delayed**

🔲 Annual progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas.

🔲 Deviations/issues/delays/risks could jeopardize success of Work Package if not managed appropriately.

🔴 **Off track**

❌ Annual progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas.

❌ Deviations/issues/delays/risks do jeopardize success of Work Package.

A group of farmers evaluating soyabean yield enhancing technologies during a field day in Kpanshegu, North East Gonja District, Savannah Region, Ghana. Credit: IITA

Section 4: **Key results**

This section provides an overview of results reported by the CGIAR Research Initiative on Excellence in Agronomy. These results align with the CGIAR Results Framework and Excellence in Agronomy's theory of change. Source: *Data extracted from the* CGIAR Results Dashboard *on 29 March 2024.*
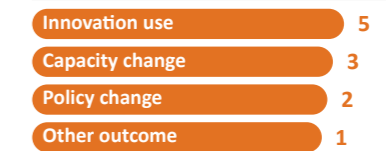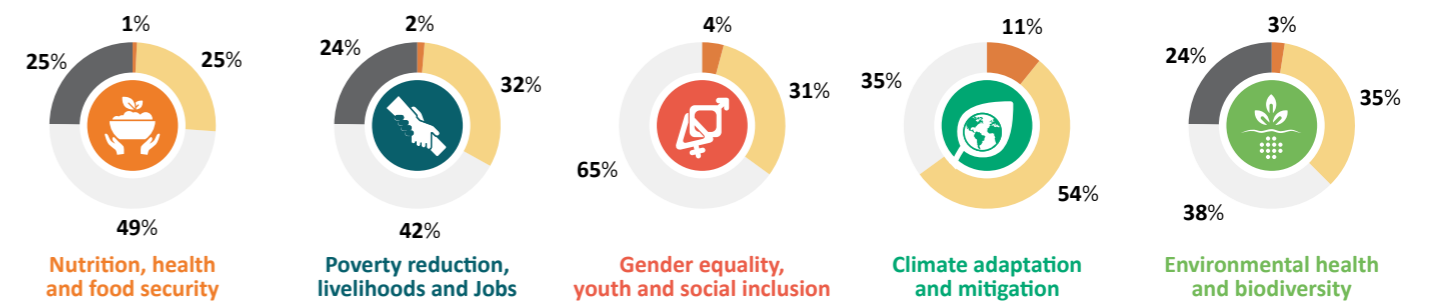
OVERVIEW OF REPORTED RESULTS

2022

Outputs

Knowledge product	170
Capacity sharing for development	113
Innovation development	99
Other output	42

Outcomes

Innovation use	23
Capacity change	3
Other outcome	3
Policy change	3

2023

Outputs

Innovation development	53
Knowledge product	50
Capacity sharing for development	30
Other output	22

