Resilient Cities
Author: CGIAR Research Initiative on Resilient Cities

Title: Annual Technical Report 2023: CGIAR Research Initiative on Resilient Cities


© 2024 CGIAR System Organization. This publication is licensed for use under a Creative Commons Attribution 4.0 International License (CC BY 4.0). To view this license, visit https://creativecommons.org/licenses/by/4.0.

Disclaimers

This publication has been prepared as an output of the CGIAR Research Initiative on Resilient Cities. Any views and opinions expressed in this publication are those of the author(s) and are not necessarily representative of or endorsed by the CGIAR System Organization.

Acknowledgements

This work is part of the CGIAR Research Initiative on Resilient Cities. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund: https://www.cgiar.org/funders.
CGIAR Technical Reporting has been developed in alignment with the CGIAR Technical Reporting Arrangement. This Initiative report ("Type 1" report) constitutes part of the broader CGIAR Technical Report. Each CGIAR Research Initiative submits an annual "Type 1" report, which provides assurance on Initiative-level progress towards End of Initiative outcomes.

The CGIAR Technical Report comprises:

- Type 1 Initiative, Impact Platform, and Science Group Project (SGP) reports, with quality assured results reported by Initiatives, Platforms and SGPs available on the CGIAR Results Dashboard.
- The Type 3 Portfolio Performance and Project Coordination Practice Change report, which focuses on internal practice change.
- The Portfolio Narrative, which draws on the Type 1 and Type 3 reports, and the CGIAR Results Dashboard, to provide a broader view on Portfolio coherence, including results, partnerships, country and regional engagement, and synergies among the Portfolio's constituent parts.

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

Table of contents

- Fact sheet and budget
- Progress on science and towards End of Initiative outcomes
- Work Package progress
- Key results
- Partnerships
- CGIAR Portfolio linkages
- Adaptive management
- Key result story
Fact sheet and budget

Executive summary

The CGIAR Research Initiative on Resilient Cities achieved significant progress in generating evidence for climate adaptation and mitigation, scores are: 0 = Not targeted; 1 = Significant; and 2 = Principal.

Scores given to the Initiative overall based on their proposal.

Regions targeted in the proposal:

- Southeast Asia and the Pacific
- West and Central Africa
- Central and West Asia and North Africa
- East and Southern Africa
- Latin America and the Caribbean
- South Asia
- African governments to engage with informal markets.

APPROVED BUDGET

PROPOSAL BUDGET

<table>
<thead>
<tr>
<th>2023</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10.00</td>
<td>$3.97</td>
</tr>
</tbody>
</table>

Credit: CGIAR

Mobile app usable endor in Dhaka, Bangladesh Credit: CGIAR
Annual Technical Report 2023

End of Initiative outcomes

Progress on science and towards End of Initiative outcomes

Initiative-level theory of change diagram

EOI 1

End hunger for all and make affordable, healthy food for the 3 billion people who do not currently have access to safe and nutritious food.

EOI 2

At least 2000 local NGOs and national government programs have the potential to increase the net farm income of smallholders and pastoralists in targeted areas.

EOI 3

CGA partner development and scale innovators that contribute to the empowerment of women, youth, and other socio-economic groups in food, land, and water systems.

EOI 4

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

EOI 5

At least 4 million consumers benefit from nutrition programs that use evidence-based UPLF environments and consumption toolkits, including approaches to increase women’s decision-making power and to improve diet quality and nutritional status.

Impact Area

Climate Adaptation

Gender Equality, Youth & Social Inclusion

Poverty Reduction, Livelihoods & Jobs

Resilient Agrifood Systems

Sustainable Development Goal

& Biodiversity

Environmental Health & Biodiversity

& Food Security

& Nutrition

& Livelihoods & Jobs

& Poverty Reduction, Livelihoods & Jobs

& Resilient Agrifood Systems

& Social Inclusion

& Climate Adaptation

& Gender Equality, Youth

& Resilient Cities

A summary of Work Package progress ratings is provided in Section 3.
EOIO 1: Municipal authorities and their public and private sector partners in at least six cities adopt evidence-based approaches, tools, and business models for planning, implementing, and monitoring investments in a CBE and/or strategies to mitigate environmental and human health risks.

EOIO 2: At least 10,000 local micro, small, and medium enterprises (MSMEs) in food processing, marketing, and agrifood service sectors can access and utilize business development toolkits, improved technologies, knowledge, and skills, with strong participation by women and youth.

