



CGIAR 2030 Research and Innovation Strategy

Purpose

This document sets out CGIAR's high-level strategy for making an ambitious and meaningful contribution to transformation of the world's food, land and water systems – both towards and beyond the 2030 Sustainable Development Goals. It provides an overview of how CGIAR will deploy and develop its capacities, assets, skills and activities to address key global and regional challenges with partners. The strategy covers all research for development programming across all CGIAR.

This document has been prepared to implement Recommendations 1 (A Compelling Mission for One CGIAR) and 4 (A New Research Modality) of the System Reference Group endorsed by the System Council on 13 November 2019 in Chengdu, China.

Action Requested

The System Council is requested to review, and if thought appropriate, approve the CGIAR 2030 Research and Innovation Strategy, pursuant to Article 6.1 y) of the CGIAR System Framework.

Document category: May be shared without restriction

Prepared by: CGIAR's Executive Management Team

Background

From March to August 2020 the Transition Consultation Forum (TCF) and its Transition Advisory Group on Research (TAG2) delivered a draft 2030 Research Strategy. In this period, a wide consultation with regional stakeholders took place via an online survey in April 2020 and a 3-day workshop among CGIAR science leaders, TAG2 and external experts in June 2020. The resulting draft Strategy went out to consultation among TCF members, System Council Funders, CGIAR staff and CGIAR advisory services.

From 1 September 2020, the Executive Management Team (EMT) took ownership of the draft Strategy and prepared a revised draft drawing on feedback received. The revised draft was reviewed by the System Board, further revised, and then between 12 and 26 October 2020 put out to a second round of internal and external consultations, both written and verbal, among CGIAR staff and advisory services, System Council Funders and regional representatives, the group of regional stakeholders consulted in April, and a group of external experts and partners identified by TAG2 and Science Leaders.

This final draft was developed on the basis of inputs from three interim Advisory Groups (one for each Action Area in the strategy, comprising System Board members, System Council members and Directors General), the extensive feedback received via the October consultations, and ongoing advice from System Board members.

The document was approved by the CGIAR System Board at its 18th meeting on 23 November 2020.



CGIAR 2030

RESEARCH AND INNOVATION STRATEGY

Transforming food,
land, and water systems
in a climate crisis



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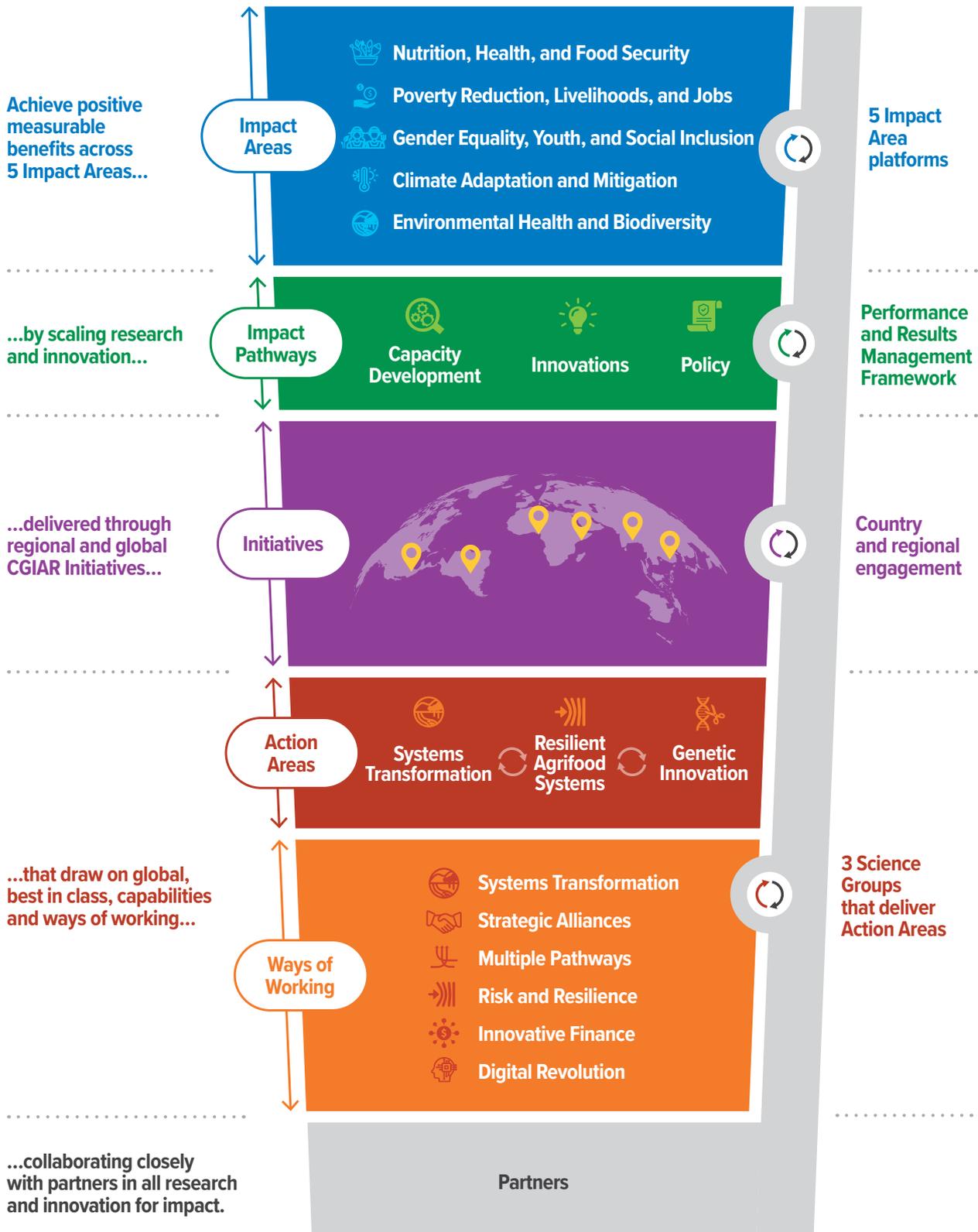
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The CGIAR 2030 Research and Innovation Strategy in a nutshell

CGIAR research and innovation will:





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Executive summary

Why a new strategy to 2030

Food unites the world, and powers us forward. Today a powerful and unified global effort is needed to equip food systems to advance human and planetary health to their full potential. The climate crisis is at the forefront of threats to our ability to provide good nutrition for all people while staying within environmental limits. Interlocked with climate change are land degradation, deforestation, loss of biodiversity, depletion of water resources, and pollution. These threats to our planetary life support systems in turn propel poor health, economic inequality, social upheaval, and conflict. Food systems are both a driver and a victim of these challenges.

Yet — if managed and governed differently — food systems could be a champion of change, at the vanguard of sustainable living for all, leading other sectors with solutions and inspiration. A radical realignment of food systems around the world could accomplish not only an end to hunger and malnutrition in all its forms, but also gender equality, job creation, prosperous livelihoods, opportunities for youth, climate solutions, and environmental health.

Multiple like-minded partners are now working towards this vision at all levels from local to global — with practical ideas on how to catalyze systems transformation with breakthroughs both small and large. Science and innovation are a critical part of the mix, providing new evidence, insights, and solutions that feed into strategic alliances for change.

CGIAR, as the world leader in agricultural science and innovation for development, must now step up to be a key player in global food systems transformation. The intertwined health, environment, and social inclusion challenges of the 21st century create an urgent impetus to sharpen the focus of CGIAR research. A refreshed, more ambitious strategy from CGIAR provides an opportunity to accelerate achievement of systems resilience and equal opportunities.

A new transition to One CGIAR — the integration of CGIAR's capabilities, knowledge, assets, people, and global presence for a new era of interconnected and partnership-driven research towards achieving the SDGs — provides the opportunity for a fresh 10-year strategy that can shape a stronger and more relevant science agenda for today's dynamic world. One CGIAR enables us to operate as a cohesive

organization with a single mission, seamlessly leveraging all of our capabilities and assets to deliver real benefits to people and our planet.

