



INITIATIVE ON
Fruit and Vegetables
for Sustainable
Healthy Diets




CGIAR Research Initiative on **Fruit and Vegetables for Sustainable Healthy Diets**

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This publication has been prepared as an output of the CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets. 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.

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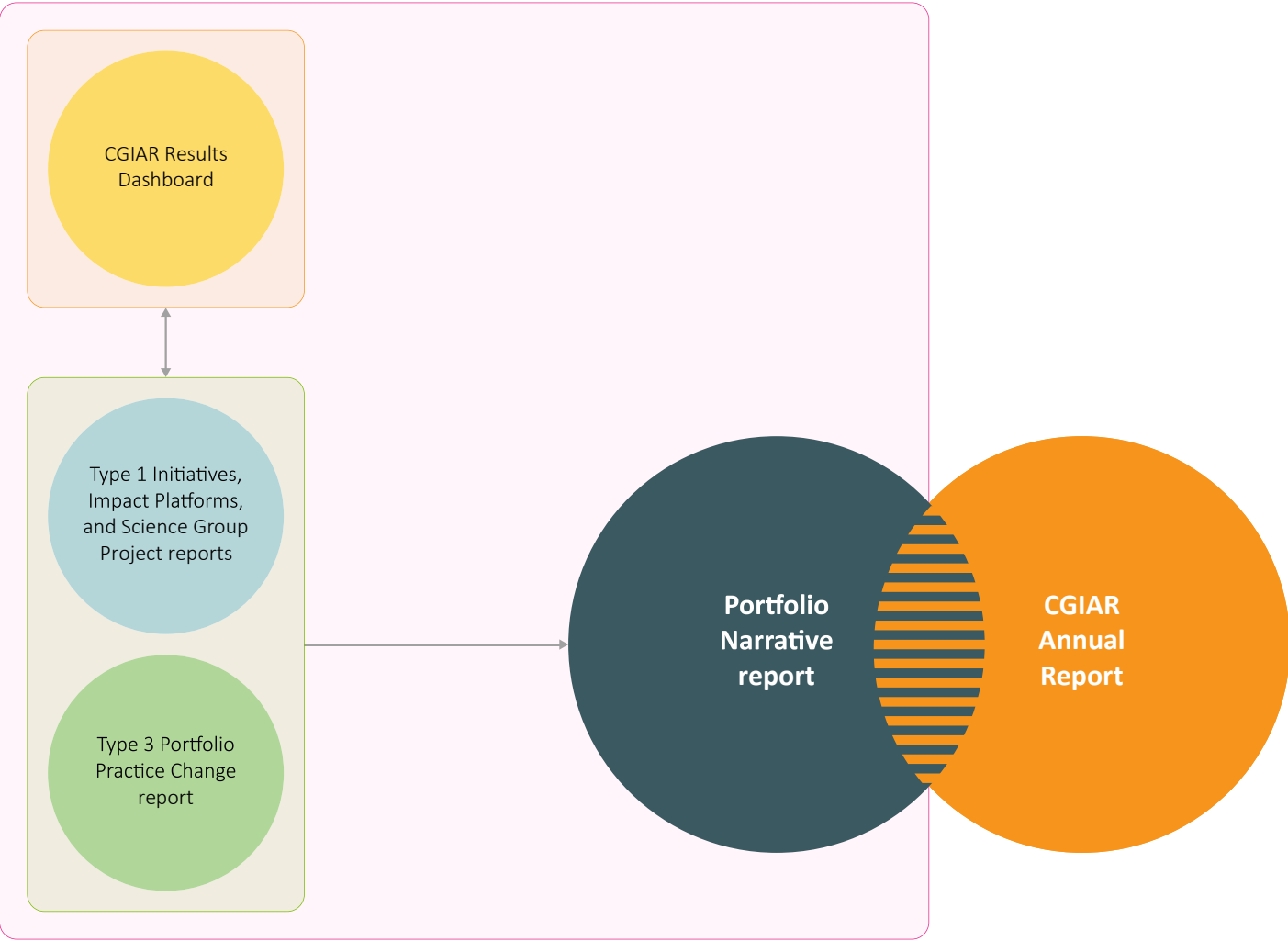
CGIAR Technical Reporting 2023

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

The [CGIAR Technical Report](#) comprises:

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

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



Section 1: Fact sheet and budget

Initiative name	Fruit and Vegetables for Sustainable Healthy Diets
Initiative short name	Fruit and Vegetables for Sustainable Healthy Diets (FRESH)
Initiative Lead	Deanna Olney- d.olney@cgiar.org
Science Group	Systems Transformation
Start – end date	01/04/2022 – 31/12/2024
Geographic scope	Countries Benin · Philippines · Sri Lanka · Tanzania · United Republic
OECD DAC Climate marker adaptation score ¹	Score 1: Significant The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation and climate policy — even though it is not the principal focus of the activity.
OECD DAC Climate marker mitigation score ¹	Score 1: Significant The activity contributes in a significant way to any of the three CGIAR climate-related strategy objectives — namely, climate mitigation, climate adaptation and climate policy — even though it is not the principal focus of the activity.
OECD DAC Gender equity marker score ²	Score 1A: Gender accommodative/aware Gender equality is an objective, but not the main one. The Initiative/project includes at least two explicit gender specific outputs and (adequate) funding and resources are available. Data and indicators are disaggregated by gender and analyzed to explain potential gender variations and inequalities.
Website link	https://www.cgiar.org/initiative/fruit-and-vegetables-for-sustainable-healthy-diets-fresh/

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

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

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

EXECUTIVE SUMMARY

The CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets, also known as FRESH, is being implemented by core partners from five CGIAR Centers — IFPRI, CIMMYT, Alliance of Bioversity International and CIAT, IWMI, and CIP — and with World Vegetable Center (AVRDC), Applied Horticultural Research (AHR), University of Sydney (USYD), Institute of Development Studies (IDS), Wageningen University & Research (WUR), University of California at Davis (UC Davis), Borlaug Institute of South Asia (BISA), Sokoine University of Agriculture (SUA), Wayamba University of Sri Lanka (WYB), and the Philippines Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) along with other partners. In 2023, FRESH made significant advancements in answering Work Package (WP) research questions and delivering WP outputs and made progress in achieving WP and End-of-Initiative outcomes (EOIOs).

FRESH is developing innovative end-to-end approaches across its focal countries — Benin, Tanzania, Sri Lanka, and the Philippines — with the overall goal of increasing fruit and vegetable (F&V) intake and subsequently diet quality, nutrition and health outcomes while also improving livelihoods, empowering women and youth, and mitigating negative environmental impacts. These goals directly align to each of the five CGIAR Impact Areas. FRESH’s WPs were designed to address the constraints across the F&V value chain such as demand (WP1), food environment (WP5) and supply (WPs2, 3, and 4) and the enabling environment for F&V innovations, programs and policies (WP6).

The FRESH approach requires multistakeholder engagement across the F&V value chain. Commitment to stakeholder engagement guides the FRESH partner-led approach to co-identify priorities, share knowledge, develop innovations and scale solutions. This year, 83 national partners across the four target countries worked with FRESH to build out the [knowledge base](#) of evidence that will inform the design of future programs, policies, and interventions. FRESH joined multistakeholder platforms in three of the four focus countries to facilitate dissemination of results and establish connections with pre-existing in-country networks. A key component of FRESH’s partnerships is information and knowledge transfer through capacity sharing, an activity that constitutes a critical pathway within the FRESH theory of change (TOC). FRESH expanded capacity sharing activities to reach seed producers, farmers, midstream actors, extension agents, government officials, and academia, with more than 3,000 individuals enrolled in short- and long-term capacity sharing activities in 2023.

In 2023, FRESH strengthened the linkages across WP activities through a deepened understanding of local F&V value chains, dietary patterns, and intervention options to improve vegetable production and fruit and vegetable postharvest processing practices and to increase consumer demand. In Tanzania, a baseline survey for an impact evaluation began in October that will assess changes over time in agricultural practices and production and dietary intake patterns as well as assess the impact of FRESH interventions across the value chain. In 2024, FRESH will implement a similar study in Sri Lanka. The concentration of activities in Benin and the Philippines across all WPs is increasing. Due to budget cuts, some previously planned activities had to be scaled back, but otherwise FRESH is on track to deliver expected results by the end of 2025.

	2022	2023	2024
PROPOSAL BUDGET	\$5.00M	\$6.64M	\$9.36M
APPROVED BUDGET ¹	\$6.97M	\$10.52M ²	\$5.70M ³

¹ The approved budget amounts correspond to the figures available for public access through the [Financing dashboard](#).

² This amount includes carry-over and commitments.

³ This amount is an estimation of the 2024 annual budget allocation, as of the end of March 2024.



Seed varieties in Tanzania.
Credit: M. Maher/ IFPRI

Section 2: Progress on science and towards End of Initiative outcomes



Summary of progress against the theory of change

In 2023, FRESH expanded activities and strengthened partnerships across the four focus countries of Benin, Tanzania, Sri Lanka, and the Philippines. It made significant progress in advancing its overall goal to increase F&V intake, which is expected to improve nutrition and health outcomes, while also working across the food system to mitigate negative environmental impacts, improve livelihoods, and empower women and youth.

FRESH partners continued to develop context-specific end-to-end approaches that address issues of desirability, affordability, accessibility, and availability of F&V and strengthen the enabling environment. The end-to-end approach involves conducting research activities to enhance understanding of constraints and opportunities across the value chain. This understanding is then utilized to design interconnected approaches that leverage opportunities and address constraints related to demand, food environments (FE), supply, and enabling environment. These context-specific approaches recognize not only the complexity of food systems but also the need for coordinated change to transform diets and associated outcomes. Throughout 2023, FRESH partners strengthened collaborations and increased engagement with F&V stakeholders along the value chain. This partnership strategy empowers local organizations to take ownership of activities, fostering a sense of responsibility for successful outcomes and laying the foundation for sustainable transformations.