EOIO 3: At least 10,000 small-scale producers in UPU zones can access and utilize improved technologies, skills, know-how, and management tools for safer, more sustainable, and more efficient vegetable, livestock, and fish production.

EOIO 4: At least 4 million consumers benefit from nutrition programs that use evidence-based UPU food environment and consumption toolkits, including approaches to increase women's decision-making power and improve diet quality and nutritional status.

EOIO 5: Urban planners and stakeholders participating in global networks of more than 200 cities representing more than 400 million consumers use, promote, and improve research and innovation tools and approaches developed by research, training institutions, and civil society to accelerate UPU agrifood system.
WP1: Enabling sustainable production of nutritious foods in (peri-) urban zones

**Output**

- Implementation guide for improving seed and seedling systems to promote urban and peri-urban (UPU) food production.
- Knowledge products comparing urban seedling systems in four cities/countries published.
- At least 500 women and youth trained in food production (Kenya, Ethiopia, Bangladesh).
- Data set comparing the cost-effectiveness of supplying vegetable seeds vs. seedlings published.
- At least 300 people trained in food production and business management per country.
- One paper comparing the effectiveness of alternative soil media and bio agents published.
- Implementation guide to exploit the re-use of urban waste in food production.
- All at least 600 people trained in the re-use of urban waste.
- One paper on the risk assessment of fruits and vegetables produced in urban and peri-urban environments published.
- One data set assessing the microplastic contamination of vegetables grown in urban and peri-urban environments published.
- Communication products on guidelines to support efficient and safe food production in urban and peri-urban environments published.
- One paper describing urban food production in Dhaka.
- One baseline data set for impact evaluation in either Kenya or Ethiopia.
- Policy brief about urban gardening in Nairobi.
- Implementation guide on how to promote women and youth to produce nutritious and safe vegetables for urban markets.
- Technical instruction videos supporting urban gardening.
- At least 300 people trained in food production and business management per country.

**Outcome**

- Small-scale producers in urban and peri-urban (UPU) zones access to and utilize improved technologies, know-how and management tools.
- Urban populations vulnerable to malnutrition gain better access to nutritious food produced in cities.
- At least 10,000 small-scale producers in Urban and Peri-urban (UPU) zones can access and utilize improved technologies, skills, knowledge and management tools for safer, more sustainable and more efficient vegetable, livestock and fish production.

**Activities**

- Implementations guide for improving seed and seedling systems to promote urban and peri-urban (UPU) food production.
- Knowledge products comparing urban seedling systems in four cities/countries published.
- At least 300 women and youth trained in food production (Kenya, Ethiopia, Bangladesh).
- Data set comparing the cost-effectiveness of supplying vegetable seeds vs. seedlings published.
- At least 300 people trained in food production and business management per country.
- One paper comparing the effectiveness of alternative soil media and bio agents published.
- Implementation guide to exploit the re-use of urban waste in food production.
- All at least 600 people trained in the re-use of urban waste.
- One paper on the risk assessment of fruits and vegetables produced in urban and peri-urban environments published.
- One data set assessing the microplastic contamination of vegetables grown in urban and peri-urban environments published.
- Communication products on guidelines to support efficient and safe food production in urban and peri-urban environments published.
- One paper describing urban food production in Dhaka.
- One baseline data set for impact evaluation in either Kenya or Ethiopia.
- Policy brief about urban gardening in Nairobi.
- Implementation guide on how to promote women and youth to produce nutritious and safe vegetables for urban markets.
- Technical instruction videos supporting urban gardening.
- At least 300 people trained in food production and business management per country.

**Work Package 1 progress against the theory of change**

Activities were implemented primarily in Dhaka, Manila, and Nairobi, where the opportunities and challenges of UPU vegetable production were broadly analyzed. The use of healthy seed and seedlings in UPU settings was heavily promoted in WP1 to improve the safe production of nutritious vegetables. In Nairobi and Kisumu, Kenya, hundreds of demonstration plots were established with farmers to illustrate the benefits of using healthy seedlings. A highly diverse range of indigenous vegetables were distributed to urban gardens in Manila, and in Dhaka the impact of an FAO-led urban gardening training program involving thousands of urban gardeners was evaluated. Alternative technologies for growing vegetables on rooftops (such as hydroponics, aquaponics, and self-watering geobags) were also demonstrated and tested with urban gardeners in Dhaka and initiated with school vegetable gardens in Nairobi.