Outcomes

Innovation use	5
Capacity change	3
Policy change	2
Other outcome	1

PERCENTAGE OF REPORTED RESULTS TAGGED TO CGIAR IMPACT AREAS

Nutrition, health and food security
- 1%
- 25% / 25%
- 49%

Poverty reduction, livelihoods and Jobs
- 2%
- 24% / 32%
- 42%

Gender equality, youth and social inclusion
- 4%
- 31%
- 65%

Climate adaptation and mitigation
- 11%
- 35%
- 54%

Environmental health and biodiversity
- 3%
- 24% / 35%
- 38%

● **Principal:** The result is principally about meeting any of the Impact Area objectives, and this is fundamental in its design and expected results. The result would not have been undertaken without this objective.
● **Significant:** The result has made a significant contribution to any of the Impact Area objectives, even though the objective(s) is not the principal focus of the result.
● **Not targeted:** The result did not target any of the Impact Area objectives.
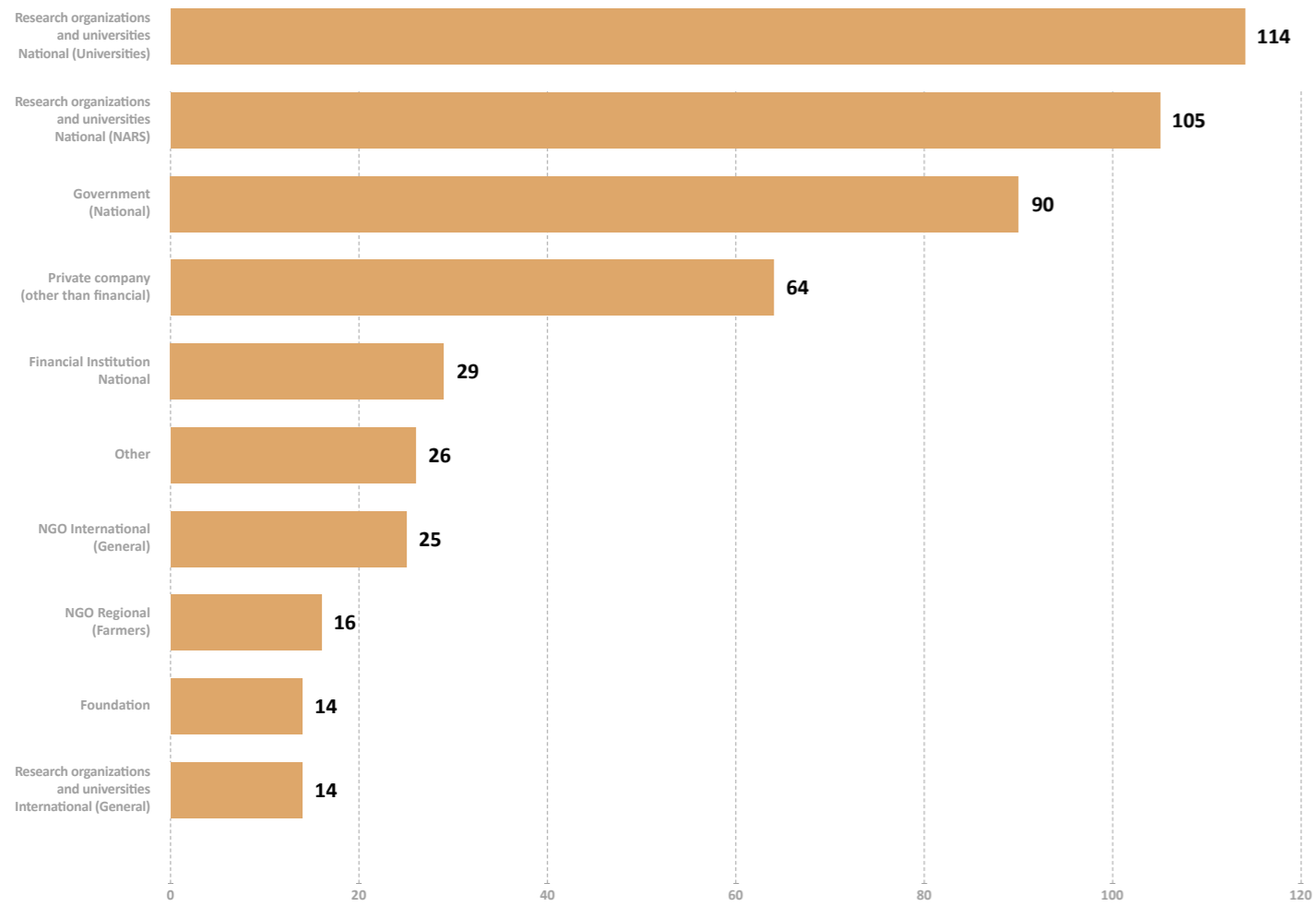● **Not applicable**