This 2030 Research and Innovation Strategy situates CGIAR in the evolving global context that demands a systems transformation approach for food, land, and water systems. It builds on our track record of collaborating with partners to deliver impacts for more than 50 years, lifting hundreds of millions of people out of hunger and poverty and supporting low-income producers and consumers. Through integrated systems research, One CGIAR and country partners will strive for impact to create sustainable and resilient food, land, and water systems, and meet SDG targets.

This Strategy presents CGIAR's ambitious high-level approach for making a significant and meaningful contribution to the transformation of the world's food, land and water systems — both towards and beyond the SDGs, providing science of relevance within and beyond the Strategy's 2030 horizon. It provides an overview of how CGIAR will develop and deploy its capacities, assets, and skills to address priority global and regional challenges with partners. The strategy covers all research for development programming across CGIAR. This CGIAR 2030 Strategy will be delivered through 3-year Investment Plans, which will frame CGIAR work supported by pooled funding of large CGIAR Initiatives. These Investment Plans will provide a much greater level of detail on the objectives, targets, activities, deliverables, and budgets of CGIAR Initiatives based on detailed co-analysis and co-design together with global, regional, and national partners, and investors.

What CGIAR will deliver

To achieve its mission — to deliver science and innovation that advance transformation of food, land, and water systems in a climate crisis — CGIAR will design its work with partners to realize multiple benefits and transformative change across five SDG-focused Impact Areas: (i) Nutrition, health, and food security; (ii) Poverty reduction, livelihoods, and jobs; (iii) Gender equality, youth, and social inclusion; (iv) Climate adaptation and mitigation; and (v) Environmental health and biodiversity. Recognizing the need to accelerate global progress towards the SDGs, CGIAR will invest in technological and institutional innovations, partnerships, capacity development, and policy engagement across all five Impact Areas.

CGIAR will strive for impact at scale globally and regionally by organizing along three Action Areas in which accelerated innovation is required to create sustainable and resilient food, land, and water systems and to meet SDG targets. The Action Areas are: (1) Systems Transformation; (2) Resilient Agrifood Systems; and (3) Genetic Innovation.

The 2030 Research and Innovation Strategy sets the stage for doing business differently to ensure that research provides real solutions for development. CGIAR will change the way it works, following seven new implementation approaches.

HOW THE STRATEGY WILL BE IMPLEMENTED

- 1 Embrace a **systems-transformation approach**, seeking **multiple benefits** across five SDG-linked Impact Areas
- 2 Leverage **ambitious partnerships for change** in which CGIAR is strategically positioned
- 3 Position **regions, countries, and landscapes** as central dimensions of partnership, worldview, and impact
- 4 Generate scientific evidence on **multiple transformation pathways**
- 5 Target **risk-management** and **resilience** as critical qualities for food, land, and water systems
- 6 Harness **innovative finance** to leverage and deliver research through new investment, and funding models
- 7 Make the **digital revolution** central to our way of working

The interrelated elements of the 2030 Research and Innovation Strategy, including its functions and the structure for delivery, are outlined in the infographic on page 6.



PART 1

Why a new strategy to 2030

A new strategy to address new challenges

Food unites the world, and powers us forward. Driven by agricultural productivity growth, humanity has made tremendous strides in reducing poverty and food insecurity over the last decades. Now food systems must step up to address a daunting array of global issues. Foremost among these is the climate crisis, which poses an existential threat to humanity. Yet — if managed and governed differently — food systems could be a champion of change, at the vanguard of sustainable living for all, leading other sectors with solutions and inspiration.

Food, land, and water systems need a profound transformation — one in which CGIAR must play a central role. People across the world are facing changes that are swifter and more interconnected than our institutions' abilities to respond: climatic shocks, environmental decline, technological innovation, and major global shifts in demographic expansion, economic growth, and geopolitical power.

Food — the ways we grow, gather, transport, process, trade, store, and consume it — comes at unsustainable cost to human health and wellbeing, the climate, and the environment. Billions of people are unable to afford or access healthy safe diets. Many agricultural systems destabilize the climate, degrade our land and water resources, and threaten critical ecosystems, biodiversity, and people's livelihoods. Agriculture and food, the world's biggest sector of employment, is predominantly characterized by poorly paid, insecure jobs and low prices to farmers.

What's more, the global food system is creating and multiplying risks, as we head further into cascading crisis because of the interconnectedness between climatic, environmental, social, economic and political threats. Climate change illustrates how the world is moving into an uncharted future. Agriculture both is a major contributor to climate change and is deeply affected by it — while greenhouse gas emissions from agricultural activities contribute to global warming, those same activities are being negatively impacted by changes in climate and extreme weather events. Worse still, we are crossing critical tipping points for ice mass loss, sea level rise, forest fires, and ocean currents, which will change people's lives and food for millennia. While all regions of the world are affected, the main challenges and risks in agriculture and fisheries associated with the changing climate vary across the six major regions and require solutions that are specific to them. When considering climate change, the primary risks for each region are outlined in Figure 1.

Figure 1. CGIAR will work with partners to address the climate crisis in six major regions.

Central and West Asia and North Africa (CWANA)

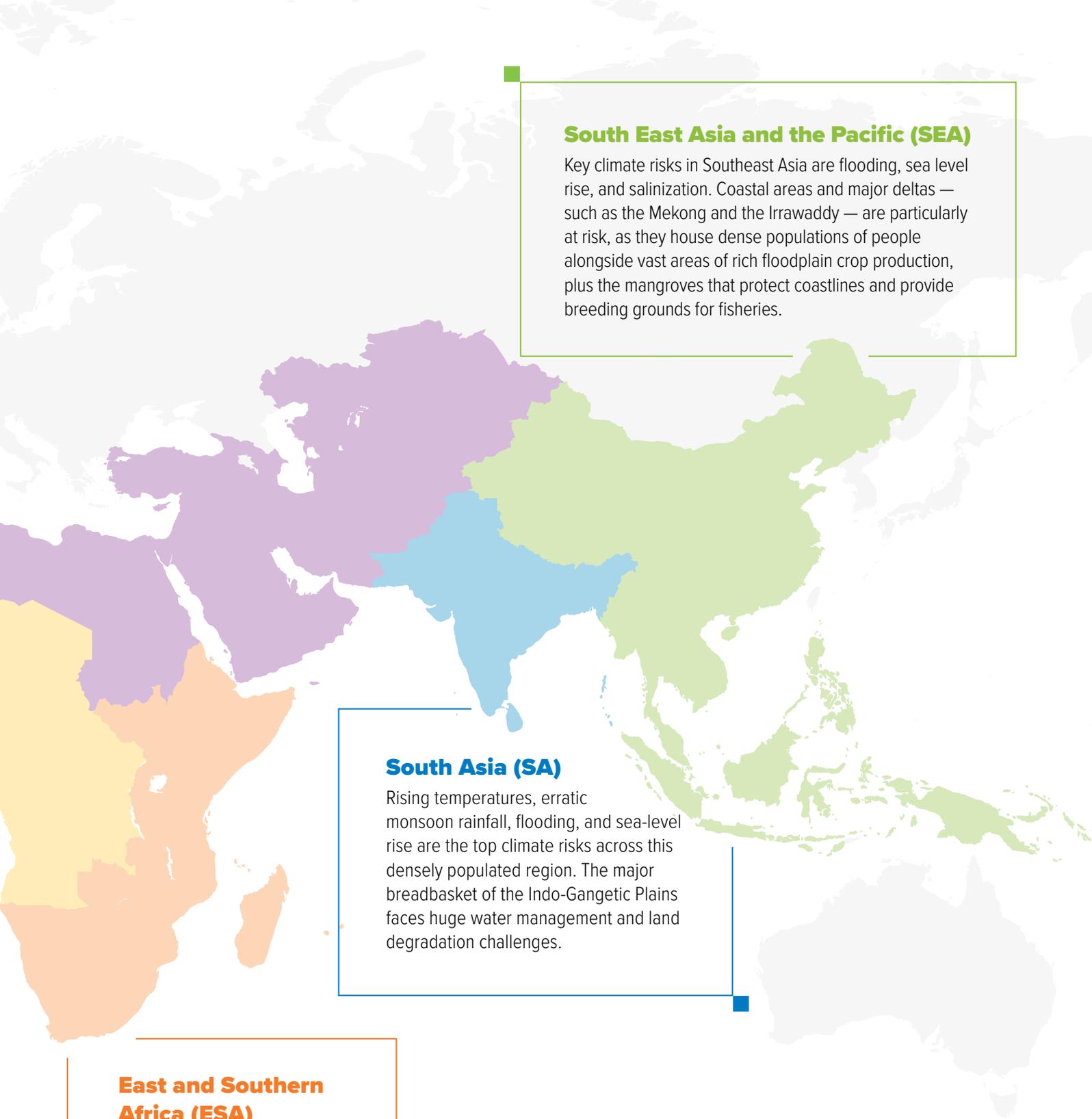
As the most water-stressed region in the world, with annual average rainfall between 100 and 400 mm, climatic risks to water are the main constraint to agriculture-led development, in both the highlands and in major deltas like the Nile.