In Dhaka, urban gardening training had various positive effects on livelihood indicators, while the rooftop gardening alternatives were received with great enthusiasm. In Manila, we introduced 68 varieties of 31 types of indigenous food crops. In Kenya, healthy seedling demonstrations highlighted their multiple benefits, including higher levels of germination, transplant survival, and overall production, as well as lower pest and disease incidence. Links with seedling propagators were developed and a mobile app to improve access to seedling information and purchase is progressing well.

Studies on rooftop gardens in Dhaka showed that urban soils have poor soil microbiome diversity and vegetables are contaminated with several novel strains of antimicrobial resistant pathogens (Citrobacter freundii, Shigella flexneri, Escherichia coli), potentially posing a significant risk to human health. In a separate study, we analyzed the food safety risk of plastic pollution and found that common vegetables, such as water spinach and lettuce, can absorb and accumulate nano-sized polymer (plastic) particles.
WP2: Building inclusive and sustainable food markets and safeguarding supply chains

**Output**
- Evidence and guidelines for market repositioning, including shorter value chains, new roles and functions, and consumer outreach.
- Food market risk profile and mitigation options developed, with necessary capacity strengthening needs identified.
- Vendor capacities for enterprise and business strengthened.
- Guidelines are developed and shared with relevant stakeholders and networks for policy support to informal markets as an essential part of urban food systems.
- Joint producer-vendor digital platforms for food marketing and waste reduction.
- Food storage and other waste management practices identified for reduced waste, increased income and employment, and market actor storage and processing capacity strengthening needs identified.

**Outcome**
- Market vendors, institutions, and policy actors reposition and diversify local markets through changes in practices and policies, enhancing food safety, food access, and decent work.
- Urban food marketing enterprises safeguard food supply through enhanced communication with food producers and improved waste management, storage, and food transformation.

**COE**
- At least 10,000 local MSMEs in food processing, marketing, and services sectors can access and utilize business development toolkits, improved technologies, knowledge and skills, with strong participation by women and youth.

**Work Package 2 progress against the theory of change**
In 2023, WP2 continued to operate at three levels: generate scientific evidence to guide the design of market interventions, pilot market and supply chain innovations, and engage with policymakers and stakeholders to make progress toward Initiative outcomes. The Initiative’s budget reduction in 2023 required downscaling activities and refocusing one of the Initiative outcomes (solutions for food processing and storage). Progress continues toward the other outcomes.

The Initiative published assessments from Bangladesh and Peru investigating entry points to strengthen food safety in urban markets and inform the design of future interventions. It also implemented interventions in Lima, Nairobi, and Quezon City. The Initiative launched an entrepreneurship program for small-scale vendors. The pilot engaged 250 vendors in measuring the program’s ability to improve their entrepreneurial practices and revenues. City governments and local authorities in Nairobi and Quezon City have shown interest in scaling the program to the city level. Stakeholders in other countries (Bangladesh, Peru, and Viet Nam) see its potential to address one of the most pressing limitations on urban food systems—the lack of entrepreneurial and business capacity among small-scale vendors in LMICs. In Lima, we implemented an innovative approach to link farmers with institutional markets (“ollas comunes” serving meals to vulnerable communities). It repurposes food discarded at the farm level for use in institutional markets. To enhance the innovation’s sustainability and scalability, the Initiative is working with the municipal government and a local multistakeholder platform for a sustainable food system to develop local ordinances that will create a policy framework to institutionalize it. The Initiative has also supported the implementation of participatory guarantee systems to certify farmers’ good practices, facilitating their ability to participate in government food procurement processes.

Dried fish at the weekly market of Yanonge - DRC.
Credit: Axel Fassio/CIFOR
WP3: Strengthening circular bioeconomy, food safety, and the urban environment