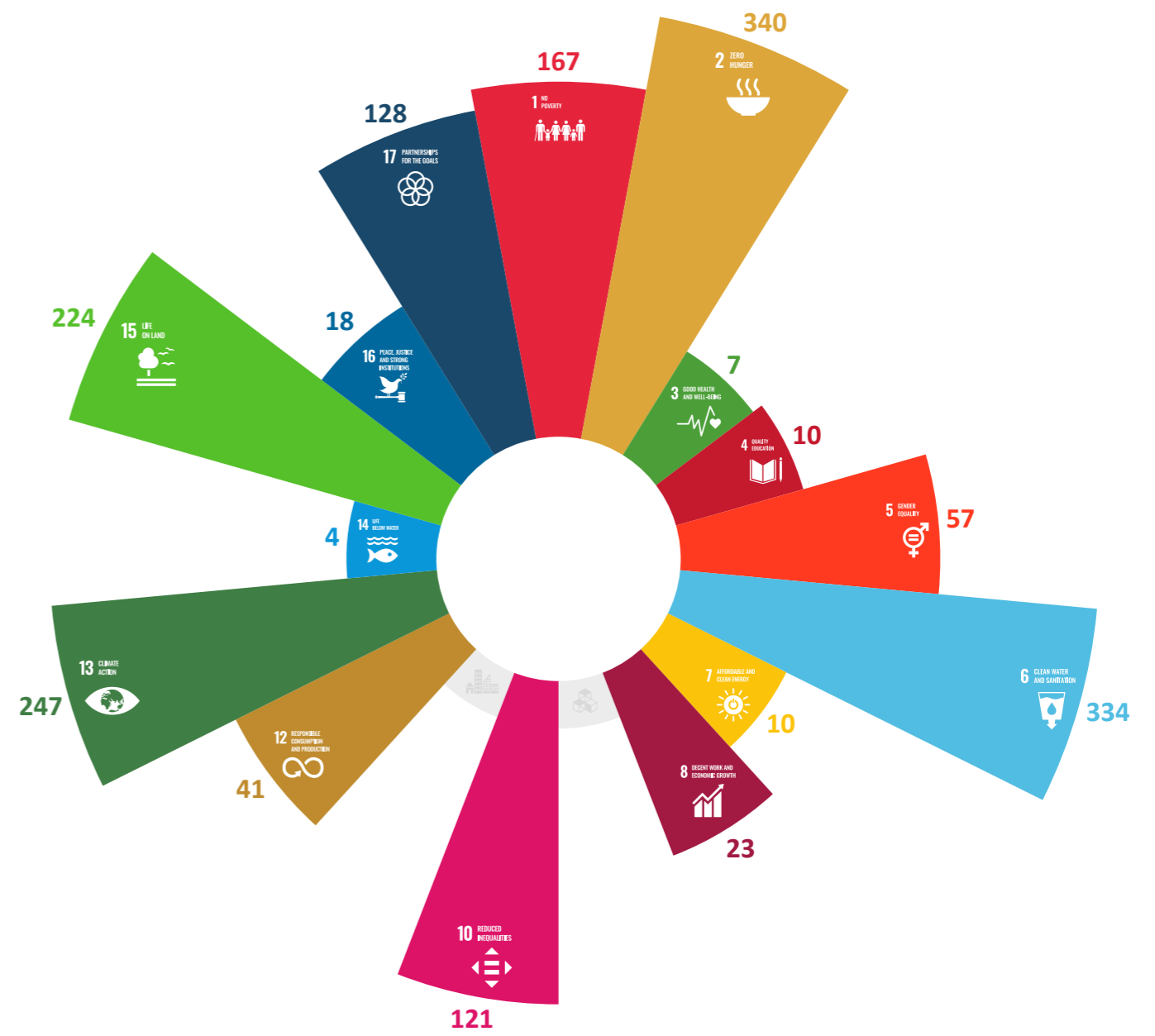## Number of innovations and their readiness levels in 2022

