CGIAR

Portfolio Narrative 2023

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Section 1: **Portfolio performance management**

This Portfolio Narrative serves as the capstone of CGIAR's 2023 Technical Report. In accordance with the Technical Reporting Arrangement, the Portfolio Narrative offers a comprehensive overview of Portfolio coherence, including results, partnerships, country and regional engagement, and synergies among the Portfolio's constituent parts.

The Portfolio Narrative draws together 2023 data and narratives from the CGIAR Results Dashboard, annual Technical Reports from CGIAR's Research Initiatives, Impact Platforms and Science Group Projects (SGPs), and the Portfolio Practice Change report into a select number of themes:

Science Group focus

- Resilient Agrifood Systems
- Systems Transformation
- Genetic Innovation
- Regional Integrated Initiatives

Country focus

- Guatemala
- Ghana

Partnerships

Impact Area focus

- Gender Equality, Youth and Social Inclusion
- Climate Adaptation and Mitigation
- Nutrition, Health and Food Security
- Environmental Health and Biodiversity
- Poverty Reduction, Livelihoods and Jobs

Under the lid

- Innovation Portfolio Management
- Adaptive management
- Risk management

The Portfolio Narrative and its subsidiary content which make up the CGIAR Technical Report (the CGIAR Results Dashboard, Initiative, Impact Platform and SGP reports, and the Portfolio Practice Change report) form an integral part of the overall CGIAR Annual Report, which is due for release later in 2024 (Figure 1.1).

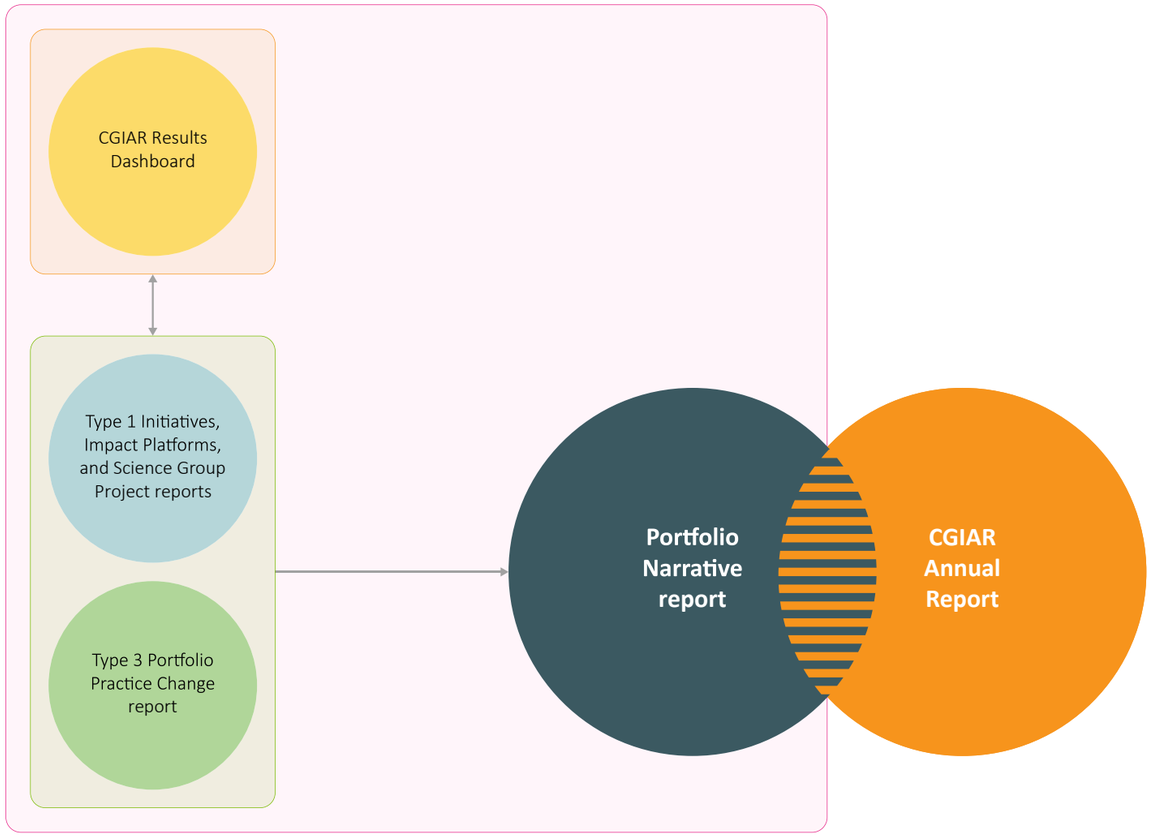


Figure 1.1. The Portfolio Narrative and CGIAR Technical and Annual Reporting.

CGIAR Technical Reporting fulfils the System-level programmatic reporting requirements set out in the Standard Provisions annexed to the Funding Agreement or Arrangement signed between each Funder and the System Organization.[1]

The Portfolio Narrative draws from CGIAR's 2023 pooled-funded results data reported against the CGIAR common Results Framework using CGIAR's Performance and Results Management System (PRMS), and for the first time, contains data sourced from two non-pooled projects which were integrated into CGIAR Technical Reporting in 2023.

The 2023 Technical Report includes the following Initiatives, Impact Platforms and SGPs:

All 32 Initiatives

Four Impact Platforms

- Gender Equality, Youth and Social Inclusion
- Environmental Health and Biodiversity
- Nutrition, Health and Food Security
- Climate Adaptation and Mitigation

Two SGPs

- Accelerated Varietal Improvement and Seed Delivery of Legumes and dryland Cereals in Africa (AVISA)
- Roots, Tubers, and Bananas Breeding Project (RTB Breeding)

As such, the data, evidence and stories in this Portfolio Narrative represent USD 343.4 million in funding (USD 322.6 million for Initiatives and Impact Platforms, and USD 20.8 million for Window 3 SGPs), representing nearly 40 percent of total 2023 CGIAR funding (pooled and non-pooled).

Moving forward, non-pooled results will be progressively included in CGIAR Technical Reporting.

2023 represents the second year of implementation for the CGIAR Portfolio in support of the CGIAR Research and Innovation Strategy 2022-2030 Throughout the year, the Initiatives and Impact Platforms built on the strengths of previous CGIAR research, and the first year of the current Portfolio cycle, progressing toward their end-of-Initiative outcomes.

As the Portfolio matures and progresses further toward end-of-Initiative outcomes, the type, number and distribution of results are evolving. A full Portfolio report detailing contribution to Science Group outcomes and impacts (Type 2 report) is scheduled for delivery following completion of the current Portfolio cycle in 2024.

1 Per the Charter of the CGIAR System Organization, Article 11, ii, jj, and kk.

The maize harvest from char land in Rangpur.
Credit: S. Storr / CIMMYT

Section 2: **Science Group focus**

Resilient Agrifood Systems

The Resilient Agrifood Systems (RAFS) Science Group is one of three CGIAR Science Groups. RAFS addresses the interconnected agricultural, environmental, and societal challenges faced by smallholder farmers in the global South, with activities in 70 countries.

Working through all three of CGIAR's impact pathways – innovation, capacity development, and policy change – RAFS generates solution-oriented knowledge, products, and services aimed at field, farm and community levels. We contribute to the diversification and sustainability of crops, trees, livestock, and fish, and consider both rural and urban locations. Through wide-ranging partnerships, we co-develop research and put innovations into the hands of those who can use them to enhance the sustainability and resilience of food systems; improve land, soil, and water health; ensure safe and nutritious foods for the wider population; and improve productivity and incomes for farmers. We enable durable improvement to adaption to, and the mitigate of climate change; job creation and the reduction of poverty; increased gender and social equity; and improved nutrition and health, while safeguarding the environment and conserving and augmenting biodiversity.

RAFS is composed of four thematic areas, each of which houses CGIAR Research Initiatives: crop-based systems, livestock-based systems, aquatic food systems, and biodiverse agroecosystems. In addition, CGIAR's Regional Integrated Initiatives are housed under RAFS but operate semi-autonomously, anchoring thematic research from all three Science Groups. There are nine RAFS Research Initiatives: Mixed Farming Systems, Excellence in Agronomy, Plant Health, Sustainable Animal Productivity, Livestock and Climate, One Health, Nature-Positive Solutions, and Resilient Cities. Each Initiative works in multiple countries and regions across the global South, and progress has been made for inter-Initiative work during 2023. Figure 2.1 shows the locations in which results were reported during 2023 by these Initiatives.

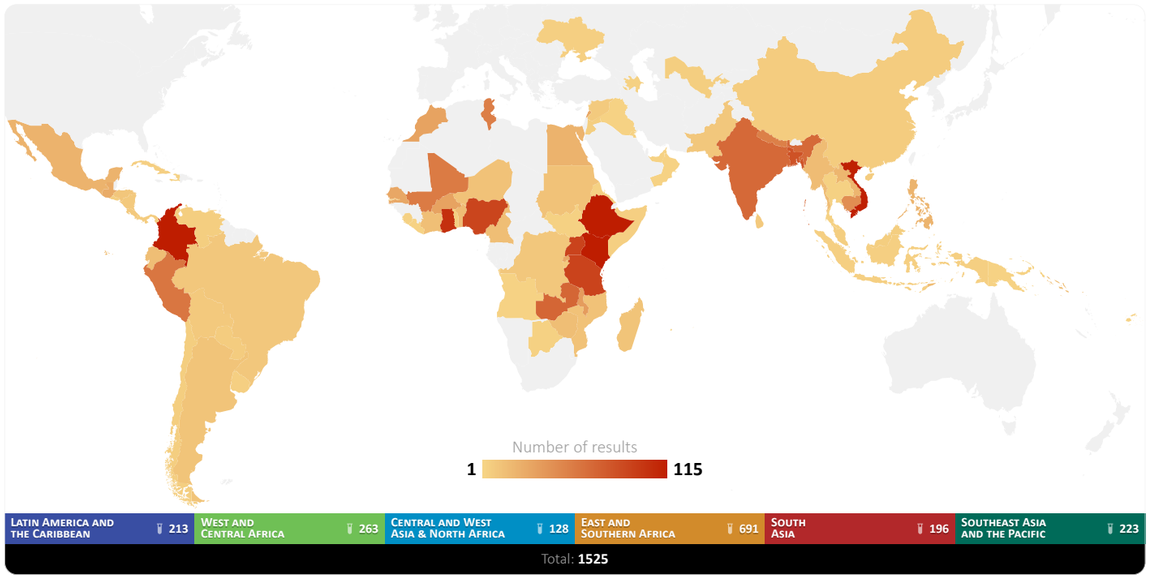


Figure 2.1. Location of reported RAFS results.

Note: These results entail all activities, including but not limited to research, publications, engagement and capacity development, or policy and organizational support. More intense coloring signifies more activities reported during 2023. Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Partnerships

In 2023, RAFS Initiatives worked in 1,055 unique partnerships active in 70 countries in the global South. Partnerships were brokered between research institutes and universities, national agricultural research and extension systems (NARES), government ministries, private companies, non-governmental organizations (NGOs), financial institutions, and more (See Figure 2.2). Almost two-thirds of the partnerships were geared around research – codeveloping new knowledge, methods, and solutions. Twenty percent of partnerships were interactions with demand partners, who defined the challenges for RAFS scientists to address, and fifteen percent of partnerships were geared around scaling-up promising innovations. Partner organizations from the global North were also engaged, building a strong basis for North-South collaboration (37 percent of partnerships), as well as South-South collaboration (63 percent of partnerships). The home country of partner organizations is shown in Figure 2.3. Additionally, there was substantial internal collaboration between other thematic Initiatives, regional Initiatives, and other CGIAR projects and programs.

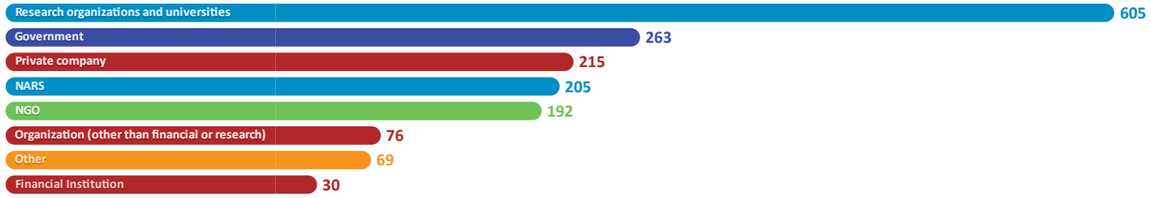


Figure 2.2. Partner organization types and the number of active partnerships.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

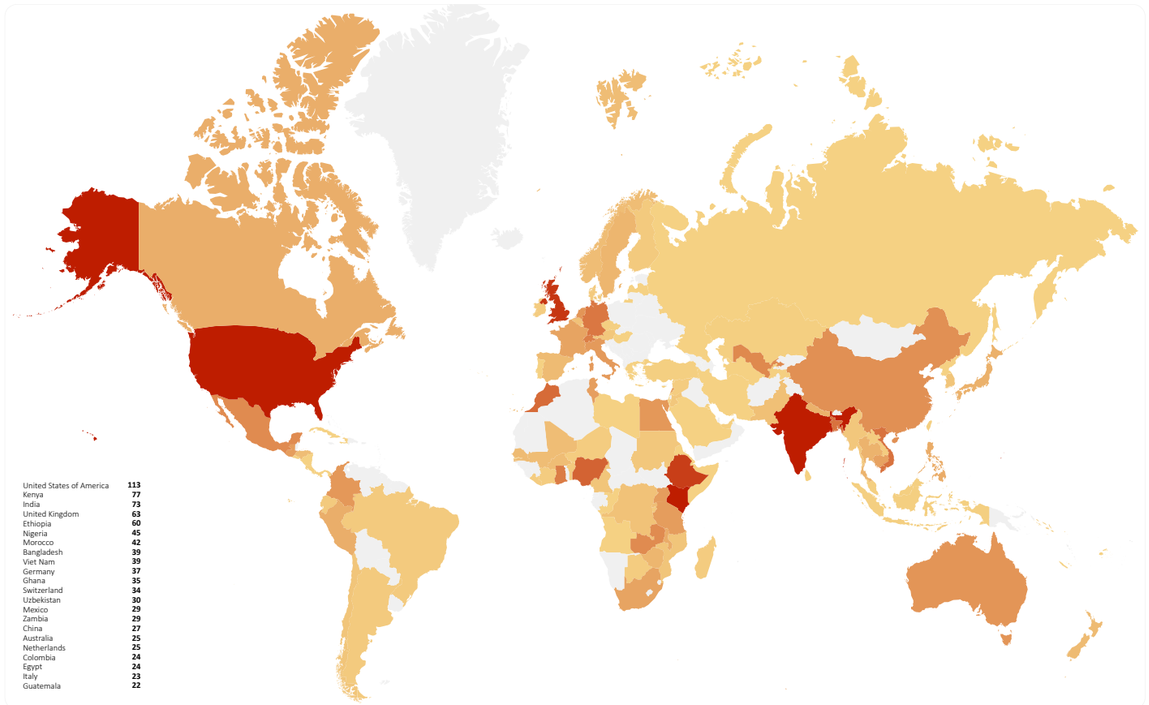


Figure 2.3. Locations of RAFS partners' head offices.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Illustrative of the burgeoning South-South collaborations, the Mixed Farming Systems Initiative brought together a team from the International Institute for Tropical Agriculture (IITA, Nigeria), Kwame Nkrumah University of Science and Technology (KNUST, Ghana), and Botswana International University of Science and Technology (BIUST, Botswana), who used satellite rainfall estimates to develop site-specific agro-advisories in Ghana, and then in Lao People's Democratic Republic (PDR).

The Plant Health Initiative had a particularly strong focus on working through demand partners, who were active in 45 countries, and formed a global plant health consortium. Scaling partnerships tended to be delivered through government or NARES organizations. The One Health Initiative established a technical working group with the government of Ethiopia on food safety (to which the Resilient Cities Initiative also contributed), and worked with various Vietnamese government departments to integrate fragmented technical groups into their national One Health mechanism. The Aquatic Foods Initiative partnered with the Nigerian and Bangladeshi governments to establish and scale improved tilapia and carp lines, the Indian Odisha state government to advance climate-resilient aquaculture, and launched a novel innovation hub model in the Solomon Islands. The Resilient Cities Initiative brokered partnerships with city governments, including Nairobi (Kenya) and Quezon City (Philippines) to improve their informal food sectors. Partnerships were also with commercial organizations; for example, the Sustainable Animal Productivity Initiative developed a business model for cattle artificial insemination involving private artificial insemination service providers, the sub-Department of Animal Health of Mai Son district, and the National Institute of Animal Science of Viet Nam. The approach provides shared access to facilities including liquid nitrogen to co-operative members and the Department of Animal Health plans to further scale the model.

Engagement and capacity building

RAFS staff engage at all levels in dialogues around sustainable agriculture, from high-level global fora to the training of farmers in field techniques. Scientists from the Livestock and Climate Initiative engaged extensively with the United Nations Framework Convention on Climate Change (UNFCCC) process, worked closely with the African Group of Negotiators Expert Support (AGNES), and contributed to the Intergovernmental Panel on Climate Change's (IPCC) sixth assessment report. In addition, new emission factors for sheep in the national greenhouse gas inventories of sub-Saharan Africa were published. The contributions of the Livestock and Climate Initiative to shaping global climate policy and practice were noted in the UN Adaptation Gap Report 2023 and during the United Nations General Assembly Science Week. The Nature-Positive Solutions Initiative established programming for national media channels in Kenya to influence mainstream narratives around the importance of natural capital and ecosystem services.

Capacity building activities led to the training of 220,830 people during 2023, of which 985 were long-term trainees, and 219,845 were short-term trainees. Thirty-seven percent of all trainees were female, 60 percent were male, and for 3 percent of trainees, gender information was not recorded. The majority of short-term trainees were farmers, receiving training on good agronomic or livestock husbandry practices. RAFS Initiatives also developed innovative models to deliver training to farmers, including by SMS, video, radio, smartphone apps, and maps, as well as farmer-to-farmer networks and commercial or public good partnerships. A minority of training events were for extension officers or commercial actors who engage with the food system.

Scientific training was also delivered, for example via workshops such as the Mixed Farming System Initiative's "International Training Workshop on Quantitative Systems Analysis for the Sustainable Intensification of Mixed Farming Systems" iin Nepal with participants from Bangladesh, India, Lao PDR and Nepal. Long-term training took the form of 30 PhD studentships and 43 Masters studentships, delivered by multiple Initiatives.

Research highlights

RAFS Initiatives published 240 peer-reviewed scientific articles in 2023, as well as hundreds more reports, working papers, and other knowledge products such as training manuals or videos (Figure 2.4). The topics covered most heavily include climate change, sustainable agriculture, crop production, animal feeding, sustainability, food systems, seed systems and gender and social equity – with many more topics also covered. The word cloud in Figure 2.5 shows the most frequent keywords from RAFS' 2023 journal articles.

Some publications achieved significant attention from the research community and media (with Altmetric Attention scores higher than 50). The Aquatic Foods Initiative published five such articles which covered scenarios under which food systems transformation can achieve net negative emissions; the decolonizing of ocean research for more equitable end effective ocean governance; the nexus between human rights and marine conservation; the contribution of aquaculture to improved human and planetary health; and principles for transformative ocean governance. The One Health Initiative published four articles with high Altmetric Attention scores on the role of roaming dogs in spreading zoonotic diseases; a COVID-19 infection in a hippopotamus; and more generally on epidemiological connections between humans and animals in urban landscapes; and on the changing climatic zones of Kenya. The Nature-Positive Solutions Initiative published articles on the perverse incentives in agriculture which do not reward conservation; and a strategy for research of Asian bees. The Livestock and Climate Initiative published on prioritizing investments in climate-resilient livestock systems; using science to accelerate agroforestry as a natural climate solution; and tailored forecasts of extreme climate change in East Africa (a collaboration with the Excellence in Agronomy Initiative and other non-RAFS Initiatives). The Excellence in Agronomy Initiative also published on using artificial intelligence to predict rice yields from ground-based photographs.

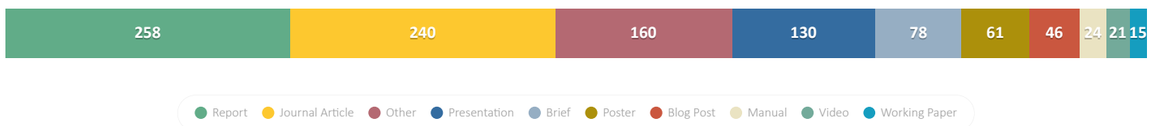


Figure 2.4. Number of different types of knowledge products.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

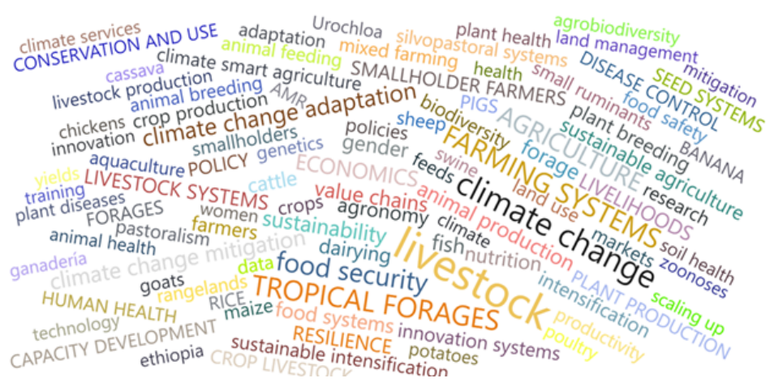


Figure 2.5. Key words extracted from 240 journal articles published in 2023.
Source: CGIAR Results Dashboard.

Highlights by Impact Area

Due to the integrated nature of RAFS research, the Initiatives – and individual activities – often address many of the CGIAR Impact Areas simultaneously. Of all the results reported in 2023 under RAFS, 61 percent addressed climate change, 56 percent addressed poverty, 54 percent addressed the environment and biodiversity, 48 percent addressed food security and nutrition, and 38 percent addressed gender and social inequality (Figure 2.6). Interestingly, more than three-quarters (90 percent) of results addressed multiple Impact Areas, with 22 percent addressing two, 17 percent addressing three, 15 percent addressing four, and 16 percent addressing all five Impact Areas (see Figure 2.7).

Examples of the innovations and results which addressed issues from multiple Impact Areas include the Plant Health Initiative's work developing, trialing, and building an international public-private partnership for Aflasafe – a crop additive to reduce the risk of aflatoxin contamination. The Excellence in Agronomy Initiative developed a platform for bundled cropping advisories in Ghana to increase resource use efficiency, reduce climatic risk, and increase productivity, while the Mixed Farming Systems Initiative produced similar advisories for maize farmers and soybean farmers in East Africa. The Livestock and Climate Initiative developed the GANSO endorsement (ganaderia sostenible or sustainable livestock) – a voluntary evaluation tool for livestock producers to assure consumers of the sustainability of their livestock in Colombia. The Nature-Positive Solutions Initiative developed a women's co-operative based on fuel-briquette production, and the Resilient Cities Initiative updated the Food and Agriculture Organization of the United Nations' (FAO) guidelines on water quality agriculture.

Figure 2.6. The number of results submitted during 2023 contributing to each Impact Area.

Note: The degree of contribution is shown by tags of "principal", "significant", or "not contributing". Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

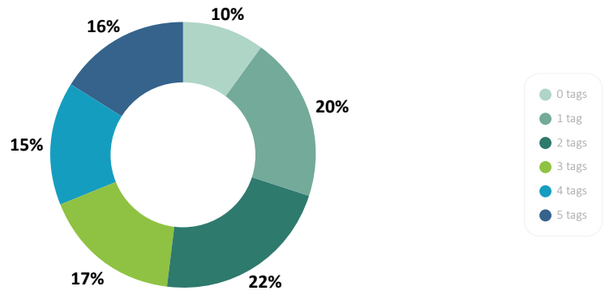


Figure 2.7. The proportion of results which address none, one, or multiple Impact Areas.

Note: Due to the integrated nature of RAFS activities, many results contribute to multiple Impact Areas. Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Highlights by thematic research area

Selected outcomes (real-world behavior changes) achieved by the thematic Initiatives are given below, grouped according to the research area: crops, livestock, aquatic, and biodiverse agroecosystems.

Crop-based systems

The Plant Health Initiative implemented data-driven risk assessment tools to counter emerging crop pests and diseases for crops including banana, wheat, rice, cassava, and maize, and others, across 18 countries (with potential relevance in many more). The Plant Health Initiative developed integrated management techniques for major diseases, e.g., banana bunchy top disease, and chickpea and lentil viruses and vectors. The Excellence in Agronomy Initiative introduced mechanized direct seeding for rice to Vietnamese farmers. This innovative approach slashed seed use by 50 percent and fertilizer use by 20 percent, increased yields by 5 percent, and boosted profits by USD 200 per hectare. This made economic sense, and lightened the environmental cost, reducing the carbon footprint by 10 percent. Recognizing its potential, in 2023 the Vietnamese Ministry of Agriculture and Rural Development released national guidelines for its implementation in the Mekong River Delta. The Mixed Farming Systems Initiative promoted the Mbili-Mbili intercropping system in East and Southern Africa. Mbili-Mbili entails two maize rows alternating with two legume species, and exploits plant spatial configurations to increase light penetration to the legumes, increasing legume productivity while maintaining the same productivity of the cereal. Crops can be harvested at different times, and in the event of a loss, one crop serves as insurance for the other.

Livestock-based systems

The Sustainable Animal Productivity Initiative developed and implemented a novel model with the potential to transform Nepal's dairy buffalo sector by partnering with rural municipalities and milk cooperatives in six districts of the eastern Terai region. Village livestock promoters, jointly supported by three organizations, are now able to provide an integrated package of inputs and services to farmers to enhance buffalo farmers' efficiency and livelihoods, breaking silos between feed, health and genetics extension and paving the way toward economic sustainability and increased production of nutrient dense foods. The Livestock and Climate Initiative enabled land-use planning and participatory rangeland management to be practiced on 166,517 hectares of grazing land located in the Tanzanian Kiteto and Chalinze districts, benefiting more than 100,000 residents. These methods are instrumental in securing land tenure for pastoralists, improving governance, resolving land-use conflicts, and helping to restore degraded lands. They enhance community resilience and climate adaptation and mitigation efforts.

The One Health Initiative (in partnership with the Resilient Cities Initiative) led food safety groups in Viet Nam and Ethiopia, improving health and livelihoods. Since 2015, collaborations with scientists and development partners in Viet Nam have influenced national policies and benefited food business operators and communities. Efforts in both nations have driven policy development and tackled food safety issues – and they demonstrate impactful research-for-development, promoting health and economic progress in varied regions.

Aquatic food systems

The Aquatic Foods Initiative responded to the Government of Nigeria's need to boost sustainable aquaculture countrywide, bringing genetically improved farmed tilapia to the country. In 2022, 60,000 very young fish were transported from Malaysia to Nigeria and in 2023 a breeding population was established, with the second generation of small fish distributed to farmers and hatcheries in November. Trials at the hatchery involving local fish feed producer Premier Feed Mills showed that Genetically Improved Farmed Tilapia (GIFT) achieved faster rates of growth and more efficient feed conversion than non-improved fish already in use. This should mean higher production of a nutritious food at lower costs, and potentially more earnings for farmers. This achievement was the result of work by scientists at WorldFish in collaboration with the Federal Ministry of Agriculture and Food Security, Premium Aquaculture Ltd, and other national partners.

Biodiverse agroecosystems

The Nature-Positive Solutions Initiative demonstrated a novel model to combat the negative effects of farm degradation and fragmentation. Collaborating with the Initiative, three groups of Kenyan farmers created two aggregated farms of 76 and 55 hectares. These farms integrate nature-positive solutions, such as permaculture and sustainable production activities, to restore land, enhance production, and develop profitable value chains. The Initiative, aligning with county agricultural plans, fosters community consensus and legal frameworks for equitable profit-sharing. This innovative approach sets a replicable model for transforming smallholder farming in Kenya and beyond.

The Resilient Cities Initiative supported the development of and brought to market a new yoghurt product in Lima, Peru, to combat the anemia and malnutrition affecting a third of children under five in the city. The "Three Power Yogurt" is enriched with proteins, iron from bovine blood, spirulina, Andean seaweed, and vitamin A from sweet potatoes, and meets crucial nutritional needs while appealing to children's tastes.

Rice growing in Santa Cuz, Bolivia.
Credit: Neil Palmer / CIAT

Systems Transformation

A growing number of results

In 2023, all 12 Initiatives of CGIAR's Systems Transformation (ST) Science Group made significant progress against their theories of change. Systems Transformation Initiatives submitted 2,100 results in 2023, a 145-percent increase over 2022. Among these, Systems Transformation Initiatives reported 102 outcomes in 2023, compared to 29 in 2022. Of these, 37 were policy changes, 32 innovation uses, and the remainder 'other outcomes'. The vast majority of results (1,998) are outputs, of which knowledge products is the largest category (1,195 outputs). The number of knowledge products more than doubled in 2023 compared to 2022. The number of capacity outputs (e.g. training) in 2023 is 314, representing a four-fold increase compared to 2022, while the number of innovations under development is 214 in 2023, up from 105 in 2022.

Impact Area focus of results

At least one-third of ST results were tagged as significant (relevant) or principal (main purpose) to each of the Impact Areas . However, there are differences in terms of results being principally related to Impact Areas. Thirty-one percent of ST 2023 results were tagged as principally relevant to the climate change Impact Area. The Impact Area with the next highest proportion of results tagged as principal was gender, at 14 percent. The other three Impact Areas (nutrition, environment, and poverty) each had between 8 and 9 percent of results tagged as principal.

Geographies: Focus on Eastern and Southern Africa, India, Viet Nam, and Guatemala

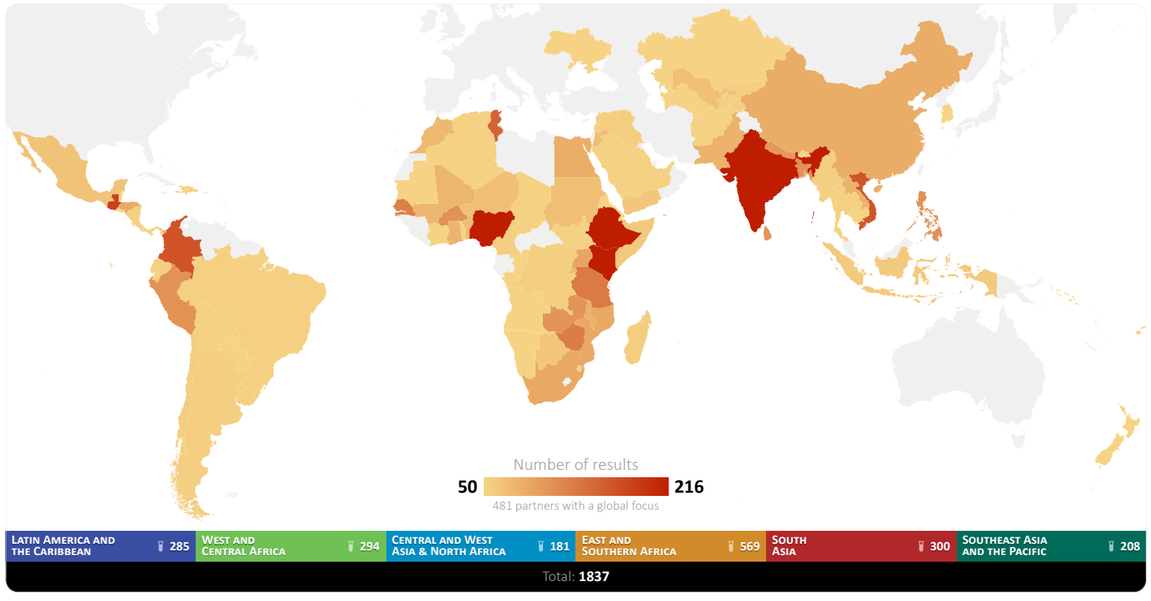


Figure 2.8. Geographical distribution of ST results in 2023.

Figure 2.8 shows the geographical distribution of the total number of ST results in 2023. The countries with the highest numbers of results are Kenya (216), India (163), Nigeria (144), and Ethiopia (139). These are also the countries with the highest reported numbers of partners. To summarize, key Systems Transformation countries are predominantly in sub-Saharan Africa, particularly in East and Southern Africa, with additional focus on individual countries in other regions, especially India, Vietnam, and Guatemala.

A wide array of partnerships for impact

A total of 986 unique partners contributed to ST results in 2023. The most common partner types are national universities from low- and middle-income countries (contributing to 500 results), national agricultural research institutes (229 results), universities and other research organizations from higher income countries (219 results), national governments (212 results), international and national NGOs (209 results), private-sector companies including financial institutions (195 results), and various types of other international organizations (105 results).

The partners contributing to the highest number of results are from across these partner types, from both the global North and South: Wageningen University and Research (contributing to 71 results), CIRAD (61), Institut de Recherche Agronomique de Tunisie (41), World Food Programme (40), World Vegetable Center (39), Ministerio de Agricultura Ganaderia y Alimentación Guatemala (35), FAO (34), Instituto Nacional de Sismologia, Vulcanologia, Meteorologia e Hidrologia da Guatemala (31), Office d'élevage et des pâturages de Tunisie (29), and the World Bank (27).

In most cases, these organizations have a core partnership with one or two ST Initiatives. For instance, Wageningen University and Research (WUR)'s principal link to ST is through the Initiative on Sustainable Healthy Diets (SHiFT), although collaborative results have been achieved between WUR and another seven ST Initiatives. CIRAD collaborates most closely with the Initiative on Agroecology but also contributes to the Initiatives on Low-Emission Food Systems, Sustainable Healthy Diets, and Climate Resilience (ClimBeR).