In early 2023, FRESH held the final two of four official country launches in Sri Lanka and the Philippines. The Philippines launch formalized the appointment of the director of DOST-FNRI and her associate as FRESH country coordinators, affirming that each focus country has an appointed coordinator (or coordination body). FRESH country coordinators continued to hold internal monthly meetings with research, implementation, and scaling partners and to seek opportunities to leverage external engagements with existing national and regional partners or stakeholder networks in-country.

In addition to FRESH’s internal meetings, FRESH representatives also formally participated in existing platforms in Tanzania (Arusha Sustainable Food Systems Platform and the Nutrition-Sensitive Thematic Working Group of the National Multisectoral Nutrition Action Plan II [NMNAP II]) and Benin ([National Horticultural Platform](#)), and is supporting the formation of networks in Sri Lanka and the Philippines.

Building off work in 2022, researchers continued activities to address WP research questions and to achieve WP outputs and outcomes, gaining insights into country-specific and often location-specific challenges and opportunities. Researchers expanded the evidence base through literature reviews and secondary data analysis for each focal country, exploring knowledge across the F&V value chain — including publications on consumer behavior (WP1), economically important vegetable value chains (WP4), and country-specific FE (WP5). WP1 continued analysis of the impact of the combined agriculture and behavior change communication approach designed to address climate shocks that showed positive impacts on micronutrient intake in Sri Lanka. Several of the publications were conducted by national partners and will be used to inform the design of future research and interventions. For example, two of our partners, the International Institute of Rural Reconstruction (IIRR) and the University of the Philippines Diliman, in coordination with the Alliance of Bioversity International and CIAT, conducted a [literature review](#) of school food environment literature, policy, and guidelines that identified where knowledge gaps exist on school food environment and related policies that will be used to inform research activities in 2024.

Considerable progress was achieved in the development of supply-side activities, with activities under WP2, WP3, and WP4 gaining momentum. WP2 advanced selection of improved vegetable varieties through [participatory field trials](#) where farmers selected preferred, high-performing varieties of tomato and pepper. To

strengthen seed producers and seed systems, WP2 continued trainings on best seed-production techniques in Tanzania and Benin. The innovative production hubs established by WP3 anchored safe and sustainable production activities and are fully operational across all four focus countries, where they act as participatory research and learning platforms. At the production hubs, innovative bundles of good agricultural packages are being promoted to address specific challenges of the agroecological zones on key crops, including indigenous African vegetables, tomatoes, amaranth, peppers, and green beans.

To address postharvest losses, WP4 conducted a thorough analysis to pinpoint the specific stages in the value chain where these losses were occurring. Subsequently, the team collaborated to co-develop and pilot effective solutions tailored to mitigate these losses. For example, researchers [examined postharvest losses](#) at fresh market locations in the Philippines. This research aimed to identify critical points in the value chain where postharvest loss occurs. Collaborating closely with partners, the team worked to determine the most suitable entities or individuals best positioned to implement these necessary changes in the value chain.

In addition to advancing their individual research objectives, FRESH’s work plans operationalized integrated research activities within specific F&V value chains, aiming to achieve a comprehensive food system approach. To gain a thorough understanding of how activities across the value chain impact one another and how evidence generated by the Initiative’s WPs shapes a holistic understanding of the F&V value chain and enabling environment, large-scale surveys and an impact evaluation commenced in Tanzania in mid-2023. These efforts are being led by WP1 and WP5 in collaboration with researchers from other WPs.

This is the EOIO directly linked to WP1 outputs and outcomes and progress toward this outcome is on track. WP1 partners have conducted key informant interviews, have made extensive reviews and secondary dietary intake analysis, and have met with key stakeholder groups to prioritize target groups, platforms, and interventions to increase F&V intake. In three of the focal countries, interventions are expected to be designed and implemented in 2024. For one country, complementary funding has been secured to support the intervention design activity. In all countries, progress has been made across all six outputs and one outcome, putting us on track to achieve this EOIO in all four countries.

This is the EOIO directly linked to WP2 outputs and outcomes and progress toward this outcome is on track. Demonstration plots were established in all four countries to showcase climate-resilient cultivars. In two out of the four countries, participatory variety trials were conducted to identify farmer-selected varieties that will become available to purchase as seed. Iterative capacity strengthening workshops for seed producers are ongoing, which will enhance their capacity to supply seed of climate-resilient cultivars to farmers.

This is the EOIO directly linked to WP3 outputs and outcomes and progress toward this outcome is on track. Production hubs in each of the four countries are operationalized as participatory learning sites. These production hubs host capacity sharing activities where farmers

One of the surveys will provide data on household characteristics that could be used to identify interventions that would increase F&V consumption (WP1). Additionally, a food environment assessment will shed light on where people buy their food: what types of markets, restaurants, and stores are nearby; and how they

A close-up photograph of a variety of fresh vegetables. In the foreground, there are several bright red cherry tomatoes on their vines. To the right, there are several long, slender green beans. Behind the beans, there are several red and yellow bell peppers. The background is dark, making the colors of the vegetables stand out. In the bottom right corner of the image, there is a black box with white text that reads 'Diversity in the Philippines. Credit: D. Olney/ FRESH'.

Progress by End of Initiative Outcome

EOIO: At least four programs to influence consumer behavior are informed by country-specific F&V profiles and menus of evidenced-based approaches.

EOIO: At least 10,000 farmers adopt improved climate-resilient vegetable cultivars across the four focus countries.

EOIO: At least 10,000 farmers adopt safe and sustainable vegetable production practices across the four focus countries.

learn climate-smart agricultural practices tailored to their agroecological zones. Scaling partners, including national agricultural research and extension systems (NARES), are co-organizing and promoting these capacity sharing activities to expand their reach.

EOIO: At least three innovation packages for improved efficiency and optimized synergies of resources in vegetable production systems are adopted by farmers across four focus countries.

This is the EOIO directly linked to WP3 outputs and outcomes and progress toward this outcome is on track. Intercropping trainings at demonstration plots have been well attended in both Benin and Tanzania. In Tanzania, partners are demonstrating the use of water-sensing technologies to promote efficient irrigation techniques. Researchers are exploring the use of digital agriculture and agroclimatic advisories to improve productivity in Sri Lanka.

EOIO: At least 12 innovations for reducing postharvest losses and/or improving food safety are piloted in at least four focus countries.

This is the EOIO directly linked to WP4 outputs and outcomes and progress toward this outcome is on track. Partners have identified key areas for intervention for both postharvest losses and food safety across four countries for important fruit and vegetable value chains including mango, tomato, Chinese cabbage and indigenous leafy vegetables. Through this work, WP4 has identified low-cost solutions to reduce postharvest and food losses, including cool storage (CoolBots), improved packaging techniques, and improved postharvest management practices. WP4 continues to engage with midstream actors to identify where their networks are best placed to create and scale out innovations in Tanzania and the Philippines.

EOIO: At least four programs aimed at making fruits and vegetables more accessible and affordable use fruit and vegetable country profiles and evidence-based guidance in their design.

This is the EOIO directly linked to WP5 outputs and outcomes and progress toward this outcome is on track. Formative FE research in the Philippines, Sri Lanka, and Tanzania is providing evidence for country profiles. Ongoing close partnerships with in-country research, scaling, and innovation actors have helped to raise the profile of FE work and identify potential pathways to engage policy and program makers to use FRESH-generated evidence to inform decision-making.

EOIO: At least four national-level programs, regulations, laws or policies across four countries prioritize fruits and vegetables.

This is the EOIO directly linked to WP6 outputs and outcomes and progress toward this outcome is on track. Across the four countries, partners have mapped out the existing policies and conducted interviews with key informants to understand where policy and administrative gaps exist. In two countries, FRESH joined existing multistakeholder platforms and in the other two FRESH has been advised to create FRESH-specific groups, one of which was established in 2023.

EOIO: Web-based F&V Knowledge Hub that collates and consolidates F&V research is accessed by at least 5,000 users across at least 10 countries.

Progress against this outcome was delayed. This was in part due to delays in understanding how to build and host the web platform. FRESH received final guidance from CGIAR and the internal capacities for building and hosting the website. FRESH hired a communications consultant and now has initial design plans with which to build the Knowledge Hub.