West and Central Africa (WCA)

In the wetter coastal and forested areas, hotter growing season temperatures and shorter rainy seasons are the key climate threats. In the drier Sahel, more frequent and severe droughts, including deadly dry spells within growing seasons, are driving changes in livelihoods, for example into livestock or out-migration to urban areas.

Latin America and the Caribbean (LAC)

Shorter growing seasons, higher peak temperatures and flash floods pose key climatic risks in the Caribbean and the dry corridor across Guatemala, Honduras, Nicaragua, and El Salvador, threatening the livelihoods of millions. Widespread degradation of forests and pasture across the wider region exacerbates climate risks.



South East Asia and the Pacific (SEA)

Key climate risks in Southeast Asia are flooding, sea level rise, and salinization. Coastal areas and major deltas — such as the Mekong and the Irrawaddy — are particularly at risk, as they house dense populations of people alongside vast areas of rich floodplain crop production, plus the mangroves that protect coastlines and provide breeding grounds for fisheries.

South Asia (SA)

Rising temperatures, erratic monsoon rainfall, flooding, and sea-level rise are the top climate risks across this densely populated region. The major breadbasket of the Indo-Gangetic Plains faces huge water management and land degradation challenges.

East and Southern Africa (ESA)

Agriculture has great potential as a driver of economic growth but is held back by sensitivity to climate change. The region faces a geographic patchwork of climate challenges, most commonly shorter and more unreliable growing seasons, particularly in the more arid south.

The global disruptions caused by COVID-19 could prove a precursor for further food system shocks under the climate crisis. One outcome of the pandemic is a backslide in the gains in food security and poverty reduction achieved in recent decades. Risks to public health systems associated with antimicrobial resistance and zoonotic diseases are also on the rise. Yet it is entirely possible to change our trajectory. We find ourselves with an unprecedented opportunity for humanity to “build back better” from COVID-19 by transforming the food, land, and water systems that are at the root of the pandemic and the climate crisis.

For 50 years, CGIAR has been delivering critical science and innovation to support food security and the development of successful and inclusive agricultural economies. Now is the time for CGIAR’s original mission — to solve hunger — to expand to address wider 21st century challenges by embracing a systems-transformation approach for food, land, and water systems to deliver broad access to healthy diets and income opportunities within environmental limits. Under resource scarcity and global connectivity, the challenges of food and nutrition insecurity, poverty, gender inequality, climate change, and environmental degradation are simply not separable.

CGIAR’S TRACK RECORD AND ASSETS

CGIAR has experience and knowledge spanning 50 years, built on a track-record of continuous innovation and world class research. CGIAR research has demonstrably helped to lift hundreds of millions of people out of poverty.

Over the past five decades, contributions of CGIAR together with its partners to crop breeding, agronomic practices, plant and animal health, policy change, improving nutrition, natural resource management, and climate change responses have resulted in a 10-fold return on investment (a benefit-cost ratio of 10:1).

The benefits of CGIAR research primarily accrue to poor farmers in low and lower-middle income countries, with consumers and economies also affected positively on a broader scale, contributing to poverty reduction worldwide.

CGIAR is also the world’s largest steward of plant genetic resources: approximately 90 percent of all germplasm transfer reported under the International Treaty of Plant Genetic Resources for Food and Agriculture is distributed by CGIAR genebanks and breeders.

CGIAR has a global presence across six major regions with 10,000 staff of 135 nationalities, living and working where the greatest food, land, and water systems challenges exist. Carefully curated partnerships link research outputs to development outcomes through CGIAR’s trusted networks of national and regional bodies, private sector companies, and civil society organizations. CGIAR is also a convener and advocate for global food and agricultural research, uniquely positioned for pooling capacities across high-, middle-, and low-income countries.

One CGIAR creates a new opportunity

One CGIAR provides the opportunity for a fresh strategy to shape a stronger, more relevant, and integrated science agenda for today’s dynamic world. One CGIAR is the integration of CGIAR’s capabilities, knowledge, assets, and people, aiming for united action in the face of the interdependent challenges facing our world today. Joining forces means a sharper mission statement and impact focus, unified governance under a common board, institutional integration, common policies and services, strategic partnerships, and a consistent presence at global, regional, and country level.

One CGIAR is based on the premise that CGIAR’s people, together with partners, can deliver relevant development impacts more consistently and efficiently when brought together under fewer institutional boundaries and supported by empowered management, clear governance, and an integrated operational structure — a truly modern, global organization and leader in agricultural science and innovation, with greater interactions across disciplines and regions. For our partners, One CGIAR will be more accessible and easier to work with both locally and globally, with a single entry point to access all of our capabilities.



PART 2

What CGIAR will deliver

CGIAR's vision, mission,
intended impacts, and
portfolio of research
and innovation

Vision

A world with sustainable and resilient food, land, and water systems that deliver diverse, healthy, safe, sufficient, and affordable diets, and ensure improved livelihoods and greater social equality, within planetary and regional environmental boundaries.

Mission

To deliver science and innovation that advance transformation of food, land, and water systems in a climate crisis.

Impact: Multiple SDG benefits

CGIAR is targeting multiple SDG benefits across five Impact Areas. Working with others, for each of the Impact Areas CGIAR will contribute to collective global targets for transformation of food, land, and water systems across local, regional, and global levels.

Table 1. CGIAR Impact Areas and collective global 2030 targets.

<h2>Impact Area</h2>	<h3>Nutrition, Health, and Food Security</h3>	<h3>Poverty Reduction, Livelihoods, and Jobs</h3>
 <h2>Collective global 2030 targets</h2>	<p>If recent trends continue, the number of undernourished people will surpass 840 million by 2030.</p> <p>More than 3 billion people cannot afford a healthy diet, millions suffer from micronutrient deficiency, and an estimated 2 billion people lack access to basic sanitation.</p> <p>Diet-related non-communicable diseases (cardiovascular disease, cancer, and diabetes) are increasing in all regions.</p> <p>Human health is threatened by poor food safety and diseases transmitted within food systems, including emerging diseases.</p>	<p>More than 10 percent of the world’s population lives on less than US \$1.90 a day and 25 percent lives on less than US \$3.20 a day, making a healthy diet unaffordable to more than 3 billion people. Food systems are the world’s largest employer, but most jobs are poorly paid and insecure.</p> <p>Though half the workforce is now urban, poverty remains disproportionately concentrated in rural areas (three times as high as in urban areas), where agriculture is the predominant livelihood activity.</p> <p>The COVID-19 crisis could push 150 million people back into extreme poverty.</p>
	<p>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.</p> <p>Reduce cases of foodborne illness (600 million annually) and zoonotic disease (1 billion annually) by one third.</p>	<p>Lift at least 500 million people living in rural areas above the extreme poverty line of US \$1.90 per day (2011 PPP).</p> <p>Reduce by at least half the proportion of men, women, and children of all ages living in poverty in all its dimensions according to national definitions.</p>

These impacts and targets are closely linked to the SDGs, particularly:



For more details on the 2030 targets please refer to the CGIAR Performance and Results Management Framework 2022–2030 — a companion document to the CGIAR 2030 Research and Innovation Strategy.