Level		#
9	**PROVEN INNOVATION** — The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	6
8	**UNCONTROLLED TESTING** — The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	12
7	**PROTOTYPE** — The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	5
6	**SEMI-CONTROLLED TESTING** — The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	4
5	**MODEL/EARLY PROTOTYPE** — The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions	2
4	**CONTROLLED TESTING** — The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions	4
3	**PROOF OF CONCEPT** — The innovation's key concepts have been validated for their ability to achieve a specific impact	4
2	**FORMULATION** — The innovation's key concepts are being formulated or designed	16
1	**BASIC RESEARCH** — The innovation's basic principles are being researched for their ability to achieve a specific impact	0
0	**IDEA** — The innovation is at idea stage	0

Number of innovations and their readiness levels in 2023

Level		#
9	**PROVEN INNOVATION** — The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	6
8	**UNCONTROLLED TESTING** — The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	12
7	**PROTOTYPE** — The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	22
6	**SEMI-CONTROLLED TESTING** — The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	26
5	**MODEL/EARLY PROTOTYPE** — The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions	6
4	**CONTROLLED TESTING** — The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions	8
3	**PROOF OF CONCEPT** — The innovation's key concepts have been validated for their ability to achieve a specific impact	5
2	**FORMULATION** — The innovation's key concepts are being formulated or designed	5
1	**BASIC RESEARCH** — The innovation's basic principles are being researched for their ability to achieve a specific impact	2
0	**IDEA** — The innovation is at idea stage	0

Results by partner type

Partner type	Value
Research organizations and universities National (Universities)	114
Research organizations and universities National (NARS)	105
Government (National)	90
Private company (other than financial)	64
Financial Institution National	29
Other	26
NGO International (General)	25
NGO Regional (Farmers)	16
Foundation	14
Research organizations and universities International (General)	14

Contributions to the UN Sustainable Development Goals

- 1 NO POVERTY — 167
- 2 ZERO HUNGER — 340
- 3 GOOD HEALTH AND WELL-BEING — 7
- 4 QUALITY EDUCATION — 10
- 5 GENDER EQUALITY — 57
- 6 CLEAN WATER AND SANITATION — 334
- 7 AFFORDABLE AND CLEAN ENERGY — 10
- 8 DECENT WORK AND ECONOMIC GROWTH — 23
- 10 REDUCED INEQUALITIES — 121
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION — 41
- 13 CLIMATE ACTION — 247
- 14 LIFE BELOW WATER — 4
- 15 LIFE ON LAND — 224
- 16 PEACE, JUSTICE AND STRONG INSTITUTIONS — 18
- 17 PARTNERSHIPS FOR THE GOALS — 128

Geographic focus of EiA's work

Number of results
1 — 45

TOP 10 PARTNER TYPOLOGIES THAT CONTRIBUTED TO DELIVERING 2023 RESULTS

Partner typology	Value
Research organizations and universities National (Universities)	80
Research organizations and universities National (NARS)	71
Government (National)	66
Private company (other than financial)	49
Financial Institution National	23
Other	23
NGO International (General)	17
NGO Regional (Farmers)	13
Organization (other than financial or research) International	11
Research organizations and universities International (General)	10

Source: Data extracted from the Results Dashboard on 17 March 2024.

Partnerships and Excellence in Agronomy's impact pathways

The Excellence in Agronomy Initiative relies on effective partnerships across all the 4 Work Packages to deliver contextualized solutions and impact. Partners involved in co-creation in use cases are selected based on their outreach capacity and network through a due diligence process. Across EiA for this reporting period, a total of 257 partners collectively contributed to 425 results. Within this group of partners, research organizations and universities and NARS accounted for the largest share of contributions to results, at 19 percent and 16 percent, respectively. This level of contribution is significant since active participation of local research organizations and universities will ensure that co-created agronomy solutions and technologies are embedded within local research and innovation ecosystems.

The contributions of government partners has also been at a significant level of 16 percent, which is essential in building a platform for policy influencing and policy implementation. Within the year, private-sector partners, who are an important player in the dissemination of technologies (through their digital platforms and private extension networks), contributed 11 percent of results. From the data indicated above, the Initiative goal of building an effective agronomic innovation ecosystem that will drive demand-

driven agronomic solutions development and agronomic gain at farm level rests with key partners at a local level. These key partners contributed 62 percent of the Initiative's results.