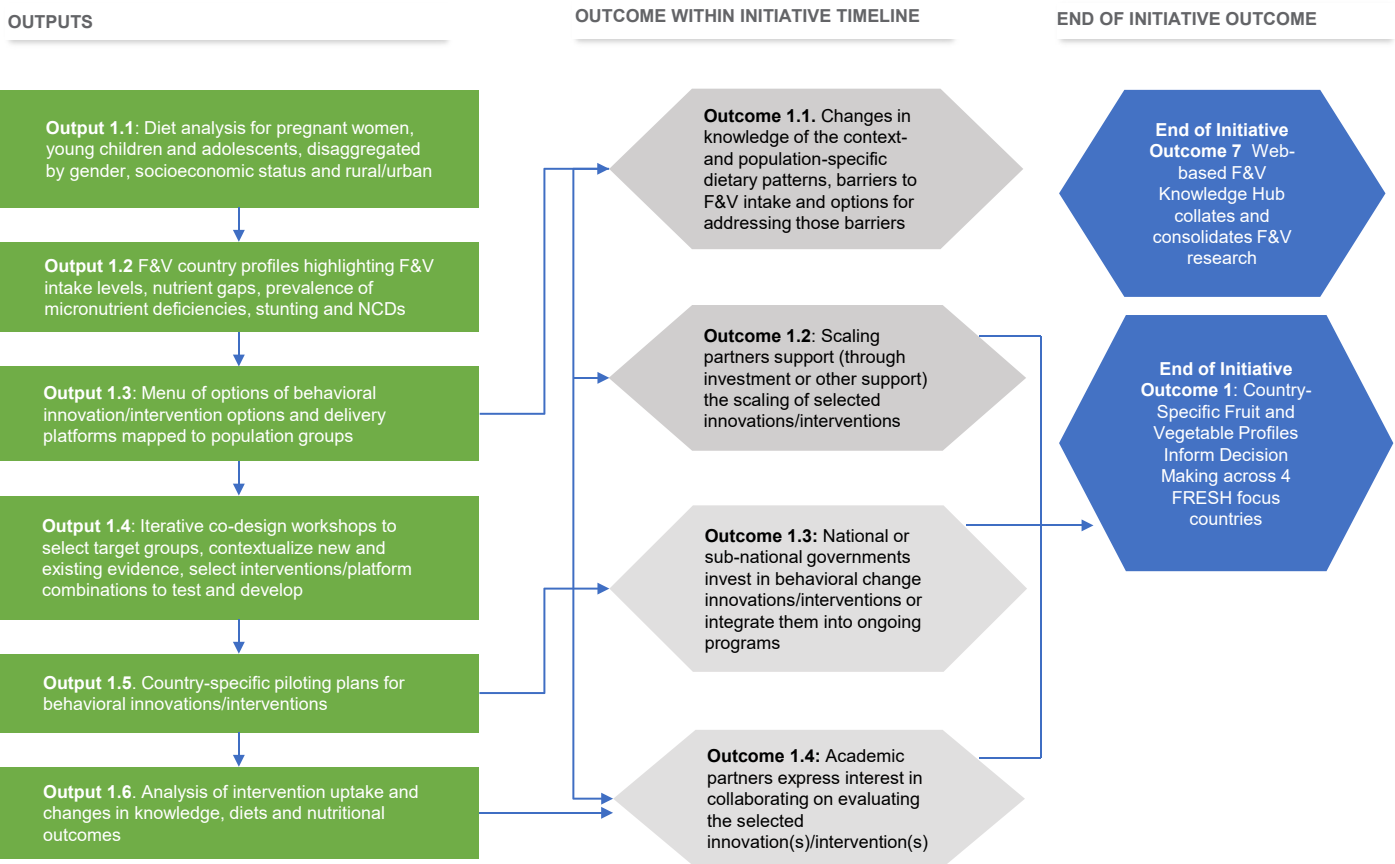


Woman and her child at a market in Cotonou, Credit: Benin. M. Cooperman/ IFPRI

Section 3: Work Package progress

WP1: Influencing and understanding consumer demand

On track



Work Package 1 progress against the theory of change

WP1 is implemented by core partners IFPRI, CIP, Bioversity International and CIAT, UC Davis, SuA, DOST-FNRI, and WYB along with other partners. In 2023, the team continued to progress on achieving the WP outputs and outcomes.

To further understanding of country-specific dietary patterns, research briefs of secondary data analysis of dietary data from [Benin](#) and [Sri Lanka](#) were published (output 1.1). These analyses improve understanding of overall diets and specific F&V intake and help identify priority F&V for improving micronutrient intake. Similar work is under way for Tanzania and the Philippines. To learn from successful programs that influenced consumer behavior, researchers also undertook country-level reviews on diet and nutrition issues and relevant interventions as well as a global review of interventions to increase F&V intake (output 1.3) to be submitted in 2024. In addition, the team continued analyses of the impact of a combined agriculture and behavior change program in Sri Lanka on dietary

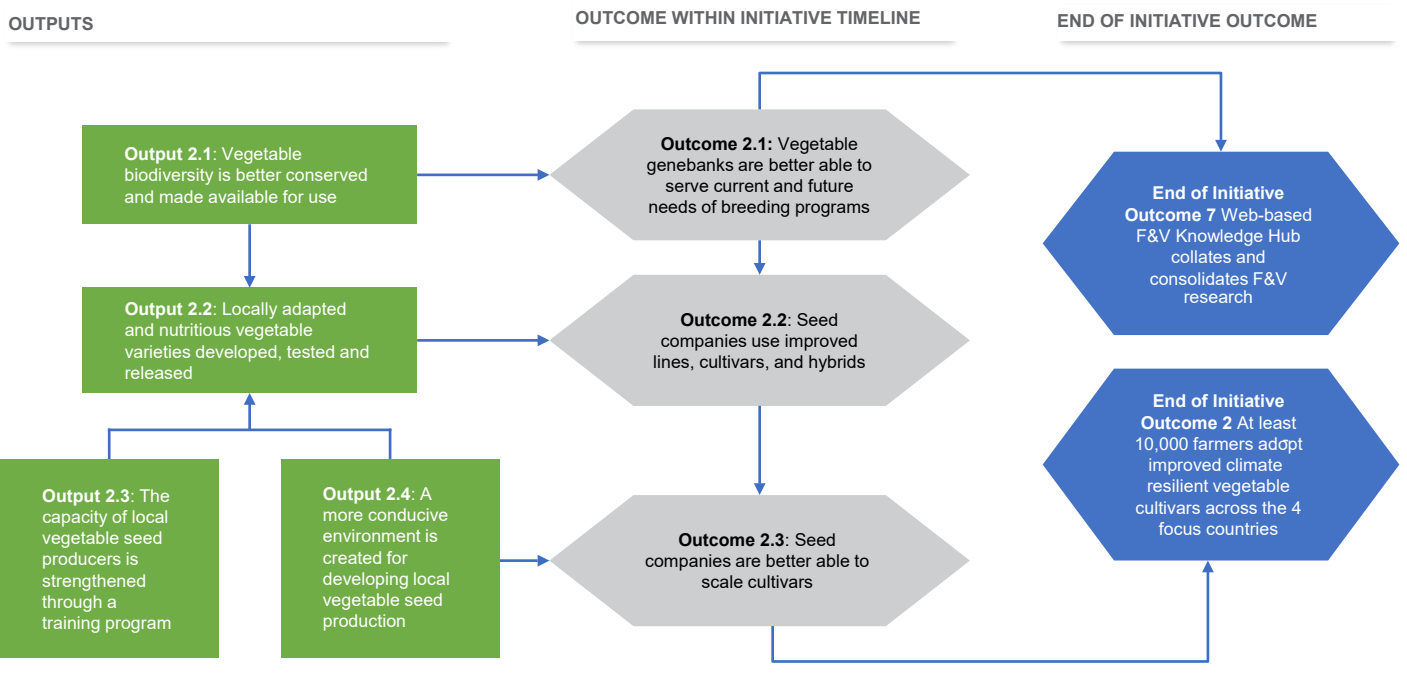
intake. Initial [results](#) were presented in Sri Lanka to the government and other stakeholders and at the Micronutrient Forum in 2023.

WP1 continued leveraging its strong partnerships to ensure that activities align with national priorities, can address research and programming gaps, and support uptake of results generated by invested stakeholders. Findings from key informant interviews were presented in [Sri Lanka](#) and [Tanzania](#) (output 1.2). These engagements are part of an iterative process across all four countries (output 1.3) where workshop participants contextualize new and existing evidence to co-design innovative ways to increase F&V intake.

WP1 researchers are co-designing demand-side interventions to shift consumer behavior toward increased F&V intake and overall healthier diets (output 1.5). These activities will begin in 2024 in Sri Lanka and Tanzania, as part of the impact evaluations launched (in Tanzania) and designed (for Sri Lanka).

WP2: Biodiversity, genetic innovation, and seed systems

On track



Work Package 2 progress against the theory of change

WP2 is implemented by core partners AVRDC, Alliance of Bioversity and CIAT, and WYB in close partnership with country and regional partners, including the Tanzania Agriculture Research Institute (TARI), Institut National des Recherches Agricoles du Bénin (INRAB), African Vegetable Breeding Consortium, University of Abomey Calavi (UAC), and IIRR, among many others. WP2 advanced research and development activities emphasizing the importance of farmers’ access to quality seeds of improved varieties tailored to local conditions, ensuring high productivity and nutritional value. This approach includes working with actors across the seed system and engaging stakeholders for more enabling environments.

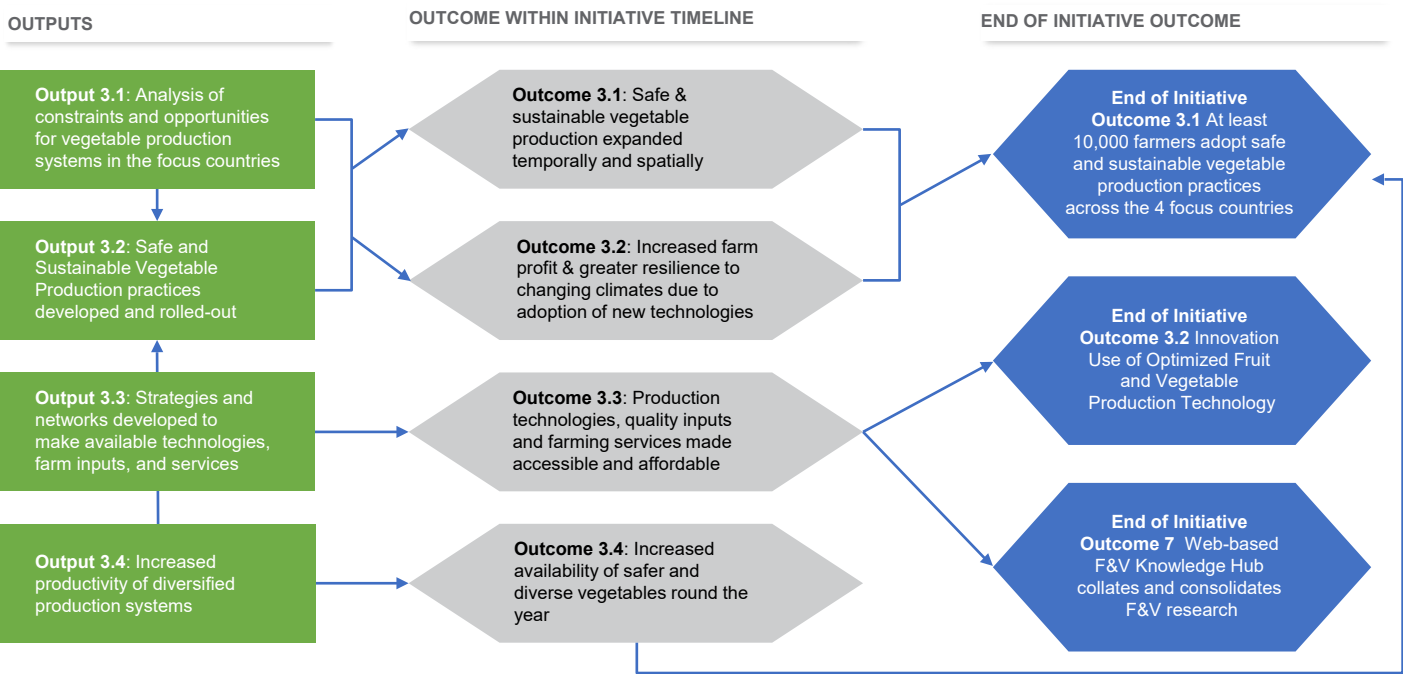
WP2 aims to accelerate variety development and adoption using advanced breeding technologies and fostering collaboration with national programs to streamline variety registration policies. Over 200 accessions of okra were collected for disease resistance screening (output 2.1). Twenty-seven locally developed vegetable lines were submitted to variety trials in Benin and 20 lines were selected for variety development in Tanzania (output 2.2). These materials will be forwarded to FRESH production hubs, emphasizing the importance of linking breeding with market and postharvest research to ensure impact.

