




CGIAR Research Initiative on **Fragility to Resilience in Central and West Asia and North Africa**

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CGIAR Technical Reporting 2023

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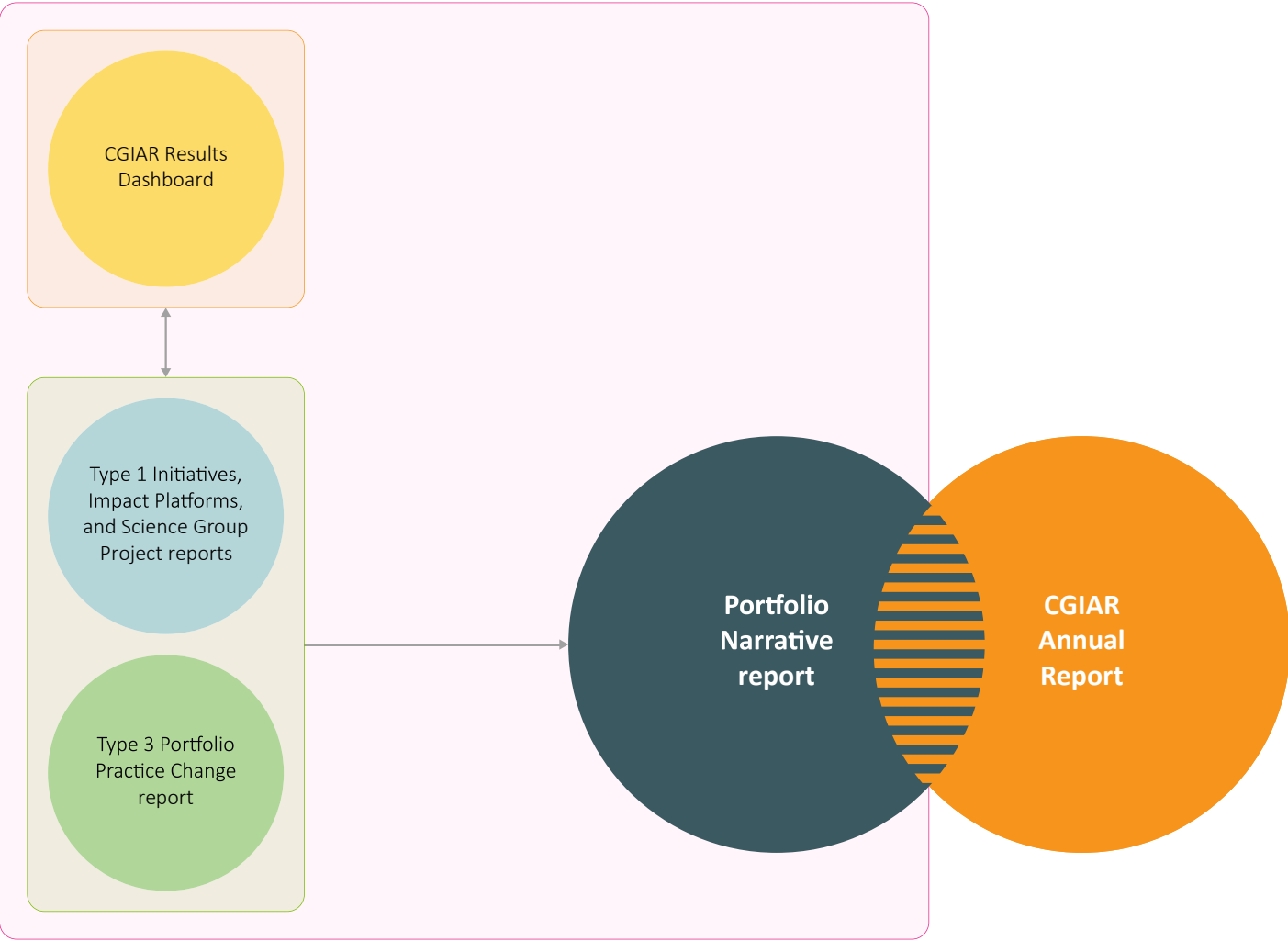
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CGIAR Technical Reporting has been developed in alignment with the [CGIAR Technical Reporting Arrangement](#). This Initiative report (“Type 1” report) constitutes part of the broader [CGIAR Technical Report](#). Each CGIAR Research Initiative submits 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	Fragility to Resilience in Central and West Asia and North Africa
Initiative short name	Fragility to Resilience in Central and West Asia and North Africa
Initiative Lead	Michael Baum (m.baum@cgiar.org)
Initiative Co-lead	Maha Al-Zu'bi (m.al-zubi@cgiar.org)
Science Group	Resilient Agrifood Systems
Start – end date	01/04/2022 – 31/12/2024
Geographic scope	Regions targeted in the proposal Central Asia · West Asia · North Africa Countries targeted in the proposal Egypt · Lebanon · Morocco · The Republic of the Sudan · Uzbekistan
OECD DAC Climate marker adaptation score ¹	Score 2: Principal The activity is principally about meeting any of the three CGIAR climate-related strategy objectives—namely, climate mitigation, climate adaptation and climate policy—and would not have been undertaken without this objective.
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 0: Not targeted The Initiative/project has not been found to target gender equality. However, as a minimum requirement for all Initiatives/projects, (1) a gender analysis was conducted, (2) its findings should be used to ensure at minimum that the Initiative activities/interventions do no harm and do not reinforce gender inequalities, and (3) data that are collected are gender disaggregated.
Website link	https://www.cgiar.org/initiative/fragility-to-resilience-in-cwana/

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 Fragility to Resilience in Central and West Asia and North Africa (F2R-CWANA) is a regional integrated Initiative that operates as a microcosm of the CGIAR system within the region, incorporating areas of work across the Genetic Innovation, Resilient Agrifood Systems, and Systems Transformation Science Groups. The overarching aim of F2R-CWANA is for our co-created research, innovation, capacity, and policy development to contribute to the effective, socially inclusive, and climate-resilient transformation of national and regional agrifood systems. In 2023, we operated across the five target countries of Egypt, Lebanon, Morocco, Sudan, and Uzbekistan to report 167 results, including 59 knowledge products; 23 capacity sharing for development outputs involving 1,170 people; 39 innovation development outputs; 36 other outputs (mostly related to stakeholder engagement); three innovation use outcomes; and seven other outcomes.

Notable results include the ongoing on-station field trials and gender-sensitive evaluations of eight key crops in the five countries to enhance climate-resilient food and livelihood security; numerous agronomic field trials in wheat-based cropping systems to sustainably bridge yield gaps through crop rotations and intercropping, irrigation, and mechanization; efforts to address the nexus management of natural resources through the release of the Online Water Accounting Dashboard for the Souss-Massa basin in Morocco and the publication of a resilience-building policy for fragile and conflict-affected countries; and the Agritech4Uzbekistan Innovation Challenge held in Tashkent and the subsequent successes of participants in the Agritech4Morocco Innovation Challenge, held in 2022.