The top ten individual partner contributors also reflect the key role our partners play in our effective delivery across the Work Packages. Within the DELIVER Work Package, contributions by partners such as INRAE in Morocco (13 results), the Ethiopian Institute of Agricultural Research (11 results), the Ministry of Agriculture and Rural Development (11 results), Agricultural Research Centre (10 results), Digital Green (10 results), Ghana Ministry of Food and Agriculture (10 results), and Degas Ghana Limited (10 results) exemplify the multiplicity of partnerships that are required to deliver agronomy solutions at scale.

Within the INNOVATE Work Package, our engagements with both international and national research organizations have also strengthened our research agenda and allowed the Initiative to tap into global and local expertise that will continue to ensure we tap into the latest agronomy research. For example, Wageningen University and Research contributes 13 results and Cornell University (8 results) and are also top ten contributors.

EXCELLENCE IN AGRONOMY INTERNAL PORTFOLIO NETWORK
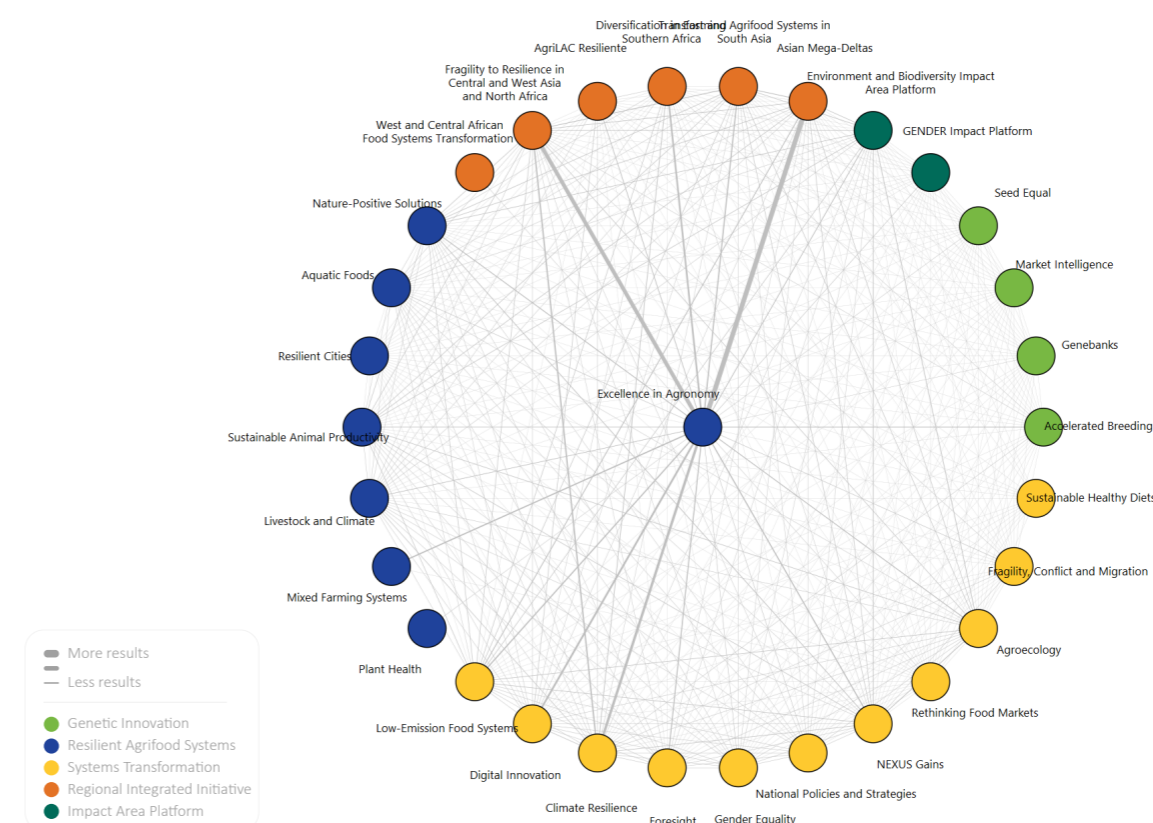
Connections are sized by the number of reported results. Collaborations where only one result was reported with a linkage between two Initiatives are excluded.
Source: Data extracted from the Results Dashboard on 17 March 2024.