Most ST Initiatives expand the range of partnerships well beyond traditional agricultural research and development, e.g. with energy, finance, health ,and social protection partners. The Initiatives on Fragility, Conflict, and Migration (FCM) and Sustainable Diets (FRESH) provide good examples of how Initiatives have formed partnerships to implement and utilize research because both cover thematic areas less well developed within CGIAR. Strengthening existing partnerships and forming new ones was vital for the Initiatives to gain legitimacy and relevance. A core partner of FCM is the World Food Programme (WFP). FCM has convened end-to-end partner engagement across WFP offices and facilitated secondments of CGIAR staff. Global partnerships formed or strengthened with the UN Refugee Agency (UNHCR), the International Organization for Migration, World Vision, and Action Aid were instrumental in addressing transboundary issues and amplifying the reach of CGIAR's research. In focus countries, partnerships were established with key national partners such as the Nigerian Federal Ministry of Humanitarian Affairs to co-identify priority areas of research. FRESH has deepened CGIAR's partnership with the World Vegetable Center as well as reaching out to non-traditional national partners. In the case of Tanzania, FRESH held meetings with the Tanzania Food and Nutrition Centre and the Ministry of Health and participated in the Development Partners Group in Nutrition, increasing FRESH's visibility among government agencies and non-governmental organizations, which ultimately led to invitations to the Initiative to participate in policy processes.

Informing critical policies on climate change, nutrition, and other topics

Many policy outcomes at stage 2 (where a policy, strategy, and the like have been enacted or adopted) are related to climate change, with several contributions to strategies of global, regional, and national organizations as well as incorporation of CGIAR outputs into public programs.

The ClimBeR Initiative informed the Intergovernmental Authority on Development (IGAD)'s Climate Adaptation Strategy (2023–2030). IGAD also published a series of factsheets to provide evidence on how climate exacerbates root causes of conflict in Ethiopia, Kenya, and Sudan using a climate security pathway analysis developed by CGIAR.

FCM provided inputs on climate hazards to UNHCR to inform implementation of its Strategic Framework on Climate Action at HQ, regional, and country levels.

The Government of Madagascar developed the Climate Smart Agriculture Investment Plan in Madagascar's rice producing regions with support from Climate Resilience and several CGIAR Centers. In Kenya, ClimBeR researchers were invited to provide input into Kenya's National Climate Change Action Plan III 2023–2027 on climate security.

The Initiatives on Asian Mega-Deltas and Low-Emission Food Systems (Mitigate+) collaborated to inform a strategy for the co-development and implementation of a Rice Production Activity Monitoring and Reporting System adopted by Viet Nam's Ministry of Agriculture and Rural Development.

In the area of nutrition, support to the government of Vietnam by SHiFT yielded several policy outcomes. The National Action Plan for Transparent, Responsible, and Sustainable Food Systems Transformation developed by the Ministry of Agriculture and Rural Development and approved by the prime minister drew upon inputs from several organizations, including CGIAR. Initiative representatives were invited to participate in the Food Systems Partnership to help design the plan's implementation. In Ethiopia, a government-led platform has prioritized the implementation of food-based dietary guidelines informed by SHiFT, and SHiFT representatives have also been invited to participate in a Multisectoral Technical Team to support the Food System Transformation agenda.

In addition to these mature outcomes, all Initiatives have engaged with decision-makers to support the development of strategies, policies, and programs in their early stages. Some examples are: ClimBeR inputs used by local governments in the Philippines to formulate adaptation strategies and FCM-informed programs of the WFP and the International Organization for Migration. The Initiative on Digital Innovation supported the state government of Uttar Pradesh in designing a digital public infrastructure for agriculture. The Initiative on Agroecology supported the Kenya National Agroecology Strategy and the Ucayali Regional Government's Regional Strategic Plan for Policy and agroecology corridor, in Peru. The Initiative on NEXUS Gains had a role in shaping the Nepal Irrigation Policy and in an information system for monitoring water resources in Punjab, Pakistan. The Initiative on National Policies and Strategies (NPS) provided inputs into seed certification regulations for vegetatively propagated materials in Kenya. The Mitigate+ Initiative contributed to the development of a Measuring, Reporting and Verification (MRV) framework for monitoring deforestation emissions in Colombia. Rethinking Food Markets (RFM) partnered with coffee growers, traders, exporters, and policymakers in Honduras to help supply chain actors and smallholders comply with the EU Deforestation Regulation.

Innovation use

ST innovations target a variety of actors and some are being used at scale. The following examples illustrate this. ClimBeR teamed up with CGIAR's Livestock and Climate, Diversification in East and Southern Africa, and AgriLAC Resiliente Initiatives to disseminate climate information services and provide climate content for these services in several countries. In Guatemala, Local Technical Agroclimatic Committees reached more than 34,680 rural people (50.5 percent women) through improved agroclimatic bulletins and WhatsApp communications, while dissemination of agroclimatic information through radio reached an estimated 144,480 people (69,500 farmers). More than one million Kenyan farmers (41 percent women) received climate resilience agro-advisories through the Shamba Shape Up television program, while 650,000 viewers received such information through the Munda Makeover farming reality TV show in Zambia.

The Initiatives on NEXUS Gains and ClimBeR co-developed the Zambia Drought Management System launched by Zambia's Ministry of Agriculture in February 2023. It incorporates real-time weather updates and open-access satellite data to provide farmers, extension workers, and agriculture and water resources authorities with the information needed to forecast, monitor, and manage drought. The Initiative on Nexus Gains also supported the development of a solar irrigation pump sizing tool. The tool has been adopted by the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) scheme, which works to ensure energy security for farmers in India.

Other innovations being used by partners include the Food System Country Profile web-based product (SHiFT), being referenced by governments in Ethiopia and Honduras; increased production of forage crop seeds and use of a small-scale compressor or 'pelletizer' to produce quality feed pellets in Tunisia (Agroecology); a risk-contingent credit product offered by banks in Kenya and Ethiopia (ClimBeR); use of the Longa speech recognition tool by Farm Radio International (Digital Innovation); formalization of participatory landscape approaches in more than 10 countries (Mitigate+ and Agroecology), the Women's Empowerment in Agri-food Governance innovation endorsed by the Nigerian Government (Gender Equality [Her+]), and innovative equipment and extension services rfmfor improved milk quality control and higher revenues for dairy farmers in Uganda (RFM).

Strengthening the capacity of farmers and other food, land, and water system actors

In 2023, ST Initiatives trained 35,405 people, 5,958 of whom were involved in long-term training. Two-thirds of trainees were women. Close to 300 partners took part in these trainings, either as providers or recipients. Most of these trainings targeted farmers or other members of rural communities. In addition, ST Initiatives held dozens of training events with other food, land, and water system actors, including policy makers.

In two cases, capacity strengthening of a partner led to further onward training. A learning module developed by NEXUS Gains was taken up by the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) and integrated into its Water Energy Food (WEF) Nexus Resource Platform. GIZ is a leader in capacity development in this field and the Nexus Resource Platform is the leading global knowledge hub for managing and sharing resources on the Water, Energy, and Food Security Nexus.

A second case involves HER+ and FCM Initiatives that partnered to launch and evaluate women's and men's training curricula designed to increase women's participation in community decision-making. HER+ partnered with ActionAid Nigeria to train 67 facilitators to deliver training to women on how to increase their participation in community decision-making as well as training for men on how to support their wives' participation. These facilitators trained more than 3,700 women and 1,850 men across 300 wards in three states in southwest Nigeria.

Other examples of training activities include: training to overcome barriers in women's leadership in Nepal (NEXUS Gains leadership program), training on designing and implementing mangrove carbon projects and a workshop on measurement (Mitigate+), training on Climate Response Programming for Sustaining Peace for African decision-makers (ClimBeR), training the African Group of Negotiators Expert Support (Mitigate+ and ClimBeR), training policy actors on a Food Security Simulation Tool in Nigeria (NPS), an e-course on Food System Governance completed by many food system actors in Bangladesh, Ethiopia, and Viet Nam (SHiFT), and trainings on post-harvest management of fruits and vegetables to prevent food loss and waste (FRESH).

The Initiative on Foresight supported the launch of a new modeling center led by the African Network of Agricultural Policy Research Institutes and is supporting new modeling units in partnership with national policy research institutes. The NPS Initiative continued to ensure that modeling tools are readily available to respond to demand. Researchers at the Kenya Institute for Public Policy Research and Analysis (KIPPRA) and at the Nigeria Institute of Social and Economic Research were supported in using economywide data and modeling tools at national and subnational levels.

Highlights of research outputs

Among ST's 1,195 knowledge products produced in 2023, 188 were journal articles, with 20 having an Altmetric score of 30 or more[1]. The top five were high-level synthesis type studies, including Safe and Just Earth Boundaries (Altmetric score of 4220), State of Food Systems (564), Freshwater Biodiversity (301), Assessment of Soil Organic Carbon (283), and Blue Foods for Food Systems (272). Several articles were related to climate (climate extreme forecasts and interventions, mapping of women and climate risks, and the impact of El Niño in Malawi). Nutrition- and health-related papers included an assessment of the effects of the Chilean labeling law on dietary intake, an assessment of a fruit and vegetable program in India during COVID, and an analysis of the effects of smoke on health in South America. A final group of highly cited papers were related to development of methods such as using phone surveys, handling measurement error, and guidelines for measuring gender transformative change.

Across the ST portfolio, outputs span a range, including methods and tools for use by various actors; situational and trend analyses; mechanistic studies; political economy and policy/governance studies' innovation testing, interventions, and approaches; ex ante evaluations of policies and programs; and training modules and curricula, among others.

Below we provide information on a sample of ST outputs that are closely aligned with broader food, land, and water system transformation challenges, addressing questions such as 'what are key considerations in transformation,' 'how will system transformations be shaped by major trends,' 'how to measure transformation', and how to catalyze or support transformation'.

The Initiative on Foresight produced several briefs on the future of FLW systems in key regions (briefs for West and Central Africa, Central and West Asia and North Africa, and Southeast Asia), resources (land), shocks (El Niño), commodities (aquatic foods, rice, and pulses), and Impact Areas (gender equality with HER+ and the GENDER Platform). To address the concern of a persisting and widening gender equality gap and identify ways to support transformation toward equitable FLW system, HER+ and the GENDER Platform developed guidelines for measuring gender transformative change and produced two global reviews to support gender-responsive, empowering scaling of socio-technical innovation bundles, one on design and one on use. Collaborating with external partners, the Initiatives on Mitigate+ and Agroecology developed the GenderUp conversational method to support responsible scaling. The Initiative on NPS studied interactions between agricultural and non-agricultural income growth in selected Asian and African countries to understand transformation processes. The NPS Initiative also published a sourcebook on Political Economy and Policy Analysis that can be used by CGIAR and external stakeholders to identify and navigate political economy challenges that may impede transformations to improved food, land, and water systems.

The Initiatives on RFM and Digital Innovation teamed up to produce an analysis of why digital tools have not been widely scaled up to support agricultural market transformation in Africa. Each of the two Initiatives also tested several innovations to support transformation (20 innovations were tested by RFM to address value chain weaknesses, including food loss and waste, while Digital Innovations tested nearly 40 innovations designed to support a variety of different decision-makers in FLW systems. NEXUS Gains generated several outputs in relation to a promising innovation, solar powered irrigation, including right sizing in India, closing the gender gap in Ethiopia, and developed tools to guide scaling in Africa and South Asia.

Transformation of FLW systems requires coherent and coordinated policy actions. The Initiative on Mitigate+ conducted assessments of nationally determined contribution plans in several of its target countries, including Vietnam, Colombia, and Kenya, and proposed options for reaching targets in the agriculture and food system sectors. ClimBeR and FCM collaborated on a policy assessment in eight African countries, looking at policy coherence between the climate and environment sectors on the one hand and the sectors of peace and security on the other. The two Initiatives also collaborated to assess the complex interactions of climate, conflict, and migration in Central America and how these interactions affect transformation processes in the region.

With a view to ensuring that food system transformations align toward nutritional outcomes, the Initiatives on SHiFT and Aquatic Foods published a paper that outlines benefits from promoting blue foods (food derived from aquatic animals, plants, and algae), assesses these benefits against national policy objectives worldwide, and outlines key implications in strategies and policies. The FRESH Initiative undertook diagnostic studies and literature reviews related to consumption patterns, food environments, and fruit and vegetable value chains in target countries (e.g. Sri Lanka and the Philippines) and is already advancing improved vegetable and fruit varieties (e.g. okra, pepper, and tomato) and pushing associated innovations through testing phases. To promote practices that deliver more sustainable and healthier food choices for consumers, the Initiative on Agroecology undertook a set of value chain studies in six countries to develop new business models providing incentives for all actors to produce and trade agroecologically produced products (e.g. leafy vegetables, milk, groundnut, mango, sorghum). Agroecology and NEXUS Gains collaborated to explore how network and institutional pathways foster agricultural diversification in areas dominated by major crops.

CIP potato breeder watering promising potato hybrids, expected to be released in East Africa in the next two years, CIP glasshouse, Nairobi, Kenya
Credit: Julie Puech / Breeding Resources Services

1 All Altmetric scores are as of April 2024.

Genetic Innovation

Integration for impact

In 2023 the Genetic Innovation Science Group (GI) built on its initial integration in 2022 to accelerate results by deepening the cohesion and coherence in CGIAR's offer on genebanks, crop breeding, and seed systems. Over the year, CGIAR and partners identified over 450 seed product market segments and 294 Target Product Profiles at the regional and national levels, enabling strategic priority-setting with national partners to direct limited resources to the breeding efforts where positive impacts on poverty reduction, gender equality, nutrition, environment, and climate resilience are likely to be greatest. Building on past breeding work, in 2023, these profiles guided the development and successful registration of 165 varieties with greater climate resilience and 50 varieties that can reduce malnutrition among women and children. Positive genetic gain was reported in 87 percent of breeding programs, driven by substantial efforts to raise human and infrastructural capacity in breeding networks that include both NARES and CGIAR Centers. Supporting these pathways to impact were CGIAR's genebanks, which sent over 200,000 samples to nearly 1,000 users in 68 countries.GI's integration is a foundation of CGIAR's success. Structured collaboration across CGIAR Centers and partners facilitates shared learning, more strategic use of resources, and improved efficiency. Over 2023, GI's integration across projects, CGIAR Centers, and partners was further strengthened. The five GI pooled-funded Initiatives link logically and practically along the pipeline of design, development and delivery of our product – improved varieties. The GI structure and Initiatives provided a backbone for all of CGIAR's work in genebanks, crop breeding and seed systems: a common philosophy, language and theory of change; sets of shared services, tools and approaches; unified metrics and targets; and interlinked circles of management and learning that bring science leaders together across the Centers. A key area of progress in 2023 was increasing alignment to this GI "backbone" by bodies of non-pooled funded work, including through two Science Group Projects (SGPs) – the Roots, Tubers, and Bananas Breeding Project (RTB Breeding) and the Accelerated Varietal Improvement and Seed Delivery of Legumes and Dryland Cereals in Africa project (AVISA) (reported below) – and the Genome Editing Initiative (reported separately), but also via scientists' elective use of GI's set of user-friendly facilities.

GI started 2023 with a very ambitious set of objectives and commitments. Despite budgetary and other setbacks, GI ended the year fully on track to achieve its expected three-year outcomes by the end of 2024. Across all GI Initiatives, 96 percent of all Work Package outputs were on track against their proposed end-of-Initiative outcomes. Likewise, GI management delivered in full on its set of formal objectives and key results. A comprehensive monitoring, evaluation, learning and impact assessment (MELIA) strategy was implemented, measuring internal performance and external results, including a standardized metric for genetic gain, a multi-year impact assessment strategy, and an annual reflection exercise. A Gender Strategy was developed, challenging GI teams to move beyond gender-responsive to gender-intentional ways of working. An advisory group, self-titled the Champions and Challengers of Genetic Innovation Group and comprising six System Council members and six regionally based experts, was convened and met regularly to provide critical input on GI strategy and results.

A unified theory of change for genebanks, crop breeding, and seed systems

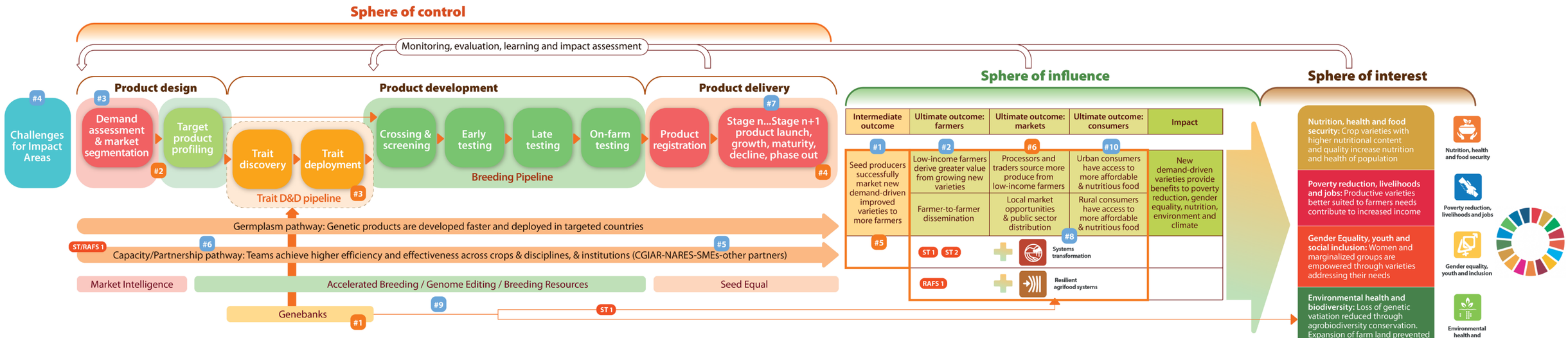
The GI theory of change guides CGIAR's delivery of positive impacts associated with accelerated adoption and turnover of improved crop varieties by small-scale women and men farmers (see Figure 2.9). The theory of change links the design-development-delivery product pipeline with CGIAR's larger ambitions for impact on the Sustainable Development Goals (SDGs) across CGIAR's five Impact Areas. GI sees two key pathways to impact: (1) through development and delivery of germplasm (the germplasm pathway) and (2) through building the capacity of multi-partner breeding networks that CGIAR participates in (the capacity and partnerships pathway). A core assumption of the GI theory of change is that better day-to-day performance by CGIAR and partners – particularly NARES and small and medium enterprises (SMEs) – will create more valuable impacts for low-income producers and consumers.

GI's five pooled-funded Initiatives operate synergistically and in support of all NARES-CGIAR breeding networks and programs. High-performing breeding programs can draw on genetic resources (the Genebanks Initiative); demand-driven Target Product Profiles that define traits needed for specific market segments (the Market Intelligence Initiative); tools and resources to support modernized breeding efforts for delivering complex multi-trait varieties (the Breeding Resources Initiative); partnerships among CGIAR, NARES, universities and the private sector that link upstream and downstream breeding (the Accelerated Breeding Initiative); and strengthened seed systems that deliver genetic gains and equitably expand product reach (the Seed Equal Initiative).

Performance and results along the theory of change in 2023

Strengthening equal and collaborative partner networks

Multi-partner breeding networks are the essential delivery system for getting improved varieties to farmers faster. In recognizing this, over 2023, GI continued to work with its 1,153 partners across the globe (see Figure 2.10, next page) and redoubled its efforts to build inclusive breeding networks and capitalize on the comparative advantages of CGIAR, NARES, and our other partners. Across Africa, for 12 crops across 18 countries including Cote d'Ivoire, Ghana, Madagascar, and Nigeria, CGIAR and NARES breeding teams held 52 national Product Design Team meetings to support the systematic alignment of regional breeding targets with the prioritized needs of farmers, consumers, seed companies, and processors. Co-implementation of activities with NARES further supported the formation of transdisciplinary teams, involving, for example, 300 trader surveys across Africa; concept testing with 1,200 farmers; and needs evaluations with 600 rice processors in Uganda and Tanzania.



#1 **Farmers, researchers, breeders** and others worldwide access and use germplasm managed by genebanks, generating and sharing benefits equitably.
#2 **One CGIAR-NARS-SME networks** use market segments, product profiles and pipeline investment cases to orient variety development and deployment towards those that provide larger scale benefits across the 5 impact areas.
#3 **National and private seed company breeding programs** accelerate the development of varieties that provide larger scale benefits across the 5 impact areas.
#4 **Integrated public and private seed systems** increase the quantity of seed of improved varieties available to farmers in priority crops and geographies.
#5 **Integrated public and private seed systems** increase the rate of adoption by farmers of new varieties for priority crops and geographies.
#6 **CGIAR partners** develop and scale innovations that contribute to the empowerment of women, youth and other social groups in food, land and water systems.

ST 1 NGO, extension, and other implementation partners actively engage with farmers and other actors in implementing transformative innovations in food, land, and water systems.
ST 2 National and sub-national government agencies use system transformation research to implement strategies, policies and programs which transform food, land and water systems to meet livelihood, inclusion, nutrition, environmental and climate objectives.
ST/RAFS 1 National and local multi-stakeholder platforms are strengthened to become more effective and sustainable in addressing development tradeoffs and generating strategies for effective food, land, and water systems transformation.
RAFS 1 National Agricultural Research Systems, Regional Research Institutes, extension services, and national and international NGOs implement agrifood system innovations with the potential to improve the livelihoods, climate resilience, and environmental health of smallholders and pastoralists.

Figure 2.9. Genetic Innovation's theory of change.

Building on the 2022 Aide Memoire, the Accelerated Breeding Initiative held the second Genetic Innovation NARES Leadership consultation meeting – an annual formal mechanism for consulting with leaders in NARES, sub-regional organizations, and other development partners. The meeting built collaboration, developed steps for better aligning with partners' expectations and ambitions for change, and yielded better alignment of the comparative advantages between CGIAR and NARES. This was captured in the 2023 Aide Memoire. Following this, the Accelerated Breeding Initiative developed a standardized and scalable methodology for peer/self-assessment of partner-level breeding activity, strengths, opportunities, and ambitions. The assessments provided baseline information for building the roles of partners within breeding networks. As a result, at least 52 Sub-Saharan African NARES breeding programs (plus others globally) better contribute to regional breeding processes through active collaboration in priority-setting and taking on a greater share of responsibilities within crop breeding pipelines.

The Seed Equal Initiative established partnerships with 636 value chain actors across 56 multi-stakeholder platforms, promoting collaboration in delivery of locally demanded crop varieties and capacity building. In Sub-Saharan Africa, the Seed Equal Initiative engaged with 11 NARES and two universities and ensured demand-led seed systems were adapted to local contexts – this promoted the adoption of new varieties and ensured the availability of quality seed. Attitudinal and behavioral shifts were observed, placing new varieties at the center of seed production in soybean, cowpea, and common bean. For example, in Zambia, the Seed Equal Initiative mainstreamed the innovative market-focused model – the Demand Led Seed System (DLSS) model – developed by the Pan African Bean Research Alliance (PABRA). This collaborative work has led to a six-fold increase in Quality Declared Seed between 2021 and 2023, with new varieties now accounting for 88 percent of seed produced. Farmers have raised yields by 11 percent and are planting more land to beans.

The Genebanks Initiative strengthened the global system of genebanks by engaging more than 60 NARES partners in capacity building and collaboration; this covered a range of genebank operations and activities from cryopreservation to the use of genomic tools for collection management and use. Fifteen NARES partners benefited from project funding to develop capacity in genebank operations and international policy implementation. Regional workshops responded to priority capacity building needs for Sub-Saharan Africa, Central and West Asia, North Africa, and Latin America. Eleven institutes in Central and South America pooled resources to genotype and map genetic diversity of their respective collections of beans, maize, cassava, potato, and wheat.

Strategic partnerships with the private sector were also a key focus in 2023. GI set up a Private Sector Partnership Platform for coordination and transparency on activities with large-scale global companies. A CGIAR licensing framework was developed in collaboration with legal and partnership specialists to enable flows of funds to low-income country partners.

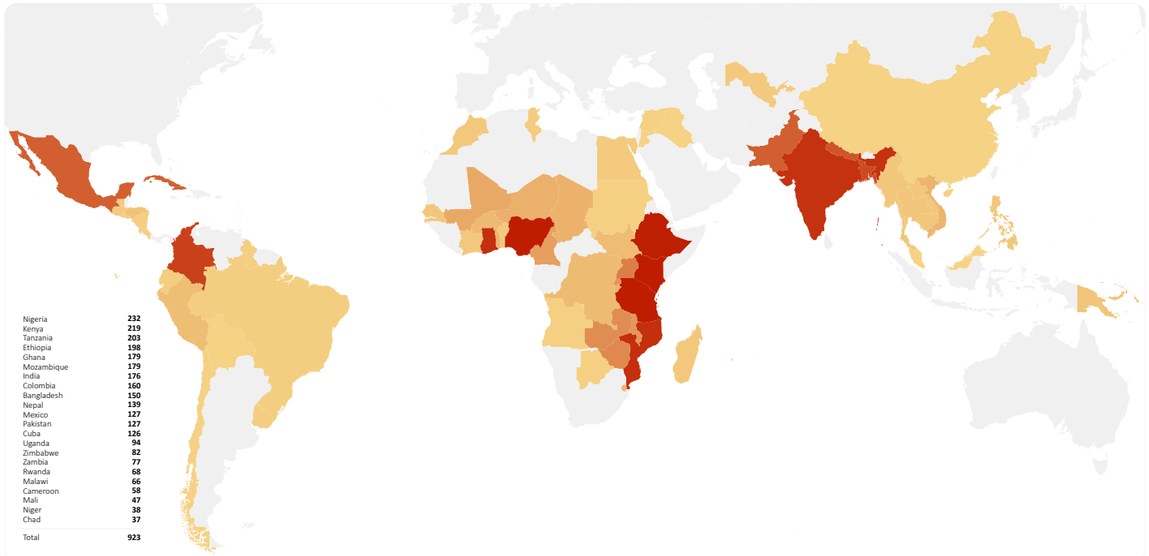


Figure 2.10. A visual representation of the partners that GI works with across the globe and the countries they come from.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Supporting CGIAR and partners' breeding through harmonized shared services

At the heart of GI is process management that supports the delivery of high-quality data, streamlined processes, and compatibility in CGIAR-NARES networks' ways of working. The Breeding Resources Initiative supports CGIAR-NARES breeding networks to modernize shared services, facilities, and operations for greater throughput, accuracy, and safety, at lower unit costs. These breeding services facilitate the delivery of complex multi-trait varieties and allow shared knowledge and capacities across CGIAR and NARES breeding efforts. In 2023, four process teams – Product Development (led by the Accelerated Breeding Initiative), Trialing and Nursery, Lab Services, and Breeding Analytics (all led by the Breeding Resources Initiative) – built on their previous harmonization work to identify, validate, and set the course for continuous improvement in all breeding operations and activities. They also began establishing standard operating procedures for breeding operation processes.

The Breeding Resources Initiative worked jointly with CGIAR-NARES network partners to identify areas for improvement and enable sustainable adoption of state-of-the-art equipment for their breeding activities (through projects like Crops to End Hunger). The Initiative was launched to provide users visibility into the capacity of breeding stations, highlighting their strengths and areas needing improvement. Ultimately, this guarantees the application of top industry standards within the breeding stations, delivering high-quality data and results.

A key 2023 achievement was a breeding informatics strategy for CGIAR. The strategy delineates a CGIAR-wide approach for effectively managing breeding databases, software, and tools. The Breeding Resources Initiative began delivery of key components of the strategy during 2023. The team launched a Digital Solution Unit to manage, develop, and maintain breeding data management tools using the Enterprise Breeding System platform, and a Global User Support (GUS) 24/7 support desk that handles user inquiries, connects them with specialists, and registers issues. The team also developed a roadmap to 2027, outlining a timeline for the strategy's successful implementation. It encompasses the transition of CGIAR Centers and NARES from their existing breeding information systems to the Enterprise Breeding System. To make it easier for both CGIAR users and external partners such as NARES to request and track a large range of CGIAR breeding support services, a Service Request Portal was developed and launched. For example, breeding teams can use the portal to access low-cost, rapid turnaround genotyping services, benefitting from pooled procurement across the Centers. The Service Portal Request portal will continue to evolve with user engagement and contribution.

Breeding for people, the value chain, and seed systems

During 2023, CGIAR continued to enhance responsiveness and connectivity across the breeding pipeline in order to better serve farmers and other clients. A key innovation was GloMIP, a public platform for sharing market intelligence to inform market segmentation, Target Product Profile design, seed systems, and investment decisions in crop breeding. GloMIP's Market Segment portal currently lists over 500 seed product market segments across 98 countries, covering half a billion hectares. The Impact Opportunities Portal provides a tool to match breeding investments to priorities for impact by linking 200 development indicators to 45 crops and 171 countries at three scales (national, national-crop and market segment). Since the majority are people-centric indicators, GloMIP plays a powerful role in connecting breeding to its human dimension – to different people (farmers, consumers, women, men, marginalized communities) and the different benefits they may value (such as nutrition, incomes, climate resilience and social inclusion).

The Market Intelligence and Accelerated Breeding Initiatives worked together to make the GloMIP platform interoperable with the Breeding Portal, a database describing the full portfolio of CGIAR breeding pipelines and their association with each distinct Target Product Profile and market segment. This interoperability now supports: (1) transdisciplinary teams to design Target Product Profiles that align better with stakeholder demands and impact opportunities in seed markets; (2) breeders to a) prioritize investment efforts in breeding pipelines in line with impact opportunities and projected benefits across the five Impact Areas, and b) align better to national and investor priorities to reach the largest number of low-income women and men farmers; (3) seed system actors to use the Product Catalog tto produce varieties better serving farmers, processors, and consumers in each seed product market segment; and (4) investors to prioritize and target their investments in genetic innovation.

In collaboration with social and biophysical scientists, the Market Intelligence Initiative characterized over 450 seed product market segments and 294 regional Target Product Profiles. Through extensive collaboration with NARES partners in a series of Product Design Team meetings, the Accelerated Breeding Initiative captured national priorities for market segments and Target Product Profiles. Led by GI's Gender Focal Point, a new Genetic Innovation Gender Strategy identified priority areas and entry points for advancing gender intentionality in breeding decision-making. The strategy formed the basis for the Market Intelligence Initiative to standardize the protocol for gender-intentional Target Product Profile design, in collaboration with Fairtrade Africa. NARES' early involvement in Target Product Profile design ensured that national priorities drive CGIAR breeding pipelines. The Accelerated Breeding Initiative also developed the Program Management Platform to align projects that address different components of a shared, higher-level goal. The Platform enables learning across projects, reduces transaction costs, and identifies key opportunities for coordination.

All of these innovations supported seed systems actors to register 198 varieties developed by CGIAR-NARES collaborative breeding. Among these registered varieties, 165 had climate-resilience traits, 50 had greater nutritional value, addressing micro-nutrient deficiencies most common among women and children, and 156 were registered in low and lower-middle income economies. Moreover, significant progress was made in raising genetic gains by reducing breeding cycles and improving quality management. Using new improved standardized metrics, positive genetic gain was reported by 87 percent of breeding programs.

Moving along the GI pipeline, the Seed Equal Initiative used a demand-led seed system approach to accelerate adoption of new varieties and improve varietal turnover of beans, cowpea, and soybean. This approach empowered seed system actors to produce and distribute seed of these varieties in target geographies. In cereals seed systems, the Seed Equal Initiative partnered with roughly 100 registered or organized seed producers from public, private, and community organizations in South Asia, Latin America, and Sub-Saharan Africa. These partnerships facilitated production and delivery of 5,500 metric tonnes of quality seed through their networks, and showcased new products through 700 strategically located demonstrations for systematic product validation and demand creation. To inform public policy and private sector strategies, the Seed Equal Initiative undertook substantive collaborative research on how seed systems work in local contexts, for example, on the synergies between formal and informal seed systems in Odisha, India. A growing area of research and engagement emerged around seed supply within humanitarian contexts, which is highly relevant under conditions of increasing conflict and climate change. The aim of the work is to ensure that relief packages, and other efforts to rebuild agriculture following shocks, provide high-quality, nutritious and locally suitable seed to farmers.

Genebanks' genetic resources and research efforts

CGAIR's Genebanks conserve more than 30 crops and 3,000 species globally, provide accessions, and accumulate data resources for diversity analyses, germplasm selection, and collection management. In 2023, CGIAR Genebanks provided more than 200,000 germplasm samples to 993 requestors in 68 countries (not including distributions from CIFOR-ICRAF). More than 8,400 samples of beans, cassava, forages, maize, potato, pearl millet, rice and sweet potato were sent to farmers, NGOs, and farmer organizations, and 2,774 samples went to commercial sector users in 24 countries.

Genebank workflows were coordinated to improve and align data and quality management. Across multiple Centers, genotypic data resources on more than 20,000 accessions were collated in the same software platform, GIGWA. Individual genebanks enriched their data resources by:

(1) digitizing seed and plant images, and generating passport data for thousands of accessions; (2) generating genotypic data on potato crop wild relatives, banana, rice wild relatives, oca, ulluco, and cassava to develop molecular atlases; and (3), in partnership with NARES and CGIAR breeders, developing and evaluating 30 subsets of banana, Buffel grass, lentil, potato, cassava, sweet potato, wheat, and other crops to identify abiotic, biotic, and nutritional traits.

In 2023, Genebanks research made strides in the use of artificial intelligence (AI) to help users find the varieties or traits they needed. The International Rice Research Institute (IRRI) genebank trained an AI tool to recognize rice samples using images of rice seeds. This AI recognition replaced humans to assess the rice seed. It worked more rapidly, reliably, and cost-effectively than humans, screening 60,000 rice samples for flooding tolerance in just one year (compared to 20,000 samples being screened since the genebank opened in 1972). This improvement will allow more IRRI genebank material to be discovered and used in breeding. Going forward, wide-scale screening of collections for specific traits to tackle climate-change challenges and emerging or intractable pests and diseases will be increasingly feasible.