These results were achieved through the collaboration of the Alliance of Bioversity and CIAT, CIMMYT, CIP, ICARDA, IFPRI, IWMI, WorldFish, and six other Centers; at least 12 Initiatives and Impact Platforms (working together on four or more results); and 246 partners. Though we focused on the five target countries, the results were linked to 35 countries, demonstrating the extensive reach of our research networks and the potential to deliver our research and innovations for beneficial outcomes and impacts across the vast and diverse Central and West Asia and North Africa (CWANA) region. F2R-CWANA’s core partners continue to be agriculture-, water-, and environment-related national agricultural research and extension systems (NARES), ministries, and agencies in the countries, followed by universities, international organizations, and the private companies linked to the Innovation Challenges through the teams, accelerators, and investors.

Challenges to delivering our 2023 workplan included a 42 percent budget reduction, conflict in the target countries of Sudan and Lebanon, price inflation across North Africa caused by the Russia-Ukraine war, and extreme heat and drought events during the hottest year ever on record. Based on the pause and reflect process, our recommendations for the adaptive management of F2R-CWANA are to continue our work in Sudan as much as possible; expand our theory of change (TOC), plan of results and budget (PORB), and People Plan to include pastoral and rangeland systems in Tunisia and diverse policy aspects in Jordan; and implement as many recommendations as feasible from the evaluability assessment that was conducted throughout 2023.

	2022	2023	2024
	▼	▼	▼
PROPOSAL BUDGET ▶	\$9.08M	\$10.04M	\$10.88M
APPROVED BUDGET ¹ ▶	\$4.06M	\$4.00M ²	\$2.96M 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.

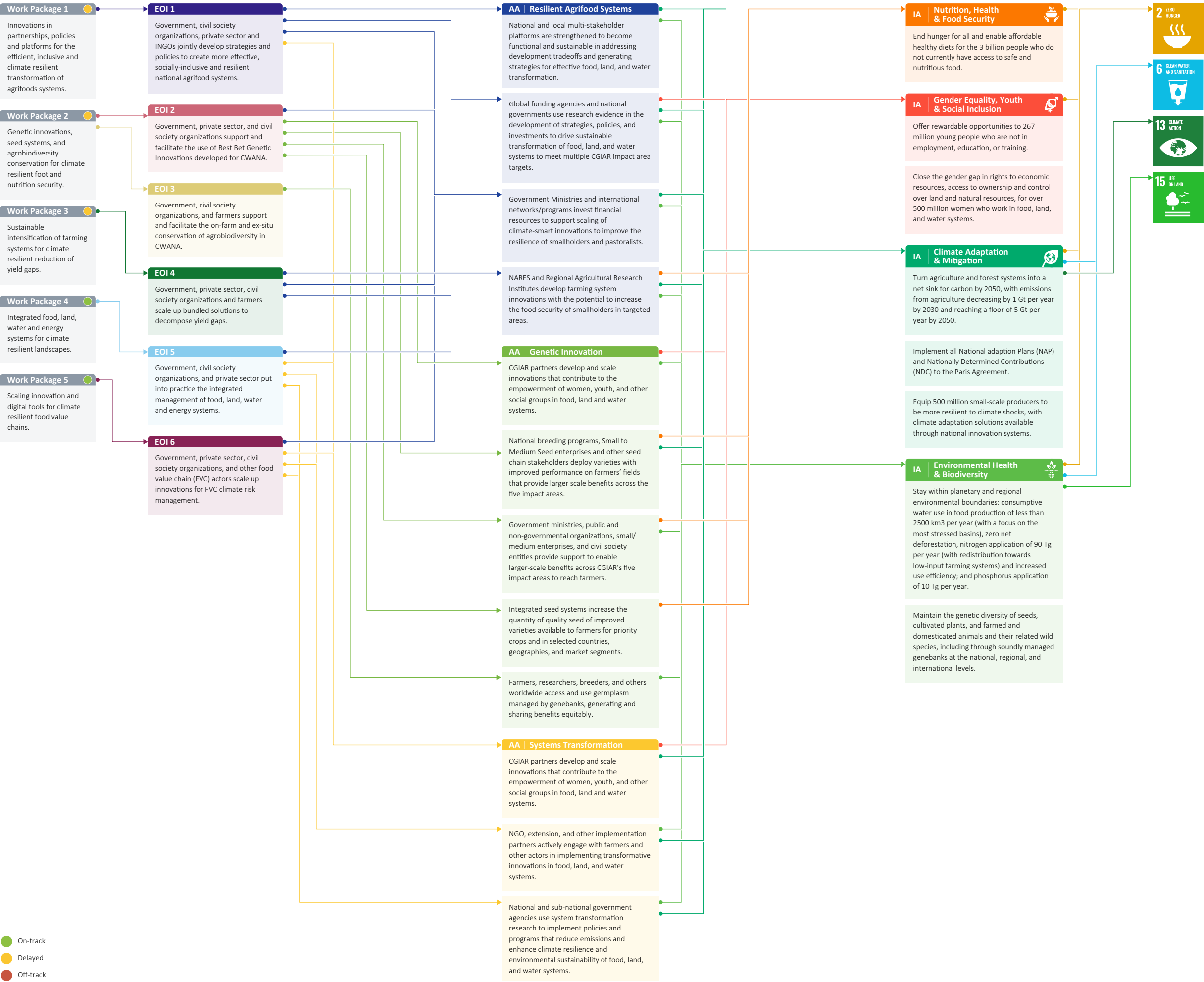
³ This amount is an estimation of the 2024 annual budget allocation, as of the end of March 2024.



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

Initiative-level theory of change diagram

This is a simple, linear, and static representation of a complex, non-linear, and dynamic reality. Feedback loops and connections between this Initiative and other Initiatives' theories of change are excluded for clarity.



EOI End of Initiative outcome
AA Action Area
IA Impact Area
SDG Sustainable Development Goal

Note: A summary of Work Package progress ratings is provided in Section 3.



Summary of progress against the theory of change

F2R-CWANA is a regional integrated Initiative that operates as a microcosm of the whole CGIAR system within the region, working primarily through the Alliance of Bioversity and CIAT, CIMMYT, CIP, ICARDA, IFPRI, IWMI, and WorldFish. We primarily work in the five countries of Egypt, Lebanon, Morocco, Sudan, and Uzbekistan, with results in 2023 also being reported in another 30 countries.

The overarching aim of F2R-CWANA is for our co-created research, innovation, capacity, and policy development to contribute to the effective, socially inclusive, and climate-resilient transformation of national and regional agrifood systems. We have invested considerable efforts in maintaining the existing teams and partnerships and in building new ones in the region.

The Initiative has thematically grouped Work Packages: Work Package 1 on enabling partnerships, platforms, and policies for agrifood systems transformation; Work Package 2 on genetic innovation, seed systems, and community management of indigenous agrobiodiversity; Work Package 3 on bundles of agronomic innovations for farm-level solutions to sustainably bridge yield gaps; Work Package 4 on landscape-level nexus governance of resources, especially water, and considerations of conditions of fragility and conflict; and Work Package 5 on enabling innovation development and the scaling of digital innovations.

