Overview of the major impact of agricultural research of the CGIAR

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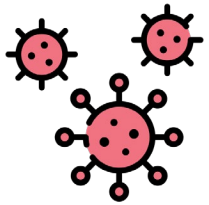
Food Systems Challenges in the Region

GROWING INEQUITIES

ASEAN has successfully slashed poverty rates, but aggregates hide women's disadvantage

CLIMATE CHANGE

IPCC AR6 notes that heat extremes have increased while cold extremes have decreased, and these trends will continue over the coming decades in the whole of Asia



COVID-19 IMPACTS

COVID-19 Impact on nutrition security due to decreased income – less nutritious foods on the plates of the poor

BIODIVERSITY LOSS

Many key components of biodiversity for food and agriculture at genetic, species, and ecosystem levels are declining while threats to diversity are increasing

URBANIZATION

Presents a set of new challenges like labor shortages in rural areas

FOOD AND NUTRITION INSECURITY

The subregion experiences a malnutrition burden among children under 5 years of age and its adult population

Our strategy in addressing these challenges

- **Pressing challenges** to food systems, human and planetary health require a **powerful and unified global effort**

- CGIAR as a **key player** in global **food**, **land** and **water systems transformation**

- CGIAR will work towards:
  - **Transformative change** across five SDG-related Impact Areas
  - Investment in innovation systems, partnerships, capacity development and policy engagement across all five areas

Climate Adaptation & Mitigation

Environmental Health & Biodiversity

Gender Equality, Youth & Social Inclusion

Poverty Reduction, Livelihoods & Jobs

Nutrition, Health & Food Security

CGIAR has a solid track record

- Over the years, we have **delivered innovations** that support, empower, and **improve the livelihoods of our stakeholders**

- In a study about "Payoffs to half a century of CGIAR research", authors concluded that CGIAR research yielded a **tenfold return to investment**

- According to an article on "Projected Benefits of CGIAR Research", the integrative strategy of the One CGIAR has the potential to result in substantial benefit to both people and planet, as it embraces **four pillars of socio-technical innovation bundles**

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ARTICLE

Payoffs to a half century of CGIAR research

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Abstract
The CGIAR is a unique and highly successful institutional arrangement for funding and conducting multilateral agricultural R&D. Established in 1971, the CGIAR has spent about $60 billion in present value terms mainly on R&D for staple food crops to support the world's poor. In this study, we provide a quantitative assessment of the past payoffs to CGIAR research. We compiled a comprehensive set of all known studies reporting estimates of returns to CGIAR research and to public research undertaken by

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Projected benefits of CGIAR Research

Projected Benefits of CGIAR Research

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report.pdf (7.746Mb)

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2022-07

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Abstract/Description
This report focuses on identifying plausible futures and potential returns on investment in the form of projected benefits for the One CGIAR research portfolio. Literature reviews indicate that returns are high. One meta-analysis of 292 studies finds an average rate of return of 100% on agricultural research after excluding extremely high outliers. In another study of 84 counties, the authors estimate that a 10-percentage-point increase in adoption of high-yielding varieties increases gross domestic product (GDP) per capita by about 15%. While macro-level returns on investment in agricultural research are clear, evidence linking technology adoption to improved agricultural productivity at the farm level is more difficult to find; studies are underway to enable estimations of returns on investment for specific crops and the corresponding socio-technical bundles.

Climate adaptation and mitigation

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

Climate-smart rice: Rice varieties that are resilient to stresses such as **drought, salt, flood, and temperature tolerant**

Asian Mega Deltas: **Securing** the Asian Mega-Deltas from **sea-level rise**, **flooding**, **salinization** and **water Insecurity**

- Around **4.8 million people** will benefit from climate adaptation through use of digital climate advisory services, improved agronomic practices, and income gains derived from use of these innovations.

Climate adaptation and mitigation

Supporting vulnerable small-scale producers to adapt to climate change and reducing greenhouse gas emissions from agrifood value chains are essential for sustaining food systems and ensuring food and nutrition security.

Greenhouse gas (GHG) mitigation in rice

- Covers rice management practices, data on biophysical and socioeconomic suitability of farming technologies and practices, and policy actions in Bangladesh, Colombia, and Vietnam.

  Alternate Wetting and Drying (AWD)

  - More controlled irrigation strategy that can significantly **reduce methane emissions** (average of 48%) as well as **water consumption** (up to 30%) and pumping costs.