In line with the Genebanks' commitments to international standards and treaties, every germplasm import and export passed through CGIAR Germplasm Health Units. The Units carried out more than 830,000 diagnostic assays and prevented the movement of more than 10,000 diseased or contaminated samples, in compliance with national phytosanitary regulations. CGIAR submitted reports to the International Treaty for Plant Genetic Resources for Food and Agriculture, the Commission on Genetic Resources for Food and Agriculture, and the Convention on Biological Diversity.

Science Group Projects

The GI Science Group spearheaded SGPs, which are bilateral or Window 3 Center-owned projects that include explicit structured alignment with the CGIAR 2030 Research and Innovation Strategy – by using common theories of change, partnerships, metrics, targets, research tools and reporting. They are the first funding model to achieve alignment between bilateral and pooled funding. Two of these projects were launched and reported in 2023.


DRC Gorilla Beans. Credit: CIAT

Roots, Tubers, and Bananas Breeding Project

The Roots, Tubers, and Bananas project (RTB Breeding) was established to integrate breeding approaches in banana, cassava, potato, sweet potato, and yam. Over their first year, RTB made strides in changing breeding management, bringing together five transdisciplinary crop teams to self-organize. This created a systematic arrangement for shared learning and co-management among CGIAR and partners in NARES and universities.

Working closely with the Accelerated Breeding Initiative, RTB breeding pipelines adopted stage-gate processes that align with Accelerated Breeding's guidelines. This alignment facilitated the advancement of superior clones tailored to market demand and breeding programs' objectives. In developing this alignment, capacity sharing was organized for three national programs. RTB worked tightly with partners who developed and updated Target Product Profiles for eight national programs in East, Central, and Southern Africa for all crops. RTB breeding programs integrated food quality traits into Target Product Profiles that had been missing from earlier breeding efforts. Product design teams were jointly established with national programs in multiple East and West African countries in banana, potato, sweet potato, yam, and cassava. Excellent progress was observed in both banana and potato with the launch of East African CGIAR-NARES breeding networks.

Accelerated Varietal Improvement and Seed Delivery of Legumes and Dryland Cereals in Africa Project

The Accelerated Varietal Improvement and Seed Systems in Africa project (AVISA) was the second SGP implemented in CGIAR in 2023. During its first year of implementation, AVISA tackled challenges associated with scaling new dryland crop varieties. Teams including 188 NARES scientists, including social scientists and economists, identified three strategic impact pathways for developing new business cases for impactful seed production and delivery: leveraging seed agribusiness as economic multipliers in local communities; innovative seed delivery models at discounted prices; and breeding strategies that optimize farmers' mixed cropping systems for resilience under diverse and low-input conditions. A major innovation from these analyses was the concept of localized seed and grain business "micro-ecosystems" as the basis for scaling.

Working closely with the Accelerated Breeding Initiative, AVISA convened crop and country Product Design Teams to develop and prioritize market segments and Target Product Profiles. More than 50 meetings were conducted for six crops, and the teams identified 58 market segments across Africa, of which 28 were prioritized for breeding. The prioritized market segments and Target Product Profiles were assigned teams with a breeding pipeline lead and co-lead from CGIAR and NARES, respectively. These teams co-designed breeding strategies for prioritized breeding pipelines in consultation with quantitative genetics experts, collected germplasm of targeted crops, had plant health teams develop a regional strategy for screening key priority traits, and held workshops with regional breeders to harmonize screening protocols.

GI's engagement and capacity building

As the success of multi-partner breeding networks is vital for raising adoption and turnover of improved varieties, capacity sharing is a fundamental component of GI's work. In 2023, the Accelerated Breeding Initiative worked closely with partners and developed a self-measurement tool for breeding capacity, allowing partners to develop plans that specify their priorities for enhancing their breeding capacity.

This completed an important early step toward NARES and CGIAR making best use of their mutual comparative advantage, as per the 2022 and 2023 Aide Memoires. The Breeding Resources Initiative's process management teams identified and responded to capacity development needs in CGIAR-NARES breeding networks. The Genebanks Initiative responded to partners' self-identified priorities for capacity development via regional workshops in Sub-Saharan Africa, Central and Western Asia and North Africa and Latin America. Actions included engagement of NARES partners in the use of genomic tools for management and use of collections. To generate awareness of improved seed variety availability, the Seed Equal Initiative built the extension, seed delivery, and marketing capacity of national and sub-national organizations. More than 50,000 seed sector stakeholders in South Asia, Latin America, and Sub-Saharan Africa were engaged through farmer field days, participatory varietal selection processes, and trait preference ranking exercises, among others. The Market Intelligence Initiative conducted 79 capacity-building and evidence-dissemination activities directly with partners, via workshops, and shared documentation, replicable tools, and characterization of seed product market segments in GloMIP.

GI's contribution to CGIAR's Impact Areas

The ultimate impact from CGIAR's work in genetic innovation comes from the value of improved varieties that farmers adopt and harvest. In 2023, partners in 36 countries registered 198 varieties derived from CGIAR-NARES breeding pipelines. Eighty-three percent of these were improved for climate resilience and 25 percent for greater nutritional value, including through biofortification to raise levels of limiting micro-nutrients such as zinc, iron and vitamin A. Positive genetic gain, with increases in productivity relative to the previous year, was reported by 87 percent of breeding programs. Ongoing increases in genetic gains are a crucial contribution to farm incomes, poverty alleviation and food security, and provide environmental health benefits through reduced land footprint per unit of food output.

GI placed special attention on gender equality and climate resilience over 2023. A new GI Gender Strategy identified priority areas and entry points to advance gender intentionality in breeding decision-making. NARES-CGIAR Product Design Teams systematically included female representatives and drew on gender insights developed in studies by the Market Intelligence Initiative. For the first time, gender was systematically addressed in Target Product Profiles for breeding. Based on priorities identified by national partners, a resulting 22 percent of the 294 profiles had at least one improved trait impacting women, such as reduced labor (drudgery), improved nutrition, or consumer-preferred traits such as cooking time. Fifty varieties were registered that have specific nutritional traits to reduce malnutrition among women and children. Work with NARES developed gender-responsive tools for preparing varietal profiles and understanding seasonal demands for seeds of roots, tubers and bananas in Nigeria, Tanzania, and Uganda. During 2023, 53 percent of breeding programs collected gender-disaggregated data from on-farm verification trials – this is an upward trend; however, there is still much room for improvement within breeding networks.

The attention on building climate resilience had two equally important foci: (1) achieving measurable improvements in priority resilience traits for different agro-ecosystem environments (the germplasm pathway to impact; see theory of change above); and (2) changing ways of working with partners to accelerate the pace of learning and uptake in farmers' fields (capacity pathway). Work on building climate resilience traits involved the full breeding pipeline. For example, the Genebanks Initiative, in partnership with NARES and CGIAR breeders, screened 30 subsets of crops for traits including drought and heat tolerance and disease resistance. Cataloging these traits allows breeders to draw on these subsets for use in breeding new climate-resilient varieties, helping future generations of farmers in their resilience against climate change. Breeding programs used modelling data to understand the current and upcoming climate risks in specific agro-ecologies and market segments. Specific climate-resilient traits included in Target Product Profiles in 2023 included disease resistance and specific tolerance traits for floods, salinity, wind, heat and drought. In terms of ways of working with partners, large-scale on-farm testing (e.g., triadic comparison of technologies (TRICOT)) became a much more widely used method by CGIAR and NARES in 2023. The strength of large on-farm trials is the variety of local climatic conditions and farm conditions that can be included within field testing, and the rapid turnaround time for data and analytics – increasing the speed of research to keep up better with climate change. Another highly strategic direction on climate resilience in 2023 was to ramp up work with humanitarian agencies on seed relief.

The five CGIAR Impact Areas are highly interdependent and GI took explicit steps to enable research users to achieve multi-benefit outcomes and avoid risks associated with potential trade-offs. The GloMIP tool was built to enable users to capture synergies and trade-offs among indicators across the full suite of poverty reduction, gender equality, social inclusion, nutrition, climate and environment. The Seed Equal Initiative developed three papers on agricultural interventions that combine nutrition-sensitive and climate-resilient cropping, and worked with colleagues across the three Science Groups to examine the policy dimensions that promote multi-benefit agriculture in different local contexts.

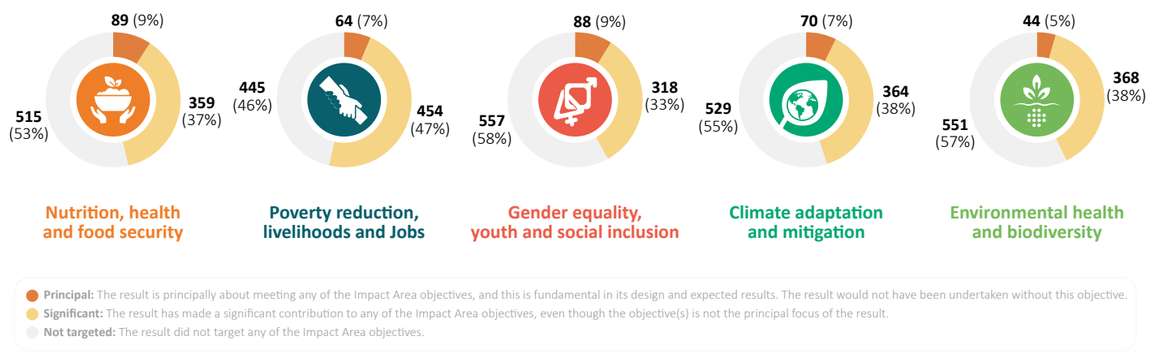


Figure 2.11. GI results reported in 2023 tagged to the five Impact Areas.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Regional Integrated Initiatives

Building on the strong foundation laid in 2022, CGIAR's Regional Integrated Initiatives (RIIs) continued to provide solutions to address the unique climatic and socio-economic challenges facing agrifood systems in six regions prioritized as crucial for achieving CGIAR's Impact Area targets.

RIIs tackled specific challenges identified by stakeholders, serving as pivotal platforms for collaboratively developing, testing, and implementing innovations, enhancing capacity, and influencing policy changes alongside local and regional partners. In 2023, the RIIs brought together the strengths of 759 partners and CGIAR Centers in innovative and participatory research for development, with impacts in six regions.

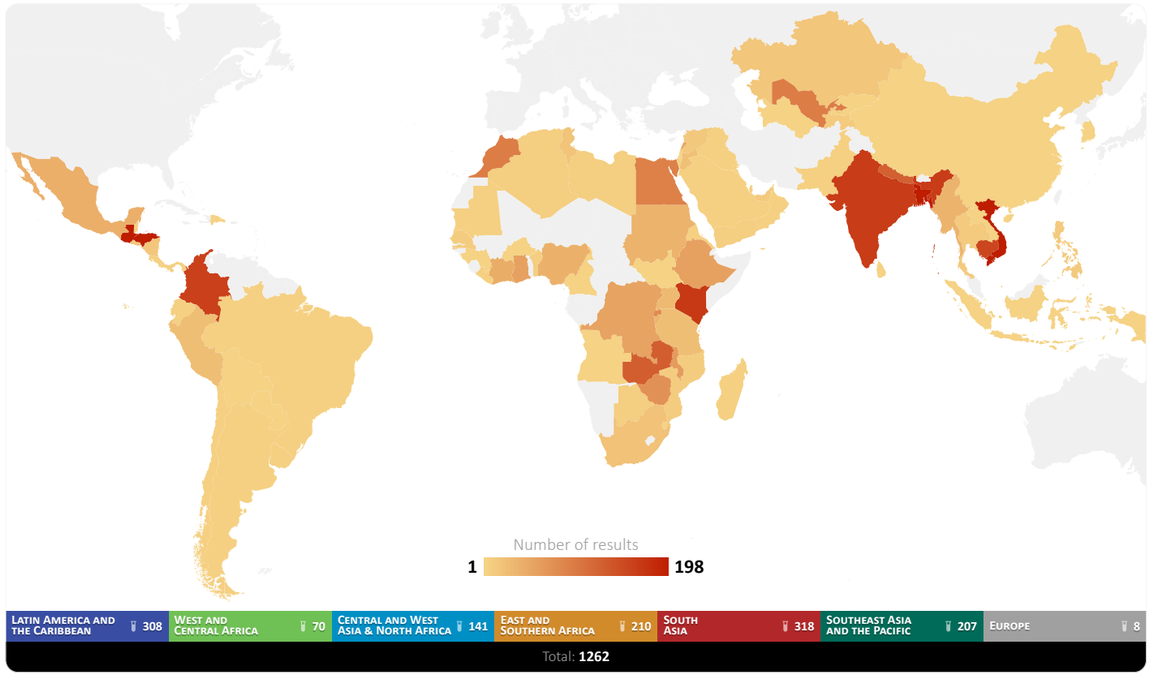


Figure 2.12. Location of RII results.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

RIIs reported over 1,400 outputs and outcomes (577 knowledge products, 341 capacity sharing for development results, 198 innovation development results, 58 innovation use results and 31 policy change results) across CGIAR's five Impact Areas. Twenty-two percent of partnerships were with national organizations and/or with the government (Figure 2.13). Significant collaborations with other CGIAR thematic Initiatives were central to RII implementation and the RII delivery model, leveraging CGIAR expertise, capacity, and stakeholder networks in each region. This section highlights the contributions of RIIs in three facets: (1) amplifying impact with higher innovation readiness and use; (2) bridging engagement and policy for impact; and (3) harnessing bundled digital innovations for sustainability.

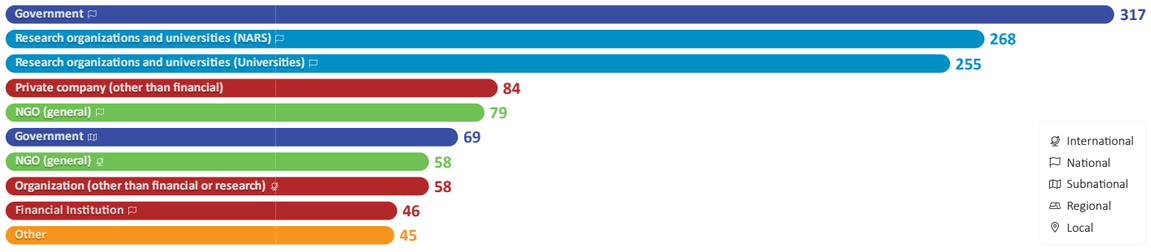


Figure 2.13. RII results by partner type.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Amplifying impact with higher innovation readiness and use

In 2023, RIIs contributed to 35 percent of all innovation use measured by CGIAR in 2023. RIIs had an average innovation readiness score of 5.77 out of 9, while CGIAR's Global Thematic Initiatives (GTIs) averaged 5.16 (Figure 2.14). In other words, innovations developed by RIIs are at more mature readiness levels and have a higher capability of being rapidly applied and scaled by stakeholders.

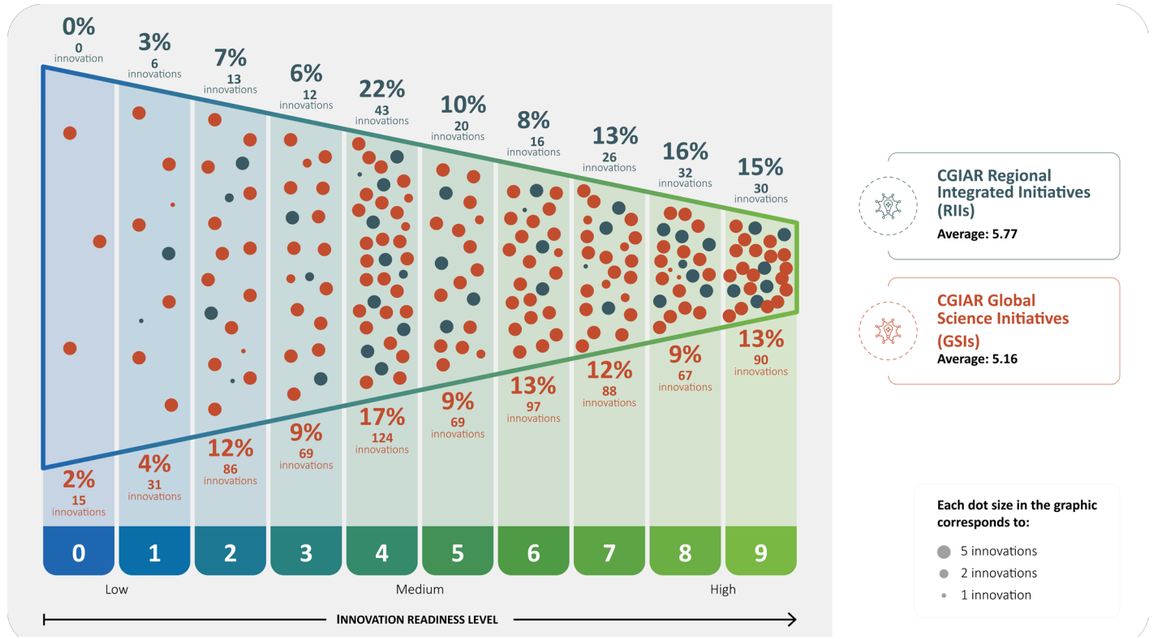


Figure 2.14. RIIs focus on innovation adaptation, validation and scaling (medium/high readiness levels), while GTIs focus more on innovation ideation, formulation and testing (lower/medium readiness levels).

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

The Transforming Agri-food Systems in West and Central Africa (TAFS-WCA) Initiative scaled improved parboiling technology for rice and the existing GEM equipment through the capacity building of women on technical aspects (process of quality rice parboiling using GEM) and soft skill (business skill, marketing strategies and personal development). It was scaled across 11 countries, significantly increasing yields and income, and thereby reducing poverty among adopters.

In South Asia, the Transforming Agrifood Systems in South Asia (TAFSSA) Initiative catalyzed diversification of farming practices through the "Small Farmer, Large Field" (SFLF) business model. In India and Bangladesh, the model enhanced farmers' access to inputs and machinery services, boosting farmers' agency and negotiating power at the farm gate, resulting in a 40 percent average profit increase. In Central and West Asia and North Africa (CWANA), participants of the Agritech4Morocco Innovation Challenge held in 2022 continued to receive post-program support to help accelerate their growth, effectively integrating technological innovation with entrepreneurial development. It spurred adoption of solutions for water management and desertification such as the natural water distillation systems and plant-based desertification controls developed by teams like Manhat and Sand to Green.

In East and Southern Africa, the Ukama Ustawi (UU) Initiative established the Scaling Fund and the Food Systems Accelerator exemplifying financial and business support mechanisms to accelerate the adoption of climate-smart agricultural practices by agribusinesses. Through the Food System Accelerator, approximately USD 11 million was leveraged for the first cohort of agribusinesses in the form of grants, debt and equity.

In Latin America, the AgriLAC Resiliente (AgriLAC) Initiative validated locally adapted crop varieties of maize, rice and beans benefiting over 2,000 households in Colombia, Guatemala, and Honduras. Through Annual InnovaHub meetings, the Initiative approached dissemination and scaling of climate-smart agricultural knowledge and technologies, alongside the capacity building of local communities.

Various digital climate advisory and bundled services (DCAS+) were utilized by farmers in the Asian Mega-Delta (AMD) in Bangladesh, Cambodia, Myanmar, and Viet Nam. The adoption of Agro-Climatic Bulletins in Viet Nam and interactive voice messaging systems in Bangladesh has provided farmers with critical information to optimize their agricultural practices and mitigate climate risks.

Bridging engagement and policy for impact

Tailored to each region and its specifics, RIIs contributed to or influenced policy development and adaptation at multiple levels through strategic collaborations, stakeholder engagement, and provision of evidence-based recommendations.

The TAFS-WCA Initiative has catalyzed policy changes and regulatory improvements in the seed sector, notably in Rwanda. By collaborating with the Seed Equal Initiative, the TAFS-WCA Initiative has enhanced the seed sector's regulatory framework, facilitating the adoption of improved seed varieties. This has been complemented by the establishment of an Agro-Advisory Committee in Rwanda, which has played a pivotal role in scaling the Early Warning System (EWS) for fall armyworm and Striga forecasting, effectively informing local decision-making processes. Additionally, through multi-stakeholder dialogues, the Initiative has developed landscape management plans in Ghana and Nigeria, integrating knowledge sharing and collaborative governance into sustainable landscape management policies.

In South Asia, TAFSSA influenced policy at local, national, and regional levels through its comprehensive agrifood systems assessments and collaborations. At the local level, integrated assessments in Bangladesh, India, and Nepal have shaped agricultural extension planning and market policies through the dissemination of 40 research notes to key stakeholders. Nationally, TAFSSA's studies on crop diversification in Bangladesh have

strongly engaged national extension and nutrition researchers to plan pathways and agrifood system development trajectories toward increased crop diversification. This progress was underpinned by the release of over 40 detailed agrifood systems briefs to inform development planners and policymakers on Bangladesh, India, and Nepal. The main objectives of the agrifood system assessment were to demonstrate the feasibility and value of creating locally relevant datasets, collect high-resolution data linking production systems, markets, diets, and the environment, and develop methods to collect gender-disaggregated data from farms, markets, and households. TAFSSA's engagement in the SoLAR project and the Regional Knowledge Forum on Energizing Agriculture and Enabling Just Energy Transitions in South Asia has facilitated discussions that are likely to impact regional policies and investment strategies in sustainable agriculture.

Through the establishment of National Alliances of Stakeholders in the cereal seed sector and collaborations on salinity management and water reuse standards, the CGIAR Research Initiative on Fragility to Resilience in Central and West Asia and North Africa (F2R-CWANA) influenced policy discourse in countries like Egypt, Lebanon, and Morocco. F2R-CWANA's contributions to the Common Market for Eastern and Southern Africa regional seed trade harmonization policy and the climate-refugee- Water–Energy–Food–Ecosystems nexus discussions at forums like UNFCCC COP28 illustrated its strategic influence on policy discussions and development. UU in East and Southern Africa convened the Policy Dialogue on Promoting Gender and Climate- Responsiveness in Agricultural Policy Formulation and Implementation with the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) as well as a validation workshop for the Policy Practice Index Tool. UU's Learning Alliance established a knowledge management policy, strengthening agricultural knowledge sharing with partners like the Forum for Agricultural Research in Africa, ASARECA, and the Centre for Coordination of Agricultural Research and Development for Southern Africa, supporting agricultural policy development and practice across East and Southern Africa.

AgriLAC finalized a public policy mapping in Guatemala on food security, climate change, and migration, and validated it with stakeholders in informing discussions at a national forum. The Initiative supported the Central America Agricultural Council in activating the Technical Group of Innovation, which gathers NARS of eight countries. The Asian Mega-Deltas (AMD) Initiative had a significant impact on the design and approval of the national program in Viet Nam for sustainable and low-emission rice production, where rice farmers adopted the Alternate Wetting and Drying method, leading to the design and approval of Viet Nam's One Million Hectares Program, a strategy for sustainable development in rice cultivation.

Harnessing bundled digital innovations for sustainability

RIIs effectively deployed digital climate advisory and bundled services across multiple regions, showcasing a robust integration of technology, research, and local engagement to significantly enhance resilience and productivity. The deployment of these innovative services has provided actionable climate information, fostering informed decision-making among farmers, and strengthening broader agrifood systems.

The TAFS-WCA initiative used digital climate advisories to combat agricultural pests and diseases. The Early Warning System for fall armyworm and Striga has been a cornerstone of this effort. In Rwanda, the Initiative improved the accuracy of forecasts and expanded its reach, with advisories being disseminated to over 51,000 individuals, including direct SMS communications to farmers. TAFSSA leveraged digital tools in coastal Bangladesh through an Interactive Voice Response service. This service provided timely weather forecasts to mung bean farmers, helping them avoid potential crop losses due to adverse weather conditions and empowered over 10,000 farmers.

Through an Online Climate Data Extractor, the F2R-CWANA Initiative provided access to satellite-based weather data across the region, enhancing the capacity of agricultural water users in Uzbekistan and Tajikistan to address climate change-related challenges. The Initiative also supported the development of digital advisory tools for Egyptian wheat farmers, integrating genetic innovations and agronomic practices into a comprehensive service package to bridge yield gaps and promote sustainable intensification.

Through the UU Initiative, the Shamba Shape Up and Munda Make-Over programs disseminated critical climate and agricultural information reaching over ten million farmers in Kenya and Zambia via television and radio.

AgriLAC scaled Local Technical Agroclimatic Committees across Mexico, directly benefiting around 100,000 farmers with essential climate information. The Initiative has also enhanced data management processes and developed the e-Agrology platform, improving agricultural data collection and analysis to support small-scale farmers with tailored agronomic recommendations.

AMD made notable progress in deploying digital climate services in the Mekong River Delta, Viet Nam, and beyond. The Agro-Climatic Bulletins have reached over 220,000 farmers, providing them with customized climate advisories that have been recognized by the Vietnamese government for their impact on agricultural and rural development.

Section 3: **Country focus**

Ghana

What CGIAR is doing in Ghana

CGIAR has been engaging in research for development and innovations in Ghana and building the capacity of diverse stakeholders in the agrifood sector. In 2023, CGIAR's activities were delivered at various levels of implementation, from the field to the landscape and influencing national-level policies. Research efforts in 2023 resulted in 202 results, including 86 knowledge products, 38 innovation development results, seven innovation use results, and two policy change results. This success represents an impressive 80 percent growth over the 112 results achieved in 2022. These results are a testament to the collaborative efforts of CGIAR and the 274 partners of the Initiatives, Impact Platforms, and SGPs in Ghana.

Strategic partnerships in Ghana

CGIAR has leveraged strategic partnerships and collaboration in Ghana to deliver results across all sectors. In 2023, CGIAR collaborated with 274 partners that spanned local to international organizations. While CGIAR provided partners with scientific, technical, and financial support, the latter contributed complementary skills and local experience to joint project development and implementation. Figure 3.1 shows 2023 results by contributing partner.

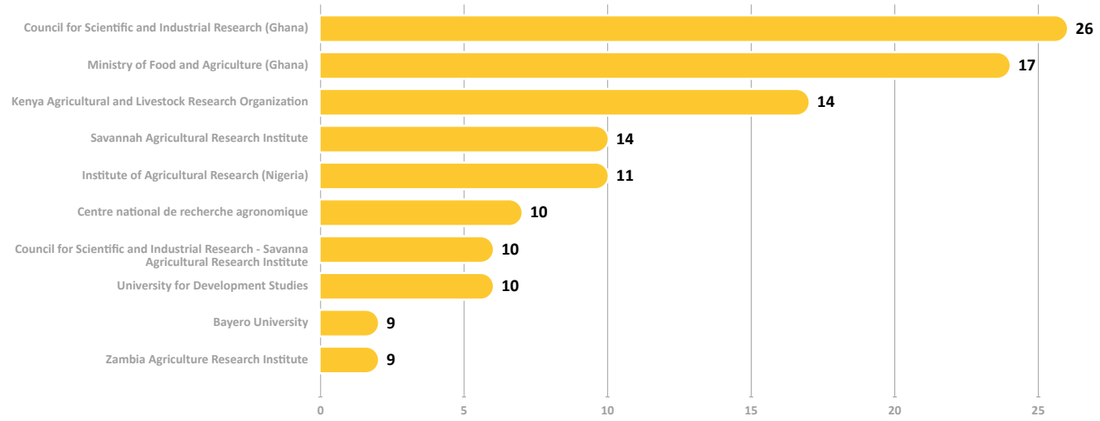


Figure 3.1. Strategic engagement partners for CGIAR in Ghana, 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Soy and Maize trial in Tamale Ghana initiative.
Credit: Excellence in Agronomy initiative

Initiatives in Ghana

CGIAR is active in multiple locations in Ghana (Figure 3.2). In 2023, seven CGIAR Research Initiatives were worked in 10 of the 16 administrative regions. CGIAR field research was targeted around the country's northern and southwestern belts due to the pronounced vulnerabilities of communities and the environment to the devasting effects of climate change, among other developmental changes, in these areas.

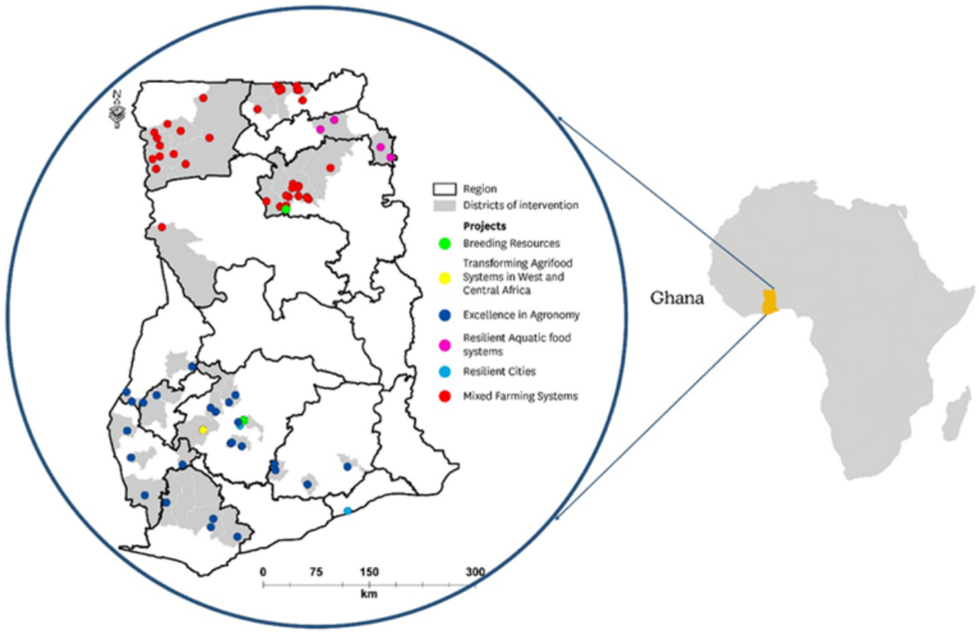


Figure 3.2. Strategic engagement partners for CGIAR in Ghana, 2023.

CGIAR results in Ghana

In terms of CGIAR's Science Groups, Ghana's results are mainly from ST (111 results), followed by GI (72 results), with 21 results from RAFS (Figure 3.3).

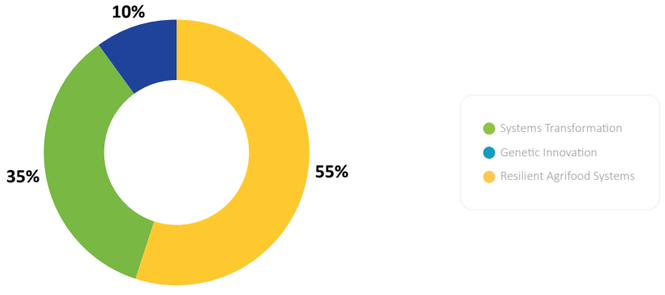


Figure 3.3. CGIAR results by Science Group in Ghana, 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

For the Impact Areas, 2023 results contribute mostly to the Nutrition, Health, and Food Security and the Climate Adaptation and Mitigation Impact Areas, with an almost equal number of results contributing to the remaining three Impact Areas. Figure 3.4 shows the breakdown of reported results.

Figure 3.4. Contributions to the CGIAR Impact Areas in Ghana, 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

These results touch on 16 of the 17 SDGs, with more than 100 results each for SDG 1 (No Poverty) and SDG 2 (Zero Hunger). The other high-scoring SDGs are SDG 5 (Gender Equality), SDG 13 (Climate Action), and SDG 6 (Clean Water and Sanitation) (Figure 3.5).