To increase variety development adoption by farmers, WP2 emphasizes farmer-assisted variety development (output 2.2). This involves field days, promotion activities, and collaborating with public- and private-sector scaling partners. Participatory selection conducted in Tanzania and in Benin identified preferred tomato, pepper and amaranth varieties (output 2.2). Training on breeding technologies reached 30 junior breeders of the public and private sector in Sri Lanka (output 2.2.) and capacity sharing for seed company staff on the production and trade of quality vegetable seed was held in collaboration with INRAB and Direction de la Production Végétale, in Benin (output 2.3).

To provide an evidence base for prioritizing indigenous vegetables and fruits, WP2 partners conducted a literature review on the diversity of underutilized crops in Sri Lanka. The review found that despite their unique nutritional and agronomic traits, these crops often receive less attention than commonly cultivated species. The study underscores the importance of prioritizing the collection and conservation of these crops to preserve their diversity and realize their potential contributions to food security and nutrition. A similar scoping study of the preservation of indigenous fruit in the Philippines found that efforts to conserve local biodiversity are primarily led by only a few individuals at public repositories and that there is opportunity to strengthen local seed systems (output 2.1).

WP3: Safe and sustainable production systems

On track



Work Package 3 progress against the theory of change

Across the four focus countries and in close partnership with BISA, AVRDC, IWMI, CIMMYT, TARI, Philippines’ Bureau of Plant Industry (BPI), Sri Lankan Horticultural Crop Research and Development Institute, and others, WP3 continued to roll out activities around the production hubs (output 3.2) through co-organized events with national partners.

In Sri Lanka, two stakeholder consultations were conducted to identify priority areas for improving sustainable and year-round vegetable production, leading to the establishment and operation of two vegetable production hubs. At these hubs, partners are piloting packages of good agricultural practices designed for safe and sustainable vegetable production in two distinct farming systems (output 3.2). The crops — green beans, tomatoes, and carrots — were selected for their economic importance and how prevalent their production was around each production hub area.

In Benin, WP3 researchers mapped agricultural constraints through a literature review of the vegetable sector and a stakeholder workshop where partners were identified. Through these partnerships, farm demonstration protocols were co-developed and piloted in two production hubs, including the diversification of cereal-based production systems and intensification (output 3.4). Field trials included crop diversification in maize-based production areas through the introduction of high-value selected vegetables — tomato and chili pepper — and mungbean for higher farm productivity, economic profitability and soil fertility improvement.

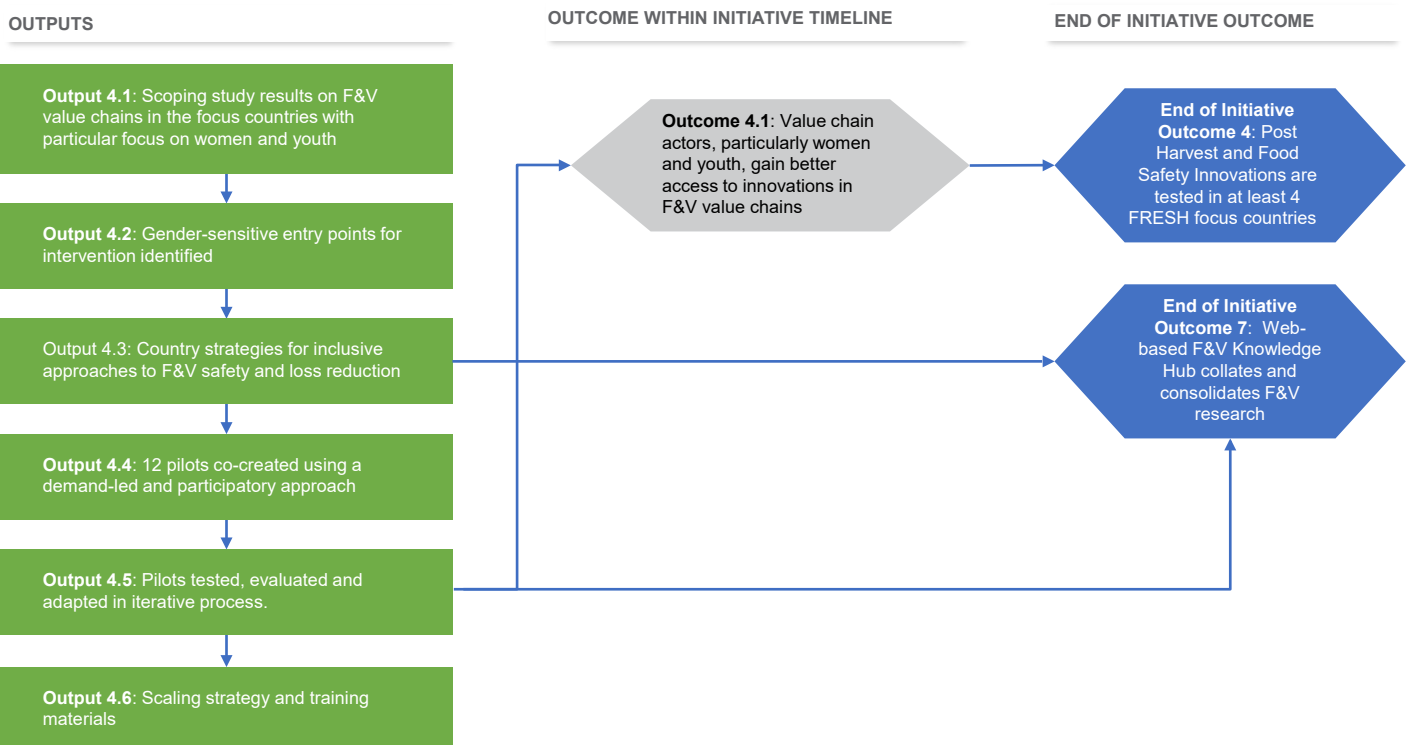
In Tanzania, FRESH production hub activities included the demonstration and capacity sharing events on good agricultural practices. AVRDC, in collaboration with in-country partners, held capacity sharing events on GAP demonstrations in diverse vegetable production systems: cabbage, tomato, onion, peppers, amaranth, African eggplant, nightshade, and kale. AVRDC, TARI, the National Irrigation Commission, and other partners co-organized training on the proper installation and use of moisture sensors, a technology that may be included as part of the GAP packages shared through the production hubs (output 3.3).

In the Philippines, the University of Philippines Los Banos (UPLB) and BPI continued field research at the two production hubs in the country and revealed challenges with soil fertility and pests affecting vegetable production. Demonstration trials showcased the impact of balanced fertilizer application, integrated pest management, and mulching on vegetable production for economically important crops, including eggplant and bittergourd. These interventions were then extended to nine villages at each production hub, promoting their wider adoption (output 3.2).

Additionally, qualitative surveys were conducted to identify gender-specific constraints and opportunities related to adopting sustainable production practices in the target countries. These surveys form the basis for designing future gender-sensitive FRESH interventions and research activities (output 3.1).

WP4: Postharvest and inclusive markets

On track



Work Package 4 progress against the theory of change

WP4 partners AHR, USYD, WUR, University of the Philippines Mindanao, Industrial Institute of Sri Lanka (ITI), UAC, and others have made significant progress in understanding country-specific food safety risks and the scope of value chain losses, pinpointing where they occur along the supply chain. Studies on postharvest losses were conducted in [Benin](#), [Philippines](#), and [Tanzania](#) (output 4.1).