Gender Equality, Youth, and Social Inclusion

Women make up 43 percent, on average, of the agricultural labor force in low- and middle-income countries, and account for two-thirds of the world's 600 million poor livestock keepers, yet their access to productive resources, rights, and services is limited, holding back prosperity for all.

More than 85 percent of the world's 1.2 billion youth live in low- and middle-income countries, and many of them face limited opportunities for employment or entrepreneurship.

Climate Adaptation and Mitigation

Agriculture and food systems produce almost a third of global greenhouse gas emissions, yet agriculture could be a global carbon sink.

Climate-related disasters could displace 200 million people by 2050.

Projections show that 2°C warming will result in an additional 540–590 million people undernourished globally by 2050.

Climate change poses major risks for agriculture and food production through high temperatures, erratic rainfall, drought, flooding, and sea level rise.

Environmental Health and Biodiversity

A third of the world's soils are degraded.

Agriculture accounts for about 70 percent of global freshwater withdrawals.

Nitrogen cycles are transgressing planetary boundaries, driven by agriculture, and phosphorus cycles are under threat.

Agriculture is the biggest driver of forest and biodiversity loss, including of diversity crucial to healthy diets and nutrition.

Multi-functional farming landscapes have an untapped potential to increase and sustain both managed and wild biodiversity.

Close the gender gap in rights to economic resources, access to ownership, and control over land and natural resources for over 500 million women who work in food, land, and water systems.

Offer rewarding opportunities to 267 million young people who are not in employment, education, or training.

Implement all National Adaptation Plans and Nationally Determined Contributions to the Paris Agreement.

Equip 500 million small-scale producers to be more resilient to climate shocks, with climate adaptation solutions available through national innovation systems.

Turn agriculture and forest systems into a net sink for carbon by 2050, with emissions from agriculture decreasing by 1 Gt per year by 2030 and reaching a floor of 5 Gt per year by 2050.

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

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.



Impact pathways through innovation systems

CGIAR will participate in innovation systems to contribute to impact at scale. Innovations — packages of complementary contributions needed to develop and take to scale products, services, and solutions — achieve impact through innovation systems of partnerships, networks, assets, and institutions. Given that timeframes for impact tend to exceed the lifetime of research programs, CGIAR investment in impact pathways focuses on best-bet investments. CGIAR will measure its effective contributions from research to impact along three main pathways within innovation systems, all working via partnerships:

- ✓ Science-based **innovation** — co-development of sets of knowledge products, technologies, services, and other solutions along a scaling pathway. CGIAR will work with partners on innovations that include genetics, agrifood management practices, social sciences and institutional solutions, biophysical sciences and solutions, databases, and tools. Activities will include participatory design, testing, and piloting, working closely with private sector partners and regulatory bodies, advancing the enabling environment and providing global architecture for collaborative international agricultural research.
- ✓ Targeted **capacity development** — working with individuals, firms, and organizations — designed to improve the utility and use of technological and institutional solutions. Activities will include training-of-trainers at the farmer level, development of training programs with private sector partners, ongoing institutional support to national partners, particularly NARES peers, and decision support for policymakers at global level.
- ✓ Advice on **policy** — including business strategies, institutional arrangements, and investment programs, together with more formal public policy sector instruments. This work will aim to help public and private sectors to improve the enabling environment for scaling of innovations, particularly to reach disadvantaged communities, women, and youth. Activities will include engagement in dialogues on public policy and private sector strategy at all levels, as well as demand-led policy analysis, foresight, and other tools.

Research and innovation portfolio

CGIAR's portfolio of work will be delivered through three Action Areas — coordinated efforts that bring a set of major ambitions for decadal transformation together with a strategic offer from CGIAR. These

Action Areas are: (1) Systems Transformation, (2) Resilient Agrifood Systems, and (3) Genetic Innovation, described under dedicated headings below. The three Action Areas are selected to build on the firm foundation of CGIAR's traditional strengths in genetics and farming systems with a more ambitious agenda around food, land, and water systems.

Action Areas will be managed by corresponding Science Groups, whose leadership will ensure active interaction and complementarity across the three areas and groups (see the infographic on page 6). A primary modality for Science Groups to deliver the portfolio of research and innovation within the Action Areas will be large CGIAR Initiatives (see box), each of which will seek to generate impacts across all five Impact Areas and draw resources from across the CGIAR. The Initiatives will be delivered through 3-year Investment Plans for the three Action Areas.

Recognizing that current capacity gaps are holding back global progress towards the SDGs, and that research and innovation must address all five Impact Areas, CGIAR will invest in Platforms for each Impact Area (see infographic on page 6). These Platforms will strengthen the work of the Action Areas, improving their focus on scaling of innovation and impact from research. The Platforms will:

- ✓ Foster global critical thinking, use of evidence, and appropriate metrics around the Impact Area;
- ✓ Increase internal capacity across the Action Areas through strengthening and sharing common tools, standards, data sets, cutting-edge science, and knowledge management;
- ✓ Advise management on the identification and performance management of CGIAR Initiatives; and
- ✓ Amplify CGIAR's external profile and voice, by engaging in and shaping global policy discourse, and by leading external communications plans to influence well beyond the agriculture and food sector.

CGIAR INITIATIVES

CGIAR Initiatives are major, prioritized areas of investment that bring capacity from within and beyond CGIAR to bear on well-defined, major challenges. CGIAR Initiatives are designed to deliver evaluable benefits towards all five Impact Areas. Initiatives state quantitatively what they intend to achieve and by when, and then work backwards to generate compelling theories of change, activities, and resource requirements. Initiatives come with evaluable results frameworks and clear reporting of results against investment. Management is divided into distinct stages, separated by assessment and decision points known as stage-gates, designed differently depending on type of research. Initiatives may be targeted at global, regional, or country levels, based on triangulation of global significance, regional relevance, and investor preferences, and will involve partners in all phases from design to scaling.

Table 2 summarizes several key pathways from science and innovation generated in Action Areas to multiple benefits across the five Impact Areas. The Action Areas are interlinked, with innovations, partnerships, capacity development, and policy engagement in each complementing and reinforcing each other. Through these channels, interdisciplinary research and innovation systems connected by a common mission generate positive shifts for environment, livelihoods, equality, nutrition, and climate.

Table 2. Delivering multiple benefits across Impact Areas.