Portfolio linkages and Excellence in Agronomy's impact pathways

EiA continued its strategic collaborations with other Initiatives for synergy and complementation aimed to jointly deliver outputs and outcomes. In 2023, EiA collaborated with 12 global Initiatives and with all 6 regional Initiatives through the engagement of Work Package teams, the regional leaders and the use case teams. DELIVER Work Package, through use cases, worked with six global Initiatives — Nature Positive Solutions (NPS), Sustainable Intensification in Mixed Farming Systems (SI-MFS), Plant Health (PHI) and Livestock and Climate (LC), Seed Equal and Accelerated Breeding — and with five Regional Integrated Initiatives (RIIs), including Asian Mega Deltas (AMD), Diversification in East and Southern Africa, Fragility to Resilience in Central and West Asia and North Africa, West and Central African Food Systems Transformation and AgriLAC Resiliente in response to agronomy-related demands in the regions. EiA and PHI jointly collaborated with AMD, through the mDSR use case, to scale the mDSR technology and to develop the suite of best management practices for rice-sweet potato and rice-watermelon in the deltaic areas in Cambodia.

The TRANSFORM Work Package continued its partnership with Digital Innovation to test and co-develop common analytics infrastructure, to generate interoperable data using EiA mediated tools, to jointly develop tools for responsible data management and re-use, and to enable use of sensitive data without compromising privacy and ethics considerations and/or regulations through the CG Labs. It also partnered with SI-MFS to implement a crop simulation training and workshop in Zimbabwe to enhance modeling capacity and African scientific leadership in solving challenges within

agricultural systems. The INNOVATE Work Package interacted with AgriLAC Resiliente to assess the status of mechanization in Central America, develop a mechanization service model, and develop a fuel consumption database as input for the formulation of climate-smart and low-emission farming. Through INNOVATE, EiA co-launched and co-financed the Latin America Agronomic Research Network to facilitate exchange of agronomic research results and strengthen local agronomic research capacity in the region. INNOVATE also collaborated with the Digital Initiative to establish the Agro-typing Network, which is proposed as a use case for its CoLab platform.

ORGANIZE cooperated with various global Initiatives, including: i) Foresight to link the micro-oriented spatial ex-ante approaches in EiA macro-oriented modeling work; ii) National Policies and Strategies to develop fertilizer response modelling approaches and publish a special issue of Food Policy on fertilizer policies; iii) the Gender Impact Area Platform and HER+ in making sure that use cases are gender- and youth-responsive and will jointly implement gender transformative approaches to identify scaling strategies for the uptake of agronomy solutions; iv) Climate Resilience on drought and flooding assessment in Cambodia; and with the five Regional Integrated Initiatives — West and Central African Food Systems Transformation, Transforming Agri-food Systems in South Asia, Diversification in East and Southern Africa, Asian Mega-Deltas, and Fragility to Resilience in Central and West Asia and North Africa — through the validation of the PAiCE tool and workshops with NARES partners to prioritize adaptation solutions to prevailing climate challenges in production areas.