**Output**
- Compilation of business models for sewage sludge reuse.
- Lessons learnt and recommendations for RRR in municipal RRR programs.
- Review of experience with biogas in the Global south.
- Training modules implemented Circular Economy and RRR.
- Analysis of wastewater freshwater swaps.
- Water quality risk mitigation guidelines for FAO.
- Review of WHO guideline adoption challenges.
- Evidence-based decision-support system for advisory services.
- Investment climate for RRR (incl. carbon credits) at least in all countries analyzed.
- Lessons learned from carbon finance for RRR in the Global south reviewed.
- Scenarios for moving from chemical fertilizers towards a circular bioeconomy analyzed.
- Food waste reuse regulations in selected countries (India, Philippines) reviewed.
- Financial models for Black soldier fly utilization in RRR enterprises assessed.
- Bioeconomy, food safety and environmental resilience assessments contributing to Urban Food System Profiles.
- Decision support tools and guidelines for human and environmental health risk reduction in peri-urban settings put in place.
- Assessments and profiling of health benefits and risk from urban livestock keeping done.
- Evidence on successful incentive-based strategies for food safety in urban environments.

**Outcome**
- Increased capacity for Resource Recovery and Reuse (RRR) business planning and operations.
- Increased knowledge of investment options in locally viable Resource Recovery and Reuse (RRR) models and supportive regulatory environments.
- Improved understanding of adoption drivers for food safety and environmental health in urban food systems.
- Increased capacity for Resource Recovery and Reuse (RRR) business planning and operations.
- Improved understanding of adoption drivers for food safety and environmental health in urban food systems.

**ECO 3**
Municipal authorities and their public and private sector partners in at least six cities adopt evidence-based strategies for planning, implementing, and monitoring investments in a circular bioeconomy and/or strategies to mitigate environmental and human health risks.

**Output**
- Municipal authorities and their public and private sector partners in at least six cities adopt evidence-based strategies for planning, implementing, and monitoring investments in a circular bioeconomy and/or strategies to mitigate environmental and human health risks.
- Compilation of business models for sewage sludge reuse.
- Lessons learnt and recommendations for RRR in municipal RRR programs.
- Review of experience with biogas in the Global south.
- Training modules implemented Circular Economy and RRR.
- Analysis of wastewater freshwater swaps.
- Water quality risk mitigation guidelines for FAO.
- Review of WHO guideline adoption challenges.
- Evidence-based decision-support system for advisory services.
- Investment climate for RRR (incl. carbon credits) at least in all countries analyzed.
- Lessons learned from carbon finance for RRR in the Global south reviewed.
- Scenarios for moving from chemical fertilizers towards a circular bioeconomy analyzed.
- Food waste reuse regulations in selected countries (India, Philippines) reviewed.
- Financial models for Black soldier fly utilization in RRR enterprises assessed.
- Bioeconomy, food safety and environmental resilience assessments contributing to Urban Food System Profiles.
- Decision support tools and guidelines for human and environmental health risk reduction in peri-urban settings put in place.
- Assessments and profiling of health benefits and risk from urban livestock keeping done.
- Evidence on successful incentive-based strategies for food safety in urban environments.

WP3 progress against the theory of change

In 2023, WP's key output was our contribution to the new FAO water quality guidelines, Water Quality in Agriculture: Risks and Risk Mitigation, which will soon be translated into Chinese. These guidelines will reach far more farmers than the target set by the Initiative. For example, 30 million ha are currently under raw or diluted wastewater irrigation and 20 percent of global irrigated areas suffer from saline irrigation water. The guidelines are intended for use by national and subnational government authorities, farm and project managers, extension officers, and engineers to evaluate water quality data and ensure safe water reuse—a major step toward greater CBE in practice.

In Sri Lanka, WP3 worked on improving the efficiency of 26 compost stations on behalf of the Waste Management Authority in the western province in 2023. The results inform capacity development programs and a new digital dashboard for monitoring key performance indicators to be implemented in three municipalities and more than 13 towns in the western province, Sri Lanka's most populated. We published a range of global reviews, such as an analysis of public-private partnerships working on CBE solutions, covering work by CGIAR and others; a selection of business models for sewage sludge reuse; and food waste minimization strategies through food rescue. Of particular interest was the feasibility analysis of Sri Lanka's 2021 shift from agro-chemicals to organic fertilizers. We also conducted assessments in Addis Ababa and Dhaka to understand drivers of food safety practices in food markets, with a focus on informal markets. These assessments inform the design of interventions that aim to enhance the capacity of informal food sector businesses to adopt best practices for food safety. Delays occurred with the design and implementation of these interventions, and preliminary results will be available by the end of 2024.