In 2023, the operational context for the F2R-CWANA Initiative was challenging on several fronts. Our monthly budget in 2023 was a 42 percent reduction from the 2022 monthly budget, considering that the 2022 budget ran from April to December, while the 2023 budget ran from January to December. As a result, reductions in the operational budget and staff time allocations were felt across all Centers, Work Packages, and countries. Budget allocations to

partners were maintained as much as possible, with the notable exception of partners in Sudan where, in April 2023, conflict intensified with the collapse of the tentative alliance between the Sudanese army and the Rapid Support Forces. With many more than 12,000 people killed, 9 million people internally and internationally displaced (including CGIAR and partner staff) and half the population requiring humanitarian aid, the ability to continue business as usual in Sudan has been halted since April. International travel in and out of Lebanon was temporarily suspended due to the 7 October attack by Hamas on Israel, and Israel's response, which has been deemed a plausible commitment of genocide on the people of Gaza, along with attacks on Lebanon and Syria. Work done by CGIAR and partner staff in Lebanon, however, was able to continue without disruption. The North African countries, in particular, are still grappling with surges in the prices of wheat grain, fertilizers, and fuel caused by the ongoing Russia-Ukraine war, which has disrupted the production and international trade of these essential commodities. Finally, the World Meteorological Organization has confirmed that 2023 was the hottest year on record, with the global average temperature 1.45 °C above the 1850–1900 average. Extreme and prolonged heat waves were experienced across the CWANA region, especially in North Africa, with the temperature reaching a record-breaking 50.4 °C in Agadir, part of the Souss-Massa basin, Morocco, where we work to provide decision support tools for water governance.

Despite these challenges, F2R-CWANA made great progress on implementing its 2023 work plan, reporting 167 results under knowledge products (59); capacity sharing for development (23); innovation development (39); other outputs, mostly related to stakeholder engagement (36); innovation use (three); and other outcomes (seven). These results were achieved through the

collaboration of 13 Centers and 246 partners, and linked to 35 countries, primarily through participants of capacity development and stakeholder engagements coming from these countries, and knowledge products were linked to clusters of countries within a region—demonstrating the extensive reach of our research networks

and the potential to deliver our research and innovations for beneficial outcomes and impacts across the vast and diverse CWANA region. Challenges across the five Impact Areas are keenly felt in CWANA, making our efforts all the more significant.

Progress by End of Initiative Outcome

EOIO 1: Government, civil society organizations, private sector, and international nongovernmental organizations (INGOs) jointly develop strategies and policies to create more effective, socially-inclusive, and resilient national agrifood systems.

F2R-CWANA collaborates with government ministries, NARES, I/NGOs, civil society, and private sector partners to co-develop strategies and policies in various ways. National alliances of stakeholders for the cereal seed sector were initiated in Egypt, Lebanon, and Morocco, as well as a stakeholders' group for water reuse in Morocco. In Uzbekistan, CGIAR Centers are involved in policy coordination mechanisms set up by the Ministry of Agriculture and Ministry of Water Resources. The gender and climate strategy for the MENA region attracts interest from numerous organizations looking to integrate its recommendations into their programs. F2R-CWANA is working with Lebanon's government on water reuse standards, and with Egyptian ministries and NARES on the salinity roadmap. Members of F2R-CWANA were part of Jordan's official delegation to the United Nations Framework Convention on Climate Change (UNFCCC) COP28, supporting sessions around the climate-refugee-water-energy-food-environment (WEFE) nexus; sat on the Climate Change Committee under the Higher Council of Science and Technology; and supported the Ministry of Energy and Mineral Resources in writing the terms of reference to establish a WEFE nexus think tank. Work on the regional seed trade policy involves partners in Egypt and Sudan.

EOIO 2: Government, private sector, and civil society organizations support and facilitate the use of best bet genetic innovations developed for CWANA.

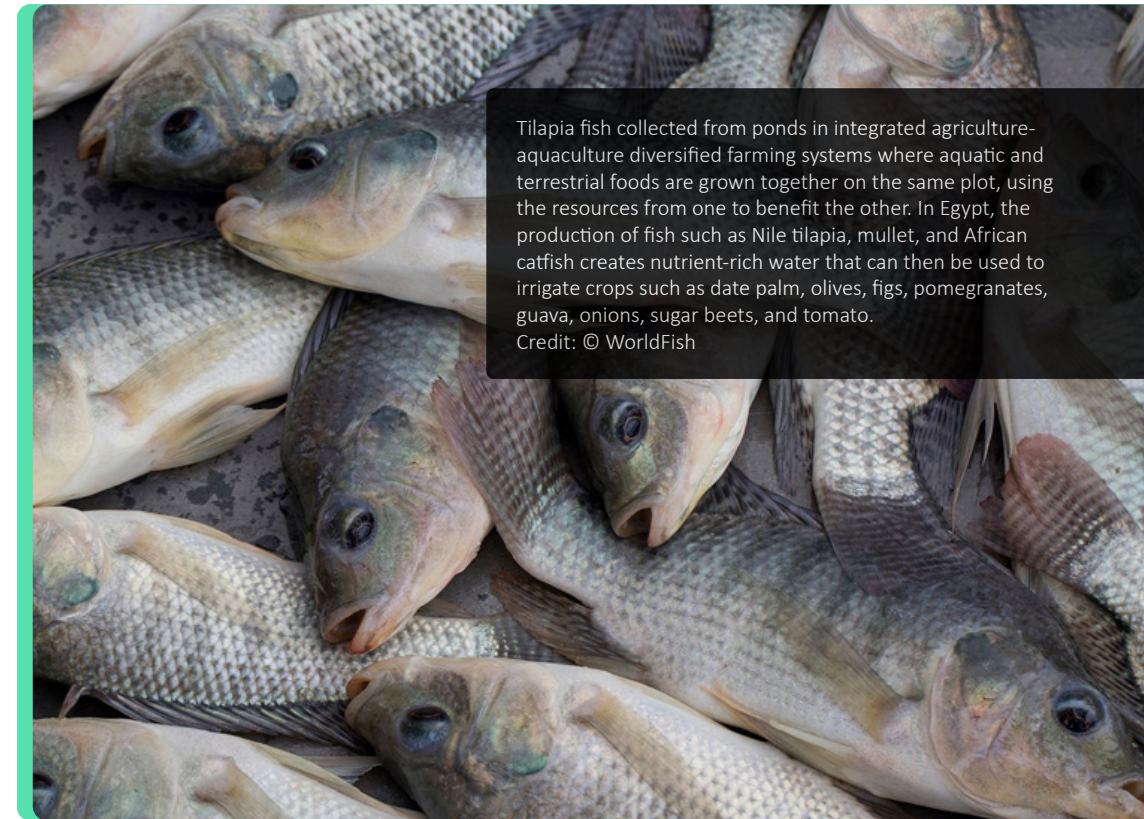
Our efforts in identifying and promoting the best bet genetic innovations for CWANA are multifaceted and conducted in close collaboration with national public and private partners, since these partners are ultimately responsible for variety selection, registration, release, multiplication, and distribution, as well as the national and regional policies that govern these processes. Participatory gender-sensitive evaluation of the elite lines and newly released varieties of crops of national importance by farmers and agrifood processors are ongoing at the research stations in Egypt, Lebanon, Morocco, Sudan, and Uzbekistan, which are embedded into the NARES system. Recent publications on the potato seed system in Uzbekistan will inform our engagement strategies, while cereal seed system work continues in Egypt, as does work on regional seed trade policy across national borders.

EOIO 3: Government, civil society organizations, and farmers support and facilitate the on-farm and ex-situ conservation of agrobiodiversity in CWANA.