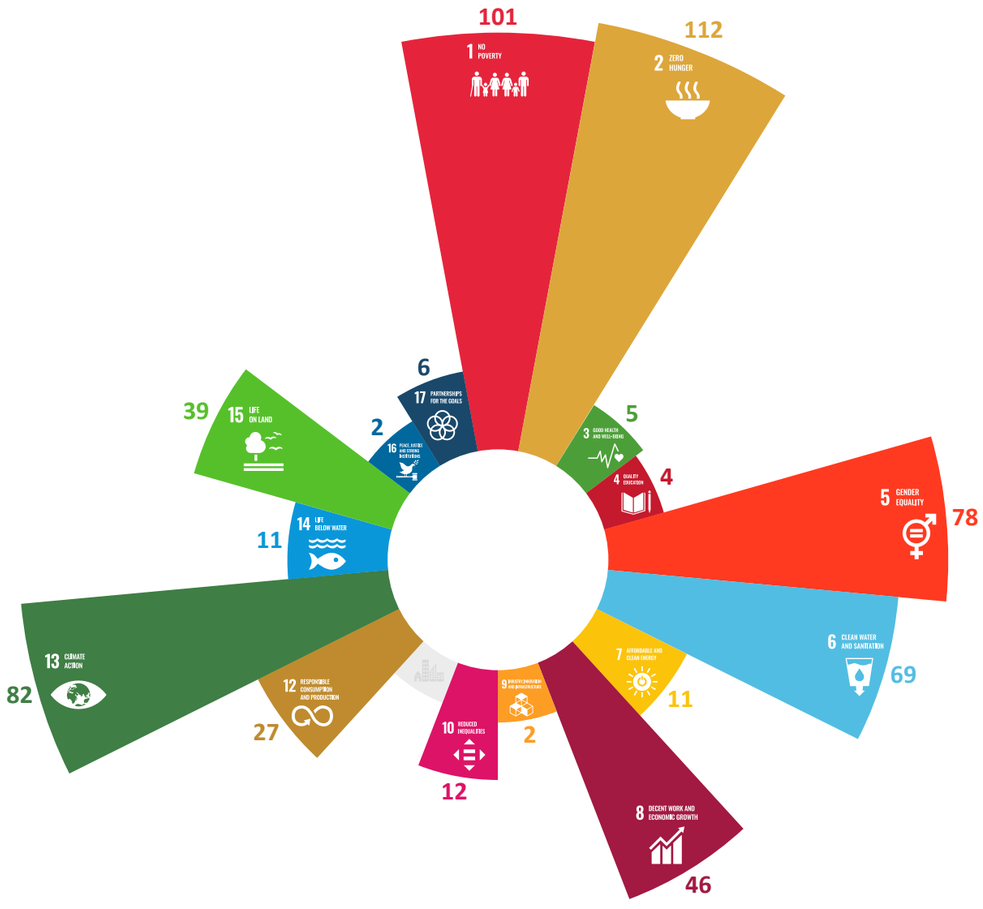


Figure 3.5. Contributions of CGIAR results to the SDGs, 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Result overview

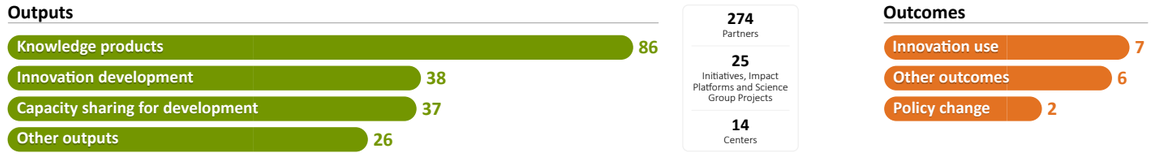


Figure 3.6. Outputs and Outcomes for Ghana, 2023.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

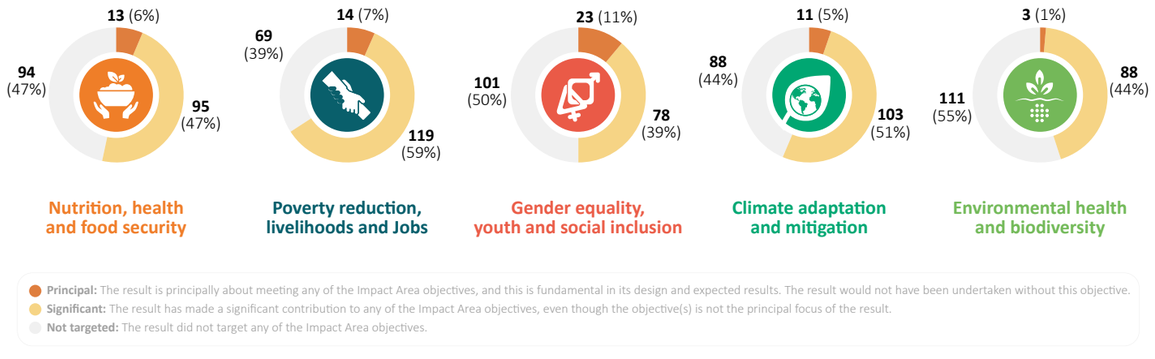


Figure 3.7. Results for Ghana tagged to CGIAR's five Impact Areas, 2023.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Result examples

Capacity sharing for development

- CGIAR has built a community of practice in Ghana for integrated seed sector development to achieve an inclusive and sustainable food system through knowledge exchange and capacity sharing among stakeholders within the agricultural value chain. Smallholder farmers are at the core of agricultural development in Ghana.
- CGIAR trained over 7,500 stakeholders in 2023. Extension agents were trained across Ghana to conduct an e-registration of farmers to ensure access to inputs and agro-climate advisory services. In addition, some local farmers in the northeast of Ghana were trained in fish cage farming utilizing small reservoirs to sustainably improve food production and livelihood streams and empower youth, women, and small-scale farmers. CGIAR also trained farmers in efficient water management practices using low cost and locally made water scheduling tools. The Alternate Wetting and Drying tool made of PVC pipe improved water and nutrient use efficiencies. Farmers living in northern and central Ghana were able to conserve water by 40 percent and improve rice yield by 22 percent.
- CGIAR has invested in genetic innovations by establishing digital platforms, breeding data management, and genotyping data analysis. Several farmers and extension agents were trained on Black Soldier Fly Technology in 2023.

Strategic innovations for the agrifood sector

In Ghana, innovation development is championed by demand actors, facilitating the uptake and scaling of innovations toward impact. In 2023, CGIAR developed 38 innovations at different scaling readiness levels with high potential. Examples include the following:

- Community volunteers were involved in the co-design and implementation of research activities of the West African Agrifood System Transformation Initiative.
- involved in the co-design and implementation of research activities of the West African Agrifood System Transformation Initiative.
- CGIAR promoted gender equality with tools such as the Women's Empowerment in Livestock Index to measure women's involvement in livestock-dependent livelihood systems. The tool allows comparisons of women's empowerment across sites and time.
- CGIAR also developed climate adaptation tools such as Aclimatar for cocoa management in Ghana and advocated for sustainable cocoa production through Integrated Soil Fertility Management (CocoaSoil).

- As part of its contribution to the Environmental Health and Biodiversity Impact Area in Ghana, CGIAR established a Circular Bio-Economy Innovation Hub, uniting more than 16 partners and serving as a one-stop shop for training, research, advisory, and demonstration for all of CGIAR's innovations in the circular bioeconomy – such as waste-based organic fertilizers, energy recovery, and the utilization of wastewater for agricultural and fish production.
- To strengthen the analysis of strategic interventions by state actors, CGIAR developed a Foresight and Rapid Response Modeling System – an on-demand modeling tool to analyze intervention impact during global crises to advise the investment response of development organizations and policymakers.

Policy for agricultural transformation in Ghana

CGIAR influenced policy transformation from the local to national governance levels in Ghana by co-creating with national institutions demand-driven solutions to transform food, land, and water systems. For example:

- The success of the Tilapia Seed Program inspired the Government of Ghana to launch an Aquaculture Development Plan. Furthermore, the CGIAR Research Initiative on Aquatic Foods, together with partners, contributed to integrating aquaculture into the design of the government flagship program "One Village, One Dam" in Ghana, integrating aquaculture and aiming at increasing aquaculture production.
- CGIAR's research findings contributed to new investment decisions by Agricultural Mechanization Services Enterprise Centers to meet the needs of smallholders in Ghana.
- Beyond supporting policymaking, CGIAR played a key role in designing and validating the national hatchery and fish farm certification system in Ghana.
- Ghana, through a strategic effort by CGIAR, prepared a Biodiversity in Agriculture Flagship Report. The report's objective is to raise countries' understanding of agriculture's impact on biodiversity and ecosystem services (nature) and provide them with the knowledge, policy tools, and investment options to protect nature while meeting the demand for food.

CGIAR investments in Ghana

CGIAR invested more than USD 6 million in Ghana through seven Initiatives. Figure 3.8 shows the top five Initiative budget allocations in 2023, highlighting the considerable focus on improving Ghana's agricultural sector through CGIAR's Initiatives (Excellence in Agronomy, Mixed Farming Systems, West and Central African Food Systems Transformation, Resilient Cities, and Aquatic Foods).

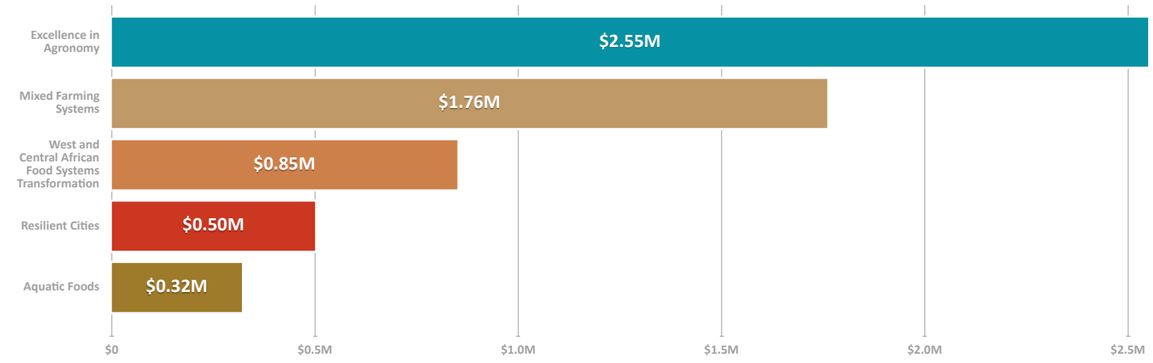


Figure 3.8. Top five Initiative budgets allocated to Ghana, 2023.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

CGIAR alignment with country priorities

Country needs for the agriculture and development sectors have been well expressed in relevant documentation, including the Medium-Term National Development Policy Framework: Agenda for Jobs II- Creating Prosperity and Equal Opportunity for All (2022-2025); the Coordinated Programme of Economic and Social Development Policies (CPESDP) 2017-2024; the Ghana Beyond Aid Charter; the Food and Agriculture Sector Development Policy (FASDEP), and its related Medium Term Agriculture Sector Investment Plan (METASIP); and Planting for Food and Jobs (2018-2024). These frameworks and polices have guided CGIAR implementation across all 16 regions in Ghana, with several staff living and/or working particularly in the climate-vulnerable hotspot districts of northern Ghana, where the greatest food, land, and water system problems persist. By working together with national partners, CGIAR has contributed to water management solutions, crop and livestock breeding, agricultural value chain improvements, agronomic practices, plant and animal health, policy change, improved nutrition, natural resource management, and climate change responses in Ghana. These solutions align well with national priorities.

The Initiatives operating in Ghana were co-implemented with national partners, demonstrating strong alignment to the country needs and priorities. Some examples include:

- The CGIAR Research Initiative on Resilient Cities' thematic focus on the key challenges of urban and peri-urban environments, including unhealthy diets and limited access to nutritious food by the urban poor; food safety and food waste reduction; pollution; environmental degradation and climate change impacts; and low visibility and support within urban policy, governance and investment aligns well with the country's existing Environmental Sanitation Policy and contributes to its revision.
- The CGIAR Research Initiatives on Excellence in Agronomy, West and Central African Food Systems Transformation, Aquatic Foods, and Mixed Farming Systems align with the government's flagship programs on Planting for Food and Jobs, Rearing for Food and Jobs, and One Village, One Dam. Together with other NARES, CGIAR has utilized its expertise to co-develop biofortified crop varieties, smart seeds, climate smart irrigation technologies, and financial models integrating public-private investments for smallholder farmers, among others. The integration of aquaculture into existing irrigation dams serves as an alternative source of food and livestock for smallholder households. The Initiative on Aquatic Foods has aligned well with the government program, One Village, One Dam.
- CGIAR's Initiatives play a crucial role in the Ministry of Food and Agriculture's Planting for Food and Jobs Phase II (PFJ 2.0), transitioning from input subsidies to a credit system tied to structured markets. Phase II emphasizes job creation and introduced the Ghana Agriculture and Agribusiness Platform for digital transactions, investment, and credit access for which CGIAR had aligned its expertise to co-develop financial models integrating public-private investments for smallholder farmers. Figure 3.9 shows the alignment of Initiative work to the government's PFJ 2.0.
- CGIAR's Initiatives are leveraging the existing partnership with the Council for Scientific and Industrial Research, NARES and development partners to identify together the research needs of the country, and co-design solutions, co-lobby for funding, and co-implement projects to support the transformation of land, food, and water systems.

Ghana as an entry point for transformation in West and Central Africa

Agricultural development in West and Central Africa needs great transformation. All agro-ecological zones in the region are burdened with drastic changes and emerging problems that are more multi-faceted and complex than what existing country capabilities can respond to. The interconnected problems cut across:

- Increasing water scarcity and insecurities, which contribute to slow agricultural productivity, postharvest losses and food waste.
- Pressure on arable lands, soil degradation, the slow pace of practicing sustainable agricultural intensification, and limited technology adoption and ineffective innovation scaling models.
- Climate vulnerability and unpredictability of rainfall, environmental degradation, and external shocks driving rising food and livestock feed prices.
- Inefficient climate information services, a lack of reliable and centralized agricultural information services, and complex land tenure arrangements.
- Ineffective collaboration, weak coordination and duplication of development efforts, policy incoherence and weak regulatory compliance and enforcement, and inadequate private sector engagement.
- Inequalities in the access to and control over productive assets by men, women and youth.

Achieving the transformation needed requires CGIAR to continue to play its vital role in confronting food, land and water system challenges. Ghana's peaceful institutional and geopolitical environment makes it possible to leverage solutions to these complex problems. Ghana is well positioned within the region to lead and significantly contribute to the agricultural transformation of other countries in West and Central Africa.

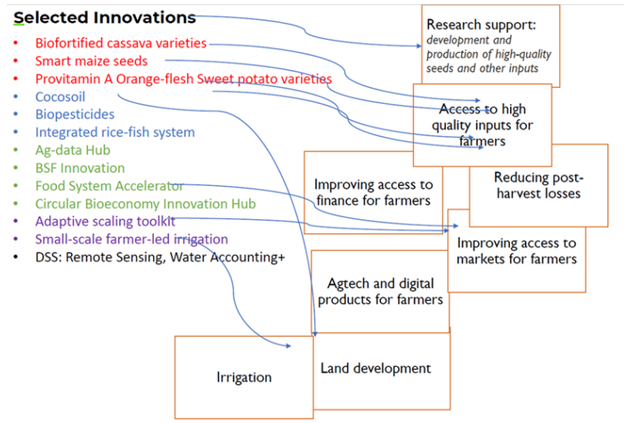


Figure 3.9. Alignment of selected CGIAR innovations to the themes of PFJ 2.0.

Soy Trial Field Ghana.
Credit: Excellence in Agronomy initiative

Guatemala

What CGIAR is doing in Guatemala

During 2023, 12 CGIAR Research Initiatives from across all three Science Groups brought together scientists from 11 CGIAR Centers to produce 193 research results together with 113 different partners across Guatemala. This includes 181 research outputs and 12 research outcomes. Four Initiatives – AgriLAC Resiliente, Climate Resilience, Livestock and Climate, and Digital Innovation – generated 90 percent of the results reported. This is a significant increase from 2022, when just 35 results were reported, only one of them an outcome, engaging just 45 partners. These numbers evidence the growth in scope and depth of CGIAR's work in Guatemala and the maturing of the pipeline of innovations and research outcomes, as well as the increasing density of the partner network with whom CGIAR is engaging, including innovation as well as scaling partners, in support of the transformation of the agrifood system in Guatemala.

CGIAR's work in Guatemala seeks to drive changes at multiple scales to transform the innovation ecosystem from the bottom up and the top down, engaging with farmers to co-design innovations to improve on farm results, and with extension and research institutions to build capacity and scale innovations. Areas of innovation include delivery mechanisms for decision-making support and information services for the agricultural sector, and capacity building for ministries and national institutions using evidence to create a policy environment that supports small-scale farmers and rural households to become climate resilient, food secure and more inclusive.

CGIAR Research Initiative results contribute to the SDG agenda in Guatemala, contributing to SDG 1 (No Poverty), SDG 13 (Climate Action), SDG 5 (Gender Equality) and SDG 2 (Zero Hunger) (over 170 results contributing to each), with smaller contributions to SDG 12 (Responsible Consumption and Production), SDG 8 (Decent Work and Economic Growth), SDG 6 (Clean Water and Sanitation), SDG 10 (Reduced Inequalities) and SDG 3 (Good Health and Wellbeing).

Figure 3.10. SDG contributions for 2023 results in Guatemala.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

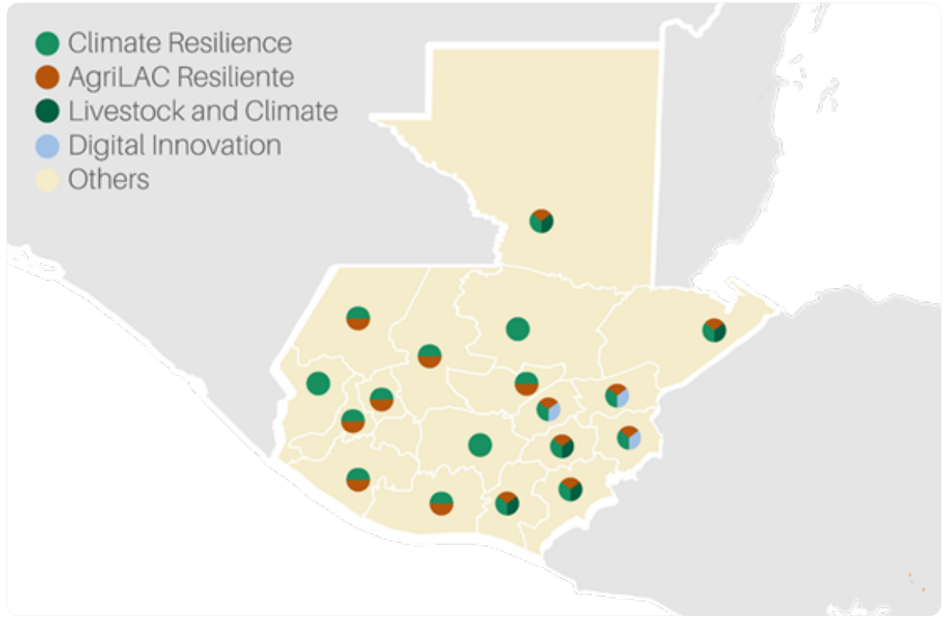
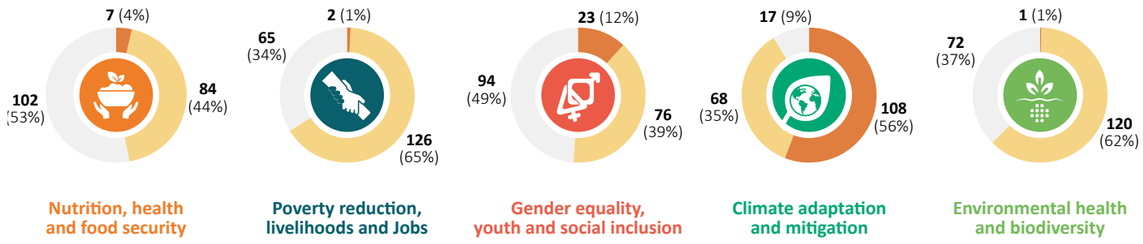


Figure 3.11. Initiatives that generated most results in Guatemala, 2023.

Reported results in 2023 target all five CGIAR Impact Areas, with over 100 results for each (see Figure 3.12). Climate adaptation and mitigation is the principal focus of CGIAR's work in Guatemala, with the largest proportion of results having climate as their principal Impact Area (as compared to number of results reporting other Impact Areas as principal). The Impact Areas related to poverty reduction, and environmental health are significant (though not principal) Impact Areas for more than half of the research results.

Figure 3.12. Number of contributions to each of CGIAR's Impact Areas.



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.

Figure 3.13.Results for Guatemala tagged to CGIAR's Impact Areas.

Initiative budgets allocated to Guatemala

CGIAR invested approximately USD 4 million in Guatemala in 2023 through 12 different Initiatives. The top five Initiatives in terms of investments were Climate Resilience; AgriLAC Resiliente; Digital Innovation; Fragility, Conflict, and Migration; and Genebanks. While this represents small decreases for the top three Initiatives in Guatemala, total investment in Guatemala remained relatively stable, compensated by increases in other Initiatives in 2023 (Figure 3.14). The sizeable growth in research results shows that 2022 investments laid a strong foundation for our work in 2023.

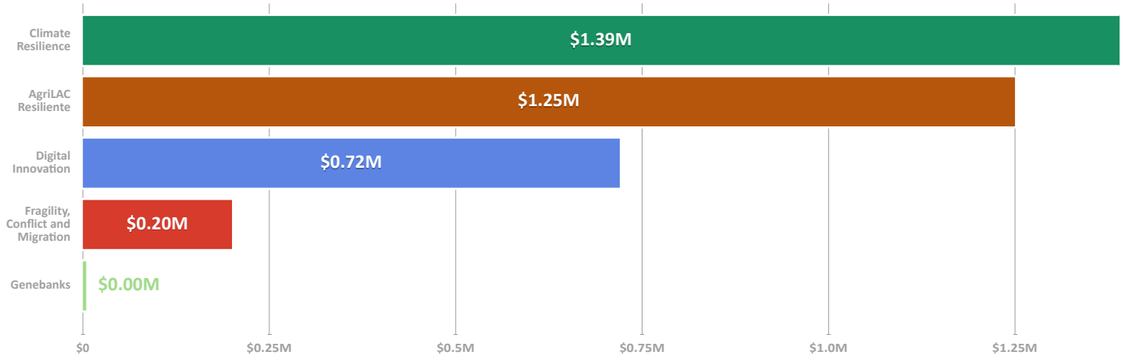


Figure 3.14. Top five Initiatives with the highest combined budget for Guatemala for 2023.
Source: Financing Plan dashboard.

In the department of Chiquimula, Guatemala, a group of women agreed to use a new bean variety that is transforming the way children in the region are fed. The biofortified Icta Chorti bean arrived two years ago to households seeking to alleviate one of the most serious problems affecting the country, child malnutrition. Chiquimula, Guatemala, June 2023. Credit: Adriana Varón / CIAT

CGIAR results in Guatemala

CGIAR results in Guatemala in 2023 include **outputs** such as capacity development of key actors through short-term training opportunities; the production and dissemination of knowledge products including reports, briefs, and presentations; and the codesign and evaluation of innovations. Some initial stage **outcomes** were also achieved in 2023, including the use of CGIAR innovations by partners, and research being taken up in policy processes. The table below shows a **healthy pipeline of research outputs and outcomes**, with the number of outputs increasing substantially from 2022 to 2023, and outputs starting to develop into outcomes as partners take up research results to change existing practices and policies.

TYPE OF RESULT	2022	2023
OUTPUTS	**33**	**181**
Knowledge products	10	76
Capacity development	5	79
Innovation development	9	17
Other	9	9
OUTCOMES	**1**	**12**
Innovation use	1	7
Policy change	0	4
Other	0	1

Table 3.15. Number of reported results, by result type, for 2022 and 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Knowledge products

During 2023, 76 knowledge products relevant for Guatemala were produced by scientists from seven CGIAR Centers in collaboration with 54 different partners. These products included technical reports, briefs, presentations, and journal articles. Almost all of these (99 percent) are open access, and 5 percent are published in journals indexed by the Web of Science. The majority of these products are findable, accessible, interoperable and reusable (FAIR) with a need to improve on interoperability (only 60 percent of products are interoperable while more than 80 percent comply with the rest of the FAIR principles).

The majority of these knowledge products had climate adaptation and mitigation as their principal focus (68 percent), followed by gender (12 percent), and nutrition (5 percent). Poverty reduction and environmental health and biodiversity were significant areas of focus, followed by nutrition and gender. An exploration of key words from these products reveals climate change, agriculture, and resilience as key themes, followed by gender and equality.

Building capacity

CGIAR scientists have partnered with 49 institutions, including governments, particularly the Ministry of Agriculture (MAGA; Ministerio de Agricultura y Ganadería); the meteorological institute (INSIVUMEH; Instituto Nacional de Sismología, Vulcanologia, Meteorologia e Hidrología); NARS (ICTA; Instituto de Ciencias y Tecnología Agrícolas); the private sector; universities; UN agencies; local and international NGOs; and farmer organizations to provide short-term training for 3,104 individuals (33 percent of whom were women). Most of these individuals were farmers, while extension agents and other staff within partner organizations have also been trained through formal and informal training events. Topics included training on generation and use of agroclimatic information for on-farm decision-making; sustainable crop management practices including conservation agriculture, climate smart agricultural practices, the production of biofortified crops, and pest management; and use and development of digital tools for data collection and application of human-centered design principles.

Innovation development and use

Seventeen innovations have been co-designed with partners. These include 10 technical innovations, four policy/organizational innovations and three capacity development innovations. These innovations target researchers, policymakers, extension agents and farmers and are designed to be taken up by next users including research organizations, NGOs, government agencies and the private sector. Seven innovations are already in use by partner organizations including governments, the private sector, and NGOs. These include new bean varieties that are being used by farmers together with farmer organizations and local NGOs, as well as novel ways to disseminate climate forecasts including farmer-centered agroclimatic bulletins distributed through the Local Agroclimatic Committees network, WhatsApp groups, and radio spots, reaching over 100,000 farmers in 2023. Seventeen innovations are under development with partners including a digital farm plot, gender responsive scaling methodology, and diet monitoring tools.

Contributing to policy change

Four results were reported in 2023 as contributing to policy change in Guatemala. All of these results, as would be expected, are at an initial stage where partners are taking up CGIAR research in policy processes but as yet there has not been any documented policy change. These four policy outcomes include influences on local/organizational policy processes as well as national and regional (Central America) level policy processes. The policy processes where CGIAR research is providing inputs include strategic planning for a local NGO; the definition of Guatemala's National Framework for Climate Services; the prioritization of digital transformation as a priority pathway for the Inter-American Institute for Cooperation on Agriculture (IICA); and contributing to the Regional Climate Change Strategy process for the Central American Integration System (SICA). Three of these policy outcomes are supported by two or three Initiatives working together to support policy development in Guatemala and the region in support of inclusive, resilient food system transformation.

Snapshot of key results

Capacity sharing for development

As part of the AgriLAC Resiliente Initiative, innovation hubs have been established in eastern and western Guatemala. These *InnovaHubs* promote testing of new agricultural practices and knowledge sharing to empower stakeholders with the necessary skills to drive agricultural innovation at the local level. Part of a comprehensive training strategy for local extension agencies and farmer organizations, these hubs have enhanced knowledge of over 3,000 farmers and other food system actors on seed systems, conservation and climate smart agricultural and post-harvest practices, food processing, climate risk management and markets.

Innovation pipeline

Beans are a major part of the diet in Guatemala and an important source of protein and iron, particularly in rural communities. In 2023 farmers in several regions of Guatemala planted approximately four pounds of improved bean (ICTA Hunapu) seed and received training on crop management as well as food preparation. This biofortified variety has the potential to improve nutrition and yields due to higher nutritional value and resistance to pests and diseases, while also contributing to climate resilience and poverty reduction, targeting women farmers. The seed was distributed to 312 farmers in six communities, 67 percent of whom are women.

The Livestock and Climate Initiative is innovating to unlock finance opportunities for livestock producers by developing a climate-linked credit risk scoring tool that catalyzes farm adaptation and facilitates access to credit. Strategic partnerships with financial organizations in Guatemala can potentially extend these benefits to hundreds of thousands of farmers.

Gender

In 2023, the AgriLAC Resiliente Initiative spearheaded a series of studies in Guatemala aimed at unraveling insights into climate resilience, migration dynamics, and gender roles. These efforts resulted in a journal article on cultural and economic barriers and opportunities for women's participation in agricultural production systems in Guatemala. Subnational mapping of key programs and interventions in food security and nutrition, along with studies on women's participation in agricultural activities and climate-induced emigration, reflect a strategic effort toward informed policy formulation and resource optimization in Guatemala.

Policy change

Scientists from the Climate Resilience Initiative, in collaboration with Guatemalan stakeholders including the INSIVUMEH, contributed to stakeholder engagement and baseline assessment activities for the formulation of **Guatemala's National Framework for Climate Services**. This framework, in line with World Meteorological Organization (WMO) standards, defines key sectors, actors, and their roles within the climate services value chain at the national level. The capabilities of the INSIVUMEH were evaluated based on the delivery of climate information services to different sectors/users, resulting in the identification of gaps and key elements for a plan of action to implement the framework.

Seven Central American countries and the Dominican Republic are joined together under the SICA which brings together ministries in regional sectoral councils that contribute to integrated governance in the region through regional policy instruments. One such instrument is the **SICA Regional Climate Change Policy**, spearheaded by the Central American Council on Environment and Development, made up of the Ministers of Natural Resources of the region. CGIAR scientists from the Climate Resilience, AgriLAC Resiliente and Fragility, Conflict, and Migration Initiatives have collaborated to contribute evidence and policy recommendations for the incorporation of climate security considerations in a new 10-year policy to govern climate change and natural resource policy at the regional level, recognizing shared environmental challenges as well as interdependence and the need for regionally integrated solutions to address issues of migration, security and economic development.

Guatemala's Portfolio network

Almost half (48 percent) of all results reported for Guatemala demonstrated the involvement of multiple Initiatives in 2023 (Figure 3.16). Fifteen percent of results were the product of collaboration between at least three and up to five Initiatives working together to integrate agendas and achieve outcomes.

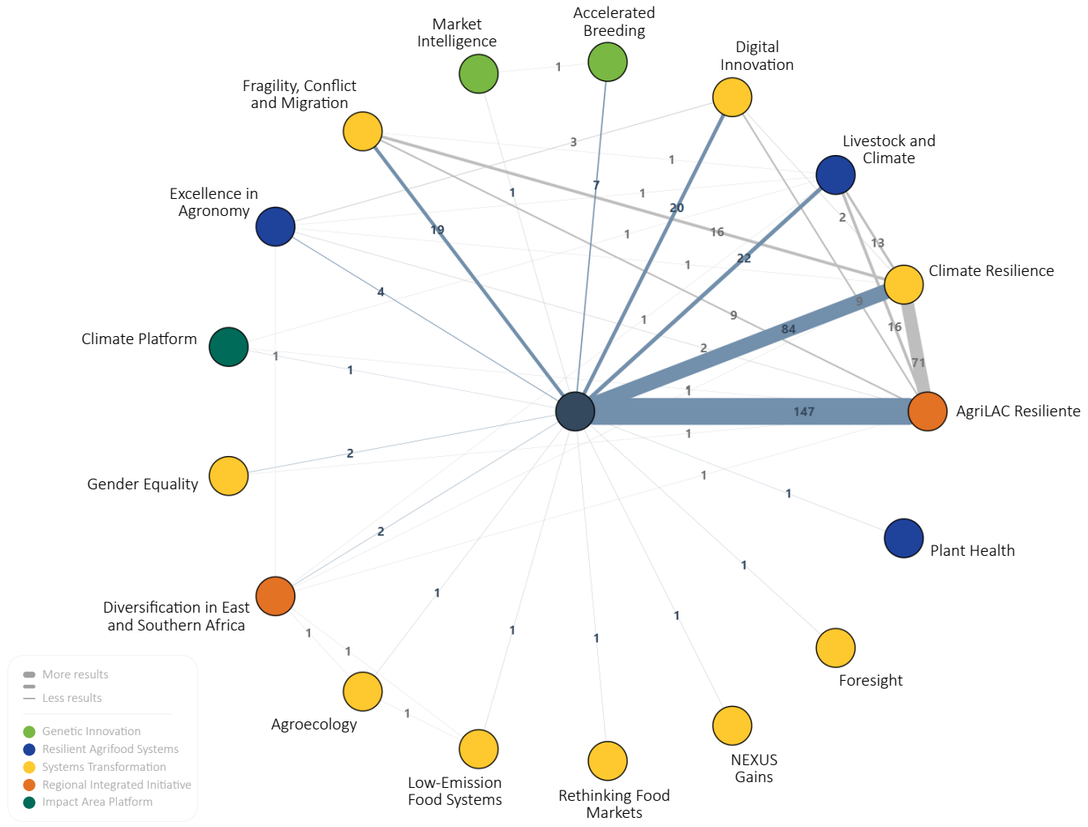


Figure 3.16. Guatemala's Portfolio network.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

The CGIAR Regional Integrated Initiative AgriLAC Resiliente collaborated with eight different Initiatives; Livestock and Climate with five; Excellence in Agronomy and Climate Resilience with four each; and Fragility, Conflict, and Migration and Digital Innovation with three each. We see strong collaboration between Initiatives in the ST and RAFS Science Groups, while GI Initiatives collaborate with each other. With climate being an important focus of CGIAR's work in Guatemala, it is important to observe the strong collaboration across Initiatives addressing climate resilience from different angles, including AgriLAC Resiliente; Climate Resilience; Fragility, Conflict, and Migration; and Livestock and Climate – together these Initiatives represent over seventy shared results.

Partners at the center of CGIAR's innovation for impact strategy in Guatemala

The 193 results reported in Guatemala were developed together with 113 different partners. This represents a doubling of the number of partners engaged in CGIAR's Portfolio in Guatemala, with just 45 partners contributing to results in 2022. The largest number of results were produced together with government institutions including MAGA (39 results), INSIVUMEH (37 results), local NGOs such as the Association of Organizations of the Cuchumatanes (ASOCUCH, 18 results), private sector actors such as the Institute for Climate Change (ICC, 14 results), international organizations such as the World Food Programme (WFP, 10 results), and universities such as the Rafael Landivar University (6 results).

An important element in CGIAR's innovation scaling strategy for Guatemala is engagement with regional organizations such as SICA institutions, including the Central American Council of Agricultural Ministries, the Central American Council on Agriculture and Development (Ministries of Environment), the Regional Hydrological Resources Committee (Meteorological Institutes), IICA (part of the Inter-American integration system connecting agricultural ministries), UN agencies (especially the WFP and FAO), regional and global development banks and donors (for example, the International Development Bank, the World Bank and USAID). These organizations are key scaling partners as they work within Guatemala but also beyond Guatemala, connecting Guatemala with neighboring countries sharing many similar challenges and therefore supporting scaling pathways for CGIAR's work in Guatemala to neighboring countries of Central America. These organizations collectively influence many large-scale investments in Guatemala and the region and as such are important next users of CGIAR results, as well as thought partners for CGIAR.

PARTNER TYPE	NUMBER OF RESULTS
Government institutions	59
Universities	26
Private sector	24
Research organizations and universities Reg	16
International organizations	15
NARS	6
Local NGOs	6
International NGO	5
Farmer organizations	4

Table 3.17. Partners involved in the co-production of results in Guatemala.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

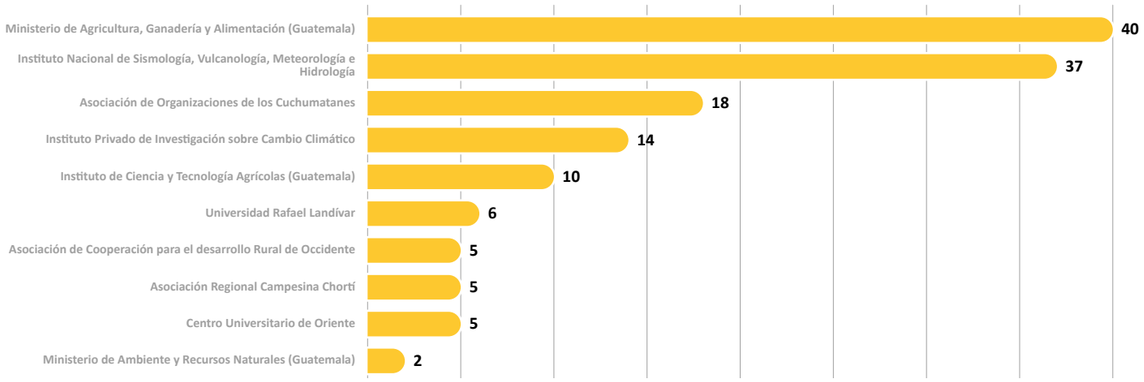


Figure 3.18. Guatemala-based partner institutions by number of results.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Responding to the country's needs and priorities

The Initiatives operating in Guatemala were co-created with partners during 2021 and 2022, and therefore demonstrate strong alignment with the country's needs and priorities. The increasing breadth of the partner network in country helps to embed CGIAR's agenda in existing innovation networks at the local and national levels, supporting increased alignment and responsiveness not only to national priorities and policies but also to the evolving demands of local organizations at the subnational level.