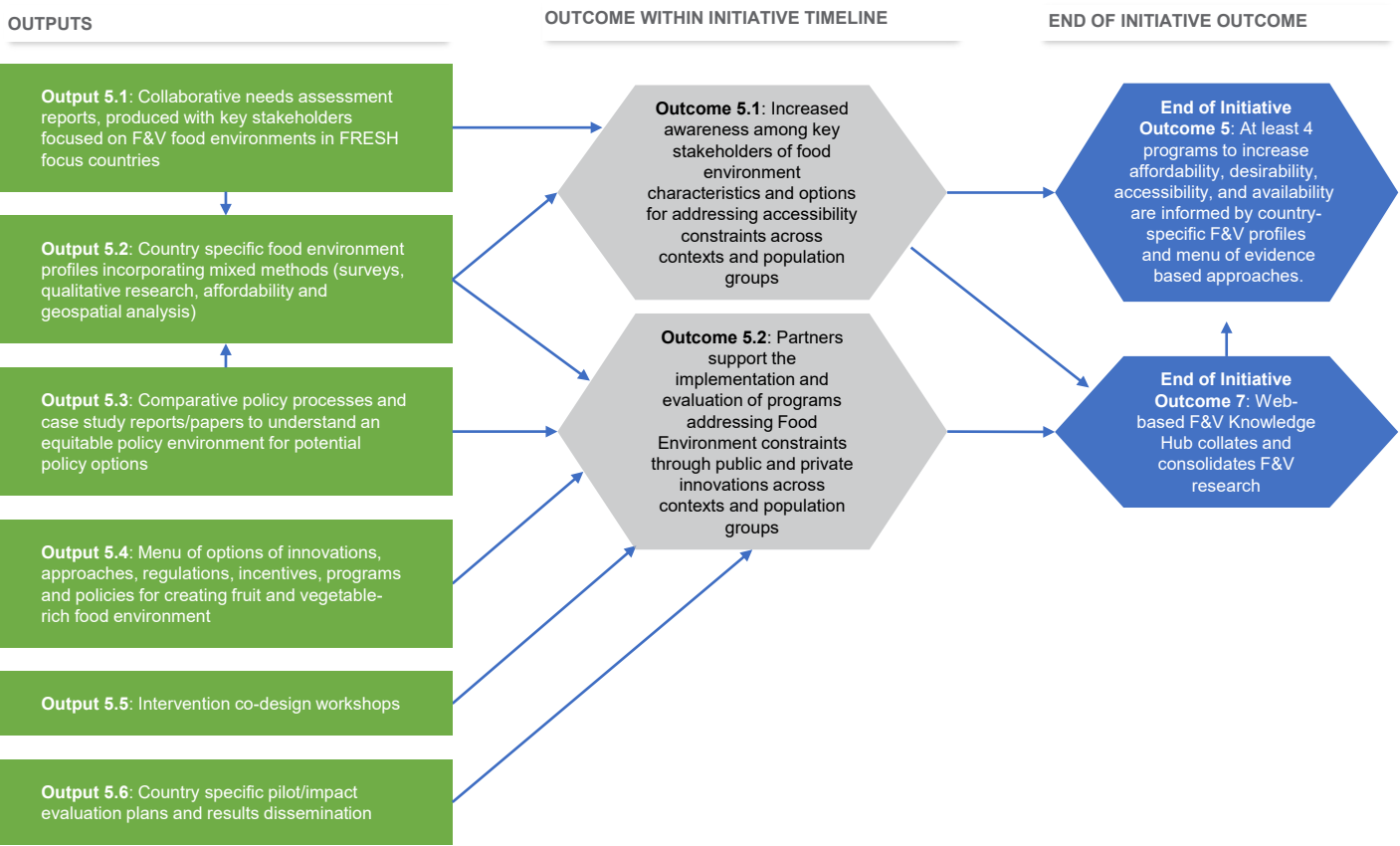
Partners collaborated to investigate food safety risks across the F&V value chain. To strengthen local partner technical expertise, they implemented a series of events aimed at sharing knowledge and building capacity in microbial testing for prevalent food safety risks. In Tanzania, two training sessions were conducted focusing on ongoing field sampling and site visits, followed by practical demonstrations and training in laboratory-based techniques, including testing for E. coli on fresh produce (output 4.3).

In Sri Lanka, capacity sharing sessions were held with diverse sets of participants, including farmers, growers, sellers, agricultural officers, and other stakeholders. Workshops were organized to raise awareness among government officials, members of the food industry, and organic cultivators about food safety issues, with a particular emphasis on microbiological safety, pesticide residues, and product analysis requirements within the food industry (output 4.3).

Researchers continued to build evidence on the extent of value chain losses and how actors in the value chain may address them (output 4.1). In [Tanzania](#), fruit and vegetable sellers were interviewed to understand challenges in the value chain and how they may be best placed to identify and implement solutions (output 4.4). In the Philippines, food loss assessment studies were conducted in urban markets. These entailed developing and [validating information, education, and communication materials](#) and informing plans for future capacity sharing events (output 4.6)

WP5: Food Environments

On track



Work Package 5 progress against the theory of change

Across FRESH partners IFPRI, Alliance of Bioversity International and CIAT, AVRDC, IDS, Colombo Urban Lab and others, WP5 researchers worked to identify existing evidence related to FE to increase understanding of FE in the focal countries and how they may influence consumers.

In early 2023, workshops in the [Philippines](#) and [Sri Lanka](#) were co-organized with WP1. These workshops fostered collaboration with in-country stakeholders and explored innovative strategies for improving diets and addressing FE challenges (output 5.5). WP5 researchers also disseminated results at local and global conferences. At the Joint Multisectoral Nutrition Review in Tanzania, researchers [presented a poster](#) describing the concept of food environments and the activities and approaches FRESH researchers are taking to understand local food environments in Tanzania (output 5.2). The [research design](#) of identifying FE interventions in Sri Lanka was presented at the EGEA Conference (output 5.5).

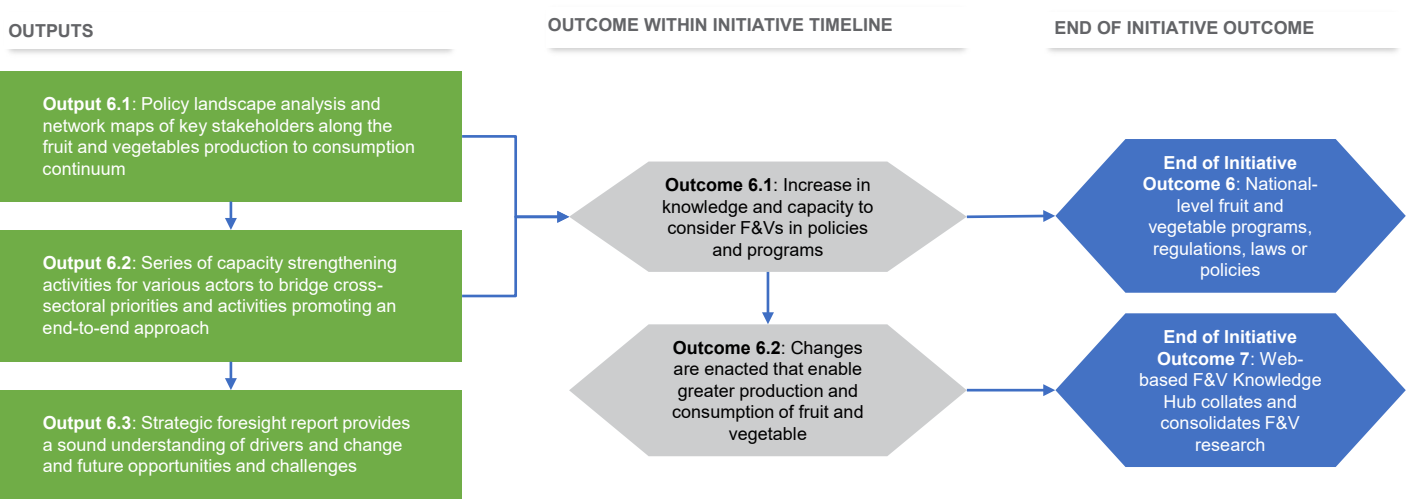
In Tanzania, [formative research](#) of FE began in mid-2023 (output 5.2). Scoping visits were conducted in four open-air markets and

surrounding community food environments where other FRESH activities are under way. Scoping visits were used to identify and classify the types of vendors in the FE, and 'ground-truth' survey questions and response options for the survey in the end-to-end impact evaluation. This approach will also be employed in the FE study in Sri Lanka, scheduled to begin 2024.

In the Philippines, WP5 researchers explored schools as key settings to enhance F&V consumption among children, including the [production and consumption of indigenous F&V](#) (output 5.2). A separate [study](#) investigated factors influencing the availability of indigenous vegetables in urban markets, emphasizing the importance of the supply chain spanning north to south Luzon. The findings highlighted opportunities and challenges in promoting indigenous vegetable consumption, emphasizing awareness, improved supply chains, and enhanced education access for women consumers in urban areas (output 5.4). These areas of research will be further explored in 2024.

WP6: Strengthening the enabling environment

On track



Work Package 6 progress against the theory of change

WP6 researchers from IFPRI, AVRDC and USYD continued research activities to understand the policy landscape and identify key actors of the F&V value chains (output 6.1), engage with those actors to bridge cross-sectoral priorities (output 6.2), and develop a collaborative foresight workshop (output 6.3).

Drawing on insights from 2022 results, a multipartner team is investigating the dynamics that shape policy decisions and identifying points of leverage to strengthen the policy landscape through qualitative policy analysis and political economy research to help identify opportunities to strengthen food systems policies in ways that increase F&V consumption (output 6.1). Preliminary findings suggest that strengthening multisectoral collaboration and improving policy integration and equity considerations are essential for promoting F&V consumption. Qualitative semistructured interviews with policy makers have begun and will continue in 2024 (output 6.2).

To bridge the gap between knowledge gained through research and its application in policy and practice, researchers and FRESH

country coordinators facilitated engagements with a range of actors who play a role in the enabling environment. As part of the end-to-end approach, FRESH connected with existing relevant policy coordination structures and technical working groups (output 6.2). These iterative engagements help to build trust by meaningfully engaging with the perspectives and values of country stakeholders. FRESH participates in four platforms across three countries: Tanzania, [Benin](#), and an emerging stakeholder groups in Sri Lanka and the Philippines.