	Systems Transformation	Resilient Agrifood Systems	Genetic Innovation
<p>Nutrition, Health and Food Security</p> 	<p>Focusing on evidence and options for improving diets and human health through food systems outcomes, policy research, and technical and institutional innovations for making healthy sustainable diets affordable, targeting consumer behavior, local urban and informal markets, and social protection.</p>	<p>Accelerated innovation in agronomy, livestock, and fisheries management to increase and diversify food supply and to manage zoonotic diseases, food safety, and anti-microbial resistance. Research advanced on a wider range of foods and farming systems, including vegetables, insects, and urban farming, with a focus on affordable diets and perishable foods.</p>	<p>Dietary diversity, quality, and resilience underpinned by custodianship and distribution of a wide variety of genetic materials of crops and their wild relatives; and breeding of nutrient-dense fish, livestock, legumes, roots, tubers, bananas, and cereals, including biofortification and market-relevant traits.</p>
<p>Poverty Reduction, Livelihoods and Jobs</p> 	<p>Policy research and engagements in all segments of food systems to help improve access to productive resources, knowledge, finance, and markets to foster inclusion and increase effectiveness of agricultural policies, social protection programs, and off-farm employment opportunities.</p>	<p>Solutions for strengthening resilience, risk management, and competitiveness to improve income-generating opportunities and sustainability of small-scale agriculture and agrifood chain participation, with a focus on women and youth.</p>	<p>Adoption and turnover of adapted and resilient varieties and breeds, leading to higher or more resilient yields, in turn driving higher and more stable farmer incomes, access to new markets, and poverty reduction among farmers and value chain participants.</p>
<p>Gender Equality, Youth and Social Inclusion</p> 	<p>Gender-transformative approaches, communication, and advocacy that lead to empowerment of women and youth, encourage entrepreneurship, and address the socio-political barriers to social inclusion in food, land, and water systems.</p>	<p>Interventions designed to enable equal access to innovations and capacity development, as well as financial, informational, and legal services for women and young people to enable them to shape agrifood systems.</p>	<p>Supply of improved varieties and breeds that are affordable and accessible to women, youth, and disadvantaged social groups, meeting their specific market requirements and preferences.</p>
<p>Climate Adaptation and Mitigation</p> 	<p>Scientific evidence, climate-smart solutions, and innovative finance that feed into local, national, regional, and global processes governing land use, land restoration, forest conservation, and resilience to floods and droughts, contributing to climate action, peace, and security.</p>	<p>Co-development of production systems and portfolios of practices, adapted to the local needs of small-scale producers to enhance their adaptive capacity while reducing emissions; provision of affordable and accessible climate-informed services, particularly using digital tools.</p>	<p>Adaptation to a changing climate through lower-emissions and adapted breeds and varieties, for example livestock breeds with better feed conversion ratios, drought-tolerant maize, and heat-tolerant beans; inclusion of long-term accessions in genebanks to provide solutions for future climates.</p>
<p>Environmental Health and Biodiversity</p> 	<p>Use of modern digital tools to bring together state of the art Earth system observation and big data analysis to inform co-design of global solutions and national policies for staying within planetary boundaries on water use, nutrient use, land use change, and biodiversity.</p>	<p>Cost-effective improved management of water, soil, nutrients, and biodiversity in crop, livestock, and fisheries systems, coupled with higher-order landscape considerations as well as circular economy and agroecological approaches.</p>	<p>Biodiversity function of genebanks; breeding to reduce environmental footprint, e.g. less water or pesticides, to help stay within planetary boundaries and to reduce local water stress, pollution, biodiversity loss, and undesirable land use change.</p>

Action Area on Systems Transformation

Food systems driving sustainable land and water use, livelihoods, and healthy diets

1 Global challenge and urgent response needed

Doubling agricultural productivity and incomes of small-scale farmers, pastoralists, and fishers to tackle poverty, hunger, and malnutrition requires urgent attention to eliminating the constraints that the poor face in accessing productive resources, knowledge, finance, and markets. The COVID-19 pandemic demonstrated that economic shocks, disruptions to food marketing systems, and changes in prices are the major drivers of food insecurity, with vulnerable groups, including women, youth, migrant workers, and poor urban populations, most at risk for falling into poverty and worsening nutrition.

At the same time, national policies and global action need strengthening to address the mismanagement of landscapes and water systems that poses threats to food security and livelihoods. Global warming, extreme droughts and floods, deforestation, environmental degradation, pressures on water resources and land use, soil degradation and erosion, and massive loss of biodiversity are among the major challenges for which multi-sectoral policies and strategies are urgently needed, with both biophysical and social sciences informing policy decisions.

Effective solutions to these complex and interrelated problems require innovations and sound policies for sustainable resource use, climate adaptation and mitigation, and improved livelihoods. Recognizing that agricultural, environmental, energy, and social challenges and risks are interconnected, they must be addressed across political boundaries, with transformations from local to global levels. Solutions need to come from coordinated action across the private, public, and civil society spheres, in particular to address trade-offs, informed by research.

2 Collective global mission with partners

CGIAR commits with partners to forge ambitious new multi-sectoral policies and strategies for food, land, and water systems transformation in 50 countries across six regions. Through integrated systems research, CGIAR will generate the evidence and knowledge for action on climate and better governance of natural resources needed for meeting targets on land use, deforestation,

water management, biodiversity, and greenhouse gas emissions. It will also play a catalytic role in designing workable, practical solutions for more resilient, diverse, and remunerative food systems that generate a smaller environmental footprint, improve livelihoods, foster inclusion, and make healthy diets affordable.

All research and innovation in this Action Area will deliver across the five Impact Areas — see Table 2.

3 Priorities for CGIAR research and innovation

CGIAR will engage with national programs and work with partners to co-generate an evidence base on policies and market-relevant solutions for systems change. Foresight and trade-off analysis will help identify and prioritize policy, institutional, and technological options in different scenarios, focusing on the challenges brought by climate change.

Co-designed innovations to foster more viable, efficient, and inclusive markets and institutions will be central to the delivery of this Action Area. Analysis of consumer behavior and the food environment will feed back into the development of technological options and innovations in services (e.g. financial, market intelligence, agro-advisory, pests, and diseases surveillance) in this and other Action Areas. New research focusing on producer-market-consumer linkages will aim to strengthen market relationships based on sustainability, inclusion, and competitiveness. The role of digital innovations to increase market efficiency and sustainable use of natural resources will also be explored.

Linking closely with the Action Area on Resilient Agrifood Systems, interdisciplinary research on terrestrial, freshwater, and marine ecosystems will integrate biophysical, technological, social, and institutional dimensions of innovations and policy. Applying remote sensing and big data tools, CGIAR will increase the quality and use of data to assess trends in landscape change, land degradation, and exploitation of water resources, adapted to the specific needs of users. Participatory approaches for planning and management of water and land resources, and related public policies, will be strengthened, informed by analysis of trade-offs and synergies between land and water uses — and users — across multiple scenarios.

CGIAR will tackle zoonotic diseases and food safety issues by addressing risk factors in different channels, including informal markets. CGIAR will make use of integrated approaches, such as One Health, recognizing that the health of people, animals, plants, and their shared environment is

- interconnected. The benefits of this work across the Impact Areas are outlined in Table 2.

4 Pathways to impact

- CGIAR's strategy is not to attempt to lead systems transformation efforts, but rather to make catalytic contributions of science, expertise, and innovations that can inform strategic alliances. CGIAR will aim to inform global and regional dialogues and decision-making. A key contribution will be to fill data and knowledge gaps to provide tangible contributions to meeting national and global targets on nutrition, poverty reduction, gender equality, climate action, and environmental health.
- Evidence-based design, targeting, and implementation of policies (agricultural, environmental, trade, labor, nutrition, and social protection) will help raise incomes, manage climate risks, create opportunities for women and youth, and enhance access to sufficient, nutritious,

- safe, and diverse diets. Research will address greater coherence among policies to amplify win-win solutions and address trade-offs, with the goal of informing long-term systems resilience.

- Acting as a translator and conduit for innovations across geographies, CGIAR will also work with partners to incorporate a South-South and triangular cooperation modality into its research, capacity development activities, and policy work.

5 CGIAR capacities to deploy now and to develop

- CGIAR already has strong capacities in key areas such as land, water, and ecosystems management, remote sensing, climate policy, nutrition-sensitive interventions, quantitative foresight modeling, and assessment of policy effectiveness. Capacities to develop, within CGIAR or through partnership, include expertise on consumers and their food environments, political economy, and innovative finance.



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Action Area on Resilient Agrifood Systems

Farming and food supply for resilient sustainable diets, livelihoods, and environments

1 Global challenge and urgent response needed

The cost of food system failures to provide human and planetary health, and decent jobs and livelihoods, falls most heavily on poor consumers and producers, often living in low-income countries. At the same time, rural-urban transport, and communications are improving, and growing urban middle classes are fueling demand for more nutrient-dense foods and higher standards of food safety, providing new agrifood market opportunities.

Small-scale food producer households, who are expected to number half a billion by 2030, face particular risks. Small-scale farming systems continue to provide more than half the world's food. Most of these producers today have multiple income streams, including non-agricultural income and strong livelihood links with urban areas.

The digital revolution and an ever-more connected world mean that the “how” of food production is ripe for innovation. Farm earnings or cost savings can, and should, be achieved hand in hand with reduction of agriculture's environmental footprint, and the building of resilience in the face of risk. For example, digital tools for precision plant nutrition, community-based solar-powered water pumps, improved livestock feed, and multitrophic aquaculture can all improve both resilience and reduce footprint. Innovations on-farm and in the food supply chain likewise may create openings for women's equality and exciting job possibilities for youth.