Some examples include:

- The CGIAR Research Initiatives on Livestock and Climate, AgriLAC Resiliente, and Climate Resilience address critical issues outlined in the National Development Plan K'atun 2032, the National Climate Change Action Plan (PANCC), and the National Low Emissions Development Strategy. Together, they have supported the formulation of the National Framework for Climate Services in accordance with the guidelines of WMO to improve country-level management of risk related to climate change and variability in different sector.
- The AgriLAC Resiliente Initiative worked together with the Climate Resilience Initiative to create a partner network for managing agroclimatic risk in agriculture through the Local Technical Agroclimatic Committees, contributing to the agriculture, livestock, and food security (AGS, agricultura, ganadería y seguridad alimentaria)-3 goal of Guatemala's Nationally Determined Contributions, which relates to developing a climate information access system.
- The CGIAR Research Initiatives on Fragility, Conflict, and Migration and Climate Resilience have a thematic focus on climate security that aligns with climate security considerations in Guatemala's National Climate Change Action Plan and Migration Policy, as well as in the Regional Climate Change Policy for SICA.
- The CGIAR Research Initiatives on AgriLAC Resiliente and Accelerated Breeding are supporting the development and dissemination of high iron beans and more nutritious maize, combined with training on food processing and preparation, aligned to Guatemala's Food and Nutrition Security and School Feeding Policy, as well as National Development Priority 4 (PND 4) – food and nutrition security.

Guatemala as an entry point for transformation in Central America

Central America contains several of the poorest countries in Latin America (Honduras and Nicaragua) as well as some of the severest pockets of undernutrition (Guatemala). As a region, the seven Central American countries, while each unique, are intimately intertwined. Specifically, countries in the region share:

- Vulnerability to extreme climate events (droughts in the dry corridor, hurricanes, and flooding) and are often hit by the same events across several countries.
- Food – other Central American countries are major food trading partners for all countries in the region meaning high levels of interdependence for food in terms of production, consumption, and transport hubs throughout the region.
- Shared sources of conflict or social tensions including narcotrafficking, migration, and organized crime.
- A relatively strong level of integration between institutions across the region through formal SICA institutions that bring ministries together around regional policy instruments and coordination as well as through regional private sector networks that span and act across multiple countries at once.

What this means for CGIAR's Portfolio in the region is the possibility of acting in specific countries, with an eye to scaling regionally where similarities of context or existing actor networks make this possible. This also means that for many Impact Areas, solutions that do not recognize and address how regional dynamics influence outcomes for vulnerable populations may not provide sustainable solutions. In recognition of this reality, the CGIAR Portfolio in Guatemala is highly integrated with work in other countries in the region as well as with regional institutional structures and dynamics. For example:

- Four results reported for Guatemala have been developed across and engage partners from up to five additional countries in the Central American region, facilitating and strengthening peer innovation networks and learning across countries.
- CGIAR was invited to participate in two workshops in 2023 to build a regional research agenda for crop improvement together with the directors of the NARS of the SICA region (Central America and the Dominican Republic).
- CGIAR also had a coordinated presence at the annual regional research conference focused on crop improvement for food crops, hosted by NARS since the 1960s, where CGIAR integrated agendas with universities and research partners from across the region as well as from the United States and Europe.
- Several reported results focus on regional outcomes at the SICA level.
- There are At least seven CGIAR partners involved in producing results are regional institutions, working across Central American countries.

CGIAR's investments in Guatemala will bear fruits in other parts of Central America over the coming years, facilitating impact at scale.

Thanks to the development and implementation of various innovations in Central American agriculture, we continue working for the mitigation and adaptation to climate change, based on science, research and data, digital innovations, financing and investments, policies and promotion of gender and social inclusion, strengthening in competitiveness, sustainability, and resilience to agri-food systems.
Credit: Daniela Arce / CIAT

Section 4: **Partnerships**

CGIAR continues to build and grow its network of partners around the world, acknowledging that food, land, and water systems transformation, as well as meeting the SDGs by 2030, require an "all-hands-on-deck" approach. Through collaboration and cooperation, CGIAR and its partners are delivering solutions to address the pressing challenges of poverty, hunger, malnutrition, climate change, social injustice, and environmental degradation.

Between 2022 and 2023, CGIAR substantially expanded its collaborative network, establishing partnerships across research, innovation, scaling, and advocacy domains. The total partner count increased from 1,963 to 2,376 – a remarkable rise of more than 20 percent (Figure 4.1). This growth underscores CGIAR's heightened commitment to collaborative alliances, involving partners extensively in the conceptualization, execution, and assessment of its research and development efforts and their subsequent outcomes. It is important to note that these numbers do not cover the bilateral partnership efforts of individual CGIAR Centers, for which detailed partnership data were unavailable.

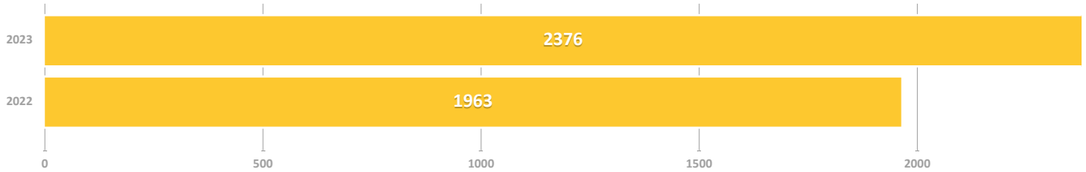


Figure 4.1. Number of CGIAR partners, 2022–2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

In 2023, Initiatives/Impact Platforms/SGPs collaborated with an average of 174 partners (Figure 4.2). This Portfolio-wide average, however, conceals a considerable degree of variation among Initiatives. It comes as no surprise that the scale of the budget for reporting entities correlates strongly with the extent of its partnership network. Overall, Initiatives falling under the GI Science Group exhibited a higher level of partnership engagement compared to Initiatives in other Science Groups or Regional Initiatives.

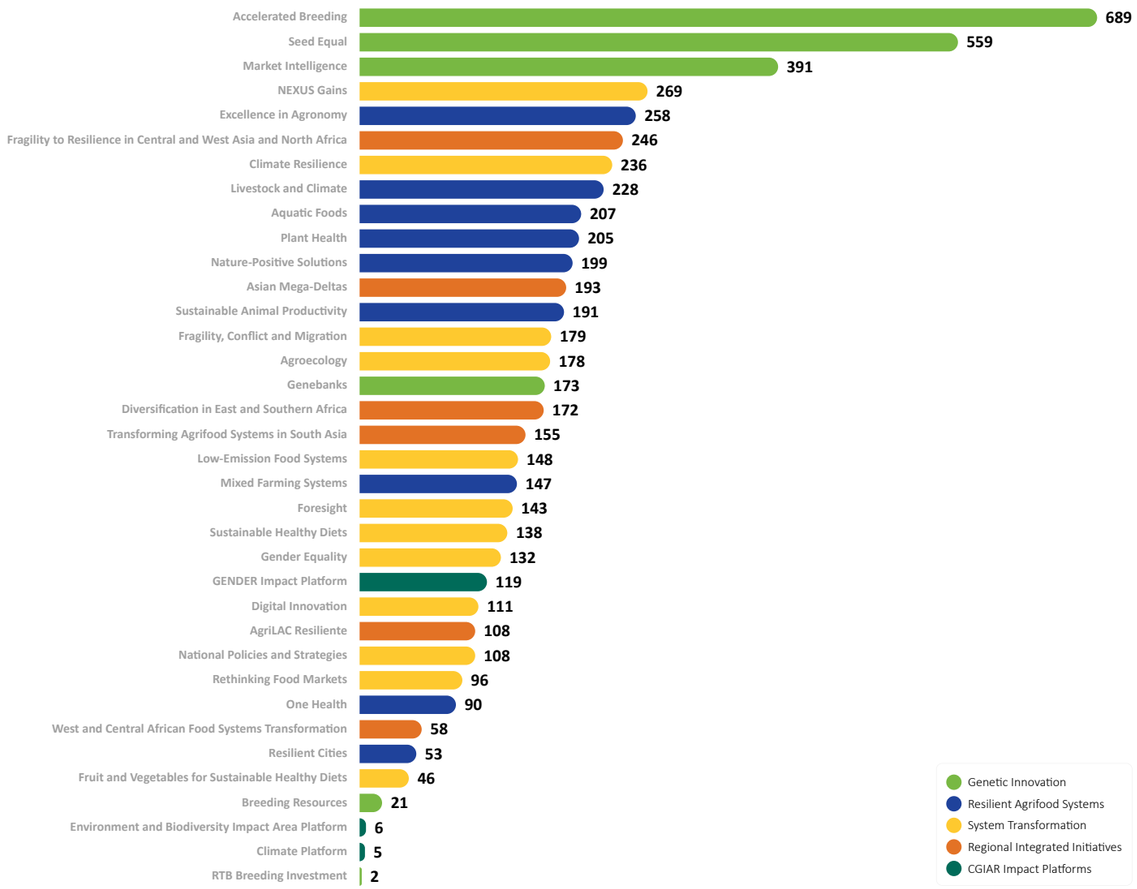


Figure 4.2. Total number of partners by Initiative/Impact Platform/SGP, 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

In 2023, research organizations and universities constituted roughly half of CGIAR's partnerships (Figure 4.3). Private companies and government agencies each accounted for 15 percent, while the remainder included NGOs, international organizations, financial institutions, foundations, and other entities. During the period spanning 2022 to 2023, there was a marked increase in the total number of partners across all categories, except for financial institutions.

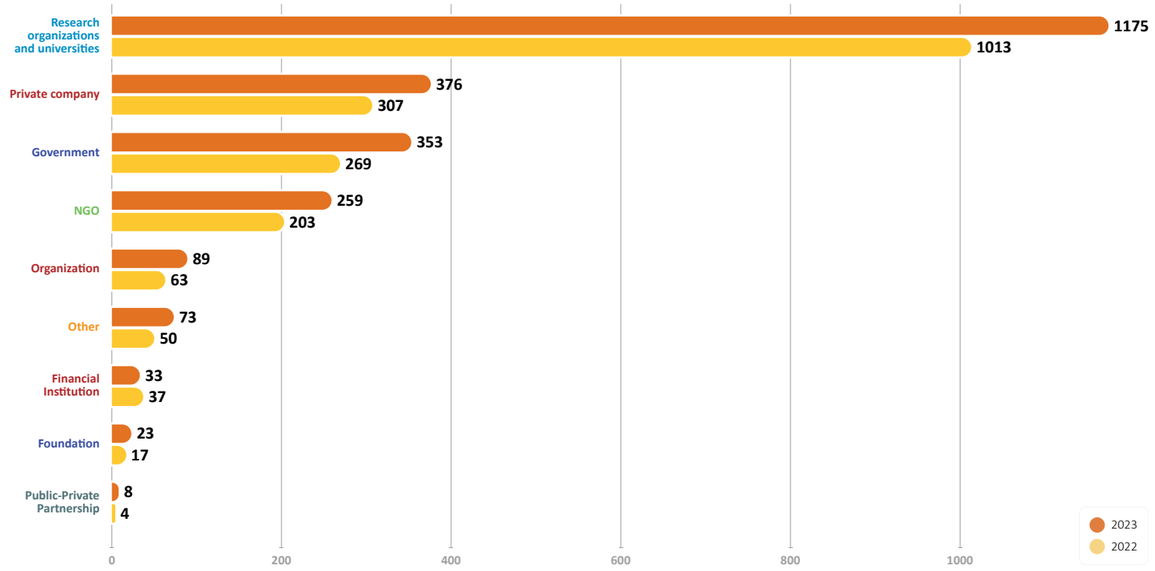


Figure 4.3. Total number of partners by type, 2022–2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

A closer look at the origins of CGIAR's partners unveils interesting distinctions. In 2023, most partners – 65 percent – were from the global South, a slight rise from the preceding year's 63 percent share. Noteworthy is that nearly 40 percent of the research organizations and universities collaborating with CGIAR are based in the global North (Figure 4.4).

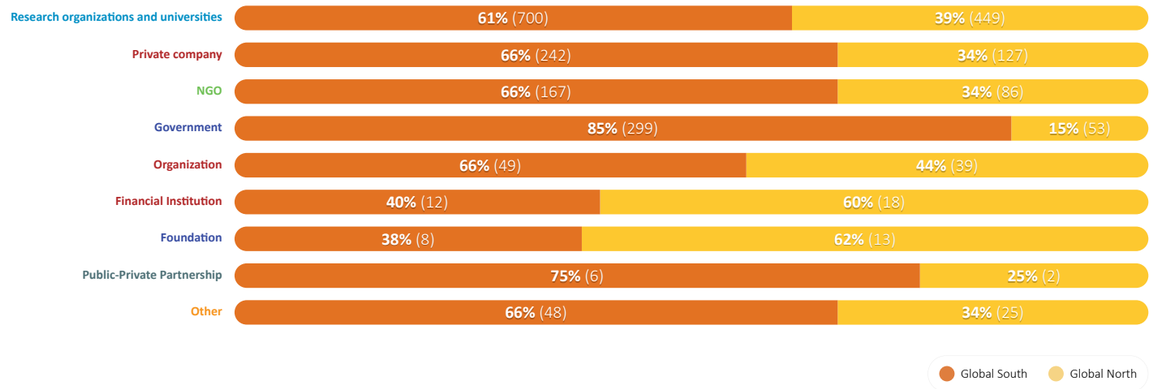


Figure 4.4. CGIAR partner types segmented by global North and global South origins, 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

CGIAR's partners can be categorized into four broad groups: demand partners, innovation partners, scaling partners, and others. Demand partners have explicit or implicit needs to address specific developmental challenges or capitalize on opportunities. CGIAR provides these partners with scientific and technical support, along with policy and investment guidance. These partners bring deep context- and subject matter-specific knowledge, collaborating with CGIAR to shape interventions. Major partners in this category include the Ministry of Agriculture and Rural Development (MARD) in Viet Nam, the Kenya Agricultural and Livestock Organization (KALRO), and Uganda's National Agricultural Research Organisation (NARO).

Innovation partners are those with whom CGIAR co-invests and collaborates to develop customized innovative solutions and enhance readiness for innovation to contribute to impactful outcomes in upstream science, applied research, and context-specific innovation testing, adaptation, and validation. Key partners here include Wageningen University and Research Centre in the Netherlands, the French Agricultural Research Centre for International Development (CIRAD), as well as various larger national agricultural research institutes in Africa and Asia.

Scaling partners are collaborators with whom CGIAR works to promote the adoption and utilization of innovations at scale, encompassing technologies, methodologies, practices, and policies. This involves advocacy by both private and public sector entities to influence policies and business practices. Partners in this category include various larger African and Asian national agricultural research institutes, as well as the FAO and the WFP.

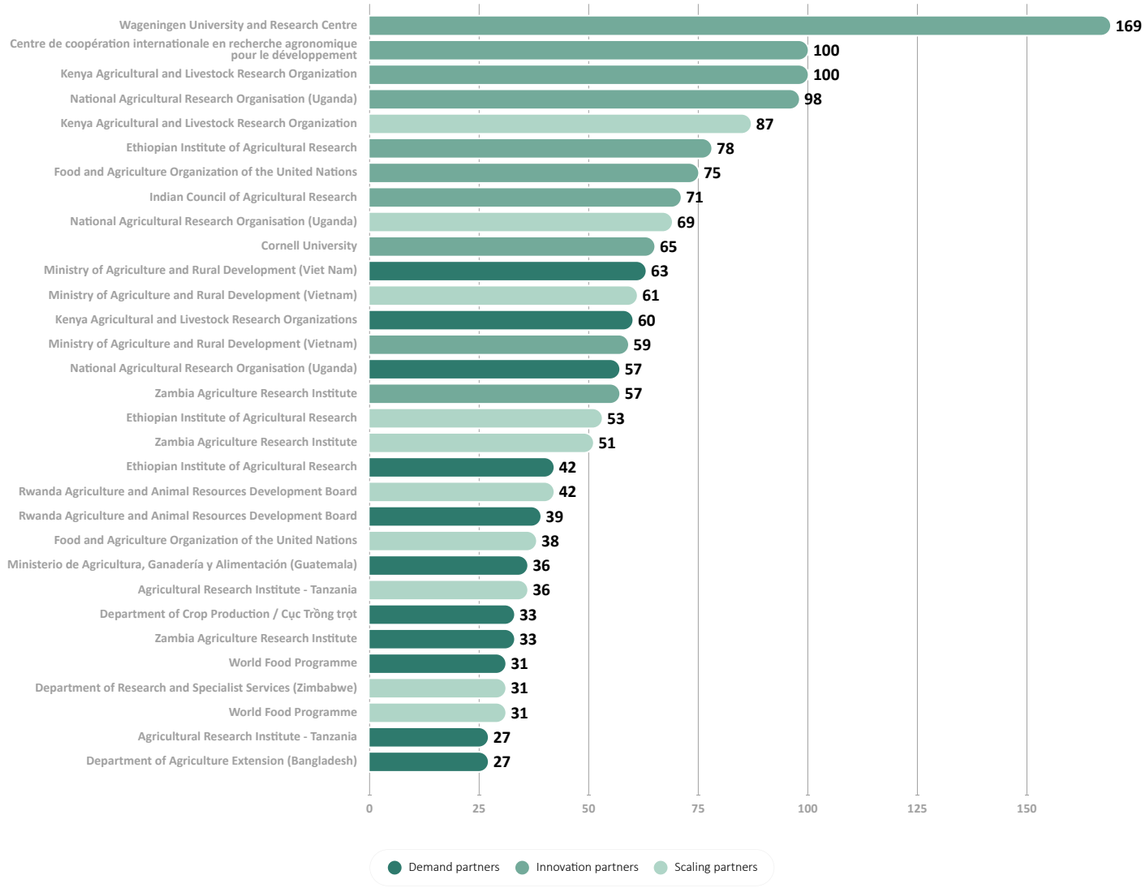


Figure 4.5. Top 10 partners by delivery type, 2023.

Note: A partner can contribute to a result with more than one delivery type. Therefore, the result of all types can be more than the total number of results associated with a partner. Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

In 2023, Initiatives/Impact Platforms/SGPs reported that 52 percent of knowledge products, such as journal articles, book chapters, working papers, videos, and briefs, were developed with partners (Figure 4.6a). Additionally, 94 percent of CGIAR innovations that same year were developed in close collaboration with partners (Figure 4.6b). Research organizations and universities emerged as the primary partners in the production of both knowledge and innovation products.

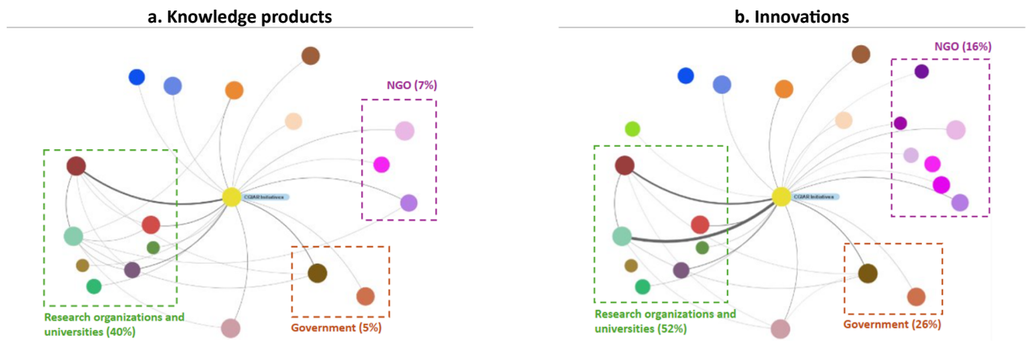


Figure 4.6. Share of CGIAR knowledge and innovation products developed with partners, 2023.

Note: Node size is by number of results, leading or contribution. Edge size is by number of results. The network is filtered by results between partner typologies > 30. A result can have several partner typologies. A 'partner' is classified as organizations or individual stakeholders that the CGIAR collaborates with to achieve its goals. Partners can also be beneficiaries of CGIAR's interventions. Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

In 2023, CGIAR continued to develop foundational elements of its approach and strategy for its engagement with partners. Noteworthy was the preparation of CGIAR's Engagement Framework for Partnerships and Advocacy, Version 2.0 (EF 2.0), which took into consideration the recommendations of the System Board-appointed independent High-Level Advisory Panel's (HLAP) report, On Improving One CGIAR's Strategic Engagement with Partners, as well as insights from across CGIAR and partners. EF 2.0 aims to build a robust network of resources, expertise, and innovative capabilities for the co-creation and effective scaling of research innovations toward greater impact. It was engineered to harness the collective strength and diversity of global, regional, national, and local partners and catalyze healthy, equitable partnerships built on mutual trust and purpose. EF 2.0 was approved by the CGIAR System Board in early 2024.

In late 2023, CGIAR partnered with The Partnering Initiative (TPI), a leading international NGO dedicated to unleashing the power of partnerships for a prosperous and sustainable future, to create a roadmap to develop a CGIAR Partnerships Strategy. This partnerships strategy will be constructed in 2024, accompanying, complementing, and building off the new Mega Programs. The aim of the partnerships strategy is to (1) articulate CGIAR's vision of how it wants to show up as a partner, based on a clear, shared partnership definition, and aligned with partnership principles; (2) define intended partnership value-added, i.e., organizational value to CGIAR and its partners; (3) create a systematic, consistent partnering approach (e.g., common language, tools, templates and processes); and (4) assess whether partnerships are achieving the aspired value, as well as continuously learn and improve.

Finally, a key element of CGIAR's enhanced approach to engagement with partners was initiated through its capacity sharing for development (CapSha) function. CapSha aims to serve as a vehicle for CGIAR to significantly improve its engagement with partners in the global South, particularly by embracing a new approach to capacity development at the individual, institutional and System-level. This new model of engagement is based on mutual learning, and the co-development, sharing and exchange of evidence, innovations, and technologies with partners, versus the traditional unidirectional transfer of knowledge and skills. Noteworthy was the launching of CapSha's "Research Engagement" prototypes in Ethiopia, Rwanda, and Senegal. Through these, CGIAR is supporting NARS partners to develop sustainable capacities, employing a "learning-by-doing" approach in which they lead research efforts that address national priorities and contribute to jointly defined impact outcomes with CGIAR Research Initiatives. These projects are expected to last through 2025.

Dr. Ismahane Elouafi, CGIAR Executive Managing Director (EMD) visits IITA HQ tours the facilities with DG Simeon Ehui and SMT in Ibadan. Credit: IITA

Section 5: **Impact Area focus**

Gender Equality, Youth and Social Inclusion

Overview of results

In 2023, 41 percent of results (2,487) reported by CGIAR addressed gender equality as a significant (30 percent) or principal (11 percent) objective. This is a marked increase from 35 percent of results in 2022. However, gender equality remains the least addressed among CGIAR's Impact Areas (Figure 5.1).

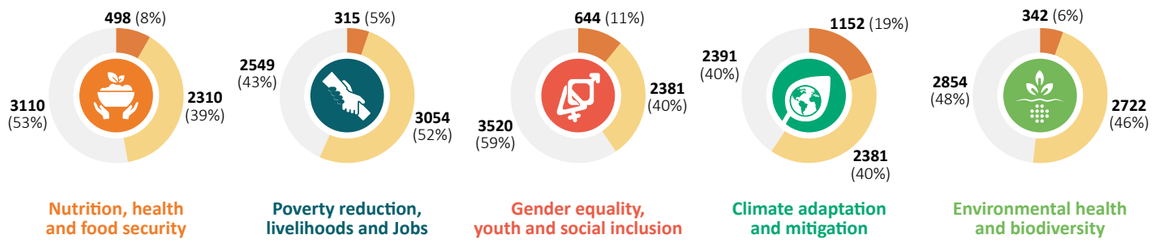


Figure 5.1. Impact Area focus across all results shows gender equality to be least represented overall, although fairly well represented in the share of principal results.

Regional distribution of gender-related results followed CGIAR-wide patterns. Most outputs and outcomes related to gender equality focused on Eastern and Southern Africa (731), followed by South Asia (397), West and Central Africa (379), Latin America and the Caribbean (253), Southeast Asia and the Pacific (222), and Central and West Asia (139). There was little variation in this regional distribution between principal/significant results and across Science Groups, although ST showed a slightly greater focus on West and Central Africa.

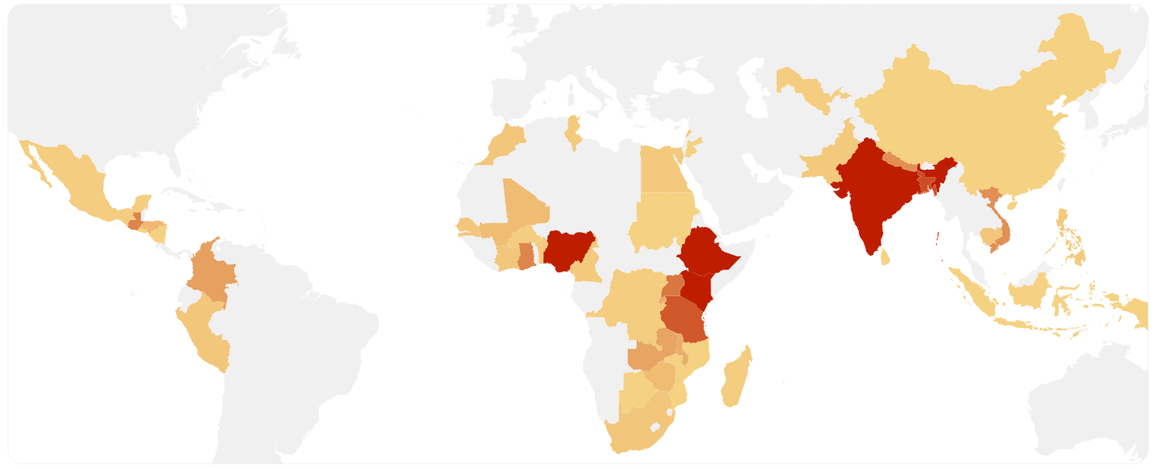


Figure 5.2. Geographic distribution of results with a principal focus (2) on gender.

A focus on gender equality was often combined with attention to other Impact Areas. The greatest synergies were with poverty reduction (targeted in 76 percent of gender-related results) and climate change (73 percent). Of particular relevance is the correlation between principal foci on gender equality and climate change, suggesting a substantial number of results focused on gendered climate impacts, resilience, and mitigation and adaptation strategies.

All Initiatives and most Impact Platforms produced at least one output addressing gender equality, but this focus was not equal across Initiatives (Table 5.3). The Gender Equality Initiative generated the most outputs related to this Impact Area, 99 percent of which had a principal focus on gender equality. The Gender Equality Initiative and GENDER Impact Platform together produced 15 percent of all results touching on gender equality, and 52 percent of the results with a principal focus on gender equality. Other Initiatives with a fairly consistent focus on gender include the CGIAR Research Initiatives on Seed Equal; Fragility, Conflict, and Migration; Sustainable Healthy Diets; and Diversification in East and Southern Africa.

INITIATIVE	# RESULTS	% RESULTS	INITIATIVE	# RESULTS	% RESULTS
Gender Equality	224	99%	Breeding Resources	1	4%
Seed Equal	193	63%	Genebanks	14	9%
Fragility, Conflict, and Migration	185	59%	One Health	8	10%
Sustainable Healthy Diets	61	59%	Fruits and Vegetables	12	13%
Diversification in E & S Africa	128	59%	Foresight	27	14%
Nature-Positive Solutions	72	57%	National Policies and Strategies	69	24%
Mixed Farming Systems	119	56%	Asian Mega-Deltas	92	25%
Rethinking Food Markets	40	54%	NEXUS Gains	40	27%
Market Intelligence	141	52%	Resilient Cities	22	28%

Table 5.3. Initiatives with the most and least focus on gender equality (as a significant or principal component) in their outputs.

Gender-focused results emerged from extensive partnerships between Initiatives and local and international partners. Most partnerships were with national universities (565 results), NARS (562), national governments (mostly agricultural departments and ministries) (364), private companies (201), and international NGOs (157). University partnerships contributed a large number of gender-related knowledge products (300), while NARS, national government, and private sector partners each contributed to about one third of gender-related innovation use outcomes. NARS partnerships were specifically common in GI (228), with more than half of the gender-related GI results emerging from these partnerships. Overall, seven of the top ten partners contributing gender-related results were NARS partners, suggesting strong collaboration with local research and extension teams on gender-related outputs and outcomes.

Key gender-related outputs and outcomes

Of the 5,812 reported CGIAR outputs, 39 percent addressed gender equality (10 percent "principal" and 29 percent "significant"). The focus on gender equality was somewhat lower than the other Impact Areas for outputs (47-59 percent for other Impact Areas). The greatest share of gender-related outputs was for knowledge products (50 percent), followed by capacity sharing for development results (20 percent), innovation development (18 percent), and other outputs (12 percent) (Figure 5.4).

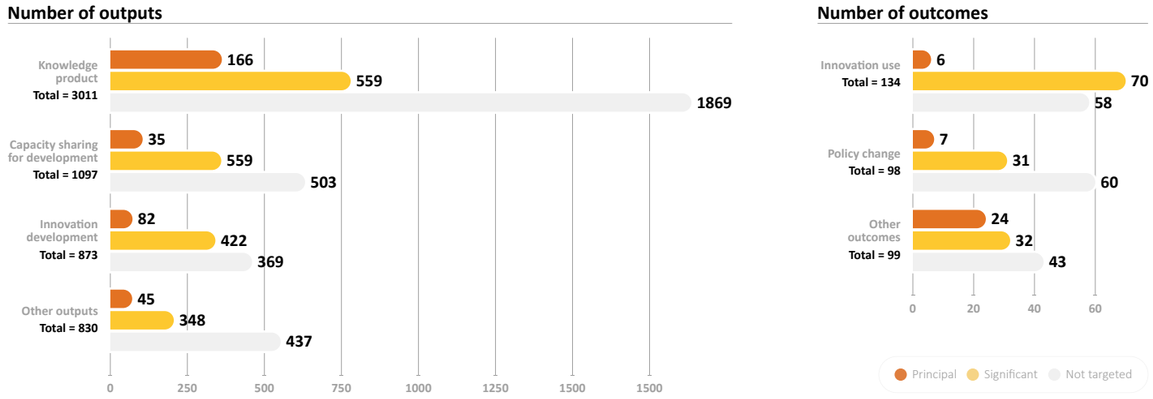


Figure 5.4. Number of results that targeted gender, by type of output/outcome.

Gender-focused knowledge products included a wide range of academic publications, reports, case studies, and training manuals. Knowledge products with a principal focus on gender explored in-depth how gender shapes farming system outcomes, with attention to topics such as gender and social norms, gender-transformative approaches, intersectionality, and intrahousehold dynamics. Results included, for example, an assessment of women's visibility and bargaining power in the common bean value chain in Mozambique, a situational analysis of climate change-agriculture-gender inequality hotspots in Bangladesh, and an analysis of gender inclusion and intersectionality in policies related to climate change, land and food issues in Latin America.

Capacity development especially targeted NARS (29 percent) and government partners (20 percent), in market segmentation and product profile development, gender-responsive research and outreach methodologies (including human-centered design), and women's empowerment. A small

number of training programs/sessions also directly built women's and youths' skills in areas such as vegetable seedling production, fish farming, and agribusiness generally.

Innovation development results focused on gender equality related mainly to the collection of gender-disaggregated data and analysis of gendered crop and variety preferences, or incorporation of gender in market intelligence and product profile design. For example, the Accelerating Breeding Initiative accelerated genetic gains for rice and sweet potato by drawing on gender-disaggregated preference data, which they used to identify lines suitable for diverse market segments and to release new varieties in Bangladesh, India, and Mozambique.

Of all CGIAR *outcomes* reported, 53 percent (189) related to gender equality (11 percent "principal" and 42 percent "significant"). The focus of outcomes on gender equality was closer to the other Impact Areas (52-79 percent). Half of reported outcomes were innovation use results, including the application of gender-responsive agronomic practices, biocontrol agents, or advisory services, and some seed distributions. For instance, community-based livestock breeding, which contributes to women's empowerment, was scaled to 90,000 new beneficiaries in Ethiopia, while new machinery dealerships and spare parts firms focused on women-friendly equipment in South Asia. While some activities were gender-intentional in their targeting practices, most results addressed gender indirectly through expanded production and dissemination of gender-responsive seed and other technologies, and inclusion of women in distributions and promotional efforts. A number of these activities demonstrated growing focus on digital technologies and services, for example, workshops on inclusive ICT4Ag services in India, assessment of inclusivity in digital platforms in Uganda, gender-responsive co-design of socio-technological bundles in Ethiopia, and development of a conceptual framework for a Multidimensional Digital Inclusiveness Index.