Researchers designed a study protocol for the co-design and implementation of a foresight analysis in [Benin](#) (output 6.3). The foresight analysis aims to prioritize the participation of key stakeholders, fostering a shared understanding of the current role of F&V in the food system and the driving forces of change. The goal is to define an envisioned future role of F&V in the food system. This exercise is poised to contribute significantly to building expertise, fostering consensus, and providing actionable insights for the future of Benin’s food system.

Work Package progress rating summary

WORK PACKAGE	PROGRESS RATING & RATIONALE
1	<div>Progress rating</div> <div>WP1 is on track to accomplish its EOIO by the end of 2025.</div>
2	<div>Progress rating</div> <div>WP2 is on track and will accomplish its EOIO by the end of 2025.</div>
3	<div>Progress rating</div> <div>WP3 is on track to achieve its EOIO by the end of 2025.</div>
4	<div>Progress rating</div> <div>WP4 is on track to achieve its EOIO by the end of 2025.</div>
5	<div>Progress rating</div> <div>W5 is on track to meet its EOIO by the end of 2025.</div>
6	<div>Progress rating</div> <div>Work Package 6 is on track to achieve its EOIO by the end of 2025.</div>

Definitions

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



Local market in Tanzania.
Credit: M. Koningstein/ CIAT

Section 4: Key results

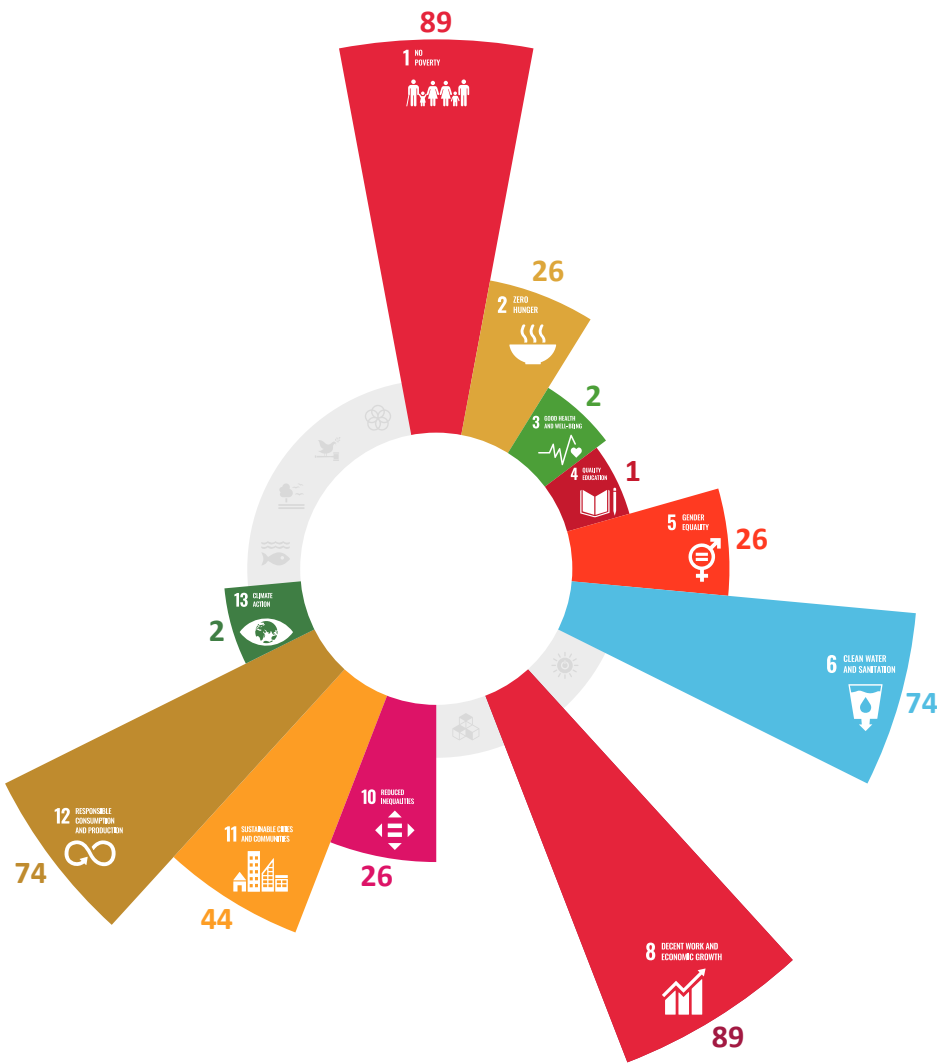
This section provides an overview of results reported by the CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets in 2023. These results align with the CGIAR Results Framework and Fruit and Vegetables for Sustainable Healthy Diets’ theory of change. Source: Data extracted from the [CGIAR Results Dashboard](#) on 29 March 2024.