  Improved direct seeding

  - **Reduce water use by 40% and GHG emissions by 47%**, and lessen cultivation time, labor, and cost of production.

Environmental Health and Biodiversity

A third of the world's soils are degraded, and agriculture accounts for about 70% of global freshwater withdrawals

Models to safely reuse wastewater and nutrients

- Will benefit **885 million urban residents** exposed to food produced with unsafe irrigation water

Fertilizer Microdosing

- Can result in crop yield increases ranging from **43% to 120%**

Water pricing

- In India, **pricing of irrigation water** was implemented to conserve water resources.
- This policy remains a challenge, yet, CGIAR research is positioned well to lead discussions on refining water policy and economics taking into consideration the social and economic factors of water pricing.

Gender equality, youth and social inclusion

In low- and middle-income nations, women work in agriculture at a rate of 43% on average, but they have limited access to resources, rights, and services, which hinders everyone's progress.

Smart valley approach

- Low-cost, participatory and sustainable approach to develop the bottoms of inland valleys for rice-based systems.
- Recorded a **94% increase in rice yield** in five countries in West Africa. **Increase net income by $267** per hectare under climate change-affected conditions; **1,370 hectares** have been developed using this approach, benefitting at least **14,027 households.**
- To date, **21 countries,** including South and Southeast Asia, are potentially benefiting millions of farmers

Women Producer Company (WPC) initiative

- **Over 1300 members** in Odisha have been provided with comprehensive services including input provision (seed, fertilizers, bio-pesticides), hiring of agricultural machinery, financial services, marketing and access to latest technologies. This contributes to **increased incomes and better livelihoods** for these farmers and their families.

Poverty reduction, livelihood and jobs

More than 3 billion people cannot afford a healthy diet. Twenty-five (25%) of the world's population lives on less than US $3.20 per day.

- In this study, 17 expost impact assessment studies on rice innovations were reviewed.
- Authors found out that stress-tolerant rice varieties in Asia and Africa significantly **increased rice yield** and **income. innovations, training, and natural resource management practices**, have had a considerable positive effect on smallholder rice farmers' economic well-being.

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Helping feed the world with rice innovations: CGIAR research adoption and socioeconomic impact on farmers

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Nutrition, health and food security

Human health is threatened by poor food safety and diseases transmitted within food systems. Diet-related non-communicable diseases are also increasing across the globe.

Product diversification and higher quality output:

- Developed **biofortified varieties** with enriched micronutrient content such as provitamin A, iron, and zinc, and rice varieties with lower glycemic index and antioxidant properties.
- **IR64 or the mega rice** was widely cultivated in over 10 million hectares

Sustainable Rice-Based Food System:

- Three Reductions, three Gains or One Must Do, Five Reductions and Sustainable Rice Platform (SRP). These practices resulted having domestic consumers in Vietnam ***willing to pay a 9–33% premium*** for **certified sustainably produced rice.**

Healthy aquatic food systems for nutrition and livelihoods:

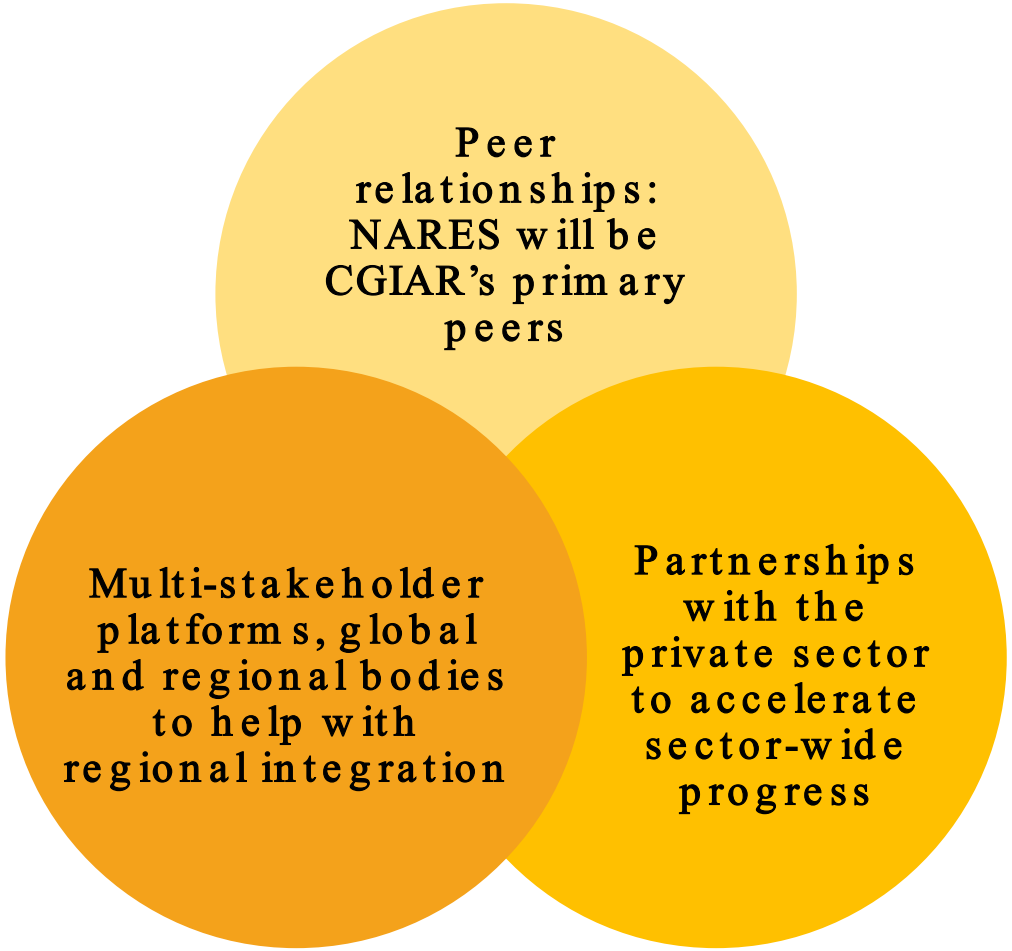
- Polyculture of micronutrient-rich indigenous fish species (carp, tilapia and mola) enhances nutritional value of food readily available.
- Reached **700,000 households in Bangladesh,** and scaling to reach **another 65,000 households in Odisha,** in household ponds and women-run community ponds.

A paradigm shift to food system transformation

Agricultural productivity paradigm	Food system efficiency paradigm	Possible implications of the evolution
Farm systems focused on agricultural production	Food systems focused on heathy and sustainable diets	Need to look beyond the agricultural sector. Involve several institutions beyond ministries of agriculture.
Agricultural supply/availability	Food demand, access, quality, safety, utilization	Shift from a primary focus on production/producer welfare to a primary focus on consumption/ consumer welfare.
Cheap & abundant staples	Nutritious & diversified foods	Higher prices are likely for consumers. They may require safety nets for the poorest households. Small farmers may get higher prices and become more competitive.
Calories, proteins	Macronutrients, micronutrients, & vitamins	Methods, tools and mechanisms to measure and monitor nutrition performance of food systems would need to adjust.
Crop productivity	Sustainable intensification, Total factor productivity	More complex management of the farm environment with multiple and sometimes competing performance indicators.
Mono-cropping	Farm diversification	Less control of agribusiness in the short term. Likely more diversified foods and biodiversity.
Economy of scale	Value addition, quality	Change in performance measurement with a focus on value addition per unit of labor as opposed to yield.
Land access	Land restitution	Possible negative consequences for marginal farmers relying on marginal land. Likely increase of land price and speculation on land markets.
Feeding people	**Nourishing people**	Change in quality and price of food.

Source: Balié, J. The trade-offs of healthy food from sustainable agriculture in the Global South (2020) Glob. Food Secur., 26, 100384.

Matching partnerships to specific challenges



- **Specific demands** of regions, countries and landscapes will shape partnerships
- Greater **diversity in the range of partners** — beyond agriculture
- As a trusted independent party, CGIAR provides a **single point of entry**
- Solutions from **coordinated action** across sectors
- CGIAR will **work with partners** to:
- **Co-identify challenges** and research foci
- **Co-generate evidence** and awareness
- **Co-deliver** innovations

CGIAR and Crawford Fund

CGIAR

Science for a food-secure future

+ largest agricultural research network
+ global presence including Australia

+transform food, land and water systems in climate crisis for future generations

Crawford Fund FOR A FOOD SECURE WORLD

+ capacity building among young Australian students and scientists in international agricultural research and development

+ stronger and impactful agricultural research investment enabling greater benefits of science for a food-secure world

Thank you

CGIAR
Science for a food-secure future