Small-scale farming, livestock, and fisheries systems face high exposure and sensitivity to risks and low capacity to cope or bounce back, due to a generally low asset base for investment. Building resilience through diverse risk management strategies and services will be critical to future inclusive prosperity. Migration and non-farm employment will be parts of the mix. More integrated systems-led rural development approaches, inclusive of public programs and social safety nets, may be critical for producers unable to leverage market opportunities due to a low asset base, geographical isolation, or social exclusion.

2 Collective global targets with partners

CGIAR commits with partners to double the assets and incomes of resource-poor small-scale food system workers, farmers, fishers, and livestock keepers, while ensuring that such increased prosperity is delivered through meeting optimal nutrition outcomes, within global planetary boundaries, and sustained under climate change. More specific targets will be developed on a regional basis in recognition of differences in agrifood systems among regions and delivered through strategic and inclusive public and private partnerships.

All research and innovation in this Action Area will deliver across the five Impact Areas – see Table 2.

3 Priorities for CGIAR research and innovation

Farmers' wellbeing will be at the center of this research. Three areas for objective-setting are strengthening resilience and risk-management, securing social equity, and raising productive assets and incomes.

CGIAR will leverage today's digital revolution, which provides an unprecedented opportunity to combine big data with Earth observation to accelerate the pace and scale of innovation in agronomy, soil health, agroforestry, farm diversification, and management of biodiversity, water, and pests and diseases.

Designing and ensuring access to affordable financial, informational and legal services that support women and young people will complement the agricultural work. CGIAR will work with implementation partners across these services, in both the public and private sectors, to leverage and optimize investments.

Research will explore multiple context-relevant pathways for production systems. These include agroecological approaches that leverage ecosystem functioning, technology-based approaches that optimize small-scale producers' access to and use of modern inputs, and circular economy approaches that aim to eliminate waste and keep resources in use. The effects of these innovations on Impact Areas are highlighted in Table 2.

This work will link closely with the Action Area on Systems Transformation. Efforts to improve resilience in agrifood systems must go hand in hand with efforts to halt and reverse forest loss and degradation. Similarly, on-farm water management involves the broader context of watersheds, river basins, and groundwater systems. Food system research will provide articulation across supply, market, and consumer challenges. Similarly, research on resilient agrifood systems will draw on the Action Area on Genetic

- Innovation, bringing in an array of crops with traits addressing consumer and producer needs and preferences for testing in farmers' fields.

4 Pathways to impact

- Regional Integrated Initiatives will be a primary model for research delivery, based on co-identification of challenges and research focus, co-design, co-creation, and co-learning in innovation processes. Research in regional integrated Initiatives will be interdisciplinary, connecting crops, trees and livestock, technical and institutional innovations, and farming and food systems.

- CGIAR will position its research agenda within public and private partnerships, including national research and extension service organizations, private companies, advanced research institutes, and government agencies. Multi-stakeholder platforms will provide mechanisms for shared innovation, capacity development, and generation of policy-relevant evidence.

5 CGIAR capacities to deploy now and to develop

- CGIAR brings strong capacities in agronomy, livestock management, aquaculture, fisheries, agroforestry, and mixed farming systems.
- Capacities will be built in risk management, digital tools and extension, and a wider range of food production, including vegetables and insects.
- This capacity development will come through a mix of strategic partnership and enhancement of in-house skills.



REGIONAL INTEGRATED INITIATIVES

Achieving benefits at scale across all five Impact Areas will need research and innovation targeted to complex regional problems, over and above global thematic work. Therefore, one channel for research and innovation will be **Regional Integrated Initiatives** formulated to address specific priority regional challenges in the six CGIAR regions, each with a strong climate focus to address critical issues such as those outlined in Figure 1.

The priority regional challenges to address through these Initiatives will draw on triangulation of *global significance*, based on scientific evidence, *regional relevance*, based on consultation and evidence of stakeholder demand, and *investor preference*, based on evidence of support for financing.

Regional Integrated Initiatives will be a key vehicle for co-design and co-delivery of innovation, capacity development, and policy change with regional partners. Regional Integrated Initiatives will be interdisciplinary, linking across scientific skills and CGIAR Action Areas. They will match CGIAR capabilities to regional demand, and connect research and innovation at the regional level with the global Initiatives and Impact Area platforms.

Regional Integrated Initiatives will engage partners at all stages as they move from strategic planning to implementation:

Design: Co-design of the Initiatives will involve strategic multi-stakeholder planning processes that engage with regional bodies, national governments, NARES, funders, regional development banks, and other partners. CGIAR will seek to align research and innovation with regional development policies and strategies, validated and contextualized with stakeholders. Targets for Regional Integrated Initiatives, across all five Impact Areas, will be co-developed with regional partners.

Implementation: Initiatives will be co-delivered with regional partners, activating and sustaining diverse and robust partnerships and mechanisms for reaching impact at scale from research. Successful Initiatives will need to be deeply embedded in innovation systems at national and regional levels, involving private, public, and civil society sector partners. Particular attention will be paid to capacity development, for example with women scientists in NARES, and policy engagement.

Measuring the results: CGIAR will monitor, measure, and report research results, working closely with regional bodies to map CGIAR contributions against objectives set out in regional policies and strategies. The Initiatives will commission evaluations to capture regional and country-level assessments of CGIAR success in meeting the demand, undertake review and communication of results, and refine innovation models, feeding into future work under all three Action Areas.

Action Area on Genetic Innovation

Genebanks and crop breeding

1 Global challenge and urgent response needed

Rapid improvement of the quality of crop varieties is fundamental to supplying the world's food and nutrition security, and to supporting the livelihoods of millions of farmers. In a time of escalating climate uncertainty, population growth, and growing demand for healthy and diverse diets, farmers need a steady stream of seed varieties that are demonstrably more productive, nutritious, and resilient than those they currently grow. Both breeding and stewardship of genetic resources are vital.

Climate change brings the challenge of rapid and continual change, in many cases towards conditions never before experienced by farmers. Keeping up the necessary replacement rate for crop varieties is becoming a critical success factor for adaptation — to climate, but also to changing market conditions, nutritional demands, and environmental constraints. Thus genetic gain — the tangible benefits from genetic improvement — must be about more than yield increases. Genetic gain in farmers' fields and in people's food supplies should be measured in terms of multiple demand-led traits. These include climate resilience (such as drought or heat tolerance), nutritional value (for example through biofortification), and market traits valued by women and other consumers (such as better shelf life, taste, or cooking time).

CGIAR genebanks, as the legal custodians of priceless agro-biodiversity, must play a pivotal part in rising to the global challenge of securing healthy diets in a climate-constrained world, by protecting and mobilizing plant genetic resources for new trait discovery and pre-breeding. Similarly, public and private seed systems need support, including through research, to get seeds to farmers as effectively and affordably as possible.

Genebanks and breeding are not the silver bullet to solve the world's poverty, nutritional, and environmental problems. But without them, food systems will be unable to respond to emerging threats. They are a primary line of defense and source of creativity for food systems in the face of a volatile present and an uncertain future.

2 Collective global targets with partners

CGIAR commits with partners to improving genetic gains in farmers' fields across the dimensions of

nutrition, livelihoods, equality, environment, and climate. Metrics of success will include much more rapid adoption of new varieties by small-scale farmers, with turnover increased by a minimum of 50 percent, meaning a maximum average lifetime of 10 years for these new varieties. CGIAR will work with partners to increase smallholder farmers' access to quality seeds by supporting the strengthening of national and regional seed supply systems.

CGIAR will also maintain its obligations with regard to genebanks, delivering on the SDG 2 target of maintaining 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.

All research and innovation in this Action Area will deliver across the five Impact Areas — see Table 2.