OVERVIEW OF REPORTED RESULTS

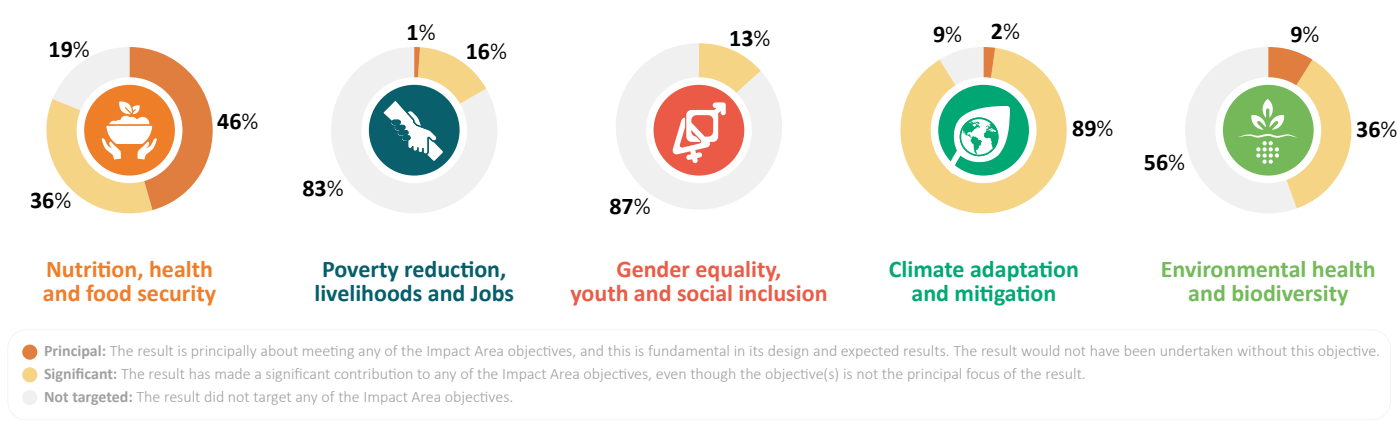
Outputs



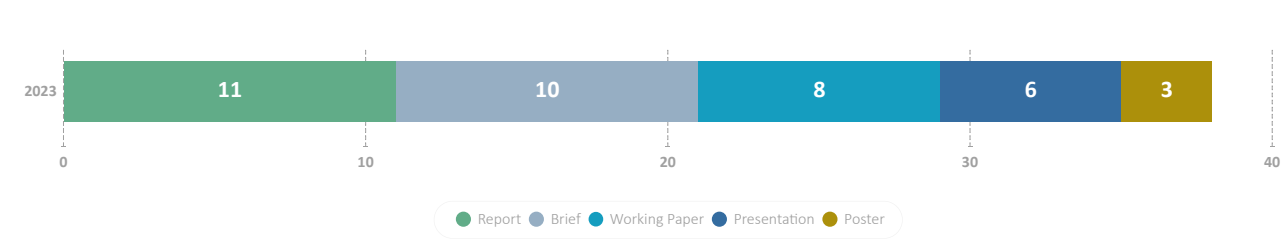
CONTRIBUTIONS TO THE SUSTAINABLE DEVELOPMENT GOALS



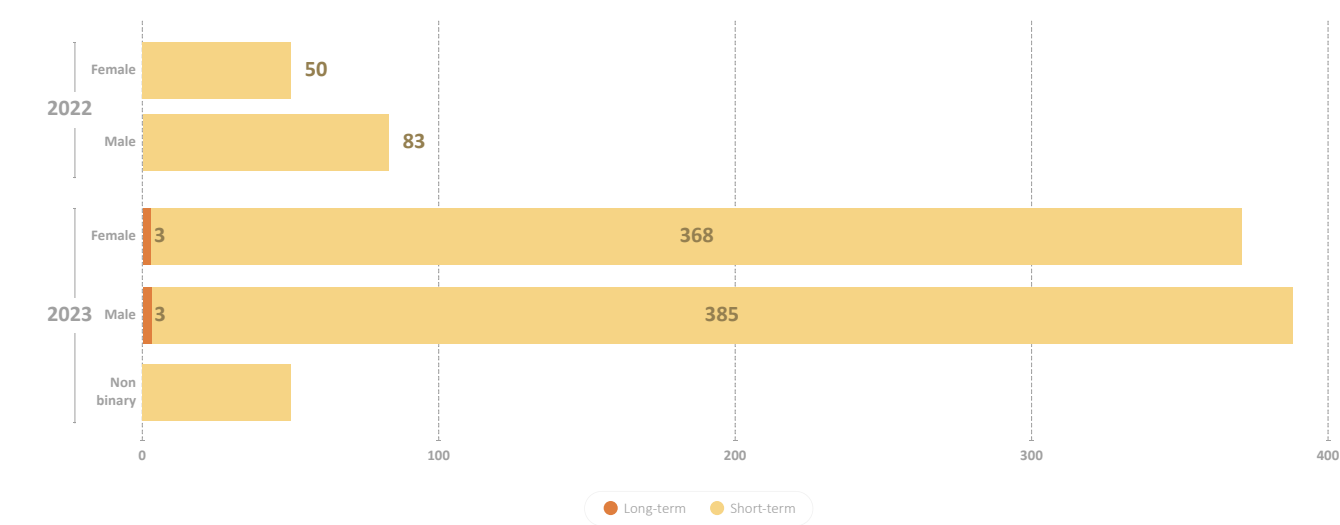
PERCENTAGE OF REPORTED RESULTS TAGGED TO CGIAR IMPACT AREAS



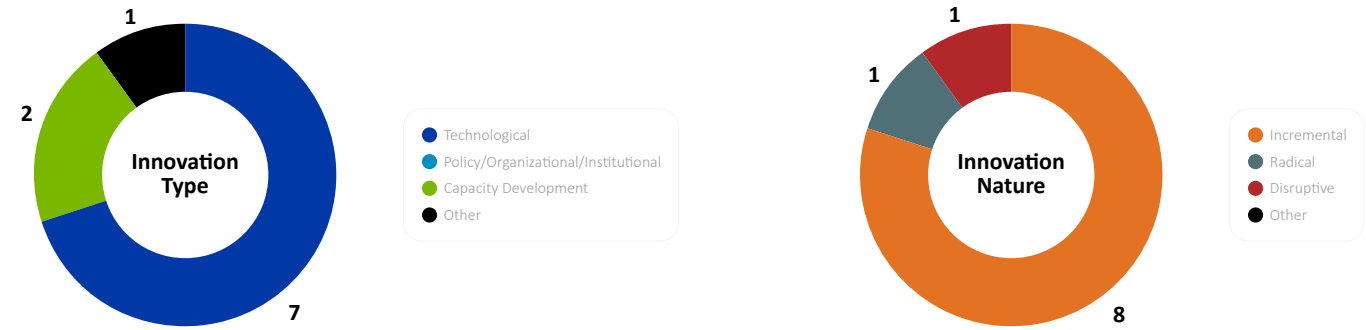
NUMBER OF KNOWLEDGE PRODUCTS BY TYPE (TREND OVERVIEW, 2022-2023)



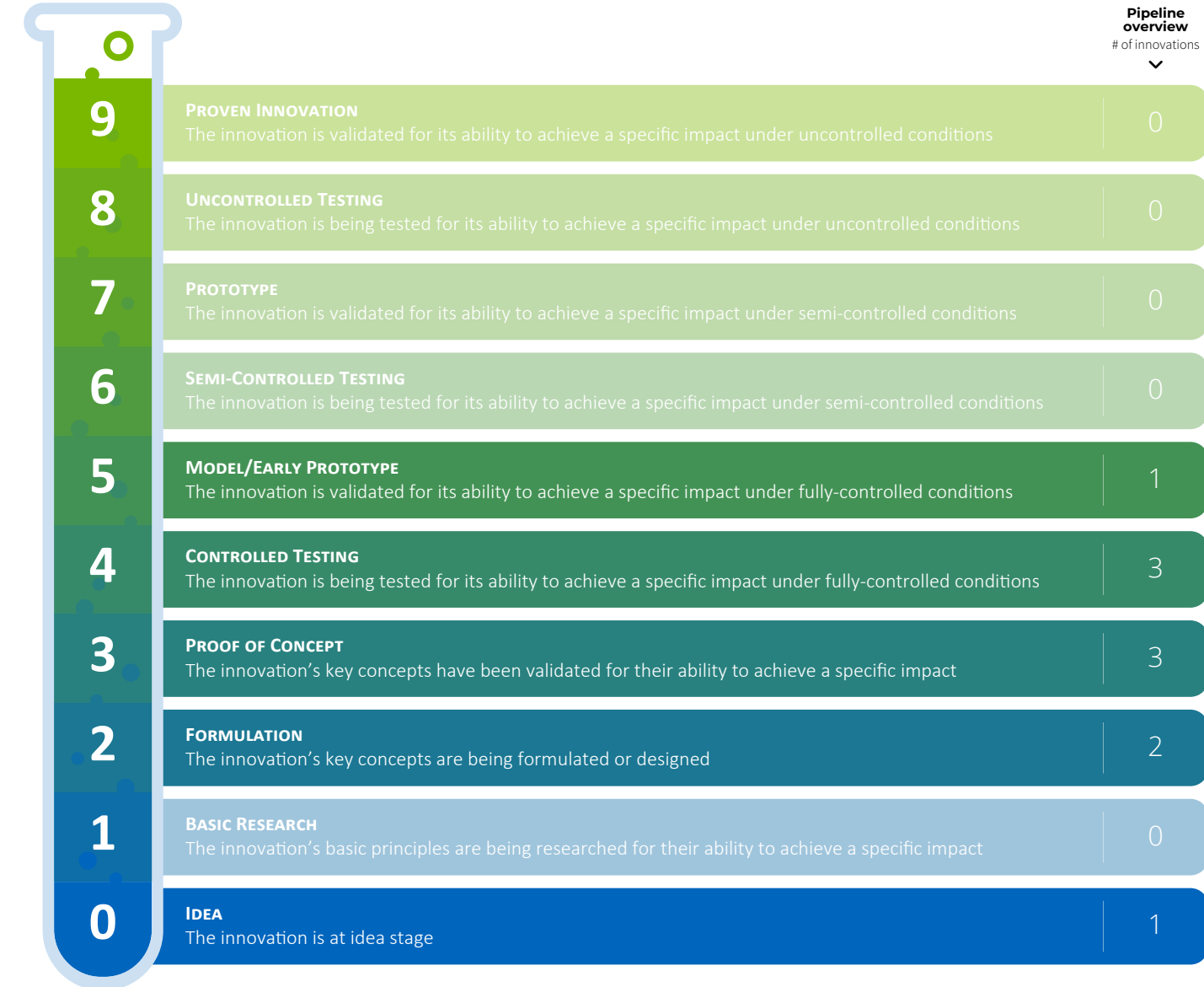
NUMBER OF INDIVIDUALS TRAINED BY FRESH (TREND OVERVIEW, 2022-2023)



REPORTED INNOVATIONS

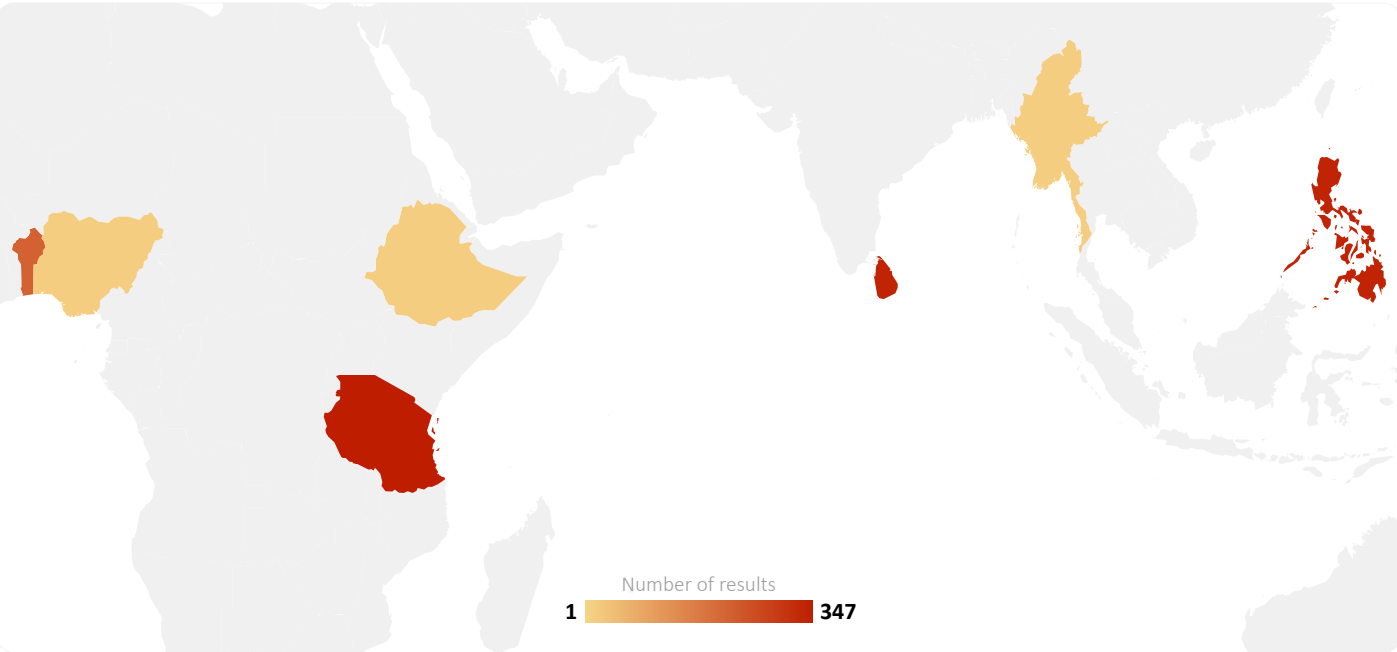


NUMBER OF INNOVATIONS BY READINESS LEVEL



NUMBER OF RESULTS BY COUNTRY

Data here represents an overview of reported results in 2022 and 2023. One result can impact multiple countries and can therefore be represented multiple times.





Section 5: Partnerships

Partnerships and Fruit and Vegetables for Sustainable Healthy Diets’ impact pathways

Since its inception, FRESH’s core partners have provided management and thought leadership at a global level. These partnerships play a crucial role in driving research activities across the focus countries, tapping into established networks and ongoing collaborations to identify opportunities aligned with FRESH research objectives. Partnerships remain integral to FRESH’s end-to-end approach — working across the value chain and within the policy environment. This comprehensive scope requires a multidisciplinary team to understand how interventions can inform each other and how their individual and joint impacts can be evaluated. This principle underpins FRESH’s design, emphasizing the need for coordinated efforts to achieve success.