Throughout the year, we engaged with relevant stakeholders in food safety in urban food systems, including the launch of the Resilient Cities and One Health Initiative–supported food safety technical working group. The group will be a strategic platform to facilitate the dissemination of research findings and design of scaling activities.
WP4: Improving food environments and consumer behavior for nutrition

**Output**
- Urban Food Environments and Diets (UFED) toolkit that includes an inventory of food environment and dietary assessment methods with recommendations as to what combinations to use in urban and peri-urban (UPU) settings.
- Assessment of the validation of using Food Recognition Assistance and Nudging Insights (FRANi) to assess nutrient intake compared to 24 h recalls in adolescents in Ghana and Sri Lanka.
- Summary of results from adaptation of food assessment tools for use in urban Sri Lanka.
- Reviews of diet and nutrition problems in urban areas of the six focal countries.
- Diet and food environment resilience profiles contributing to Integrated Urban Food System Profiles.
- Assessment of the validation of using a phone-based dietary survey compared to a weighed record in Sri Lanka.
- Guidance for leveraging social assistance programs (SAPs) to improve diets in urban settings.

**Outcome**
- Stakeholders in at least three countries adopt UFED toolkit.
- Countries promote guidelines for social assistance programs (SAPs) in urban environments for safe and sustainable health diets.
- Stakeholders and beneficiaries participate in pilots of at least one social assistance program (SAP) with the aim of improving diets (women and/or youth).

**EOI 4**
- At least 4 million consumers benefit from nutrition programs that use evidence-based UFED food environment and consumptive behavior tools, including approaches to increase women’s decision-making power and to improve diet quality and nutritional status.

**EOI 5**
- Urban planners and stakeholders participating in global networks of more than 200 cities representing over 400 million consumers use, promote and improve Research and Innovation tools and approaches developed by research, training institutions and civil society to accelerate urban and peri-urban (UPU) agrifood system.

Work Package 4 progress against the theory of change
WP4, implemented with partners in Ghana, the Philippines, and Sri Lanka, progressed on achieving outputs outlined in the Initiative’s TOC. The first output is the UFED toolkit, an urban dietary assessment and food environment resource. For this, we first consulted relevant experts, mapped existing tools, and identified gaps. We then created inventories for methods/metrics to assess diets and food environments. Last, we developed the decision tree approach, a prototype recommendation package, and online mockup. UFED will be completed and launched in 2024.

As our second output, WP4 and University of Ghana completed a validation study of an AI phone application to measure nutrient intake among adolescents. Results were presented at a workshop that received national television coverage and in three published briefs.

Third, in Sri Lanka, we conducted fieldwork comparing availability of vendors and food groups to construct a vendor typology and refine food lists for urban food environment assessments. This work will be summarized in a brief. Also in Sri Lanka, we co-developed, with University of California (UC) Davis and Wayamba University, the protocol and institutional review board for a 2024 study that will assess the validation of a phone-based dietary survey compared to a weighed record.

WP4 conducted nutrition and food environment scoping reviews for our six focal countries (and two secondary countries). All reviews were completed and are being used to develop country profiles to inform future research. The Rwanda profile was published in 2023.

As our final output, we conducted a nutrition-sensitive social protection workshop with government, nonprofit, and UN stakeholders that included discussions on urban programming. Outputs of this workshop will be used in guidance for leveraging SAPs to improve urban diets. An updated literature review of urban SAPs was conducted to supplement the guidance. We also drafted a landscape analysis on urban agriculture and early childhood development in five countries.

In collaboration with the Sustainable Healthy Diets Initiative, we co-developed outputs related to urban diets, nutrition, and food environments in Ethiopia.
WP5: Strengthening the evidence base and research and innovation capacities for UPU agrifood system governance and growth