The focus of this work is agro-silvopastoralist communities in marginal areas in Lebanon, Morocco, and Uzbekistan where farming systems rely on indigenous agrobiodiversity. Management plans for the community-based conservation of agrobiodiversity are being co-developed.

EOIO 4: Government, private sector, civil society organizations, and farmers scale up bundled solutions to decompose yield gaps.

The research, development, and scaling of bundles of agronomic solutions to sustainably bridge yield gaps at research stations that are fully integrated into the NARES system continues at a rapid pace. Solutions for wheat-based cropping systems across the CWANA region remain the central focus, along with conservation agriculture-based systems in Morocco in support of the government's Generation Green 2020-2030 strategy; soybean production in Egypt in support of the government's desire to increase its production; and potato in Uzbekistan, also in support of the government's stated desire to increase its production.



EOIO 5: Government, civil society organizations, and private sector put into practice the integrated management of food, land, water, and energy systems.

The release of the Online Water Accounting Dashboard for the Souss-Massa basin, with plans for its handover to the Souss-Massa Basin Agency later in 2024, marks an important step in facilitating the sustainable and equitable management of increasingly scarce freshwater resources across all demand sectors, including domestic, agriculture, and energy. A series of consultations and workshops focused on building resilience in fragile and conflict-affected agrifood systems through a water-energy-food nexus approach have successfully engaged stakeholders from various government ministries, NARES, and I/NGOs, firmly establishing this approach on institutional, national, and regional agendas. Efforts to implement the identified proposed actions will continue with the United Nations Economic and Social Commission for Western Asia (UN-ESCWA) and partners in 2024. Efforts to enhance resource use efficiency in agrifood systems continue across the region, encompassing water, land, and energy. This includes activities such as wastewater reuse, the development of a salinity management plan for Egypt, and the implementation of integrated agriculture-aquaculture (IAA) systems.

EOIO 6: Government, private sector, civil society organizations, and other food value chain (FVC) actors scale up innovations for FVC climate risk management.

The online climate data extractor for CWANA is being used by various partner organizations, including the Center of Agricultural Services of the National Center for Agricultural Knowledge and Innovation under the Ministry of Agriculture in Uzbekistan, the Ecological Movement of Uzbekistan, and the National Academy of Sciences of the Republic of Tajikistan. Letters of endorsement from these partners highlight the tool’s exceptional craftsmanship and how it helps them tackle climate and weather-related challenges effectively. By request, training is underway to expand its usage to additional provinces within Uzbekistan and with other partners. Participants from the inaugural Agritech Innovation Challenge in Morocco in 2022 are making significant strides in developing their innovations and support network to facilitate scaling, including successful fundraising endeavors, partnerships with the United Nations Convention to Combat Desertification (UNCCD), and recognition for their potential contribution to the future economic growth of the United Arab Emirates (UAE). Ongoing research is identifying obstacles and opportunities for scaling agrifood-related digital applications.

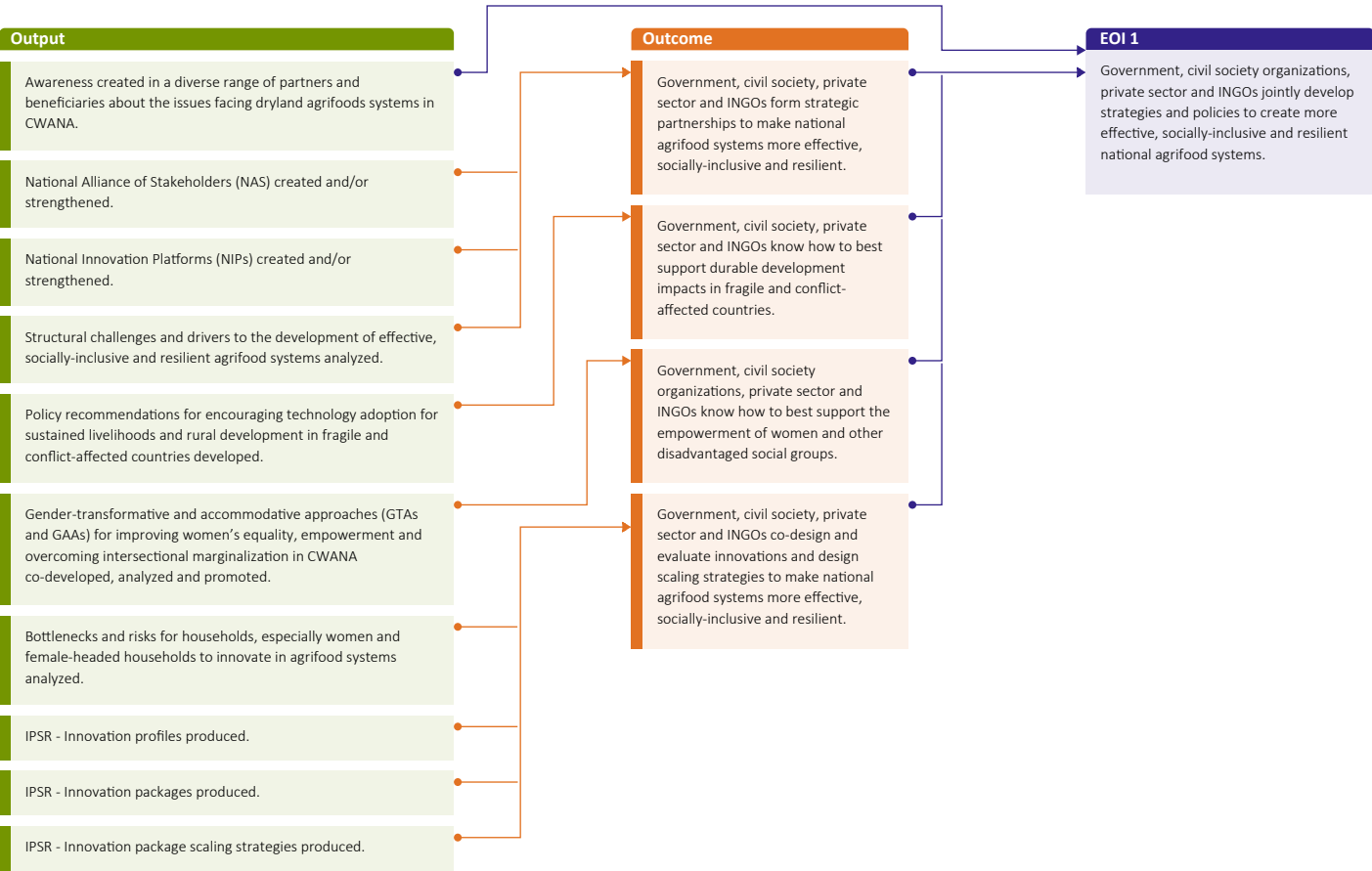


The natural water distillation innovation of Manhat, a finalist in the Agritech4Morocco Innovation Challenge (2022) and participant in the Agritech4Uzbekistan Innovation Challenge (2023), uses the natural water cycle as an ally to sustainably produce water to irrigate crops on floating farms, thereby providing solutions to water scarcity and accessibility to fresh food. Credit: © Manhat

Section 3: Work Package progress

WP1: Innovations in partnerships, policies, and platforms for the effective, inclusive, and climate-resilient transformation of agrifood systems

Delayed



Work Package 1 progress against the theory of change

F2R-CWANA delegates engaged with a diverse array of partners and stakeholders to highlight the challenges facing dryland systems in the region and the solutions being advanced by CGIAR and partners through participation in prominent international forums such as the [15th Salon International de l'Agriculture au Maroc](#), the UNFCCC [MENA Climate Week](#) and [COP28](#), and the [6th Cairo Water Week](#), among others. Noteworthy publications addressed critical issues, including the formulation of [100 priority questions](#) for sustainable food systems development in sub-Saharan Africa, [developments in Central Asia](#), the impact of the [COVID-19 pandemic on food insecurity](#) in Africa, and the [future of agrifood systems](#) in CWANA.