Policy change results (20 percent of gender-related outcomes) were linked to development and implementation of national, regional, and UN policies on agriculture and resource management. Several Initiatives contributed to development of **inclusive agrifood sector policy frameworks**, for instance, in Zambia, Guatemala, Madagascar, and Nigeria. Others helped shape **UN agency policies**, including for the International Organization for Migration, UNHCR, and the WFP. The GENDER Impact Platform also engaged deeply at COP28, and contributed to Voluntary Guidelines on Gender Equality and Girl's and Women's Empowerment in the Context of Food Security and Nutrition, which the Committee on World Food Security endorsed. Notably, innovation use and policy change outcomes' attention to gender, especially as a *principal* component, was lower than for other Impact Areas (Figure 5.5 below).

A third of gender-related outcomes were "other outcomes", many of which had a principal focus on gender. These included shifts in discourse resulting from significant meetings and other high-level sharing of results, establishment of new partnerships, or changes in approaches/programs by non-government institutions. For example, after engaging with CGIAR Initiatives, private sector actors in India, NGO partners in Ethiopia, and UN partners in Bangladesh expressed interest in continued collaboration around gender and incorporation of Initiative learning into their operations.

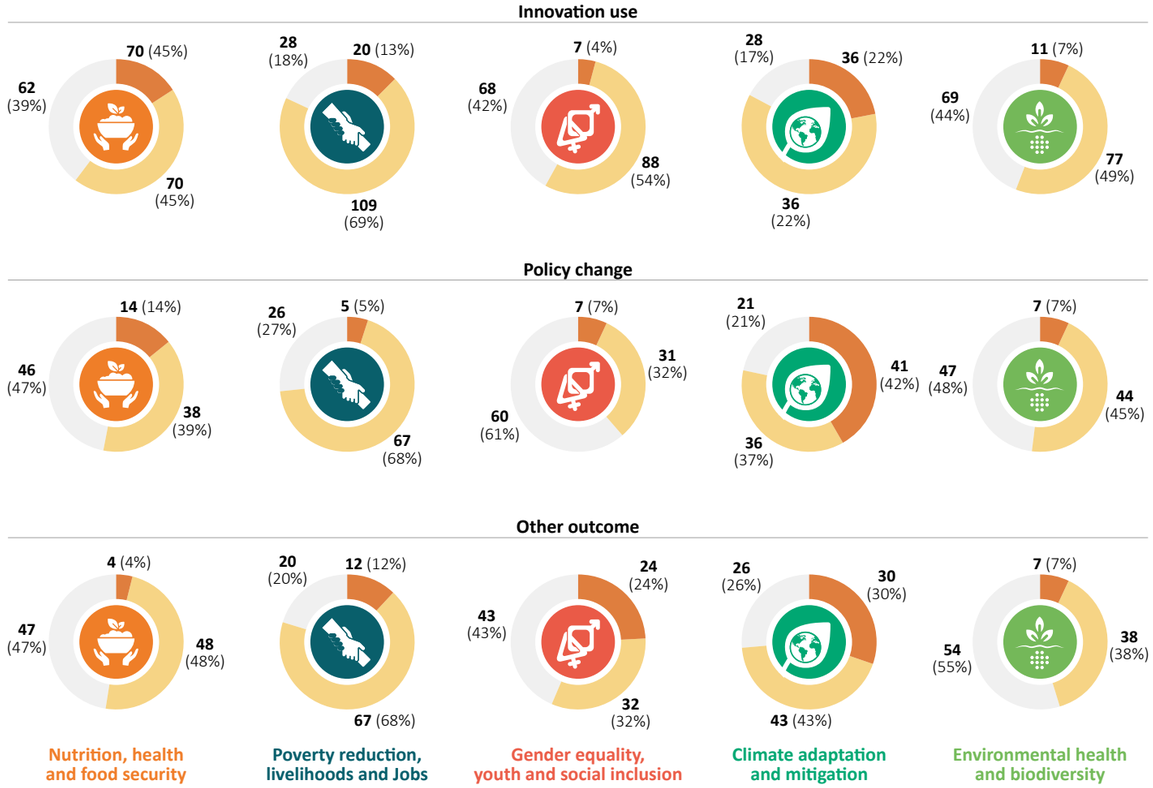


Figure 5.5 Gender equality is a limited focus in innovation use and policy change outcomes.

One of the more promising patterns in outcomes with a principal focus on gender is the development of gender-responsive breeding networks, seed systems, and crop corridors. These suggest application of gender-related research in pursuit of equitable outcomes at broad agrifood systems levels. Examples include efforts to **pilot and establish innovative women-led seed businesses** across Asia, in India, in Rwanda and Kenya, and the establishment of dozens of bean business platforms supporting women in bean value chains across 19 countries. In these activities, there is often focus on inclusive entrepreneurship, for instance, through support for women agri-preneurs in livestock value chains in Uganda and Tanzania, in aquaculture in Ghana, and in the review of promising seed businesses models to support women and youth. Within RAFS specifically, we also see Initiative outcomes and outputs tied to youth engagement and entrepreneurship. For instance, **policymaker guides on increasing youth engagement in aquaculture** were published for Nigeria and Myanmar, as well as reports on youth entrepreneurship in India and training on women and youth innovation platforms were held in Ghana. We would anticipate measurable impacts on these populations in the future.

Science Groups

Attention to gender equality is evident across the three Science Groups. In GI, gender equality featured in 42 percent of results, including 41 percent of outputs and 61 percent of outcomes. Many outputs were innovation development results or knowledge products related to the development of market intelligence methodologies and operationalization of gender-intentional breeding guidance. For instance, in the Breeding Resources Initiative's development of a gender checklist to support breeding institutions and farm managers in inclusion efforts, and the Market Intelligence Initiative's publication of a standard protocol to guide gender-intentional product profile design. Gender-related outcomes included the strengthening of breeding networks, demand-driven breeding capacity, and inclusive seed systems, as well as outcomes from these processes. For example, female Nigerian bean and cowpea farmers using improved varieties showed increased productivity, product quality, income, and confidence, and became seed producers and service providers in their communities.

In RAFS, 37 percent of results (37 percent of outputs and 43 percent of outcomes) focused on gender equality. Nearly half of the gender-related outputs (48 percent) were knowledge products, touching on, for example, intersectionality and gender norms in dairy systems in India and Tanzania. Most gender-related outcomes (68 percent) were innovation use results, including application of agronomic and livestock practices, biocontrol technologies, deployment of climate advisory services, and Innovation Package and Scaling Readiness Assessments with attention on gender. For instance, over 18,000 farmers (88 percent of whom were women) in Senegal received weather forecasts, nutrition advice, and agro-advisories via SMS to strengthen their climate resilience.

In ST, 41 percent of results (40 percent of outputs and 63 percent of outcomes) were related to gender. Knowledge products, covering topics such as social inclusion in sustainable water-energy-food-ecosystem management, social protection and climate adaptation and climate resilience, and socially inclusive digital innovation processes in food, land, and water systems, comprised the majority (60 percent) of outputs. Outcomes included contributions to policy and program design among partners, as well as the roll-out of inclusive agricultural services. For example, partners reported adopting guidance around women-led socio-technical innovation bundles in Ethiopia and Kenya, while CGIAR gender researchers developed six background papers that helped shape FAO's "The Status of Women in Agrifood Systems" report.

Kenyan Plant Health Inspectorate technical workers replanting cassava cuttings, KEPHIS glasshouse, Muguga, Kenya.
Credit: Julie Puech / Breeding Resources Services

Climate Adaptation and Mitigation

This section is under development and will be included in the next update of the report.

Nutrition, Health and Food Security

The world continues to grapple with global hunger and malnutrition, further exacerbated by fragmented of broken food systems, conflicts, climate change, and crises. Since 2021, the State of Food Security and Nutrition of the World (SOFI), an annual FAO publication on global hunger and malnutrition, has indicated that we are off-track to achieve the targets of SDG 2 (Zero Hunger), reversing the successes gained in the years before. CGIAR, the world's largest agriculture innovation network, has clearly articulated its vision to deliver science and innovation that advance transformation of food, land and water systems in a climate crisis in its 2023 Research and Innovation Strategy, and has identified effective delivery and results that "shift the dial" on global achievements through its five Impact Areas.

The Nutrition, Health and Food Security Impact Area guides CGIAR's contributions to SDG 2 and SDG 3 (Good Health and Wellbeing). There is also a critical link to SDG 6, noting the emphasis in Target 6.3 on safe water, including reductions in waterborne diseases. Specifically, CGIAR seeks to deliver on its ambitious 2030 collective targets on action for nutrition, health, and food security to:

- 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.
- Reduce cases of foodborne illness (600 million annually) and zoonotic diseases (1 billion annually) by one third.

This section of the Portfolio Narrative presents the progress made in nutrition, health, and food security in 2023 collectively, through Initiatives and SGPs, toward reaching these goals.

2023 was the first year whereby results presented in the CGIAR Results Dashboard were disaggregated and tagged for contributions to nutrition, health, and food security (Figure 5.6). Of the 6,164 results reported, 8 percent (509 results) were reported by Initiatives as principally contributing to improved nutrition, while 39 percent (2,431 results) were contributing in a significant way. While the remaining 52 percent of results were not tagged toward the areas of nutrition, health, or food security, this does not mean that they did not necessarily contribute to the Portfolio in achieving targets of improving food and nutrition security, or health. Furthermore, many of the results presented contributed to more than one Impact Area (Figure 5.7), indicating the value and ability of CGIAR research and innovations to generate multiple benefits and impact, with greater efficiency and interactions across disciplines and regions.

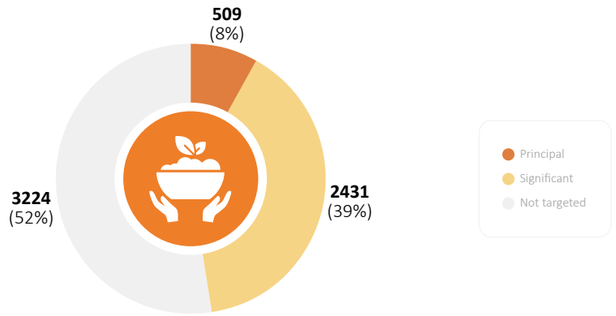


Figure 5.6. Results reported in 2023 tagged to the Nutrition Impact Area.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

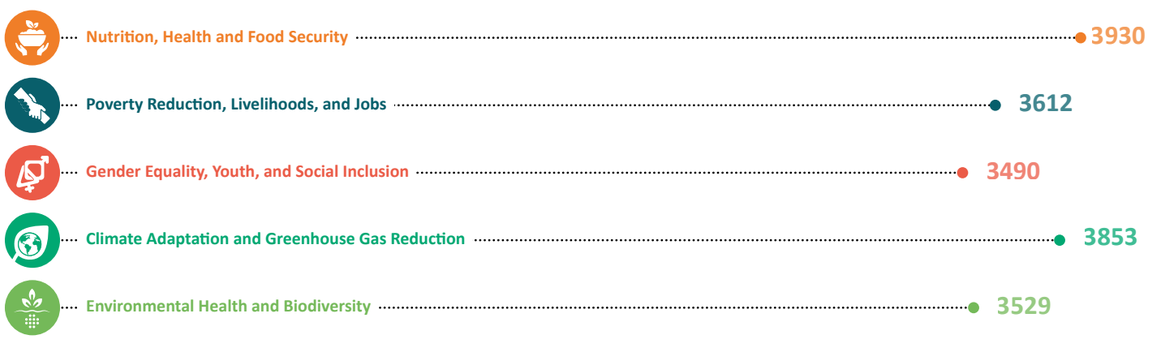


Figure 5.7. SDG contributions across all five CGIAR Impact Areas in 2023
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

An overview of results in 2023

Figure 5.8: Results that principally contributed to the Nutrition Impact Area in 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Out of the 511 results tagged as making a principal contribution to the Nutrition Impact Area, 210 (41 percent) are in the form of knowledge products, 44 (9 percent) are related to capacity development activities, 113 (22 percent) are innovation development results, and 101 (20 percent) are categorized as other outputs. At the outcome level, 25 (5 percent) results were reported for innovation use, 14 (2 percent) for policy change and 4 (1 percent) for other outcomes, indicating the positive contribution of CGIAR research toward long-term, impactful changes. When further disaggregated according to Science Group, 198 of these results are contributions to ST, 156 to RAFS, and 126 to GI.

Contributions from East and Southern Africa topped the list, with 120 results reported for this region. This is followed by South Asia (76 results), Southeast Asia and the Pacific (68 results), West and Central Africa (60 results), Latin America and the Caribbean (53 results), and Central and West Asia and North Africa (49 results). In 2023, CGIAR's research and innovation contributions toward the Nutrition Impact Area had almost similar interest and distribution across all six regions described in the CGIAR Research and Innovation Strategy.

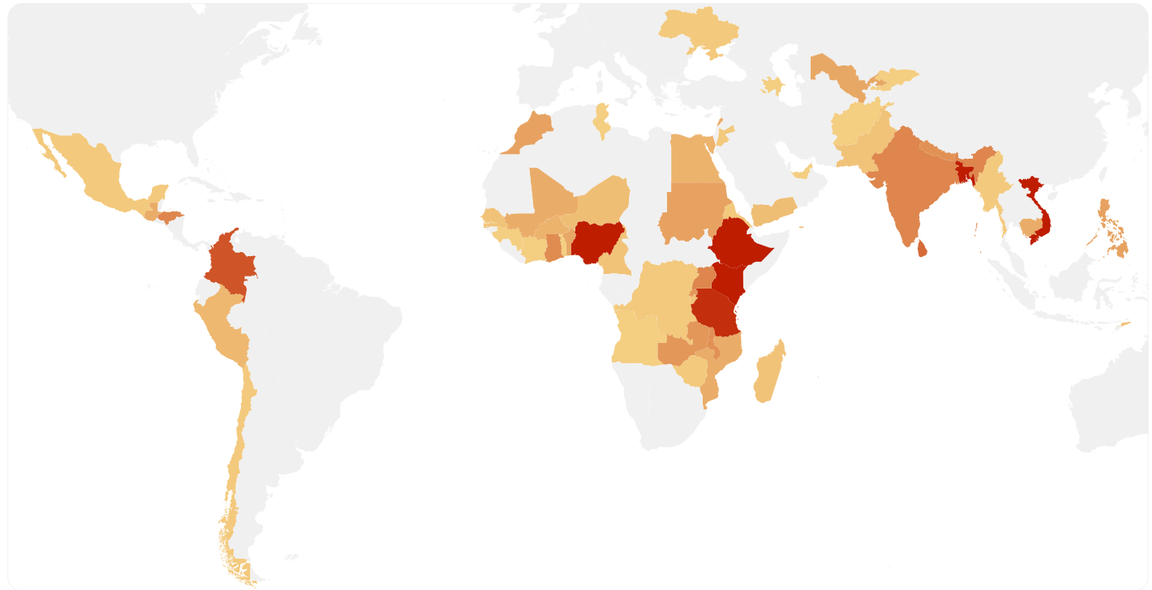


Figure 5.9: Principal contributions of CGIAR research toward positive impacts on nutrition.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

A key opinion piece reported in 2023 is the article, "The world is precariously dependent on a handful of staple food crops", published in The Telegraph, indicating the need for dietary diversity, and diversification of methods and systems, in addressing global hunger and malnutrition. The importance of dietary diversity should be emphasized in CGIAR research and toward developing the CGIAR Portfolio toward 2030.

In 2023, 2,431 results were reported as having made a significant contribution toward realizing impacts in the areas of food and nutrition security or health. Out of these results, 1,187 (49 percent) are knowledge products, 427 (18 percent) are capacity development activities, 351 (14 percent) are innovations at different stages of development, and 309 (13 percent) are reported as other forms of output. At the outcome level, 70 (3 percent) of the results are associated with innovation use, 38 (1 percent) are associated with policy change, and 48 (2 percent) are associated with other outcomes.

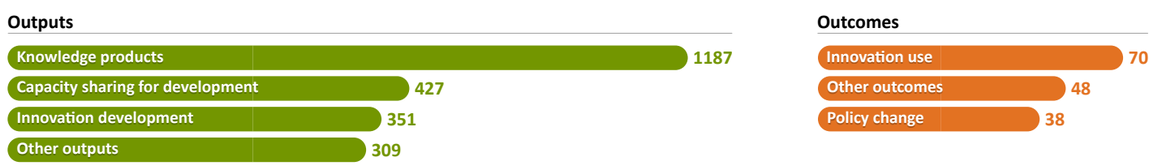


Figure 5.10: Results that significantly contributed to the Nutrition Impact Area in 2023.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

When disaggregated by Science Group contributions, ST had the largest number of contributions, with 1,362 results reported, followed by GI (872 results) and RAFS (466 results). Regional disaggregation data for results principally contributing to the Impact Area shows that East and Southern Africa tops the list with 718 results (30 percent). This is followed by South Asia (370 results), West and Central Africa (341 results), Latin America and the Caribbean (309 results), Southeast Asia and the Pacific (233 results), and Central and West Asia and North Africa (167 results).

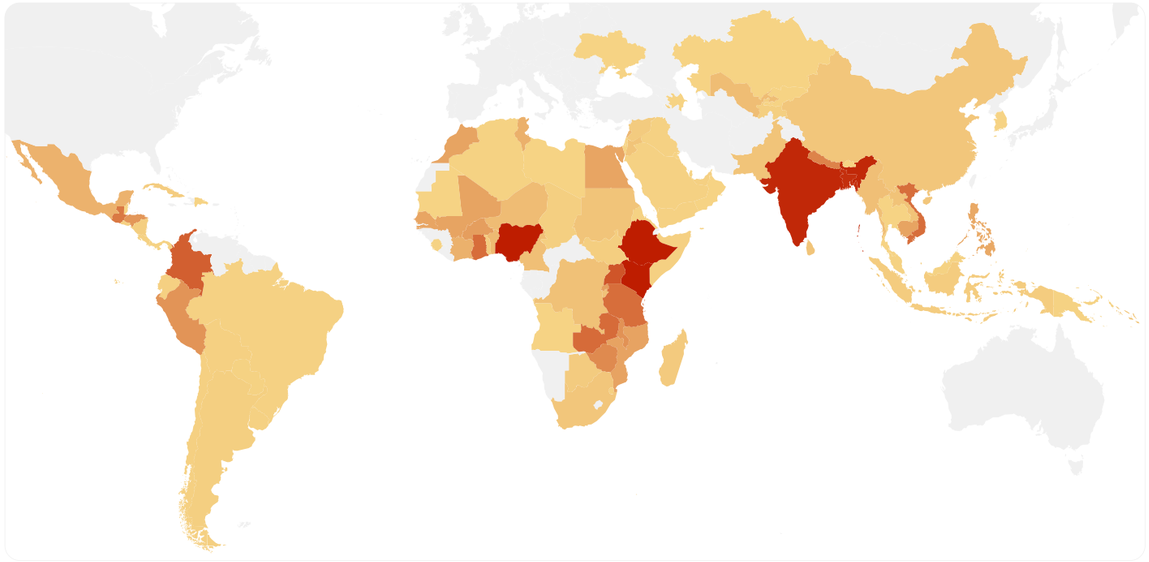


Figure 5.11: Significant contributions of CGIAR research toward positive impacts on nutrition.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Some notable publications that significantly contributed to the Nutrition Impact Area include:

- The widening food gap in Kenya amid serious drought: A cry for policy reforms on food security – contributions by the CGIAR Research Initiative on National Policies and Strategies.
- Ecological shocks and children's school attendance and farm work in Ghana – contribution by the CGIAR Research Initiatives on Agroecology and National Policies and Strategies.
- An assessment and analytical report for integrated agriculture-aquaculture (IAA) systems in Egypt – contributions by the CGIAR Research Initiative on Fragility to Resilience in Central and West Asia and North Africa.
- CGIAR's evidence and solutions to tackle farmer-herder conflicts – contributions by the CGIAR Research Initiatives on Climate Resilience and Fragility, Conflict, and Migration.
- A food systems approach to climate action – contributions by the Climate Impact Platform.

Partnerships

In 2023, CGIAR worked with 2,145 partners to deliver research and innovations that generate impact for nutrition, health, and food security. Out of these, 667 (31 percent) are partners who made principal contributions, and 1,478 (69 percent) are partners who made significant contributions toward improved nutrition and food security. Research organizations and universities form the largest type of partners, with 176 universities and 110 national agriculture research centers principally contributing to this Impact Area; and 580 national agriculture research centers and 562 universities significantly contributing to the Impact Area.

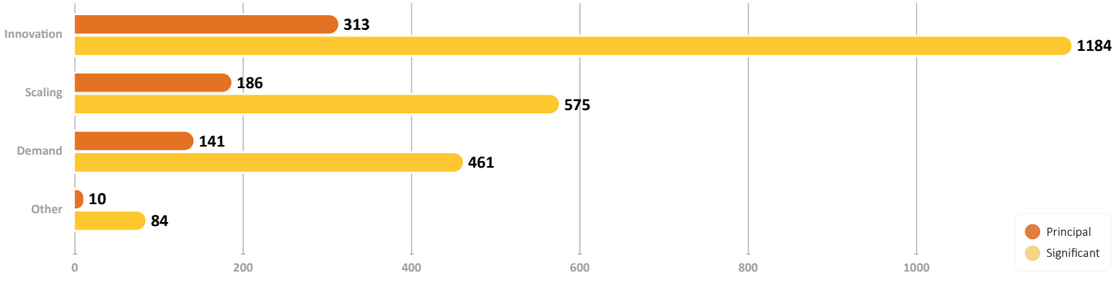


Figure 5.12: Results by partner delivery type, according to the type of contribution to the Nutrition Impact Area in 2023.

Note: Bars are not to scale. Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Innovation

Innovation development refers to investments by CGIAR and partners in the design, testing, and validation of new, improved, or adapted outputs (individually or grouped), with high potential to contribute to generate positive impacts when used at scale. In 2023, 464 innovations were reported – at various stages of readiness – to have principal and significant contributions to delivering impact on nutrition, health, and food security. Out of these results, 73 were reported to be proven innovations (24 with a principal contribution and 49 with a significant contribution) that are ready to be scaled for impactful outcomes. Increasing investment in radical, disruptive and contextual innovations is needed to generate significant impact at scale, and address food and nutrition security gaps to meet the CGIAR collective global targets.

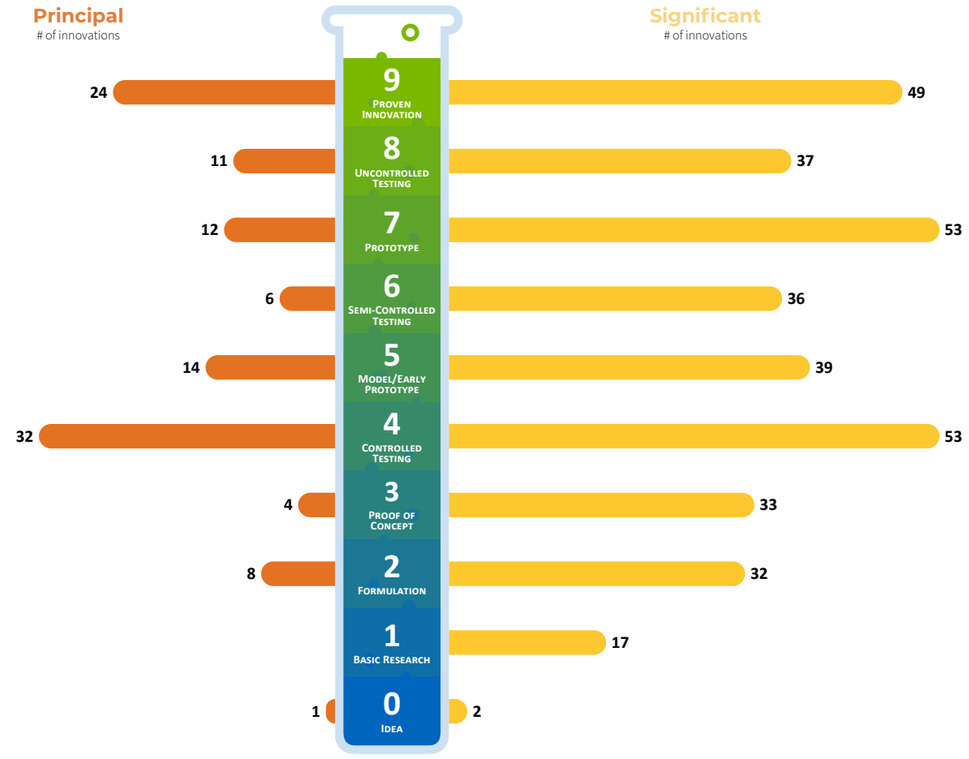


Figure 5.13: Innovation readiness levels of innovations reported to have made principal (left) and significant (right) contributions to the Nutrition Impact Area in 2023.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Global agenda

2023 was an important year for CGIAR as it continues to foster thought leadership, critical thinking and advocate transformative approaches for food systems at the global level. CGIAR was present at high-level events, notably the UN Food Systems Summit Stocktaking Moment, the G20, the Africa Food Systems Summit, Micronutrient Forum, and Climate COP28. Through these global platforms, CGIAR continues to push for holistic food systems transformation, and improving availability and access to sustainable, diverse, and healthy diets worldwide. The inclusion of sustainable agriculture and resilient food systems in the face of climate change, as in the Declaration adopted during COP28 in the United Arab Emirates, marks an important moment in global history. The Declaration recognized the unprecedented impacts of climate change on threatening the resilience of agriculture and food systems, and the importance of realizing the right to adequate food in the context of national food security, as well as ensuring access to safe, sufficient, affordable, and nutritious food for all. In addition to supporting the drafting process, CGIAR joined FAO, IFAD and the World Bank, among others, in partnering on the launch of mechanisms to accelerate implementation of the Emirati Food Declaration, including the Sharm-El Sheikh Support Programme and the National Food Systems Technical Cooperation Collaborative.

Conclusion

2023 was the first year nutrition tagging was implemented for the CGIAR Portfolio, as well as the first year of reporting for the Nutrition Impact Platform, and a few lessons have been learned. There needs to be better understanding, guided by the Nutrition Impact Platform and the nutrition and health community, of the tagging system to produce better insights to the breadth and depth of work being done by CGIAR and partners on nutrition, health, and food security. Linked to this is the need to define the tagging mechanism to include not just work on nutrition, but also work in the areas of health and food security. Furthermore, results that have not been tagged to the Impact Area do not necessarily mean that they do not contribute in some way to realizing the global goal of addressing hunger and malnutrition.

Credit: Hacienda San José Climate Smart village Lushoto, Tanzania. Credit: Georgina Smith, CIAT

Environmental Health and Biodiversity

This section analyzes the CGIAR Portfolio of results submitted in 2023 by Initiatives, Impact Platforms, and SGPs that map to the Environmental Health and Biodiversity Impact Area (EHBIA). The two collective targets of the EHBIA that address agrifood system challenges are: i) to stay within planetary and regional environmental boundaries: consumptive water use in food production of less than 2500 km^3 per year (with a focus on the most stressed basins), zero net deforestation, nitrogen application of 90 Tg per year (with a redistribution towards low-input farming systems) and increased use efficiency, and phosphorus application of 10 Tg per year; and ii) maintain the genetic diversity of seeds, cultivated plants, and farmed and domesticated animals and their related wild species, including through soundly managed genebanks at the national, regional, and international levels. Of the 6,172 results reported in 2023, 3,142 results from across the entire portfolio (51 percent) were tagged to the EHBIA (353 principally, 2,789 significantly) (Figure 5.14).

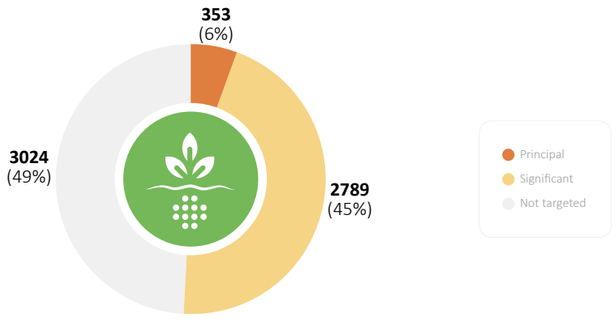


Figure 5.14. Results reported in 2023 tagged to the EHBIA.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Results by Science Group and Initiative

The ST Science Group emerged as the top contributor, with 156 principally and 798 significantly tagged results. Among the ST CGIAR Research Initiatives, Low-Emission Food Systems, Digital Innovation, and NEXUS Gains were the top contributors. The Regional Integrated Initiatives (RIIs) also made significant contributions, with 97 principally and 672 significantly tagged results. Among the RIIs, Fragility to Resilience in Central and West Asia and North Africa, Transforming Agrifood Systems in South Asia, and Asian Mega-Deltas were the top contributors.

The RAFS Science Group contributed 51 principally and 943 significantly tagged results, with Nature-Positive Solutions, Excellence in Agronomy, and Mixed Farming Systems being the top contributors. The GI Science Group contributed 42 principally and 300 significantly tagged results, primarily through the CGIAR Research Initiative on Accelerated Breeding) (Figure 5.15).

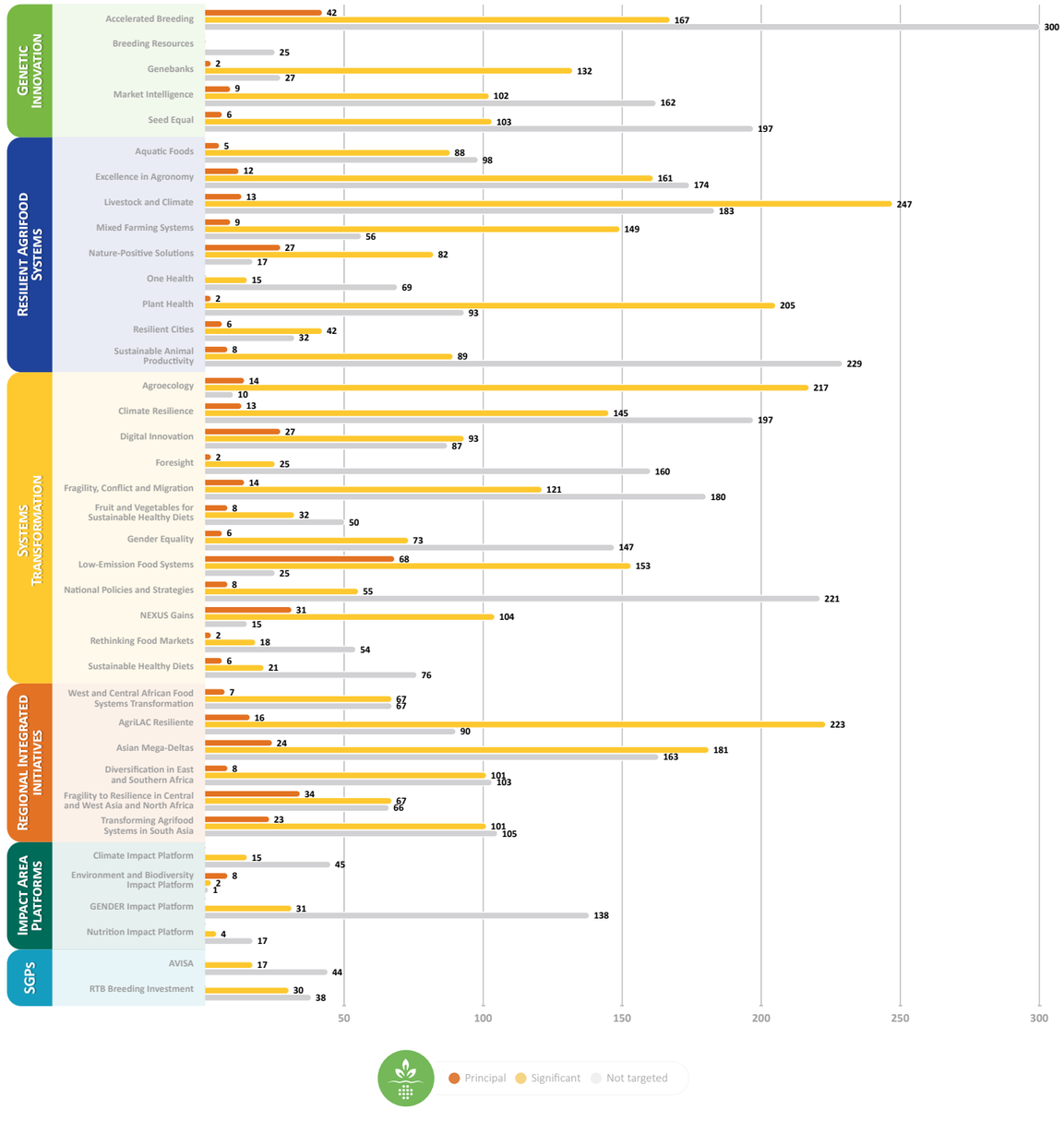


Figure 5.15. Types of results reported in 2023 tagged to the EHBIA.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

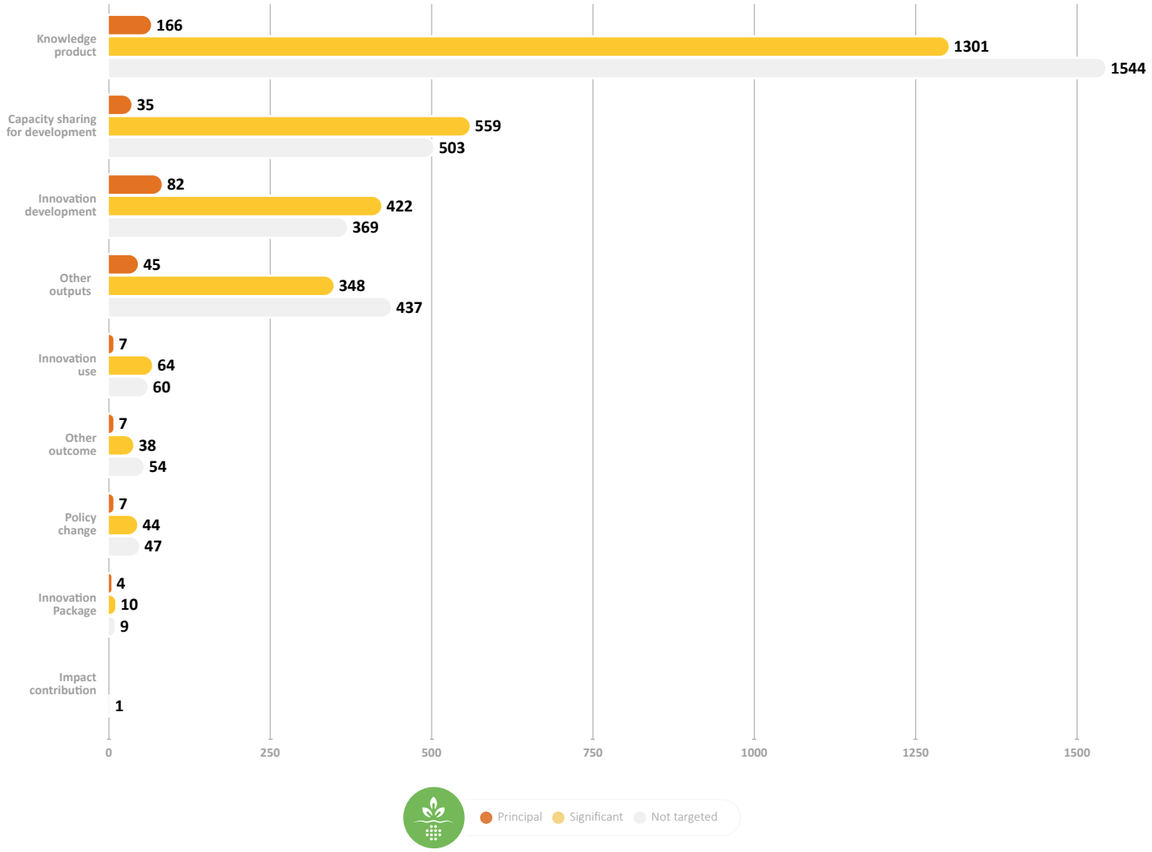


Figure 5.16. Types of results reported in 2023 tagged to the EHBIA.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Dr Hakeem Ajeigbe, ICRISAT scientist and Nigeria country representative, with sorghum. Credit: C. de Bode / CGIAR

Results by type

The majority of results tagged to the EHBIA were knowledge products, comprising 166 principally tagged results, including 57 journal articles, and 1,301 significantly tagged results, including 252 journal articles (Figure 5.16). Capacity sharing for development outputs accounted for 35 principal and 559 significant results, engaging more than 402 partners, 15 Centers, and training more than 199,795 people. Innovation development outputs comprised 82 principally and 422 significantly tagged results, spanned the full range of innovation readiness levels (Figure 5.17).