<table>
<thead>
<tr>
<th>Output</th>
<th>Outcome</th>
<th>EC1</th>
<th>EC2</th>
<th>EC3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Urban Agrifood System Profiles published</td>
<td>UPU governments, private sector, civil society, and international partners better understand and engage with urban food systems.</td>
<td>Municipal authorities and their public and private sector partners in at least six cities adopt evidence-based approaches, tools, and business models for planning, implementing and monitoring investments in a circular bio-economy and/or strategies to integrate environmental and human health benefits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White paper ‘Food systems for an Urban Planet’ published</td>
<td>Improved indicators, metrics and data tools for resilient urban food systems published.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webinar series on urban food systems held by World Bank.</td>
<td>Training materials on circular bioeconomy options linking waste management and agriculture compiled for industry, civil society, government, and development organizations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center of Excellence for Urban Agrifood Systems Research launched.</td>
<td>Lean Launchpads support urban agrifood startups.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributions to country-level knowledge sharing events by Government, NGOs and others.</td>
<td>Integrated Urban Food System Profiles used for priority setting by Municipalities, National Ministries, World Bank and other International Financial Institutions (IFIs).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge sharing events and capacity development sessions held targeting LMIC demand.</td>
<td>LMIC governments, private sector, civil society, and international partners better understand and engage with Urban Food Systems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved indicators, metrics and data tools for resilient urban food systems published.</td>
<td>Lean Launchpads support urban agrifood startups.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In 2023, WP5 mainly focused on three levels of work: supporting innovation and entrepreneurship, advocating for greater engagement of international partners in the thematic areas of urban food systems, and supporting municipal decision-makers with improved data and decision-making tools. Unfortunately, the scope of work had to be limited due to budget reductions, but progress was still made within these three levels.

- In Lima, the partnership between CIP and the National Agrarian University La Molina’s (UNALM) Incubagraria trained 237 aspiring scientists and entrepreneurs (115 men and 122 women) in Lean Launchpads to promote evidence-based entrepreneurship in science. In 2023, this collaboration resulted in four initiatives, including an incubation program focused on agrifood and triple-impact business models. The program trained 51 participants (27 men and 24 women) and led to the development of 15 innovation projects.
- In Ghana, the CBE Innovation Hub expanded to include more than 12 co-owners and four scaling partners. A dedicated team was established with more than 30 trainers who have expertise in various CBE areas, such as product development, business and financial strategies, partnerships, and gender diversity. These trainers conduct both virtual training and practical sessions in the hub’s seven “living labs” across Ghana, focusing on converting organic waste into useful products like compost, dry fuel, and protein from black soldier fly. Additionally, an educational campaign reached more than 5,500 students in Ghana and 900 in Sri Lanka. The campaign aimed to increase awareness of waste management and resource recovery, in collaboration with organizations such as Water & Sanitation for the Urban Poor, Engineers without Borders, and the Soba Kantha Foundation.
- In Nairobi, a partnership with RUAF resulted in the publication and distribution of a food systems profile to NCC staff. Additionally, a collaborative effort with NCC led to the creation of a monitoring plan to oversee the advancement of Nairobi’s Food System Strategy. This included field pre-testing of two key indicators, conducted with the involvement and guidance of NCC’s food and agriculture extension officers.
- Another significant achievement was the collaboration between the World Bank and Resilient Cities and agreement to co-author a white paper on resilient urban food systems. Although the white paper is scheduled for publication in 2024, considerable advancements were accomplished in 2023.

Resilient Cities

ANNUAL TECHNICAL REPORT 2023
## Work Package progress rating summary

<table>
<thead>
<tr>
<th>Work Package</th>
<th>Progress Rating &amp; Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good progress was made on a range of studies that demonstrate challenges to urban food production, highlight clear opportunities for improving urban food production, and show the enthusiasm of stakeholders. However, there have been delays in developing tools that would enable the WP reach its targets.</td>
</tr>
<tr>
<td>2</td>
<td>Overall, WP2 has continued working toward its stated outcomes. The reduction in budget required us to refocus activities and reduce our overall scope. Considering the activities implemented and the continued engagement with governments, we believe that the Initiative continues to be on track to achieve its outcomes (as currently revisited).</td>
</tr>
<tr>
<td>3</td>
<td>The new water quality guidelines adopted by FAO for crops, livestock, and fish farming provide access to good agricultural practices for tens of thousands of UPU farmers using unsafe or saline water. This by far exceeds the Initiative’s outreach target under EOIO 3. New circular economy tools for M&amp;E are being rolled out in 2024 across 16-plus cities and towns in Sri Lanka, accompanied by related capacity development activities in support of EOIO 1.</td>
</tr>
<tr>
<td>4</td>
<td>WP4 is progressing on its defined outcomes, with completion of several final knowledge products as well as many intermediary outputs that will feed into briefs, papers, guidelines, and an interactive tool to engage a diverse group of urban stakeholders including policymakers, consumers, and implementers.</td>
</tr>
<tr>
<td>5</td>
<td>Despite budget constraints in 2023, WP5 achieved considerable advancements across its primary objectives, including innovation and entrepreneurship support, international partnership engagement, and aid to municipal decision-makers with enhanced data and tools. However, the need to narrow the WP’s scope and reduce the number of targeted cities for several activities has affected our ability to be on track to achieve our EOIOs.</td>
</tr>
</tbody>
</table>