National Alliance of Stakeholder meetings focused on the wheat seed sector in [Morocco](#) and [Lebanon](#) and on [evidence-based agrifood policy](#) in [Egypt](#). Methodological guidelines for using a [kaleidoscope model for policy analysis](#) were developed to analyze policy and institutional constraints and key drivers of agrifood policy change in CWANA, since making an impact on policy requires a comprehensive understanding of a given country’s underlying policy processes.

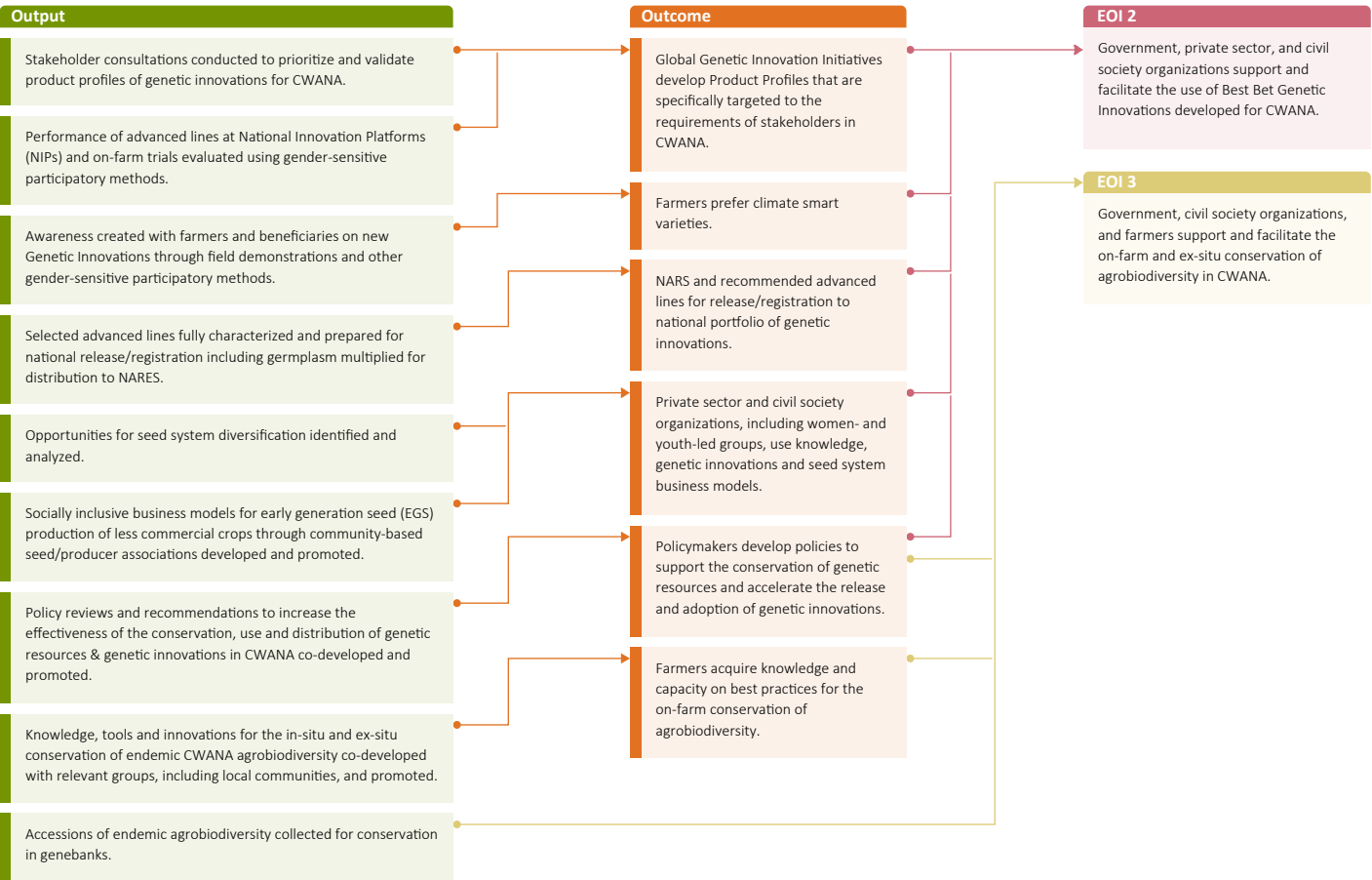
Methodological guidelines to [evaluate and characterize existing research stations](#) and what is needed to turn them into Innovation Platforms were developed and successfully applied to [Terbol](#) by an [Master of Science \(MSc\) student](#).

Structural challenges and transformational drivers of agrifood systems transformation in CWANA were addressed in publications examining the adoption and impacts of [agricultural technologies and practices in fragile and conflict-affected settings](#), [cereal market \(dis\) integration](#) in Sudan, and [factors enabling resilience](#) in farm technical efficiency in Kazakhstan and Uzbekistan. Forty-six individuals received [training](#) in applied econometric data analysis in Uzbekistan.

A policy brief on the priorities for research on gender equality, climate change, and agriculture in the MENA region was published (in [English](#), [French](#), and [Arabic](#)). The Senior Gender Scientist was [invited to speak on the policy](#) at events and through media appearances. Gender-transformative and-accommodative approaches in F2R-CWANA mainly focus on women’s [collectives](#) in [Morocco](#) and [Uzbekistan](#).

WP2: Genetic innovations, seed systems, and agrobiodiversity conservation for climate-resilient food and nutrition security

Delayed



Work Package 2 progress against the theory of change

In 2023, the on-station evaluation of more than 355 elite lines and the demonstration of newly released varieties of eight crops continued across the region. The crops include [barley](#), [bread wheat](#), [chickpea](#), [durum wheat](#), [faba bean](#), and [lentil](#) in Morocco; [barley](#), [bread wheat](#), [chickpea](#), [faba bean](#), and [lentil](#) in Sudan; [barley](#), [bread wheat](#), [chickpea](#), [durum wheat](#), [faba bean](#), and [lentil](#) in Lebanon; and [barley](#), [bread winter wheat](#), [chickpea](#), [lentil](#) (new), [potato](#), and [sweet potato](#) in Uzbekistan. Gender-sensitive participatory evaluations engaged 241 farmers and agrifood processors in [Egypt](#), [Lebanon](#), [Morocco](#), [Sudan](#), and [Uzbekistan](#). Training on [potato](#) post-harvest storage methods and sensitization to the new crop, [sweet potato](#), engaged farmers in Uzbekistan.