3 Priorities for CGIAR research and innovation

To prioritize breeding investments, CGIAR will develop documented investment cases for crop-geography-end user combinations (product profiles). Product profiles will address all five Impact Areas — in other words, the product's realistic potential to alleviate poverty, raise incomes, improve the nutritional status of vulnerable populations, meet the specific needs of women and of youth, increase resilience to climate change, and reduce environmental footprint. These impacts are shown in Table 2.

The more coordinated system of breeding under One CGIAR will enable adoption of best practices across CGIAR and partners' diverse breeding programs, and more efficient, lower-cost provision of services required such as genotyping, information management, and mechanization. Globally, there is still a great need for CGIAR to provide:

- ✓ Support for the optimization of breeding pipelines and implementation of genomics-assisted breeding approaches;
- ✓ Identification and incorporation of new traits, collaborating with the CGIAR genebanks; and
- ✓ Regionally adapted, rapidly cycling source populations with genomic selection models, to help provide a continuous flow of diverse, elite materials for use as parents by NARES.

CGIAR will support effective seed systems by helping national government and private sector companies and regulators build their capacities to play their roles successfully. New initiatives will be jointly designed along the seed distribution chain, including for regional seed registration, import and export procedures, efficient in-country

trials, registration and release of new varieties, and seed quality promotion through fit-for-purpose certification.

CGIAR genebanks and pre-breeding pipelines will complement breeding programs using modern genotyping and phenotyping information and digitalized data accessible to scientists. The CGIAR genebanks and germplasm health units will monitor, test, germinate, multiply, characterize, clean, culture, store, and distribute germplasm under high scientific standards of operation. Collectively, the genebanks will drive improvements in and alignment on standards, practices, and appropriate benefit sharing and engagement with users. Future-focused technologies for disease indexing, high-throughput sequencing and phenotyping, and screening data have the potential to create a dramatic increase in value and demand for diversity.

Connections with the Action Areas on Systems Transformation and Resilient Agrifood Systems will be multiple and include shared testing of varieties in farmers' fields, as well as use of data sources such as integrated climate modelling information and population nutrition analyses to inform product profiles.

4 Pathways to impact

CGIAR will work most closely with NARES partners. Shared agendas will include product profiles, varietal development, large-scale trials, and release processes, which must link to seed

systems to achieve impact. Improvements in NARES' capacities at institutional and system levels will allow CGIAR to focus more on trait, population and parent development.

Regarding seed systems, CGIAR will engage in capacity development, connecting companies, entrepreneurs, foundation seed entities, and NARES and supporting the learning and capacity development needed to fill their roles sustainably. Public-private partnerships will support effective seed sector development for seed delivery, adoption of quality agro-biodiversity by smallholder farmers, and impact at scale.

With genebanks, CGIAR will build its focus on enabling access to genetic resources at regional level and across a wide array of users. The genebanks will also consult regularly with users to improve the quality and focus of activities across all dimensions, including distribution, health units, and policy aspects.

5 CGIAR capacities to deploy now and to develop

CGIAR brings broad-based capacity in plant genetic resources availability and use, pre-breeding, mechanization, data management systems, genotyping, and phenotyping. CGIAR will work to improve capacities in-house and among key partners on product profiles that respond to end-user demands, data management systems, and better connection of seeds and propagation materials to value chain activities.



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PART 3

How CGIAR will implement this Strategy



A changed context for CGIAR requires a different approach to how we work. There are seven ways in which CGIAR will work differently. Together, these will add up to a major progression in the way that CGIAR will conduct research and maximize pathways for research to impact at scale.

1 Embrace a **systems-transformation approach** for food, land, and water systems, **seeking multiple benefits** across five SDG-focused Impact Areas. CGIAR has a strong track record of impact through plant and animal sciences, particularly breeding and health. Now it is time for CGIAR to strive for a similar level of impact through integrated systems research. The pursuit of impacts across environment, livelihoods, equality, nutrition, and climate collectively rather than on separate tracks will often require more interdisciplinary and transdisciplinary approaches. Such work will inevitably take us beyond the farm gate into broader landscapes and food systems. This ambition is encapsulated in CGIAR's new Action Area on Systems Transformation — but will be embedded throughout all CGIAR work.

Key implementation elements:

- ✓ Interdisciplinary research design that brings together social, economic, environmental, and health considerations.
- ✓ Use of foresight and trade-off assessment during project development and implementation.
- ✓ Inclusion of all five Impact Areas in assessment criteria for all CGIAR Initiative designs and reporting requirements.
- ✓ Specific gap filling in systems research, recognizing that science alone does not create systems change and stimulating the need for research on technological, environmental, and institutional processes.
- ✓ Focus on specific scientific contributions to wider agendas for transformation, feeding into impact pathways that, even while incremental on their own, can play a part in unlocking wider change and broader benefit to society.
- ✓ Development of CGIAR's capacity in systems research.

2 Embedding research within **ambitious alliances for change** in which CGIAR is strategically positioned within broader innovation systems and transformation agendas aimed at achieving the SDGs. These involve key partners from national to global levels. CGIAR will work with partners before, during, and after research, to ensure that all activities in science, capacity development, and policy work are designed to respond to partners' needs and are delivered in ways that accelerate specific opportunities for change. Matching partnerships to the challenge, with greater diversity in the range of research and scaling partners — many beyond the agriculture sector — will be crucial

for addressing wider systems transformation ambitions.

Key implementation elements:

- ✓ Identification of useful points of entry for science and innovation in existing active partnerships among global and regional bodies, including from the private sector, public sector, and civil society.
- ✓ Co-communication and co-delivery within these partnerships.
- ✓ Adoption at CGIAR Initiative-level of targets and metrics developed, used, and measured by partners.
- ✓ Commissioned evaluations to capture partners' assessments of CGIAR contributions to partners' agendas for transformation.
- ✓ Co-creation of innovations, particularly modest breakthroughs that may unlock wider systemic change, through interaction with partners.

3 Position **regions, countries, and landscapes** as central dimensions of partnership, worldview, and impact — as the source of demand, and as the location of co-design and co-delivery of innovation, capacity development, and policy change with partners. CGIAR will build on

PARTNERSHIPS OF CRITICAL IMPORTANCE TO CGIAR'S SUCCESS

Three types of partnerships were identified in a recent independent evaluation as especially critical to CGIAR:

Peer relationships in national and international innovation — NARES, which exist in all countries where CGIAR works, will be CGIAR's primary peers. Relationships built over 50 years of proven support and collaboration will be strengthened and extended. Other important partners for upstream research, translational research, and delivery of innovation will include national governmental agencies, universities, and other advanced research institutes, as well as scaling partners. CGIAR will catalyze and complement country partners' work, preparing the next generation of scientists, extension agents, farmers, agrifood businesses, and leaders to work effectively for positive change. CGIAR will help individuals and organizations interpret and respond to the rapidly changing physical, financial, and political landscape of the global agriculture and food sector through solution sharing, co-research, shared intellectual property rights, and advocacy platforms.

Partnerships with the private sector — Recognizing that the private sector is essential to food system transformation, CGIAR will build interdependent relationships with small, medium, and large enterprises, as well as with private sector coalitions, to accelerate sector-wide progress. These partnerships, safeguarding our reputation as a trusted independent party, will not be simply a one-way channel for scaling technologies, but rather pivotal to market assessment, product design, and research implementation. CGIAR understands farmers, livestock keepers, and fishers as private sector constituents, and our research will support their focus on improving both short-term and long-term prosperity, working directly with farmers' organizations. Bringing a business focus to our work is essential to bridge the gap between innovation and use, and impact at scale. To help bridge this gap, CGIAR will make systematic use of tools such as market research, product profiles, and stage-gated research management. CGIAR will develop a one-stop shop for private sector enterprises, to enable sharing of solutions, sustainable and ethical sourcing, intellectual property rights, and transparent contracting. Demand-driven engagement with the private sector will include businesses in large middle-income emerging economies in South Asia, Southeast Asia and Latin America.