### Definitions

- **On track**: Annual progress largely aligns with Plan of Results and Budget and Work Package theory of change. Can include small deviations/issues/delays/risks that do not jeopardize success of Work Package.
- **Delayed**: Annual progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas. Deviations/issues/delays/risks could jeopardize success of Work Package if not managed appropriately.
- **Off track**: Annual progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas. Deviations/issues/delays/risks do jeopardize success of Work Package.

## Key results

### Overview of reported results

#### Outputs

- Knowledge products: 30
- Capacity sharing for development: 23
- Innovation development: 20
- Other output: 6

#### Outcomes

- Policy change: 1

## Percentage of reported results tagged to CGIAR Impact Areas

- **Climate adaptation and mitigation**: 28%
- **Gender equality, youth and social inclusion**: 46%
- **Poverty reduction, livelihoods and jobs**: 54%
- **Nutrition, health and food security**: 73%
- **Environmental health and biodiversity**: 3%
- **Environmental health and biodiversity**: 11%
- **Poverty reduction, livelihoods and jobs**: 5%
- **Gender equality, youth and social inclusion**: 40%
- **Climate adaptation and mitigation**: 53%

This year, 79 results are reported, up from 28 results reported in 2022. Progress has been made on knowledge products and innovation development. Coming into the final year of the Initiative, more results are expected to be reported at outcome and impact levels.
The biggest contribution of the Initiative to the SDGs is on Goal 1 (no poverty), Goal 2 (clean water and sanitation), Goal 3 (decent work and economic growth), and Goal 5 (gender equality).

In 2023, 30 knowledge products were reported. Reports continue to dominate among knowledge products, though it is important to note the increase in journal articles and conference papers.

20 results with a global focus

Training has been extended to all genders. An impressive 410 people have undergone long-term trainings, with some trained for master’s and PhD levels, which is important for developing sufficient human capital to support urban agrifood systems.
Number of innovations reported in 2023, by readiness level

<table>
<thead>
<tr>
<th>Readiness Level</th>
<th>Number of Innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea</td>
<td>1</td>
</tr>
<tr>
<td>Basic Research</td>
<td>0</td>
</tr>
<tr>
<td>Formulation</td>
<td>0</td>
</tr>
<tr>
<td>Proof of Concept</td>
<td>4</td>
</tr>
<tr>
<td>Controlled Testing</td>
<td>1</td>
</tr>
<tr>
<td>Model/Early Prototype</td>
<td>10</td>
</tr>
<tr>
<td>Semi-Controlled Testing</td>
<td>0</td>
</tr>
<tr>
<td>Prototype</td>
<td>0</td>
</tr>
<tr>
<td>Uncontrolled Testing</td>
<td>0</td>
</tr>
<tr>
<td>Proven Innovation</td>
<td>1</td>
</tr>
</tbody>
</table>

Partnerships and Resilient Cities’ impact pathways

- At the city level, the Initiative has engaged with city governments and private sector entities in the implementation of activities. Examples are the Quezon City Government and the Kenya Dairy Board as part of the vendor business school program; and the Pachacamac district government in Lima through its multistakeholder platform for sustainable food system and the social program called “ollas comunes.” Activities are occurring in collaboration with local nongovernmental (NGOs) and civil society organizations, like BCAS in Bangladesh and Ecosad and IDMA in Lima. The Initiative works in alliance with Incubagraria, the Business Incubator of UNALM, with whom it has signed an agreement to partner with the Initiative in Peru. This partner has been strategic in developing activities with young researchers and entrepreneurs, with the aim of boosting their research and innovation capabilities through the development of entrepreneurship and innovation programs designed to promote startups based on science and technology in areas of agriculture, food, and circular economy.