The intensity of WP activities varied across the focus countries and in 2023 many WPs expanded their presence within countries. FRESH has maintained a consistent approach to forming partnerships at the national and subnational levels by conducting key informant interviews and stakeholder workshops to introduce FRESH and

explore potential collaborations. These efforts raised awareness about FRESH, familiarizing stakeholders with its research objectives and end-to-end approach. The FRESH country coordinators continued to play a pivotal role in outreach to stakeholders and representing FRESH at events.

Country partners are able to validate the work undertaken by grounding it in real-world experiences, providing context, and identifying avenues for integration into existing networks, systems, and processes. This collaborative approach fosters shared responsibility and ensures the effective delivery of FRESH’s outcomes. Notable evidence of this collaborative effort is that partners carried out most of the capacity sharing activities in 2023. Partners identified specific knowledge or technical gaps across the F&V value chain and co-designed capacity sharing events to address these needs. This helps achieve FRESH outcomes through strengthened F&V food systems and also helps to ensure the overall sustainability of the Initiative.

Section 6: CGIAR Portfolio linkages

Portfolio linkages and Fruit and Vegetables for Sustainable Healthy Diets’ impact pathways

In 2023, FRESH supported global, regional, and national efforts in advancing research by strengthening collaborations and facilitating information sharing to learn from other actors in the food system. FRESH supported and participated in nutrition-focused global and regional events. FRESH was among the 10 Initiative co-hosts of a regional conference, Delivering for Nutrition in South Asia, that brings together researchers, program implementers and policy makers working in and focusing on South Asia to deliberate innovative ways to transform diets and improve nutrition outcomes for all. Alongside three CGIAR Initiatives and CGIAR’s Nutrition, Health and Food Security Impact Area Platform, FRESH supported the annual Agriculture, Nutrition & Health Academy Week that brings together researchers, practitioners and policy makers working for better nutrition and health through improved agriculture and food systems.

In a more focused effort, FRESH continued to engage with other CGIAR Initiatives that have primary research goals of improved health, diet, and nutrition outcomes. There’s a shared interest in standardizing tools and methodologies across these Initiatives. Therefore, researchers from FRESH and two other CGIAR Initiatives — Sustainable Healthy Diets through Food Systems Transformation (Sustainable Healthy Diets) and Resilient Cities through Sustainable Urban and Peri-Urban Agrifood Systems(Resilient Cities) — launched a hybrid seminar series to exchange information on food environment and dietary assessment research. The participants included partners of this Initiative, with several of them presenting the Initiative’s work. This exchange of information and ideas fosters crosslearning among the Initiatives, enabling them to draw upon best practices and innovative approaches. This seminar series is planned to continue in 2024.

FRESH innovations provided a way to foster collaborations and share learning experiences. In Sri Lanka, FRESH and the CGIAR Research Initiative on Building Systemic Resilience Against Climate Variability and Extremes (Climate Resilience) worked together to pilot a mobile phone application that provides real-time climate information and agronomic advisories to farmers. This digital innovation has been piloted at FRESH production hub sites and further

investigation of the impact will happen in 2024. Another [digital tool](#) was tested across Initiatives with Resilient Cities and FRESH both testing a real-time diagnostic app drive by artificial intelligence that can assess diets and nudge app users across different countries to make better-informed choices about healthy diets.



Diversity kits at IIRR in the Philippines. Credit: Deanna Olney/FRESH



Indigenous fruit in the Philippines.
Credit: D. Hunter/ Alliance of Bioversity International

Section 7: Adaptive management

RECOMMENDATION	SUPPORTING RATIONALE
Hire a communications consultant to support FRESH communications needs across partners.	Reviewing the internal resources across the FRESH partner teams, it was determined that there was a need for a communication specialist to support the creation and dissemination of FRESH results. Hired mid-year, the consultant has crafted tailored strategies to reach stakeholders, leveraged storytelling, and increased FRESH media presence. The consultant's expertise enhances transparency, builds credibility, and fosters stakeholder engagement, driving project success and sustainability.
Choose Sri Lanka as the country where the second end-to-end evaluation will take place.	As mentioned in the 2022 Annual Report, Tanzania was the first focus country selected to undergo an evaluation of the FRESH end-to-end approach. Building on experiences from designing and implementing the Tanzania study, Sri Lanka was selected as the second country because of the strong in-country partnerships, number and diversity of activities across the FRESH WPs, and opportunities to leverage previous research activities.
Bring BISA on as a core partner.	One of the FRESH WP leads transferred employers over the course of 2022 to 2023. To ensure continuity of research and oversight of the WP, the new employer – BISA – was brought on as a core partner in 2023.
To meet a reduction in funding, reduce the intensity of activities across WPs and countries.	To meet the allocated budget reductions mid-year, FRESH implemented an even reduction across partners. After consulting with the management team, further reductions were made based on intensity of activities and investments across focus countries, considering the impacts that funding level changes would have on meeting FRESH goals. This adjustment led to the discontinuation of some activities in Benin. However, continued close collaboration among partners has revealed opportunities to use ongoing activities to support FRESH research in Benin. Additionally, FRESH leadership has actively pursued fundraising opportunities to supplement its research resources.

Section 8: Key result story

Engaging stakeholders to shape nutrition policy

Through engagement at Tanzania’s Joint Multisectoral Nutrition Review (JMNR), FRESH positioned fruit and vegetables in national policy discussions.



Representatives from FRESH at the JMNR in Arusha, Tanzania.
Credit: Tanzania Food and Nutrition Centre

At Tanzania’s 9th JMNR, FRESH shared research findings on the importance of fruit and vegetables in achieving national nutrition goals. By engaging key stakeholders such as Tanzania’s prime minister, FRESH generated support for evidence-based programs and policies that will empower Tanzanians to incorporate more fruit and vegetables in their diets.

Undernutrition, micronutrient deficiencies, and obesity pose complex public health challenges in Tanzania, especially among women and children. Insufficient consumption of fruit and vegetables (F&V) is a significant contributor. The CGIAR Research Initiative on Fruit and Vegetables for Sustainable Healthy Diets (FRESH) uses an end-to-end approach to increase fruit and vegetable intake to improve diet quality, nutrition and health outcomes while also improving livelihoods, empowering women and youth, and mitigating negative environmental impacts.

Recognizing the need for strong partnerships to ensure that FRESH’s activities align with government priorities and have buy-in from governments and other key stakeholders, FRESH has diligently engaged key stakeholders in Tanzania across the nutrition, agriculture, and related sectors since its inception. Over the past year, FRESH held meetings with the Tanzania Food and Nutrition Centre (TFNC) and Ministry of Health and participated in the Development Partners Group in Nutrition, increasing FRESH’s visibility among government agencies and non-governmental organizations. These engagements led to FRESH being invited to participate in the 9th Joint Multisectoral Nutrition Review (JMNR), held in October 2023, in Arusha, Tanzania.

The JMNR presented a pivotal opportunity to champion F&V in nutrition policy discussions. The event brought together influential figures, including representatives from government ministries, ministerial departments and agencies; non-state actors; research institutions; and the private sector. The theme of the JMNR, “To Strengthen Sustainable Food Systems for Better Nutrition Outcomes and Human Capital Development,” aligns with FRESH’s mission to

improve diet quality, nutrition, and health outcomes by increasing F&V in diets.

Through research presentations, FRESH effectively communicated the importance of F&V in achieving national nutrition goals. As one of four oral presentations at the JMNR, FRESH was provided a platform to share findings from a scoping review on nutritional status, diets, and F&V consumption among women and children in Tanzania. The presentation, delivered by Dorcas Amunga, a research associate and nutritionist at the International Potato Center (CIP), was tied directly to an output jointly produced under FRESH by colleagues from CIP, IFPRI, Sokoine University of Agriculture, and the University of California at Davis. Informative posters created by colleagues at the World Vegetable Center in collaboration with local Tanzanian organizations showcased FRESH’s research on improving production of safe and sustainable vegetables and the influence of food environments and the political economy on F&V accessibility.

During an exhibition, FRESH’s interactive booth fostered discussions with key stakeholders, including Tanzanian Prime Minister Kassim Majaliwa Majaliwa, who commended FRESH’s efforts to combat malnutrition and encouraged further progress in local F&V production.

By interacting with diverse actors across the food system, FRESH has established partnerships able to co-create solutions addressing barriers to F&V consumption. FRESH is generating new evidence and formulating actionable recommendations to increase F&V intake. In 2023, FRESH launched a baseline survey as part of a comprehensive evaluation of its end-to-end approach in Tanzania. The evaluation will provide data on household dietary intake patterns, food environments, and the effectiveness of FRESH interventions on household production of vegetables and dietary intake of F&V among women of reproductive age. Through collaborative efforts and a strengthened national policy focus on F&V, FRESH is actively contributing to a healthier future for millions of Tanzanians.



Good nutrition is key for people’s wellbeing! Thanks to CGIAR’s FRESH Initiative for participating in the 9th Joint Multisectoral Nutrition Review in October 2023 that brought together nutrition stakeholders to review the progress of the implementation of nutrition interventions in Tanzania. With combined efforts, we will achieve healthier livelihoods.

Wiston Mwombeki, FRESH country coordinator, Tanzania

Primary Impact Area

Other relevant Impact Areas targeted

Contributing Initiative

Fruit and Vegetables for Sustainable Healthy Diets

Contributing Centers

International Food Policy Research Institute · International Potato Center

Contributing external partners

World Vegetable Center · Applied Horticultural Research · Sokoine University of Agriculture · University of California Davis





Front cover photo

Woman transports fruit on a boat in Ganvie.
Credit: Benin. M. Cooperman/ IFPRI

Back cover photo

Harvested chilies in a home garden, Sri Lanka.
Credit: K. Arunasalam/ IWMI



INITIATIVE ON
Fruit and Vegetables
for Sustainable
Healthy Diets