Multi-stakeholder platforms, global and regional bodies — CGIAR will actively engage with the regional bodies of key partner countries, for example to help resolve regional integration and transboundary issues. CGIAR will foster strong partnerships with FAO, WFP, IFAD, and other UN agencies, in support of their critical work at global, regional, and national levels. The complexity of today's challenges also calls for a new breed of partnerships — even more inter-sectoral partnerships that take advantage of new perspectives and opportunities to achieve the vision. Systems transformation will require a joint commitment from the private sector, civil society, governments, the UN system, and development finance institutions. CGIAR will position itself strategically to provide the most useful evidence and advice within structured alliances of stakeholders at global and regional levels.



its deeply established presence in selected geographies and landscapes, embedded in strategic partnerships, to co-create agriculture and food systems innovations. CGIAR will work with national governments, regional entities, and funder platforms to set priorities for all work at country and regional levels. Coordination across CGIAR will provide an integrated offer and a single point of entry for partners at country and regional levels, nurturing strong partnerships and presence, and building shared accountability towards national and regional development goals.

Key implementation elements:

- ✓ Active ongoing engagement with regional stakeholders to identify shared priorities, co-design activities, and cultivate critical research and development partnerships.
- ✓ Requirement for all research design to define outcomes and impacts in specific regions, countries, and landscapes (e.g. a cross-boundary river basin).
- ✓ Country strategies that contribute to regional and country policies and investment programs.
- ✓ Research objectives aligned with national and regional targets and plans.
- ✓ Commissioned evaluations to capture regional and country-level assessments of CGIAR success in meeting demand.

4 Generate scientific evidence on **multiple transformation pathways** that are appropriate to different contexts. Both sustainable intensification and agro-ecological approaches will help identify such pathways adapted to the huge diversity of agriculture, land, water, and food systems. As no one size fits all, the challenge is to help stakeholders make decisions and manage trade-offs in different contexts. CGIAR will contribute to current and future debates with scientific knowledge on different options for change — and will aim to be a balanced and trusted research for development organization that provides evidence for the optimization of choices regarding food, land and water systems.

Key implementation elements:

- ✓ Provision of knowledge on different pathways and innovations, or a mix of pathways.
- ✓ Work with research users to improve understanding and distribution of benefits, costs, and risks associated with competing options.

- ✓ Economic and social sciences research to improve knowledge on incentives and drivers for different pathways.
- ✓ Focus on tactical entry points to use science to support system change, rather than attempting to tackle the entire system.

5 Target **risk-management and resilience** as critical qualities for food, land, and water systems in a world where the climate crisis and emergence of new infectious diseases like COVID-19 demonstrate that rapid change, shocks, and tipping points are the new normal. From the outset, CGIAR work will consider vulnerability to multiple risks to food systems (e.g. zoonoses, degraded ecosystems, climatic shocks, market swings, political upheaval, migration) and how this vulnerability can be turned into resilience by reducing exposure where possible, building human and societal capacity, and managing the sensitivity of forest, water, farming, and food systems to the onslaught of systems shocks. Research, capacity development, policy engagement, and partnerships will explore multiple possible future scenarios, map major pathways for change, and aim to create solutions that are robust across multiple scenarios and contexts.

Key implementation elements:

- ✓ Active use of foresight and trade-off tools.
- ✓ Generation of solutions that are demonstrably robust across multiple future scenarios and contexts.
- ✓ Greater collaboration with service-oriented partners, including lending and insurance sectors, on specific risk management tools.
- ✓ Building internal and external capacity in course corrections based on monitoring, evaluation, and learning.

6 Harnessing **innovative finance** to leverage and deliver research through new investment models. CGIAR will become more closely involved in innovative finance, working with partners to inform their investments while also sourcing new funding streams for CGIAR work. This work will explore partnerships and financial streams beyond agriculture, in sectors such as health, water supply and sanitation, disaster prevention and preparedness, and security. Additionally, alignment and framework agreements with international finance institutions, including regional development banks, will help to embed innovations in loan programs and support the implementation of new programs. Increased attention will be paid to private and innovative

funding sources, including: corporate social responsibility, philanthropy (including trusts, foundations, and high net worth individuals), shared value partnerships, blended finance, and impact investing. Working with innovative finance externally will be complemented by innovative financing models internally to support higher-risk areas of science and innovation, for example through an innovation fund.

Key implementation elements:

- ✓ Industry liaison and intellectual property function to support targeted private sector investment to scale innovations.
- ✓ Capacity established to implement, and project manage, climate finance and other global funds.
- ✓ A hub to advance global legal frameworks to incentivize financial contributions.
- ✓ An innovation fund to support smaller, higher-risk areas of science and innovation.

7

Making the **digital revolution** central to our way of working, leveraging the rapid global spread of digital technologies to change how agrifood innovation is done — using the best tools available (e.g. big data analytics, artificial intelligence) to enhance research, but also engaging digitally empowered end-users to support them in improving their own access to and use of innovations and knowledge. CGIAR will facilitate the co-design of inclusive, transformative digital services across the food system, and help to build supporting innovation systems to accelerate their growth.

Key implementation elements:

- ✓ Engagement with private sector and development partners on developing both cutting-edge and context-appropriate digital solutions, including artificial intelligence, machine learning, and big data.
- ✓ Improved access to and use of data, information, and digital innovations by partners, with a focus on small-scale farmers.

- ✓ Active seeking of new digital applications to accelerate learning and exchange among partners.
- ✓ Principles of findability, accessibility, interoperability, and reusability for all CGIAR data.

Underpinning these approaches, CGIAR will invest in systems to ensure the accountability, effectiveness, and quality of the CGIAR portfolio of work. Internally, the CGIAR Performance and Results Management Framework 2022–2030 — a companion document to the CGIAR 2030 Research and Innovation Strategy — describes the processes, tools, and performance management measures that will support portfolio delivery. Beyond these internal measures, CGIAR will invest in fully independent advice, review, and evaluation (see box below).

INDEPENDENT ASSURANCE OF QUALITY OF RESEARCH

CGIAR draws on fully external, impartial, and expert advice related to strategic planning and positioning, program evaluation, and impact assessment. CGIAR’s independent advisory services comprise ISDC, SPIA, and an independent evaluation workstream implemented at the request of the CGIAR System Council. ISDC provides independent scientific guidance, foresight, and review to inform CGIAR’s governance bodies in their decisions on research strategy and the research portfolio. SPIA offers CGIAR rigorous, strategic advice on efficient and effective impact assessment methods and delivers independent evidence of impact of CGIAR research investments. The independent evaluation workstream commissions independent evaluations of CGIAR research and delivery, designed to meet both accountability and internal learning functions.



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Glossary

Impact

A durable change in the condition of people and their environment brought about by a chain of events to which research, innovations, and related activities have contributed.

Innovations

New ideas, products, services, and solutions capable of facilitating impact through innovation systems involving multiple partners and enablers.

Innovation system

The interlinked set of people, processes, assets, and social institutions that enable the introduction and scaling of new ideas, products, services, and solutions capable of facilitating impact.

Research

Generation and communication of data, information, and knowledge on an empirical basis.

Science

Rigorous theory-based research.

System

A set of interacting entities and processes that form a complex whole.

System transformation

A major shift — bringing about significant positive change for the majority of people involved — in the governance and functioning of a system. It requires action from multiple stakeholders who work toward common goals along transformation pathways.

Acronyms

COVID-19	Coronavirus disease 2019
FAO	Food and Agriculture Organization of the United Nations
IFAD	International Fund for Agricultural Development
ISDC	Independent Science for Development Council
NARES	National Agricultural Research and Extension Services
PPP	Purchasing power parity
SDG	Sustainable Development Goal
SPIA	Standing Panel on Impact Assessment
UN	United Nations
WFP	World Food Programme

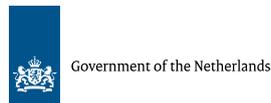
CGIAR Trust Fund* Contributors

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CONSULT THE FULL LIST OF CGIAR TRUST FUND CONTRIBUTORS AND BILATERAL CONTRIBUTORS: www.cgiar.org/funders/



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