A [rapid assessment of the potato seed system in Uzbekistan](#) was conducted to better understand the connections between relevant stakeholders and how to improve potato production quantity and quality. Additionally, research on the wheat seed system in Egypt and the Common Market for Eastern and Southern Africa regional seed trade harmonization policy progressed and will be published in 2024.

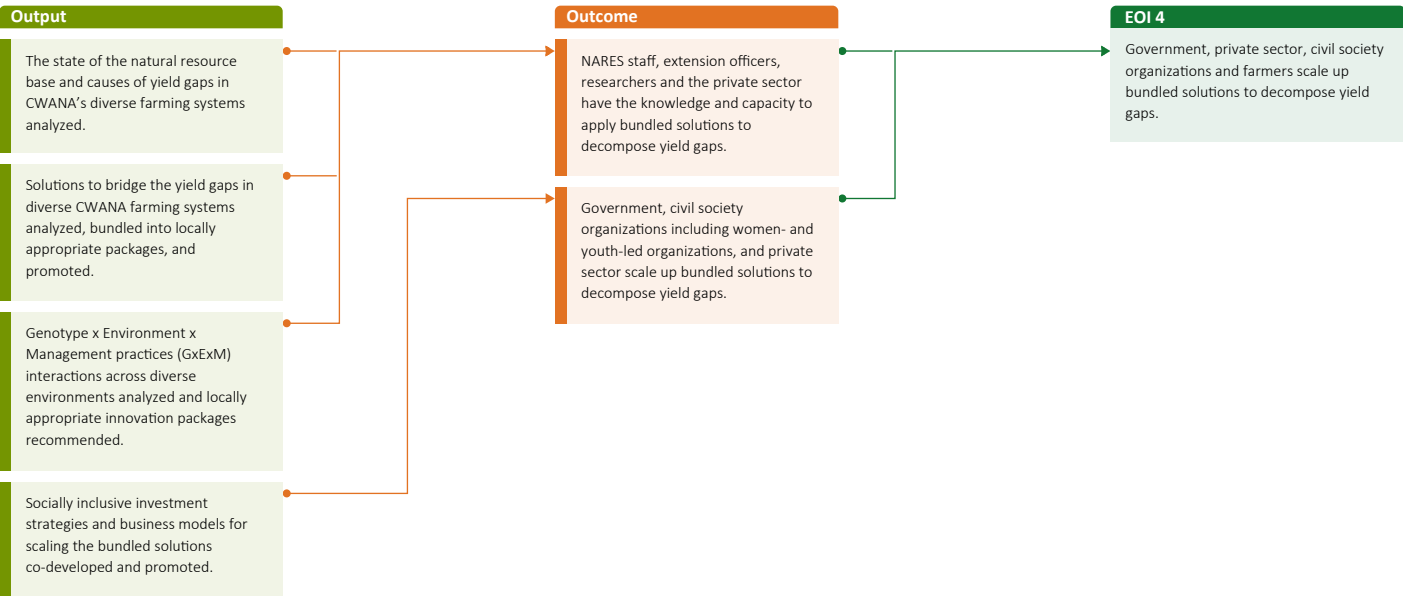
The [Potato Tracker Georgia](#) app was successfully handed over to the Georgian Farmers Association.

Ecogeographic surveys, farming system surveys, and gap analysis were conducted in Lebanon, Morocco, and Uzbekistan to identify areas for community-based management and conservation of indigenous and locally significant agrobiodiversity. This includes cereal and legume landraces and crop wild relatives; fruit and nut trees such as almonds, apples, cherries, pears, pistachios, and walnuts; rangeland forages; and medicinal plants. A [workshop](#) was held with members of the Ait Ichou commune to present the survey results and discuss conservation options. [Training sessions](#) on agrobiodiversity conservation tools were conducted in Morocco for two Uzbekistan NARES representatives.

Under the leadership of the Livestock and Climate Initiative, F2R-CWANA contributed to a [sustainable rangeland management toolkit](#), [workshops](#) on governance for silvopastoral restoration, a [training course](#) on indigenous silvopastoral species’ seed collection, and conservation and nursery management, among others.

WP3: Sustainable intensification of farming systems for climate-resilient reduction of yield gaps

Delayed



Work Package 3 progress against the theory of change

In all five countries—Egypt, Lebanon, Morocco, Sudan, and Uzbekistan—the development and testing of locally tailored bundles of agronomic solutions to close yield gaps in wheat-based systems continued, including analyzing interactions between [genotype](#), [environment](#), and [management \(GxExM\)](#). Findings from the [rainfed Morocco GxExM trial](#) that the [supplemental irrigation](#) of wheat during drought increased wheat productivity by 2–3 tonnes per hectare were published alongside [process-based modeling of the GxExM interactions](#).

Ongoing experimental field trials in Morocco and Egypt explore optimizing nitrogen fertilization, diversifying wheat-based systems through crop rotations (sorghum, soyabean), and intercropping (citrus, maize, soyabean), estimating irrigation requirements and employing minimum tillage and raised-bed planting techniques.

A [knowledge exchange](#) day with wheat farmers and extension officers in Rabat-Sale-Kenitra, Morocco, highlighted technological gaps for sustainable intensification of wheat production. In Egypt, an on-farm water, energy, food, and carbon footprint [nexus index](#) was [developed](#) to assess the impact of nexus interventions on farm-level transformation. Two [field days](#) introduced farmers to new multi-seed planter models and integrated agronomic bundles. [Agronomy Community of Practices](#) were established in [Egypt](#), [Sudan](#), and [Uzbekistan](#) to facilitate knowledge exchange and training on topics