- At the national level, Resilient Cities has supported the Ethiopian National One Health Steering Committee in setting up a food safety technical working group to serve as a national forum to strengthen dialogue and capacity sharing among food safety stakeholders in the country. Over time, the group will also provide support and advice to the Ethiopian government in designing efforts to strengthen food safety in the country. Partnerships remain at the core of the work on scaling CBE innovations. In Sri Lanka, the Initiative works for the national Waste Management Authority and various municipal councils, and in Ghana within the CBE innovation hub (which was invited by Ghana’s Ministry of Environment, Science, Technology, and Innovation to join its program on the commercialization of research and innovation) under the Ministry of Sanitation and Water Resources and the Ministry of Food and Agriculture, in collaboration with four private companies, four NGOs, and four other national institutions, including one university. The Initiative also partnered with academic institutions such as the University of Ghana and Penn State University on the Food Recognition Assistance and Nudging Insights (FRANi) AI-assisted phone application to measure nutrient intake in adolescents, and Wayamba University of Sri Lanka and UC Davis to develop a study protocol to assess the validity of using a phone-based 24-hour recall, compared to a weighed record on dietary assessments.

- At the multi-country level, the Initiative is working with the African Union to develop guidelines for African governments to engage with informal markets.

Credit: Michael Varcas-The Philippine STAR.
Resilient Cities' internal portfolio network

Portfolio linkages and Resilient Cities’ impact pathways

RECOMMENDATION

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>SUPPORTING RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Three Power Yogurt: A food innovation to combat childhood anemia in Lima, Peru

In Peru, 42 percent of children were affected by anemia in 2022, according to studies by the country’s National Institute of Statistics and Informatics (INEI). In 2021, chronic malnutrition affected 512,000 children in the country. In Lima, the situation is also alarming, with 31 percent of children under five years of age suffering from anemia and 32 percent at risk of malnutrition. Even in Lima Centro, which includes many higher-socioeconomic districts, 31 percent of children are at risk of malnutrition, and 25 percent suffer from anemia, according to data provided by the INEI in 2023. These numbers show that malnutrition and anemia affect many families in Lima, including those with higher incomes. In a survey conducted by the Three Power team with 60 households in Lima, 45 percent expressed concern about the lack of nutritious and tasty food options on the market for their children. They reported that, on numerous occasions, they had to persuade their children to eat certain foods to achieve the required levels of iron and nutrients. Access to nutritious food products is crucial for promoting the health and development of children, especially in countries like Peru where anemia and malnutrition remain a significant challenge. It is easy for children and teenagers to find sweets in nearby kiosks, but difficult to find products that are desirable and nutritious. It is increasingly urgent to create nutritious and tasty products that are designed to please the demanding palates of children, while also providing the nutrients necessary for their health and optimal development during this crucial stage.

To address this pressing issue, a group of students and a biotechnology professor from UNALM embarked on an innovative journey. Their solution? Yogurt Three Power—a revolutionary food innovation aimed at combating anemia and malnutrition in children by providing a delicious and highly nutritious food. This innovative idea resulted from innovation and entrepreneurship programs organized and financed by Resilient Cities in association with Incubagraria, the UNALM business incubator.

Three Power Yogurt transforms the Peruvian market by offering a product that boasts three times more protein than any other available yogurt, and is the only yogurt high in iron and vitamin A. Crafted from a unique blend of spirulina, cushuro (Andean seaweed), and bovine blood, and supplemented with vitamin A from sweet potatoes, this yogurt addresses the critical nutritional needs of children suffering from anemia and malnutrition.

Through an innovative process, the yogurt ensures optimal uptake of nutrients and probiotics, promoting energy, vitality, and enhanced learning, while helping to combat anemia and malnutrition among Peru’s children and adolescents. The gummy capsules in the yogurt add an element of fun for young consumers, making Three Power Yogurt not only nutritious but also appealing to its target audience.

In June 2023, the Three Power Yogurt team was one of the winning teams in an innovation challenge in Lima. The team received seed capital of US$600, which they used to develop a product prototype. The prototype has been tested on children and young people, and received widespread acceptance for its innovation and taste. As the following testimonials demonstrate, the product has been well received by consumers:

“A very attractive product for my son, who does not like vegetables or soups, but does like yogurt.”

“Novel and pleasant alternative for my children who are in school.”

“I buy nutritious foods because my daughter suffers from anemia, but normally she doesn’t like this kind of food. Having a highly nutritious yogurt would be a good option for her since she likes this drink.”

“An excellent product that many children need.”
Ghanaian people at the market in Ghana. People of Ghana suffer from poverty due to the unstable economic situation.

Credit: Anton Ivanov

A crowded market in Dhaka is indicative of a flourishing agricultural economy.

Credit: IFPRI/CGIAR