This photo, taken on the mDSR seeding date in My Hanh Trung Commune, Vietnam, symbolizes the collaborative effort between IRRI and farmers to transform rice production with this innovative technique.
Credit: IRRI

Section 7: **Adaptive management**

RECOMMENDATION	SUPPORTING RATIONALE
Transition from "individual agronomic solutions" (termed "use cases") in bespoke locations to "combined solutions" for large, similar agroecologies within ASSAPs as a pathway for increased impact and efficiency.	EiA is responding to six main demands — *Nutrient/Fertilizer Response and Recommendations; Planting Date/Optimal Planting Window Advisory; Variety Choice/Suitability Mapping; Fertilizer Investment Prioritization/Liming Investment Prioritization; Best Management Practices for Perennials; and Climate Advisories* — through 20 individual location-specific agronomic solutions. Having assessed these individual solutions in relation to reaching large farmer networks, it will be worthwhile to transition from the individual solutions to combined solutions within ASSAPs, focusing on similar agroecologies, crops and partnership overlaps. The Initiative had aimed to co-develop 20 individual agronomic solutions by the end of 2023. Combining some of the solutions will reduce this to 15 agronomic solutions while covering the same geographic regions and farmers.
Allow for more testing of the solutions being developed. Some use cases will repeat their validations and piloting activities in 2024 to cover more varied geographic locations and involve more farmers to ensure the solutions are sufficiently responsive.	Viable use cases (agronomic solutions) have been developed and showcased successfully based on initial validations and piloting results. However, some use cases are developed within complex agroecologies (large geographies, large farmer networks with diverse typologies). One season is usually insufficient to validate and pilot some of the solutions across large areas. Use cases therefore require enough time to transition from validation and piloting to scaling, which may affect the Innovation Readiness levels of these products/solutions in 2024.
Facilitate accountability of staff by establishing different mechanisms including 360-degree evaluations in 2024 to internally manage the situation and assure delivery.	In 2022, many EiA staff worked less than full-time; in 2023 the total work hours of some key staff have been increased. However, there is no mechanism beyond monitoring work plan execution to address this as a performance issue since individuals are assessed solely by their Centers.
Restructure activities, theory of change, use cases — and budget appropriately.	Based on achievements, learnings and budget reductions, the Initiative plans to restructure activities to focus on key clusters of activities with greater impact toward the End of Initiative outcomes, which include making key products available and accessible by end users and measuring agronomic gains of innovations. More emphasis will be placed on developing and launching a playbook for the implementation of the ASSAPs, on concerted efforts to transition individual use cases into large-scale agroecological solutions to pilot and scale, and on merging some key clusters of activities (e.g., CoA 2.1 and CoA 2.2, CoA 3.2 and CoA 3.4) to ensure efficiency and to address the data systems and standardization. There is also a mechanism to ensure flexible budgeting so that teams can allocate funds to key deliverables and not necessarily to all clusters of activities.

Section 8: **Key result story**

Mechanized Direct Seeding Transforms Rice Production, Boosting Yield, Profit, and Reducing Carbon Footprint in Vietnam's Mekong River Delta

Meet Hieu, a happy farmer from Vietnam. This happy farmer is holding up his harvest after a successful rice crop. Hieu implemented the mDSR (mechanized direct seeded rice) technique and the results speak for themselves.
Credit: IRRI

In 2021, the Excellence in Agronomy Initiative (EiA) and the International Rice Research Institute (IRRI) embarked on a groundbreaking project to help transform Vietnamese agriculture. During its incubation phase, EiA introduced mechanized direct-seeding (mDSR) to Vietnamese farmers. This innovative approach slashed seed and fertilizer usage by 50 percent and 20 percent, respectively, increased yields by 5 percent, and boosted profits by US$200 per hectare. It not only made economic sense, but also lightened the environmental cost, reducing the carbon footprint by 10 percent. Recognizing its potential, in 2023 the Vietnamese Ministry of Agriculture and Rural Development embraced mDSR and released national guidelines for its implementation in the Mekong River Delta.

In the heart of the Mekong River Delta, where lush green fields stretch as far as the eye can see, a transformative technology has taken root — mechanized direct-seeding rice (mDSR). This method doesn't just plant seeds; it is also sowing the seeds of change, prosperity, and sustainability.