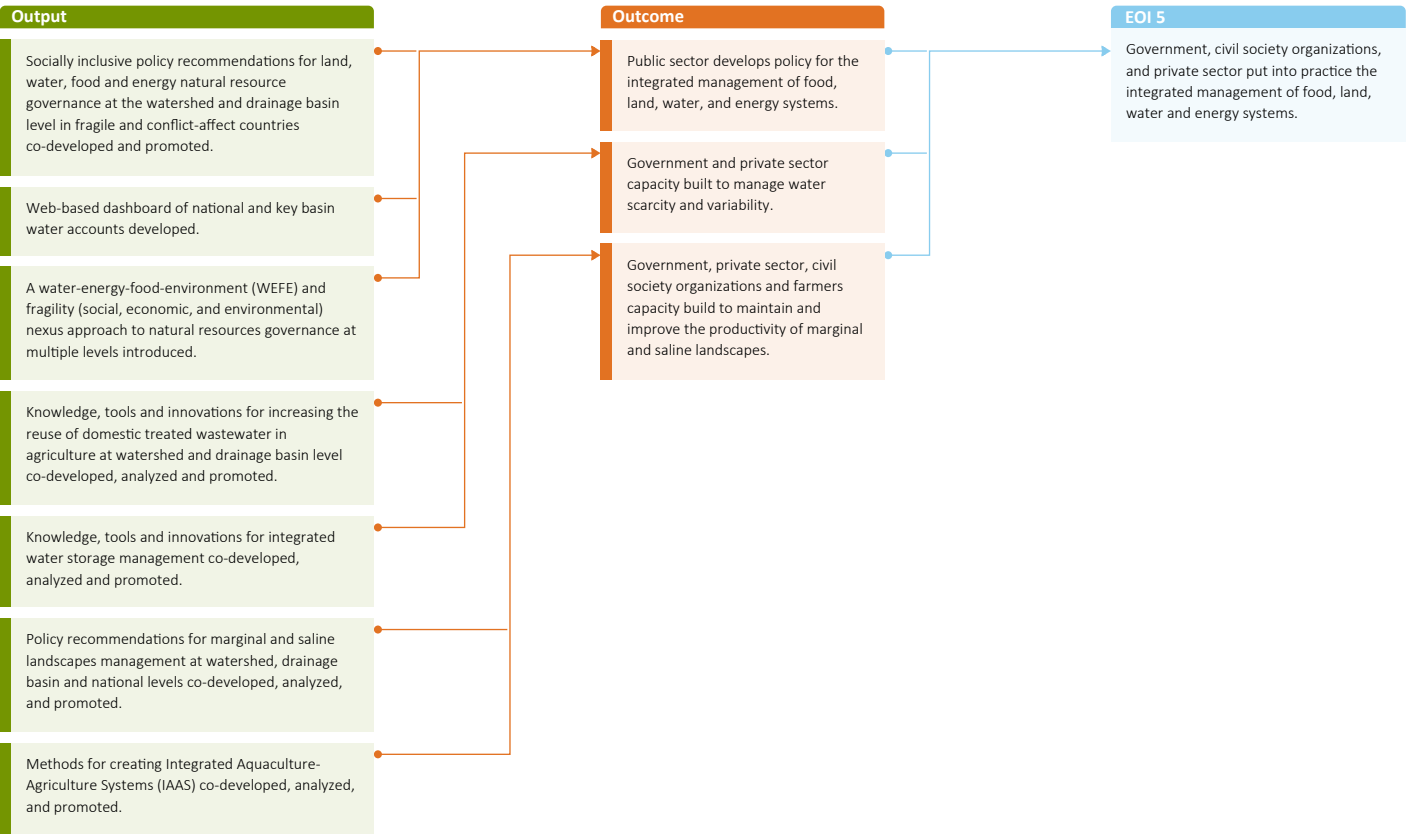
like the agricultural field trial [design and statistical analysis](#). Scientists supported the [6th African Young Water Professional Forum](#) training event during Cairo Water Week, further contributing to capacity development.

Papers and guidelines were published on [saline water irrigation and phosphorus fertilization](#) of wheat, pathways to [wheat self-sufficiency](#) in Africa, [sustainable intensification of wheat production](#) in Egypt, growing [quinoa](#) in saline conditions, [intensification options](#) in cereal-legume systems in Morocco, tips to [manage the weed seed bank](#) in conservation agriculture-based farming systems, the [effects of tillage systems](#) on soil properties, and [climate-smart agriculture’s](#) role in reducing greenhouse gas emissions in North Africa.

F2R-CWANA’s collaboration with Excellence in Agronomy made significant progress in the [Morocco Conservation Agriculture](#) and Egypt use cases. Efforts include the development of a [digital advisory tool](#) for Egyptian wheat farmers, [mechanization training](#) for the [no-till seeder](#) adapted to Moroccan crops and soil types, and a [workshop](#) for its scaling in support of the Moroccan government’s Generation Green strategy and its goal to convert one million hectares to direct seeding. Through CGIAR, [17,000 farmers have been supported to manage 85,000 ha of land](#) using conservation agriculture. The [12th Advanced Course on Conservation Agriculture for Asia and Africa](#) was held in India.

WP4: Integrated food, land, water, and energy systems for climate-resilient landscapes

On track



Work Package 4 progress against the theory of change

The [release](#) of the online [Water Accounting Dashboard](#) for the Souss Massa basin, Morocco, facilitates the informed, sustainable planning and management of scarce freshwater resources in this drought-prone region, and will be [replicated in other transboundary basins](#) across Africa at the request of the relevant authorities and funded by interested donors.

Stakeholder consultations on the water-energy-food-nexus and building resilience in fragile and conflict-affected agrifood systems were held during the [10th International Micro Irrigation Conference](#), the [6th Arab Water Week](#), a dedicated [regional dialogue](#) event, and [UNFCCC COP28](#), culminating in the publication of a [policy brief](#). F2R-CWANA supported NEXUS Gains with the second [international summer school](#) in Uzbekistan, aimed at strengthening participants’ capacities to adopt a WEFE nexus approach.

In Lebanon, F2R-CWANA is contributing to the development of [water reuse standards](#), with [endorsement](#) from the Lebanese Standards Institutions (LIBNOR) and Ministry of Energy and Water. Several papers and policy reports were published, addressing topics such as spatially explicit [wastewater generation and tracking](#), the challenges of [transitioning from freshwater to treated wastewater irrigation](#) in the northern Jordan Valley, water reuse in the Middle East and North

Africa ([in Arabic](#)), and [expanding water reuse](#) in the Middle East and North Africa.

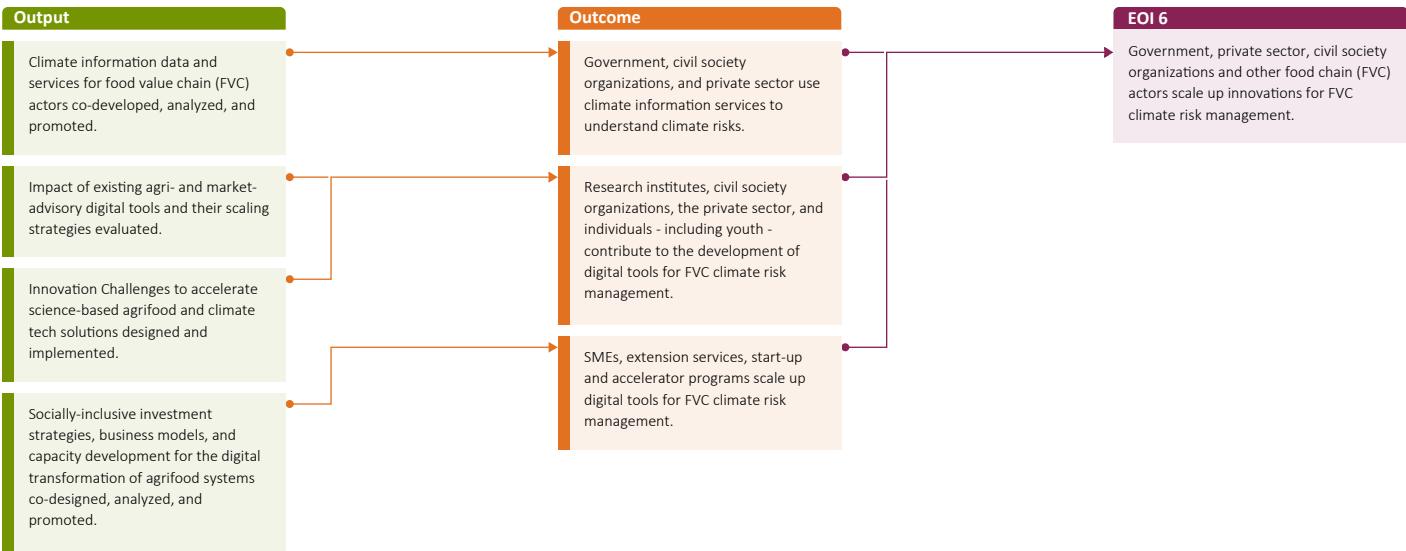
Though the area of integrated water storage management has been paused, the governor of Kashkadarya Region in Uzbekistan [endorsed](#) implementing water harvesting and storage methods because decreasing rainfall is negatively impacting the environment and people’s livelihoods.