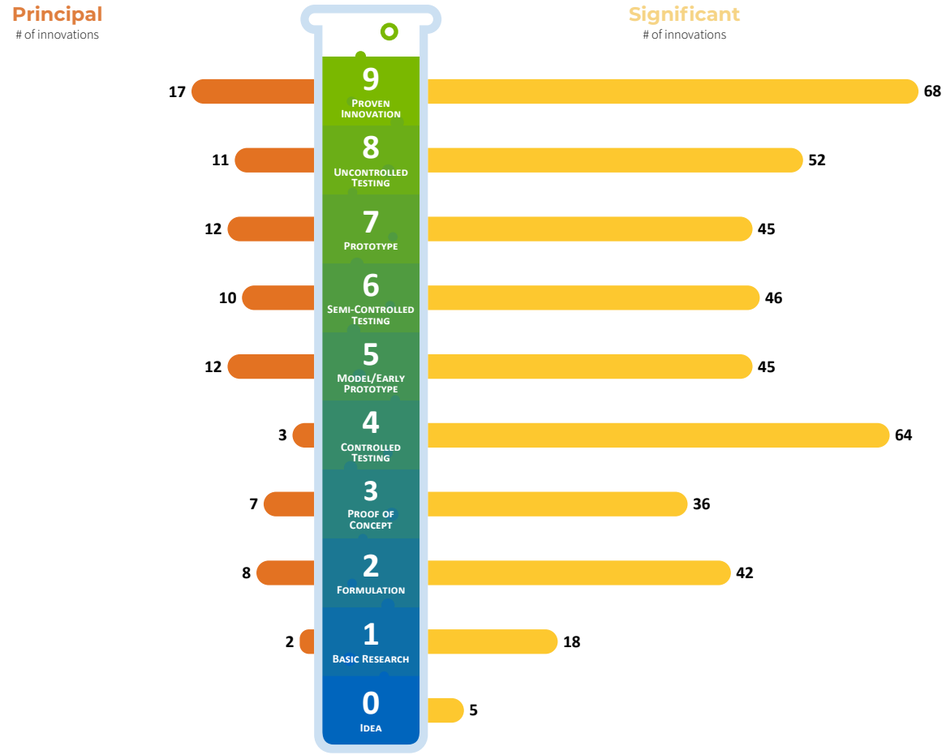


Figure 5.17. Number of innovation development outputs, by innovation readiness level, principal (left) and significant (right) tagged to the EHBIA.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Results by geographic distribution

The geographic distribution of results tagged to the EHBIA encompass all regions of the world (Figure 5.18). East and Southern Africa contained the most results tagged to EHBIA with 75 principally and 688 significantly tagged results; followed by Latin America and the Caribbean (41 principal, 421 significant); South Asia (45 principal, 382 significant); West and Central Africa (18 principal, 339 significant); Southeast Asia and the Pacific (55 principal, 263 significant); and Central and West Asia and North Africa (40 principal, 240 significant). Additionally, 595 results were tagged as “global” in scope, indicating their focus on addressing environmental health and biodiversity issues at a global scale.

The top ten countries with the most results tagged to the EHBIA are Kenya (26 principal, 250 significant), Ethiopia (18 principal, 189 significant), India (19 principal, 184 significant), Colombia (32 principal, 139 significant), Viet Nam (24 principal, 125 significant), Bangladesh (12 principal, 135 significant), Nigeria (9 principal, 129 significant), Guatemala (1 principal, 120 significant), Tunisia (7 principal, 111 significant), and Uganda (6 principal, 91 significant).

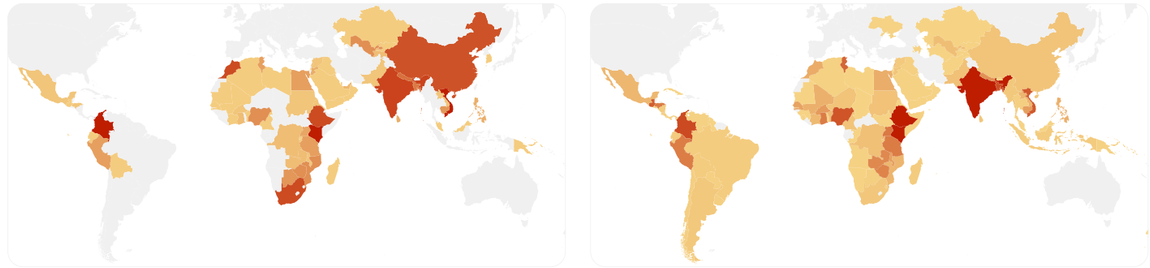


Figure 5.18. Geographic distribution of results tagged principal (n=353) (left) and significant (n=2,789) (right) to the EHBIA.

Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Results by partner type

More than 1,813 partners contributed to the 3,142 results tagged to the EHBIA (Figure 5.19). The primary partner types for these results are the NARES, other research organizations, and universities. The partners who collaborated with CGIAR on the most results tagged to the EHBIA were the Kenya Agricultural and Livestock Research Organization (KALRO), CIRAD, Wageningen University and Research Centre, FAO, the Ugandan National Agricultural Research Organisation (NARO), the Indian Council of Agricultural Research (ICAR), the Ethiopian Institute of Agricultural Research (EIAR), and Institut National de Recherche Agronomique de Tunis (INRAT), among many others.

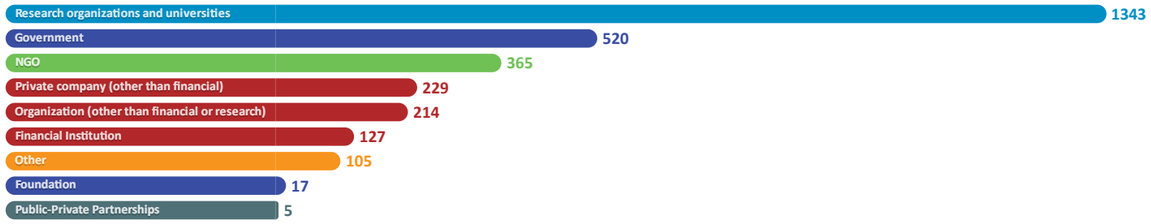


Figure 5.19. Number of results tagged to the EHBIA by partner type.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

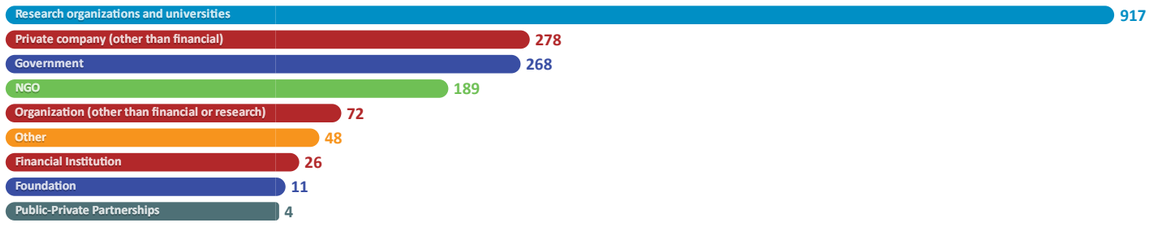


Figure 5.20. Number of partners by partner type, for results tagged to the EHBIA.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Deep dive into the CGIAR Portfolio linked to main themes of the Impact Area

Land

Within the land theme, notable innovations include the My Farm Trees digital platform for community-led restoration efforts, the expansion of the Diversity for Restoration (D4R) tool to Colombia, the Targeting Tools web platform offering GIS tools for identifying suitable land areas for targeted interventions. Furthermore, a framework for measuring, reporting and verifying zero-deforestation agreements in Colombia, and a global platform for sharing information on rangelands status, changes, influencing forces, and restoration opportunities. Noteworthy outcomes include the restoration of degraded rangelands by Tanzanian pastoralist communities through participatory rangeland management and joint village land use planning, and the implementation of the Sustainable Rangeland Management Toolkit in Tunisia.

Capacity sharing for development activities included training sessions on rangeland management and restoration (here, here), land use mapping in Nandi County, governance for silvopastoral restoration in Tunisia and the use of online tools such as Cacao Diversity and D4R in Colombia. An e-learning course on planning seed and seedling supply for forest and landscape restoration (FLR) was also delivered.

Knowledge products focused on zero deforestation, rangeland management, and ecosystem restoration. Deforestation-related products covered areas such as deforestation-free supply and value chains, food systems drivers of deforestation, financing for zero-deforestation practices, and European Union (EU) deforestation-free regulation. Rangeland work included participatory management (here, here), governance (here, here), and restoration, while restoration work encompassed FLR in Africa (here, here, here) and Asia, land degradation and restoration in Vietnam, natural regeneration. Land degradation assessments were conducted in Ghana and Ethiopia. A noteworthy cross-cutting result is the "Ground Zero? Let's get real on regeneration! Report 1: State of the art and indicator selection".

Soil

To improve and maintain healthy soil, various approaches have been employed, including the development of diagnostic tools and capacity sharing events to monitor soil health indicators. These included creating standard operating procedures (SOPs) that provide step-by-step guidance on soil sampling, handling, and storage to assess soil chemical, biological and physical properties. In Bangladesh, digital soil mapping techniques were used to integrate soil data with digital data on topography, climate, vegetation, and land use, resulting in the creation of high-resolution maps of soil properties and characteristics.

A wide range of capacity-strengthening activities took place targeting producers in Honduras to enhance their knowledge of soil physical and chemical properties and raise awareness about the importance of natural resources like water, forests, and soil (here, here, and here). These efforts also educated producers on using soil parameters for plot diagnosis (here, here, here, and here). Capacity-building activities extended to early career researchers, including PhD students, through soil health research and development in Morocco (and here). A Community of Practice on Soil Health was established.

In conjunction with soil health, considerable work has been done to improve the efficient use and management of nutrients. Studies in South Asia highlighted the benefits of conservation agricultural (CA) practices for improving maize growth and yield, showing that farmers can achieve better results through CA-based permanent beds and the use of USG for nitrogen management. Similar studies focused on improving nutrient use, particularly nitrogen, in the crops of banana, grass, rice, and rice-wheat systems. An assessment of land suitability for cereal-forage legume mixed cropping systems was conducted in Ethiopia. To address the issue of nitrogen from fertilizers being released as nitrous oxide emissions, a farmer-focused monitoring, reporting, and verification framework (MRV) for tracking fertilizer-induced nitrous oxide emissions was developed.

Water

In water-related domains, numerous innovations have been developed to conserve water environments and aquatic ecosystems. These innovations include technological advancements to improve water use efficiency, such as automated water level sensors equipped with SMS notifications to enable rice farmers to make informed irrigation decisions.

Significant progress has been made in developing monitoring systems and assessment methodologies for water environments. A groundwater monitoring system co-developed and pilot-tested with the Punjab Irrigation Department in Pakistan has been adopted and implemented by Punjab and other provinces. Several water quality modeling systems have also been developed: FISHTRAC, a real-time monitoring system tracking water quality dynamics using fish-attached sensors; MiniSASS, a biomonitoring tool for assessing river system health and water quality through macroinvertebrate communities; and Enviro-Champs, a community-driven initiative in South Africa engaging youth in environmental observation.

For water environment assessment, a methodology has been developed to determine the environmental flow requirements of the Limpopo River basin in southern Africa. This methodology determines the river discharge needed to maintain the river's current ecological state and assesses the risk of failure of the many ecosystem services relied upon by communities living in contact with the river. These tools and methodologies (here, here, and here) serves to enhance the monitoring capabilities and decision-making capacities in agricultural water environment management.

Biodiversity

Several innovations have been developed to help manage biodiversity-related tradeoffs. The Agrobiodiversity Solution Hotspot Tool helps stakeholders address water, energy, food and environment challenges by identifying priority interventions to restore and enhance ecosystem functions and services. The Rikuy-Agrobio toolbox enables in-situ agrobiodiversity monitoring from genes to landscapes. The optimized biodiversity management of rice-based ecosystems in Cambodian farming communities focuses on finding optimal rice and crop combinations to improve ecosystem services, human health, and economic benefits for farmers.

A study on freshwater systems explored ten critical factors for the successful implementation of environmental flows (e-flows) and biodiversity outcomes. Another study reviewed national and regional approaches to river health monitoring, proposing scalable indicators to support "top-down" global surveillance as well as "bottom-up" local monitoring efforts. Another study cataloged nine fundamental ecosystem services provided by the biotic components of indigenous freshwater biodiversity such as fish, frogs, microbes, and macrophytes. These services include material (food, health and genetic resources, material goods), nonmaterial (culture, education, recreation), and regulating services (catchment integrity, climate regulation, water purification, nutrient cycling), emphasizing the need for the integrated conservation of freshwater biodiversity.

Capacity sharing efforts included webinars (here and here) and a 10-day event in Peru provided a wide range of stakeholders with practical insights into integrated crop genetic conservation for agrobiodiversity conservation.

Considering genetic diversity, stakeholders surveyed on breeding priorities in the face of climate change and consumer demands discussed tools and approaches to discover, validate, and incorporate novel genetic diversity into breeding populations. In Sri Lanka, the diversity of underutilized vegetables and fruit was assessed, highlighting the importance of collecting and conserving genetic diversity for food and nutrition security.

Key result stories

Each year, every Initiative/Impact Platform/SGP reports one of its outcomes as a detailed "key result story" (KRS). Three Regional Integrated Initiatives reported KRSs where the results were principally tagged to the EHBIA. The CGIAR Research Initiatives on AgriLAC Resiliente and Low-Emission Food Systems collaborated in Colombia to promote cocoa agroforestry and silvopastoral production in regions with a history of armed conflict, as a way to foster peacebuilding, improve rural livelihoods, protect and restore the environment while increasing carbon storage. The CGIAR Research Initiatives on Asian Mega-Deltas, Excellence in Agronomy, and Low-Emission Food Systems worked together to mainstream and scale innovations such as rice straw-based circular economy in countries within the Lower Mekong River Basin. The CGIAR Research Initiative Fragility to Resilience in Central and West Asia and North Africa released the online Water Accounting Dashboard for the Souss-Massa River Basin in Morocco. The dashboard serves as a user-friendly visual tool for stakeholders to monitor current water status and trends, enabling informed decision-making for the sustainable and equitable management and cross-sectoral governance of scarce freshwater resources.

Hmong ethnic girl uses a household water source, Ban Sopphouan, Lao PDR. Credit: Jim Holmes / IWMI

Poverty Reduction, Livelihoods and Jobs

CGIAR research contributes to achieving the SDG 1 (No Poverty); SDG 8 (Decent Work and Economic Growth) and SDG 10 (Reduced Inequalities). Its goal aligns with CGIAR's 2030 Research and Innovation Strategy to lift people above the extreme poverty line (USD 1.90) and reduce poverty in all its dimensions, especially in rural areas. The CGIAR global targets include: (a) Lifting 500 million people in rural areas above the extreme poverty line by 2030; and (b) reducing poverty in all its dimensions by half by 2030.

This section of the Portfolio Narrative analyzes progress toward these goals for the 2022-2023 reporting period. 2023 marked the first year with specific reporting on poverty reduction, livelihoods, and jobs with data available on the CGIAR Results Dashboard. Encouragingly, the Poverty Reduction, Livelihoods and Jobs Impact Area had the **third-highest number of results** with 2,853 results according to CGIAR Initiatives' theories of change.

Portfolio results for 2022-2023 toward the Poverty Reduction, Livelihoods and Jobs Impact Area

In 2022-2023, 3,159 (35 percent) results were specifically identified as contributing in a **significant** way to poverty reduction, livelihoods and jobs, while only 320 (5 percent) were considered as having a **principal** focus. This demonstrates that Initiatives/Impact Platforms/SGPs contributed to poverty reduction, livelihoods and jobs at the same time as addressing other Impact Areas and SDGs to maximize synergies.

It is also important to note that while 2,687 results (36 percent) were not tagged as having a significant or principal focus on poverty reduction, livelihoods, and jobs, and 2,928 were not considered applicable to the Impact Area (32 percent), the contributions of these results to these cross-cutting dimensions may have been indirect.

Out of **9,100 results reported** in 2023, 3,479 were specifically reported for this Impact Area. Interestingly, out of the 3,479 results exhibiting a poverty tag of 1 (significant) or 2 (principal), 2,464 results have a specific focus on SDG 1 (No Poverty) (70 percent), 1,038 results target SDG 8 (Decent Work and Economic Growth) (29 percent), and only 454 results focus on SDG 10 (Reduced Inequalities) (1 percent).

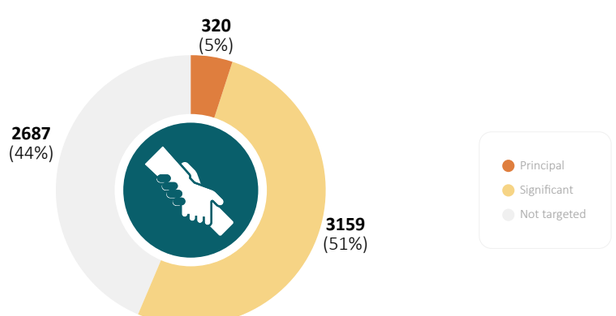


Figure 5.21. Number of 2023 results tagged to Poverty Impact Area.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

With regard to contributions to CGIAR's three Science Groups, ST emerged as the main focus, with 1190 results, followed by RAFS (1133) and GI. The Regional Integrated Initiatives reported 902 results.

The CGIAR Research Initiative on Fragility, Conflict, and Migration reported the highest number of results (133) across result types linked to this Impact Area. The next four Initiatives with the highest number of results related to poverty reduction, livelihoods, and jobs contributions only reported knowledge products and are therefore presented in the following section.

Knowledge products

A total of 1,625 knowledge products (34 percent of the 4,848 knowledge products reported) were delivered in 2023 that were specifically relevant to poverty reduction, livelihoods and jobs. The knowledge products dominate reported outputs for 2023, with capacity sharing for development results coming next with 597 reported results. 555 innovation development results with a focus on poverty results, livelihoods, and jobs were reported.

At the outcome level, 129 innovation use results were reported with a focus on this Impact Area, followed by 72 policy change results.

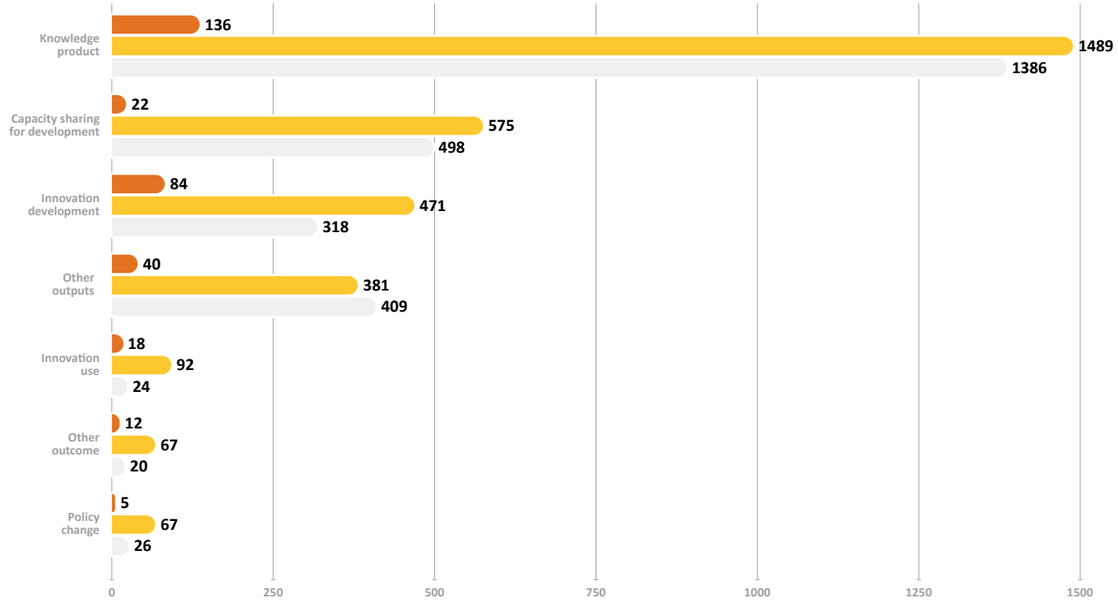


Figure 5.22. Number of results that poverty, by type.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Of the knowledge products reported, 1,489 (89 percent) were reported as targeting poverty reduction, livelihoods and jobs in a **significant** way, while only 136 (8 percent) declared these dimensions as the **principal** focus.

Considering the 1,625 knowledge products with a focus on poverty reduction, livelihoods and jobs by main category, reports were reported the most (423), followed by journal articles (278), presentations (166) and other types of knowledge products (233).

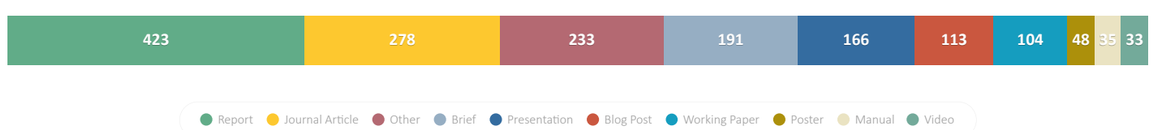


Figure 5.23. Number of reported knowledge products with focus on poverty reduction, livelihoods and jobs.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

The CGIAR Research Initiative on Livestock and Climate had the highest number of Impact Area-relevant outputs (172) tagged as principal or significant, followed by 133 outputs reported by the CGIAR Research Initiative on Fragility, Conflict and Migration, and the CGIAR Research Initiative on National Policies and Strategies, with 125 outputs. This is indicative of a concentration of past investments on poverty reduction efforts in these areas of work.

The following examples illustrate the results focusing on poverty reduction, livelihoods, and jobs with a score of 2 (principal):

- The contributions of scale-appropriate farm mechanization to hunger and poverty reduction: Evidence from smallholder systems in Nepal
- The adoption and impacts of improved parboiling technology for rice value chain upgrading on the livelihood of women rice parboilers in Benin
- How relative poverty influences responses to social protection programs: Evidence from Pakistan
- Building pathways out of poverty for ultra-poor internally displaced persons (IDPs) and vulnerable host communities in Baidoa, Somalia
- Targeting market segment needs with public-good crop breeding investments: A case study with potato and sweet potato focused on poverty alleviation, nutrition and gender

Partners

CGIAR recorded nearly 3,000 partners in implementing its Portfolio. The production of knowledge products with a focus on poverty reduction, livelihoods and jobs involved 719 partners and 15 CGIAR and non-CGIAR Centers.

The main partners included national research organizations and universities (791 results) followed by NARES, national governments (566), and private companies (286).

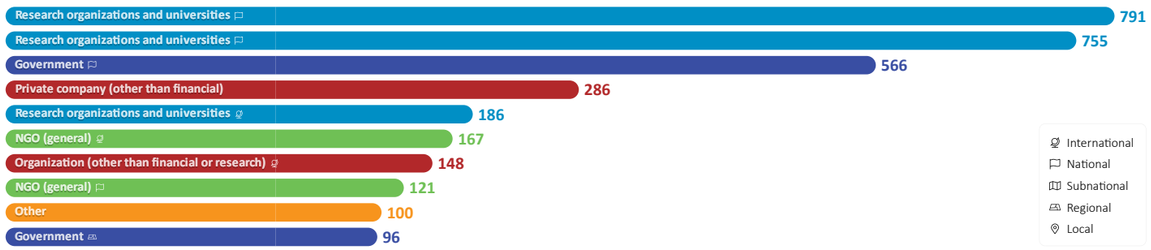


Figure 5.24. Number of results by contributing partner type.
Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

The top five contributing partners with a focus on this Impact Area are Kenya Agricultural and Livestock Research Organization (102 results), National Agricultural Research Organisation (Uganda) (100), the Wageningen University and Research Centre (97), the Zambia Agriculture Research Institute (73), and Ethiopian Institute of Agricultural Research (67).

Geographical distribution

The reported results tagged as "principal" for this Impact Area exhibit a global distribution, representing all continents and all six CGIAR regions, in addition to 54 results reported as having a global focus.

As could be expected for this Impact Area, there is a concentration of results in Africa with 629 in East and Southern Africa, 80 of which are tagged as "principal", and 306 in West and Central Africa, of which 59 are tagged as "principal". South Asia is the region with the second highest number of contributions, with 426 reported results, of which 58 are tagged as "principal". Latin America and the Caribbean, Central and West Asia and North Africa, and Southeast Asia had 25, 12, and 10 results reported, respectively.

Unsurprisingly, the countries with the highest number of reported results include Bangladesh, Ethiopia, India, Kenya, Nigeria, Tanzania, and Uganda.

Innovations in support of poverty

The Portfolio primarily includes results in the form of technological (e.g. new high yielding varieties/breeds), institutional or policy (e.g. international agreements on seed exchange), capacity (e.g. training on methodologies to measure and assess decent job creation) and other innovations at various stages of readiness. Innovations are usually incremental in nature as they derive once delivered on the ground from iterative improvements of existing products, services, or tools. Interestingly, **555** innovations were tagged as either "principal" or "significant" to the Poverty Impact Area (Figure 5.25). The distribution of these innovations is uneven with an over-representation of high innovation readiness levels (levels 7, 8, 9 – prototypes; testing and validation of innovations in uncontrolled conditions) and medium innovation readiness levels (levels 4, 5 – testing and validation of innovations in fully controlled conditions). Increasing investment in radical and disruptive innovations is needed to close poverty gaps and make faster and more tangible contributions to SDG 1, SDG 8, and SDG 10.

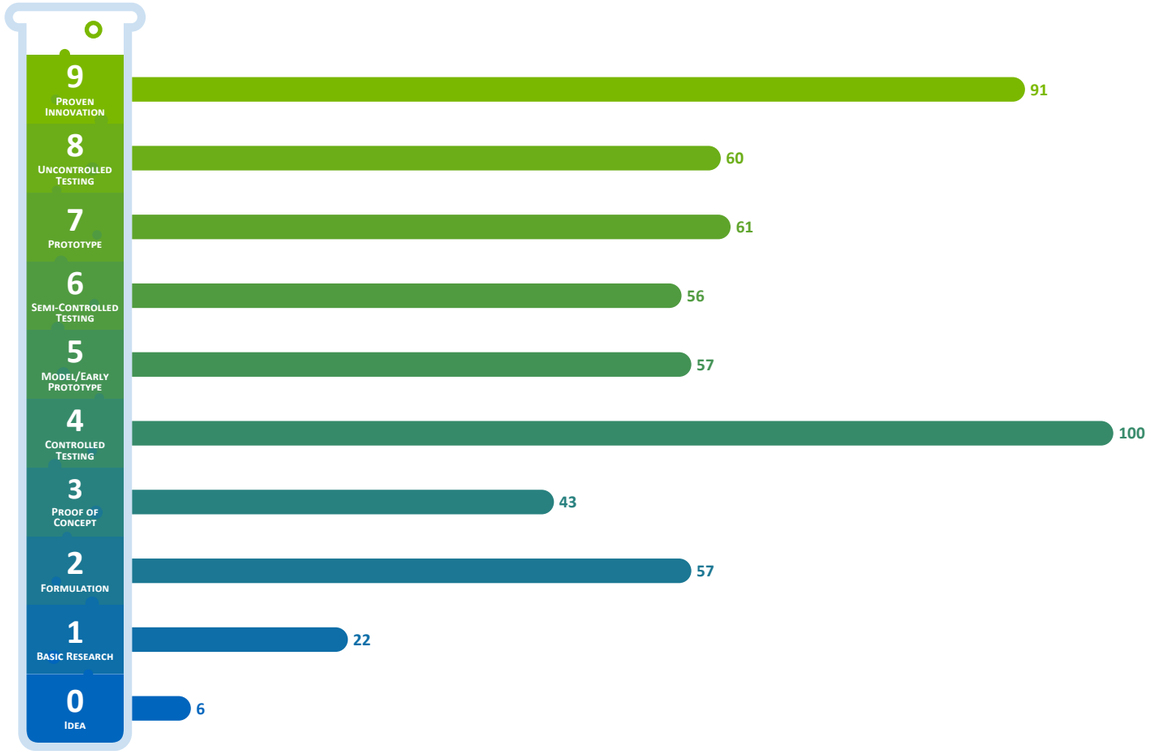
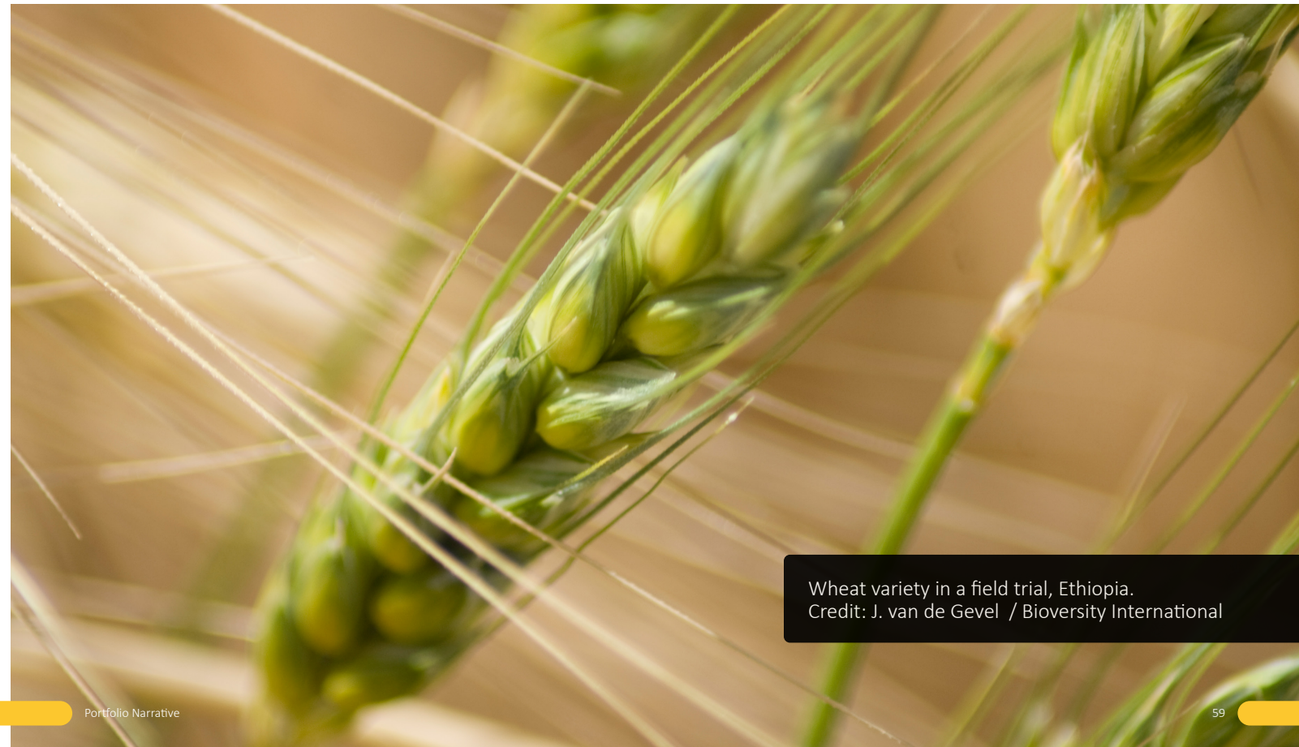


Figure 5.25. Number of innovations tagged as either Principal or Significant to the Poverty Impact Area

A few lessons have been learned from the first year of reporting CGIAR Portfolio results against the Poverty Impact Area. It is important to recall that these results are self-defined tags by Initiatives/Impact Platforms/SGPs. The CGIAR poverty community will need to provide better guidance as to what can be tagged as poverty-principal and poverty-significant. Linked to this is the need to redefine tagging to establish a better understanding of the breadth and depth of the work that is being done by CGIAR specifically on poverty reduction, minimizing inequalities, and improving job quality. It is helpful to keep in mind the fact that those results that are not tagged poverty-relevant may still positively contribute to at least one of the dimensions of this Impact Area and SDG 1, SDG 8, and SDG 10.