Since 2021, when IRRI launched the Excellence in Agronomy Initiative, it has been on a mission to revolutionize rice farming in Viet Nam to combat food insecurity and climate change. IRRI collaborated with the Department of Crop Production and the Ministry of Agriculture and Rural Development. Their focus was on disseminating a "One Must Do, Five Reductions" program to promote the best management practices in lowland rice cultivation in the Mekong Delta. Developed in this Initiative, mDSR has proven to be a game-changer, especially in Can Tho City and Tien Giang Province. Farmers like Vo Van Than, embracing mDSR on his 4-hectare farm, uses 50 percent less seed than in traditional broadcasting, harvests

7 percent more grains, and has increased his profits by 17 percent. A win for these farmers is a win for their communities.

In collaboration with HK Company in Cai Lay District, Tien Giang Province, EiA's mDSR trials produced a 35 percent higher paddy yield with just half the seed used in conventional practices along with reduced nitrogen fertilizer rates, less frequent pesticide use, and more efficient water use. This success story resonates with the Vietnamese government's broader vision to cultivate one million hectares of high-quality, low-emission rice in the Mekong by 2030. Can Tho, Tien Giang, and Kien Giang provinces are gearing up to implement mDSR-based rice production across 350 hectares in the upcoming summer–autumn 2024 season.

To empower the country's farmers with practical knowledge, the Department of Crop Production worked with IRRI to issue national "Technical Guidelines for Mechanized Direct Seeding" on 31 October 2023. This government recommendation for a rice production technology provided a roadmap for farmers in the region, ensuring they could harness the benefits of mDSR, which would not only increase their efficiency but also reduce their greenhouse gas emissions.

In December 2023, the Vietnamese government formally integrated these guidelines into its broader strategy, "Sustainable Development of One Million Hectares of Specialized High Quality and Low Carbon Rice Production Areas under the Green Growth Agenda in the Mekong Delta Region". This government strategy aligns perfectly with Viet Nam's ambitious project launched in December 2023 to create one million hectares of sustainable, low-carbon rice fields in the Mekong Delta by 2030.

> **Planting the seeds of prosperity is about more than rice; it's about empowering farmers. Mechanized direct-seeding is transforming fields in the Mekong Delta, ensuring not just a harvest today, but a bounty for generations to come.**
>
> Nguyen Van Hung, IRRI senior scientist

> **If you give me rice, I'll eat today; if you teach me how to grow rice, I'll eat every day.**
>
> Mahatma Gandhi

Primary Impact Area

Contributing Initiative
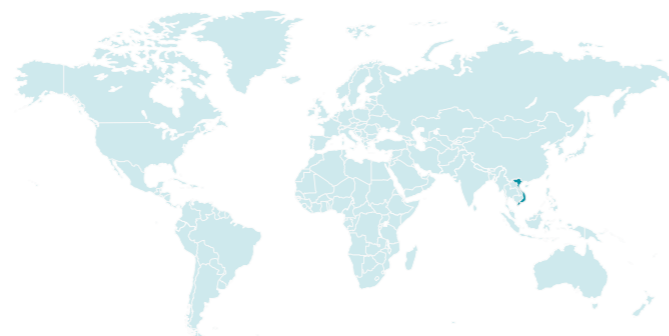
Excellence in Agronomy- EiA

Contributing Center

International Rice Research Institute – IRRI

Contributing external partners

DCP – Department of Crop Production · CLRRI – Cuu Long Rice Research Institute · Can Tho DARD · Tu Sang Company · Dong Nhan Company

Geographic scope

Country: Viet Nam
Sub-national region: Mekong River Delta

Front cover photo

Juliana Moises, a farmer tending her soybean plot. Soy Farmer in Mozambique. This is part of the EiA Chinyanja Triangle Use Case.
Credit: CIMMYT

Back cover photo

A snapshot of Moises' soybean plot in Angonia, Mozambique.
Credit: CIMMYT

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