Wheat variety in a field trial, Ethiopia.
Credit: J. van de Gevel / Bioversity International

Innovation Portfolio Management

CGIAR's unique approach to managing its innovation portfolio

CGIAR's 2030 Research and Innovation Strategy emphasizes innovation and scalability, advocating for strategic and inclusive public-private partnerships to enhance its innovation portfolio. Through these partnerships, CGIAR participates in thousands of innovation and scaling projects, collectively known as its innovation portfolio. The practice of using data and analytics to guide strategic decision-making and resource allocation is referred to as Innovation Portfolio Management (IPM).

The adoption of IPM approaches by public research and development organizations remains limited according to the OECD. However, CGIAR is pioneering in this space, adopting a unique IPM approach grounded in Scaling Readiness principles. The CGIAR IPM approach has been detailed in a publication within Elsevier's Agricultural Systems journal, highlighting its distinctiveness and applicability, and an assessment by the Global Scaling Community of Practice, focusing on the integration of scaling practices within public sector funding and implementation bodies, noted CGIAR's unparalleled commitment to embedding scaling within the innovation process.

IPM currently applies to the "pooled" portion of CGIAR's research and innovation portfolio (nearly 40 percent of CGIAR's 2023 funding), and significant initiatives like the African Development Bank funded Technologies for African Agricultural Transformation (TAAT) project are also beginning to adopt this approach. Insights from this work offer other public sectors guidance on leveraging IPM for impactful research and innovation outcomes.

Positioning CGIAR within the broader agrifood innovation ecosystem

CGIAR's IPM approach aims to enhance internal innovation and scaling capabilities while also connecting with a wide range of external partners in the agricultural innovation ecosystem. This strategy goes beyond internal optimization to engage with government, public, and private sector innovators and scalers.

Central to its internal management is CGIAR's Performance and Results Management System (PRMF), featuring the Innovation Packages and Scaling Readiness (IPSR) approach, which uses evidence-based methods to monitor and curate innovation along an impact pathway, providing standardized methodologies and metrics.

To complement its internal efforts, CGIAR introduced the Accelerate for Impact Platform (A4IP), a strategic initiative by the Alliance of Bioversity International and CIAT. A4IP aims to transform traditional scientific research by promoting innovative models that transition research products from the lab to the market. It supports teams in developing and scaling early-stage solutions into market-ready products, fostering an entrepreneurial culture among CGIAR scientists and linking them with the external agritech ecosystem. See: A4IP 2023 Year in Review.

2023 achievements toward effective CGIAR Innovation Management

A summary of key achievements are below; more details can be found in the 2023 Portfolio Practice Change (Type 3) report.

Achievement 1: Data- and evidence-driven portfolio management

In 2023, the CGIAR Portfolio reported 843 innovations in development, including 474 new and 369 updated innovations, with 93 percent of the latter showing progress in Scaling Readiness. Additionally, 163 innovations were reported as 'in use', benefiting many farmers and stakeholders.

CGIAR also activated mandatory annual updates, collecting new data on innovation users, investment amounts, private sector engagement, and Intellectual Property Rights. For the first time, CGIAR has data on which innovation development were discontinued and why, providing valuable insights for portfolio performance management.

Furthermore, the IPSR outcome-level module was launched to aid CGIAR and partners in defining scaling ambitions and developing strategies to address scaling bottlenecks. In 2023, 27 Innovation Packages were reported which offer a more granular entry point for developing context-specific scaling strategies.

By year's end, A4IP had profiled over 3,000 innovations using standardized data collection, enhancing linkages between CGIAR and external partners' innovation efforts.

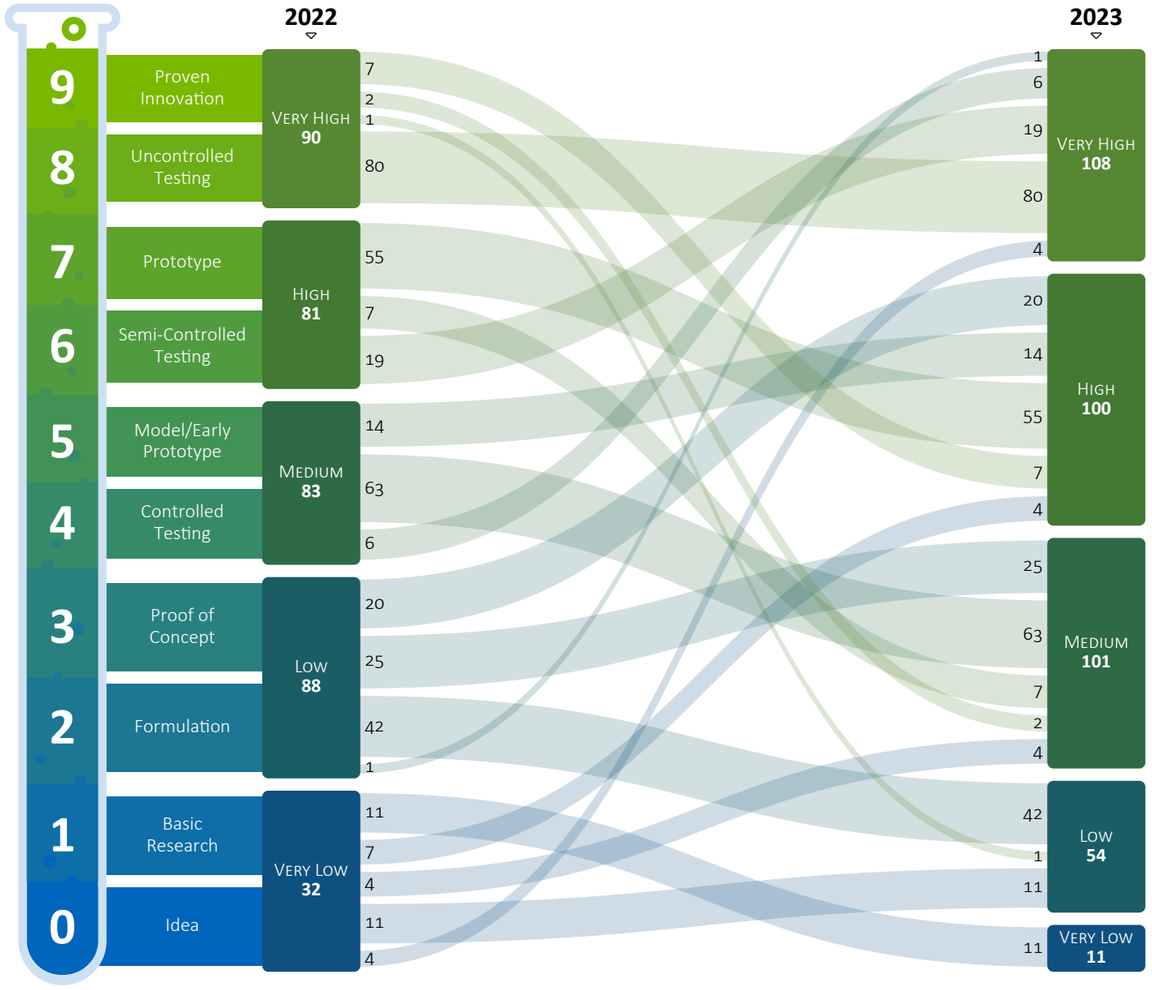


Figure 6.1. Comparing innovation readiness levels for the 376 innovations that were reported in both 2022 and 2023.

Note: The majority of updated innovations show an increase in Scaling Readiness (93 percent). Source: CGIAR Results Dashboard, accessed on 1 May, 2024.

Achievement 2: Strengthened capacity and community

In 2023, CGIAR conducted four workshops across Ethiopia, Kenya, Mexico, and Thailand, training 100 facilitators from 28 CGIAR Initiatives and various partner organizations in innovation and scaling. Participants were added to a scaling directory for networking and expertise sharing.

The second annual "Week of Scaling" in Nairobi emphasized inclusivity and sustainability in scaling agricultural innovations, with 98 attendees representing 10 CGIAR Centers and 16 external organizations and partners, including the Forum for Agricultural Research in Africa (FARA), the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), the World Bank, the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), and the New Zealand Ministry for Foreign Affairs (MFAT), facilitating dialogues on responsible innovation and scaling and private sector involvement. Dr Agnes Kalibata, president of AGRA, provided a key-note on what it takes to scale agricultural innovations.

A4IP launched the "Venture-Out: Bridging Science and Entrepreneurship " webinar series, featuring success stories from science-based ventures and tech transfer experts, primarily viewed by CGIAR staff, to foster learning and partnerships among innovators.

Achievement 3: Novel modalities to nurture innovation and scaling

Innovation Challenges: A4IP successfully spearheaded two innovation challenges in partnership with CGIAR Research Initiatives in 2023 – the AgriTech4Uzbekistan Innovation Challenge and the Sustainable Cocoa Innovation Challenge in Colombia – and extended its support to seven additional challenges, collectively nurturing 171 innovative teams and startups. A4IP's work has been recognized as a global ecosystem builder in a publication within the Global Food Security journal. Similar innovation challenges, hosted by the CGIAR Research Initiative Ukama Ustawi (CGIAR Research Initiative on Diversification in East and Southern Africa) and the Fragility, Conflict and, Migration Initiative and the WFP, focused on enhancing the investor readiness of small and medium enterprises.

Scaling Strategies: In a strategic collaboration with the Bill & Melinda Gates Foundation (BMGF), CGIAR is poised to advance its design process for developing, implementing and monitoring responsible and inclusive scaling strategies together with the CGIAR Research Initiatives on Sustainable Animal Productivity and Excellence in Agronomy, and selected bilateral projects from the International Livestock Research Institute (ILRI).

Scaling Fund: CGIAR's Regional Integrated Initiative, Ukama Ustawi, has inaugurated its Scaling Fund, designed to propel high-impact CGIAR innovations into wider markets, reaching more consumers, and catalyzing significant change. In its inaugural round, after an intensive selection process, three innovations were chosen.

Achievement 4: New internal and external partnerships

In September 2023, A4IP collaborated with the World Agri-Tech Innovation Summit in London, bringing a delegation of five, including two scientists, to showcase CGIAR's agritech research and innovations, facilitating high-level Summit involvement and providing scientists with market exposure and potential partnership opportunities.

The CGIAR Portfolio Performance Unit closely coordinated with One CGIAR Private Partnerships for Impact (PP4I) to streamline Intellectual Property Rights (IPR) efforts, enhancing support for managing IPR across CGIAR and partner teams.

CGIAR's IPM approach attracted significant interest, leading to key engagements with entities like CIRAD, GIZ, BMGF, the African Development Bank, and others, including FAO. Collaborations with academic institutions like UC Davis and Wageningen University focused on integrating responsible innovation and scaling principles into CGIAR's Portfolio.

In 2023, A4IP signed eight new Memoranda of Understanding with various innovation leaders such as Boost Biomes and Ginkgo Bioworks, to co-design projects and products, strengthening ties with the external agritech ecosystem and leveraging data and technology for more effective institutional programs.

Achievement 5: Progress toward holistic innovation management

The Scaling Community of Practice has commended CGIAR for effectively integrating scaling into its innovation process, a move not widely seen in other research or donor organizations, highlighting the need to extend similar practices to the non-pooled or bilateral portfolio.

There are positive indicators of this integration of the innovation management protocols at CGIAR Centers, including the Alliance of Bioversity International and CIAT, and ILRI, as well as at the level of bilateral projects, such as the African Development Bank-funded Technologies for African Agricultural Transformation and it e-catalog. These are important steps towards mainstreaming the IPM approach in alignment with CGIAR's broader goals, contributing to a unified innovation narrative and management across CGIAR.

CGIAR is expanding its innovation management beyond its own organizational limits, engaging with funders like the World Bank, BMGF, and GIZ, and partners like CIRAD and FAO, who are keen to adopt elements of CGIAR's innovation management strategies. To support this expansion and enhance global visibility and quality assurance, CGIAR is exploring the development of open-source software and has begun a due diligence process to determine the best approach to achieve this goal.

Next steps: IPM to support the CGIAR 2025-2030 portfolio

To maximize the impact of CGIAR's innovation within the 2025-30 Portfolio and align with the strategic goals for 2030, the IPM approach will support:

1. Identifying and transitioning "Golden Egg" innovations into the 2025-30 portfolio to meet partner demand and ensure continuity.
2. Designing context-specific innovation packages that are ready-to-scale, creating an enabling environment for client use and benefit.
3. Co-creating, implementing, and monitoring scaling strategies with government and other sector partners to optimize impact.

IPM will help CGIAR and its partners review their innovation and scaling efforts to ensure the 2025-30 portfolio effectively addresses major global challenges.

Forage pilot farms in Mai Son District, Son La Province in the northwest of Vietnam.

Adaptive management

Reflecting on 2023

In 2023, CGIAR Research Initiatives continued to advance their commitment to adaptive management, employing the Report-Reflect-Replan cycle as a foundational component of the CGIAR Technical Reporting Arrangement for the second time. The Report-Reflect-Replan cycle in CGIAR is a structured annual process that allows Initiatives to report on past performances, reflect on lessons learned to adapt strategies, and replan future activities to enhance impact and responsiveness to evolving research and development needs. This year's cycle was instrumental in enabling Initiatives, SGPs, and Impact Platforms to systematically evaluate their progress, adapt to shifting conditions, and refine their strategies to better align with evolving research and development needs.

The adaptive management process at CGIAR is a strategic tool that catalyzes continuous improvement across CGIAR's Portfolio. It involves a rigorous assessment of Initiatives and their environments, leading to actionable insights that drive more targeted and efficient research outcomes. Annual reports, which detail activities, outcomes, and strategic adaptations of each Initiative, incorporate these insights to provide a comprehensive overview of annual progress. One section in these reports encapsulates the essence of adaptive management of each Initiative, SGP and Impact Platform by providing recommendations and a rationale of how key challenges may be addressed and opportunities may be leveraged in the coming year.

In 2023, a total of 32 Initiatives, two SGPs and four Impact Platforms, actively participated in this adaptive management process by providing reflections and strategies that reveal a collective commitment to learning and optimization in their annual Technical Reports. In total, 175 adaptive management recommendations were made in 2023 – an average of 4.6 recommendations per Initiative/Impact Platform/SGP.

Among the key recommendations emerging from the 2023 analysis were:

- **Streamline research focus and scale impact**

  As a reaction to reduced or shifting budgets, strategic adjustments were recommended to narrow research scopes to focus on priority areas and develop mechanisms to scale impactful innovations. Twenty-three Initiatives, two Impact Platforms and the two SGPs mentioned this adaptive management recommendation (71 percent of Initiatives/Impact Platforms/SGPs).

- **Enhance partnerships and stakeholder engagement**

  Numerous recommendations referred to increasing efforts toward strengthening partnerships and stakeholder relationships, ensuring responsible scaling of research outputs, leading to greater impact. Fifteen Initiatives and one Impact Platform made this adaptive management recommendation (42 percent of Initiatives/Impact Platforms/SGPs.

- **Optimize technological integration**

  Some Initiatives recommended the integration of advanced technological tools and systems to enhance real-time data management and decision-making processes in research. Seven Initiatives and the two SGPs mentioned data-driven strategies and the integration of specific technological solutions like APIs, which suggests a significant and growing focus on this area (24 percent of Initiatives/Impact Platforms/SGPs).

These strategic recommendations are not merely reactive adjustments but are part of a broader vision to ensure that CGIAR remains a thought leader in agricultural research, capable of delivering solutions that are both innovative and impactful in different contexts. By systematically and periodically incorporating feedback from various stakeholders and adjusting strategies accordingly, CGIAR is seeking to improve its internal processes to remain agile and effective in the face of complex global challenges such as climate change.

Key adaptive management recommendations

Addressing funding limitations

Revision of scope and intensification of fundraising efforts

Funding constraints continue to pose significant challenges across CGIAR's Research Initiatives, necessitating a revision in scope and an increase in fundraising efforts. The Transforming Agrifood Systems in South Asia Initiative, for example, has streamlined its research focus, particularly impacting Work Packages on food waste and behavior change communications. This strategic adjustment has been complemented by enhanced partnership efforts with government bodies to ensure sustained impact despite reduced financial inputs.

Similarly, the Fruits and Vegetables Initiative has faced reductions in funding, leading to a proportional decrease in activities across several countries, including Benin. The Initiative's leadership is actively engaging in new fundraising activities, showcasing a proactive approach to maintaining research momentum and quality.

Enhancing partnerships and stakeholder engagement

Strengthening collaborative networks for impactful research

Effective stakeholder engagement and partnership management are vital for achieving the goals of CGIAR Initiatives. The NEXUS Gains Initiative has prioritized enhancing stakeholder relationships, especially through river basin teams, to ensure better alignment between Work Package outputs and Initiative outcomes. This focus is crucial for fostering ownership and commitment among stakeholders, thereby enhancing the transition from outputs to outcomes. The Ukama Ustawi Initiative, emphasizing partnership management, is reallocating budget and targets among key partners such as the International Potato Center (CIP), WorldFish, and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) to better serve expanded objectives. Additionally, the Seed Equal Initiative is bolstering its public policy work to enhance engagement with national and regional actors, introducing Key Account Managers to maintain and strengthen strategic relationships.

Leveraging technology for advanced data management

Integrated systems and real-time data for strategic decision-making

The Accelerated Breeding Initiative has effectively integrated advanced data management systems and APIs, such as the collaboration between the Breeding Portal and Global Market Intelligence Platform (GloMIP). This technological synergy facilitates real-time data exchange and strategic decision-making, significantly enhancing the efficiency and impact of breeding strategies aligned with market needs.

Building capacities for sustained impact

Focused training and resource optimization

Capacity-building across teams, partners and locally among constituents remains a core focus for CGIAR Initiatives to ensure sustainable and impactful research outputs. The SGP AVISA, for example, is enhancing the capabilities of NARS and junior scientists through targeted training programs, while the RTB Breeding has strengthened capacity through formalized CGIAR-NARS agreements.

Revising and coordinating research practice

Streamlining research approaches for efficiency

Continuous improvement of research methodologies is crucial for maintaining the relevance and effectiveness of CGIAR Initiatives. AVISA's structured approach to revising breeding strategies and the Low-Emission Food Systems Initiative's efforts to enhance coordination exemplify the ongoing commitment to operational excellence and strategic alignment are examples of this.

Scaling and replicating successful models

Establishing mechanisms to scale and accelerate mature innovations

The establishment of a Scaling Fund by the Ukama Ustawi Initiative demonstrates a strategic approach to enhancing the dissemination and adoption of agricultural innovations in East and Southern Africa. Due to the success of the Fund, it will use the continued support and funding from the New Zealand Ministry of Foreign Affairs and Trade to ensure stable and sustained scaling activities through similar mechanisms.

Communication

Enhancing internal and external communication

CGIAR Initiatives are placing a growing emphasis on enhancing external communication strategies to engage stakeholders effectively and broaden the dissemination of research findings. By actively improving communication approaches and leveraging digital platforms and media, Initiatives can extend their reach and impact, thereby facilitating better stakeholder engagement and enhance the visibility of research impacts. Teams further recommend strengthening internal communication and coordination between Work Packages and countries to ensure efforts are better aligned, streamlined and coordinated.

Crosscutting strategic enhancements

Gender-focus and monitoring for impactful engagement

A stronger focus on incorporating gender perspectives into research underscores CGIAR's commitment to ensuring that research outcomes are inclusive and equitable. This strategic enhancement is pivotal in fostering more comprehensive agricultural development, with ongoing efforts to integrate responsible and gender-focused strategies and assess their impact on the inclusivity of agricultural innovations.

Alongside these efforts, CGIAR has recognized the crucial role of rigorous monitoring and evaluation from the onset of projects. Streamlined monitoring and evaluation practices are being embedded within Initiatives to enable accurate tracking of progress and outcomes, supporting evidence-based adjustments and strategic decision-making in and beyond Initiatives.

Evolving adaptive management recommendations from 2022 to 2023

The evolution from 2022 to 2023 in CGIAR's recommendations produced through its Reflect process showcases an organization in active response to its external environment while also striving for internal improvements. The shift towards more dynamic and integrated approaches in managing partnerships, financial constraints, and technological integration highlights CGIAR's adaptive capacity to optimize its impact on global agricultural research and development despite ongoing challenges.

Consistencies

- **Focus on funding constraints or shifts:** Both years underscore the need for adaptive financial management in response to funding constraints. The emphasis on adjusting the scope of projects and seeking alternative funding to sustain research activities remains consistent. This continuous challenge highlights a critical aspect of CGIAR's operational environment that necessitates ongoing strategic financial planning.
- **Enhancing stakeholder engagement:** Enhancing stakeholder engagement has been a continued priority, recognizing the importance of partnerships in achieving and scaling impact. Both years feature Initiatives striving to further and continuously improve their partnerships and relationships to ensure the effective implementation and broader impact of research outputs.
- **Technological integration for efficiency:** The integration of advanced data management and decision-making tools has consistently been a part of the strategy to enhance operational efficiency and effectiveness. The use of technology to streamline processes and improve data-driven decision-making underlines an ongoing commitment to embracing technological innovation across CGIAR.

Evolving priorities

- **Strategic adjustments and scope:** In 2022, the focus was more on revising the scope of work due to budget cuts and reassessing theories of change, with several Initiatives explicitly mentioning the need to scale down or prioritize certain areas of their work. While these strategies are still mentioned in 2023, there is significantly greater emphasis on finding alternative funding streams and enhancing existing projects.
- **Emphasis on capacity building:** In 2023, stronger emphasis was placed on building local capacities through training programs and collaborations. This focus is aimed at ensuring that research methodologies and sustainable agricultural practices are aligned with the needs and realities of target populations.
- **Gender and cross-Initiative collaboration:** In 2023, Initiatives, SGPs and Impact Platforms highlighted a more pronounced focus on gender integration and fostering cross-Initiative collaborations to leverage synergies and enhance overall research outcomes. This approach reflects a strategic evolution toward more integrated and inclusive research practices, which may signal the benefits of the ongoing One CGIAR transition efforts.

Read about the methodology used to develop the section on adaptive management here.

Nelly Adhiambo milking her cows in Busia, Kenya. She has seen the benefit of new forages grasses as a result of the Grass to Cash project together with KALRO, Send a Cow and Advantage Crops.
Credit: Georgina Smith/ CIAT

Risk management

Risk is not inherently negative. CGIAR understands that embracing and handling risks are essential for executing its strategy, emphasizing that efficient risk management is crucial for its success and a fundamental aspect of good governance. Effective risk management is not just about mitigating risks; it also involves making informed decisions about risk-taking.

Managing risk in Initiatives can deliver significant value by fulfilling several critical purposes. Firstly, it enhances the likelihood of achieving objectives by ensuring effective and consistent progress. Secondly, it enables strategic decision-making that is informed by a comprehensive understanding of potential opportunities and threats. Lastly, it creates a foundation for compliance with regulations and fosters robust governance and assurance, thereby contributing to the overall success and sustainability of the Portfolio.

Approach and progress

Between November 2023 and January 2024, all Initiatives followed a common approach to update their top risks as part of the Reflect process. Whilst Initiative teams may maintain a longer list of risks which they monitor and manage on an ongoing basis, the reporting process is only requesting the top five risks to impact contribution to be reported annually. This is to help ensure the burden of reporting on Initiative teams remains proportionate and governing bodies receive risk information in a prioritized way rather than the complete register of risks. The standard approach to Initiative risk reporting allows portfolio managers to monitor and manage the balance of risks across the Portfolio, and make sure resources and support are provided, and decisions are made at an appropriate time.

The risk management process followed, adapted from ISO 31000:2018 – the international standard on risk management – is illustrated below.

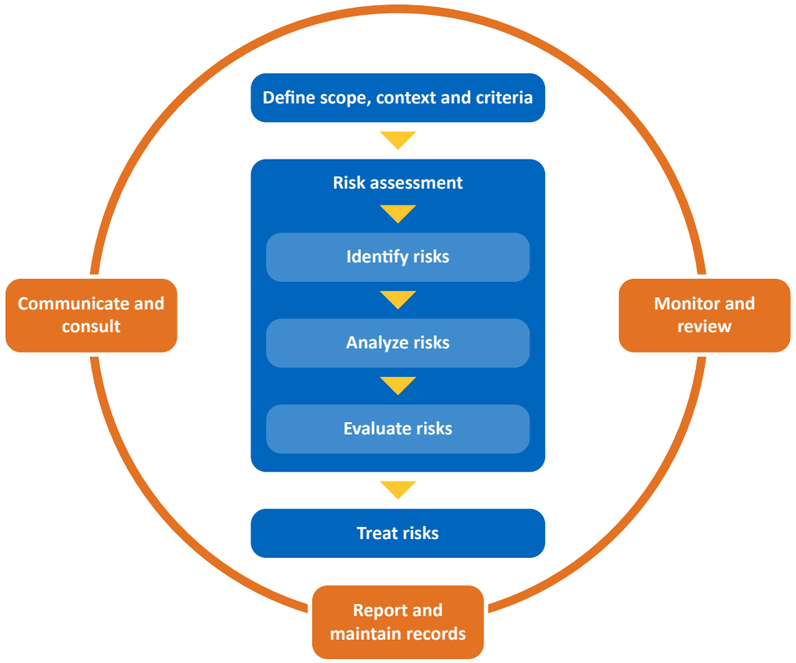


Figure 6.2. CGIAR's risk management process.

Scope

Guidance on risk scope provided to Initiative teams focuses on risks to an Initiative's contribution to impact. These are the processes, outlined in the Initiative's theories of change, by which the Initiative, with partners, contributes to processes which are expected to ultimately lead to impact within one or several of the five Impact Areas set out in CGIAR's 2030 Research and Innovation Strategy. The risks reported by Initiatives are almost evenly distributed across three main categories: financial, operational, and strategic, with strategic featuring slightly stronger.

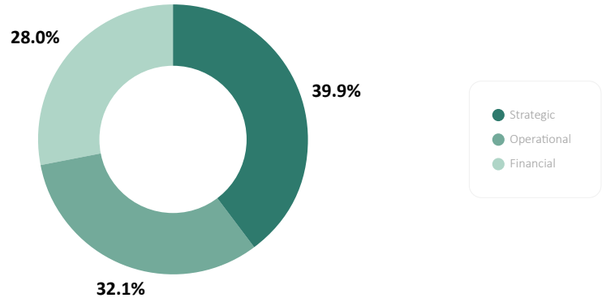
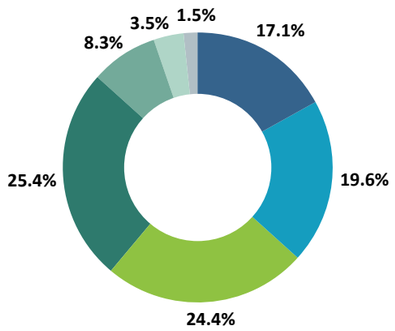


Figure 6.3. Category groups for risks reported in 2023.
Source: Initiative Risk Management Module in the Performance and Results Management System (PRMS).

Key areas of risk

While risks for Initiatives are interconnected and complex, organizing risks into categories helped to identify common themes and prioritize resource allocation and ownership. These categories provide a framework for understanding and managing risks effectively. Stakeholders can better identify patterns, address underlying issues, and allocate resources strategically to mitigate potential challenges. However, it is important to recognize that risks often overlap and interact in intricate ways, necessitating a comprehensive approach to risk management.

Based on reported risks, as shown on the chart below, the categories of risk that scored higher are Scaling Impact, Partners and Partnerships, Operations and Funding. Definitions provided to the Initiatives teams are illustrated in the table below.



Funding
Risks associated with budget and financing.

Operations
Risks associated with internal processes and systems and external socio-political, economic, or environmental events (instability, interruptions, and disruptions), or health and safety.

Partners and Partnerships
Risks to effective partnerships, and risks which lie with CGIAR's partners.

Scaling Impact
Risks to identifying and delivering pathways and activities which can take the resulting innovations to scale. This may include intended and unintended consequences of technologies/innovations for natural resources, GHG emissions, and social and economic aspects.

Research Innovation
Risks to efficiently and effectively producing high quality knowledge products, technologies, and services to develop innovations, including the identification of high impact potential research, addressing research questions, and use of appropriate methods and tools.

Talent
Risks related to attraction, engagement, development and retention of talent, and enhancement of diversity.

Legal
Risks arising from not adhering to legal requirements (e.g., force majeure) or ethical concerns.

Figure 6.4. Risk categories and their definitions.
Source: Initiative Risk Management Module in the PRMS.

Breaking down scaling impact risks for the Portfolio

Policy and regulatory risks: Unfavorable international policies may hinder partnerships for germplasm exchange, impacting research scope. Complex policy environments may hinder innovation uptake.

Challenges in technology adoption: Inability to incentivize behavior change among stakeholders may hinder the adoption of innovations. Unfavorable policy environments and climate-related stresses also pose adoption challenges.

Operational constraints and readiness for scale: Failure to deliver outcomes on time, lack of scalable technologies, and poor alignment with other Initiatives may hinder scalability. Stakeholder engagement and policy alignment are also key challenges.

Gender and social inclusion barriers: Gender and social norms may limit system-level changes, while capacity constraints and conflicting interests among stakeholders hinder consensus and adoption. Lack of political will and operationalization of supporting policies further exacerbate these challenges.

Breaking down partnership and partner risks for the Portfolio

Partnership challenges: Low willingness of demand partners, institutional barriers, and reluctance of national authorities hinder effective partnerships.

Data sharing reluctance: Countries may resist sharing plant disease data, impacting research efforts, along with challenges in aligning government priorities with Initiative programs.

Capacity and engagement issues: Limited skills among partners, inability to incentivize stakeholder behaviors, and poor coordination between ministries/agencies impede progress.

Policy and governance constraints: Weak urban governance, lack of government support, and poor coordination hamper policy implementation.

Uncertainty and disengagement: Future program uncertainty, conflicts between stakeholders, and low engagement from public actors pose significant risks to Initiative success.

Breaking down operations risks for the Portfolio

External event risks: Adverse events such as security issues, political instability, or natural disasters in target countries can disrupt operational activities, stakeholder engagements, and research partnerships, affecting implementation and success.

Technical and operational challenges: Technical limitations, operational inefficiencies, and difficulties in adapting to changes may impact efficiency.

Impact of organizational changes: Reorganization within CGIAR or other institutions can disrupt execution and generate uncertainty.

Breaking down funding risks for the Portfolio

Inadequate funding and resource allocation: Lack of adequate funding may prevent the capture of technical advances and innovations, leading to inefficiencies. Internal budget uncertainties and reliance on inconsistent pooled funding further compound the problem. Additionally, unstable funding from CGIAR donors and uncertainties regarding geopolitical events may disrupt planning and performance.

Challenges in scaling innovations: The scaling of innovations and innovation packages may be hindered by inadequate or unsustainable financial support. Insufficient resources for rigorous impact assessment of plant health innovations may also limit their scalability and impact.

Dependency on stable funding: Initiatives rely heavily on assumptions of stable funding sources, such as pooled funding and anticipated increases in funding from the CGIAR transition. Uncertainty regarding funding flows, budget insecurity, and delays due to geopolitical events pose significant challenges to the implementation of planned activities and achievement of desired outcomes across all Work Packages.

Impact on innovation pilots: Funding uncertainties and delays may result in insufficient resources to test planned innovation pilots, threatening the sustainability of projects and their ability to achieve long-term objectives. The use of grant mechanisms may fail to produce innovative solutions with scaling potential, further exacerbating the issue of inadequate funding.

Progress on actions

The most significant risks to impact contribution may fall within the Initiative's sphere of control, sphere of influence or sphere of interest. This may mean that, for some risks, the Initiative team, or Science Group leads, may be able to effectively manage or mitigate the risk, whilst for others, risk management or mitigation may more effectively be carried out by partners. For some risks, management or mitigation may not be feasible or proportionate. It is still important to identify and monitor such risks, as this will help inform Initiative decision-making.

Based on reported actions for the identified risks, as shown in the chart below, most actions are considered as ongoing and on track.

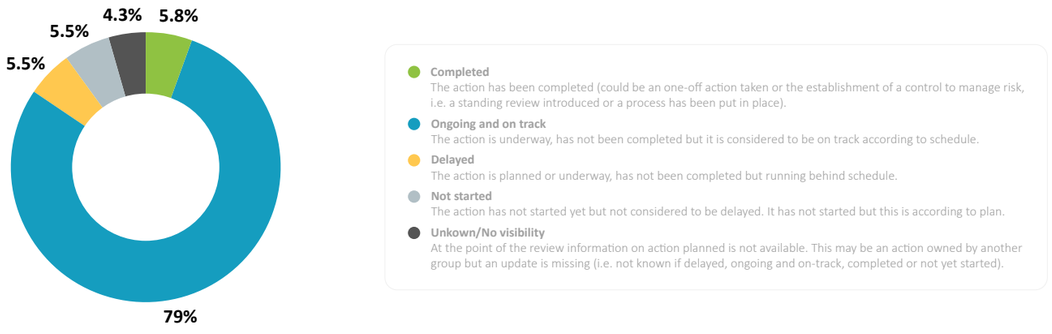


Figure 6.5. Status of reported actions for identified risks and definitions.
Source: Initiative Risk Management Module in the PRMS.

Front cover photo

Dutch Ambassador during his visit to IITA to support Youth in Agribusiness tours IITA forest with the youth representatives.
Credit: IITA

Back cover photo

Fish crew members preparing net for fishing activity within Lake Victoria in Migori County, Kenya.
Credit: Lightbulb Studios Africa/WorldFish

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