Work toward producing a soil salinity roadmap and action plan for Egypt continued, including a South-South [expert consultation and brainstorming workshop](#) held in India. A [new soil-leaching technique](#), which was trialed in newly reclaimed agricultural land in the Sinai Peninsula, Egypt, to improve water drainage and salt removal from the soil via leaching, resulted in an 84 percent decrease in soil salinity and a 96 percent decrease in internal drain water salinity.

Work on [IAA systems](#) that produce aquatic and terrestrial foods on the same land, using the resources from one to benefit the other, continued in Egypt with the publication of an [assessment and analytical report](#) and a [manual](#). An [expert consultation workshop](#) was held in Morocco to discuss the potential for IAA in local agrifood systems.

WP5: Scaling innovations and digital tools for climate-resilient food value chains

On track



Work Package 5 progress against the theory of change

Partners continue to be [trained](#) in how to use the online [climate data extractor](#) for CWANA to access satellite-based weather data. [Feedback from users](#) in Uzbekistan and Tajikistan highlight the tool’s effectiveness in helping agricultural water users understand and address climate change–related challenges.

In 2023, Uzbekistan hosted the [AgriFoodTech and ClimateTech innovation challenge](#), branded as the [Agritech4Uzbekistan](#) Innovation Challenge. The challenge consisted of various stages including the [kick-off](#), [bootcamp](#) and pitch day, and the [12-week acceleration program](#) concluding in the demo day in 2024. The challenge received 179 eligible applications from teams across 78 countries, with 22 teams selected to participate in the bootcamp. The 45 participants are 31 men and 14 women, with an average age of 32 years, and are split equally between Uzbek and international citizenship.

Building on the success of the Agritech4Uzbekistan Innovation Challenge, CGIAR was invited by the Food and Agriculture Organization of the United Nations (FAO) to contribute to the [Hack4DigitalVillages](#) Innovation Challenge. This effort supported 60 youth in developing digital innovations for rural communities in the Fergana Valley, Uzbekistan.

[Participants](#) of the Agritech4Morocco Innovation Challenge held in 2022 continued to receive [post-program support](#) in 2023 to help accelerate their growth. Remarkable achievements were made by two teams in 2023. Sand to Green, based in France and Morocco, [secured significant funding](#) from investors, [signed an agreement](#) with the President of the UNCCD COP15 to collaborate on desertification innovations, and [planted](#) 300 trees and 7,000 intercropped plants in Morocco to combat desertification and improve community resilience. Manhat, based in the UAE, participated in and won [other](#) incubator and accelerator programs, was [granted special accreditation](#) to attend the UN 2023 Water Conference, and was recognized by the UAE Government as making a promising contribution to the UAE’s future economic sectors by being named in their [Future 100](#) list for 2023.

Several papers, reports, and policy briefs were published on topics such as [farmers’ participation in social media groups](#) in Kazakhstan and Uzbekistan, using farmers’ social media groups for better extension and advisory services ([English](#), [Russian](#)), [digital tools for the transformation of agricultural markets](#) in Africa, the [current context of digital agriculture](#) in Egypt, [institutional policy constraints](#), necessary [investment and policy](#) frameworks, [social equity issues](#) to consider, and [e-extension](#) to scaling digital agriculture.

WORK PACKAGE	PROGRESS RATING & RATIONALE
1	<div><div></div><div>Progress rating</div></div> <p>The progress of Work Package 1 in 2023 is largely in line with the PORB and TOC, with the exception of the work being conducted in Wad Medani, Sudan. The affected areas of work are national alliance of stakeholder meetings and the characterization of the Wad Medani research station.</p>
2	<div><div></div><div>Progress rating</div></div> <p>The progress of Work Package 2 in 2023 is largely in line with the PORB and TOC, with the exception of the work being conducted in Wad Medani, Sudan. The affected areas of work are the on-station field trials of elite lines and newly released varieties of barley, bread wheat, faba bean, chickpea, and lentil, and the stakeholder consultations related to the regional seed trade policy.</p>
3	<div><div></div><div>Progress rating</div></div> <p>The progress of Work Package 3 in 2023 is largely in line with the PORB and TOC, with the exception of the work being conducted in Wad Medani, Sudan. The affected areas of work are the genotype by environment by management trials, and the Sudanese Agronomy Community of Practice. Although CIMMYT has hired a new scientist position, which commenced in July 2023, the individual is currently based outside the region while the hosting agreement in Egypt is being finalized.</p>
4	<div><div></div><div>Progress rating</div></div> <p>The progress of Work Package 4 in 2023 is in line with the PORB and TOC.</p>
5	<div><div></div><div>Progress rating</div></div> <p>The progress of Work Package 5 in 2023 is in line with the PORB and TOC.</p>

Definitions

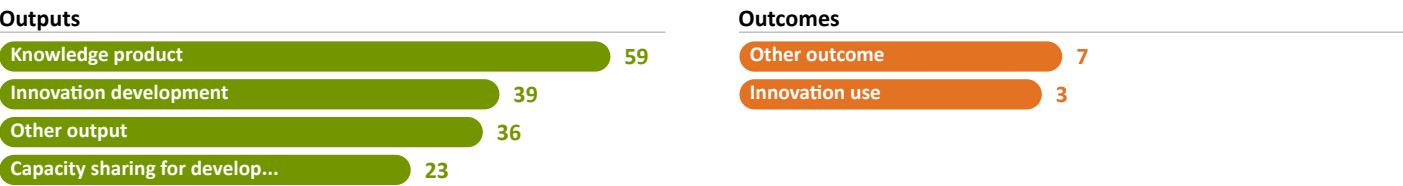
<div><div></div><div>On track</div></div> <div><div>✓</div><div>Annual progress largely aligns with Plan of Results and Budget and Work Package theory of change.</div></div> <div><div>✓</div><div>Can include small deviations/issues/delays/risks that do not jeopardize success of Work Package.</div></div>	<div><div></div><div>Delayed</div></div> <div><div>⚠</div><div>Annual progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas.</div></div> <div><div>⚠</div><div>Deviations/issues/delays/risks could jeopardize success of Work Package if not managed appropriately.</div></div>	<div><div></div><div>Off track</div></div> <div><div>✖</div><div>Annual progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas.</div></div> <div><div>✖</div><div>Deviations/issues/delays/risks do jeopardize success of Work Package.</div></div>
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Section 4: Key results

This section provides an overview of results reported by the CGIAR Research Initiative on Fragility to Resilience in Central and West Asia and North Africa in 2023. These results align with the CGIAR Results Framework and Fragility to Resilience in Central and West Asia and North Africa’s theory of change. Source: *Data extracted from the [CGIAR Results Dashboard](#) on 29 March 2024.*

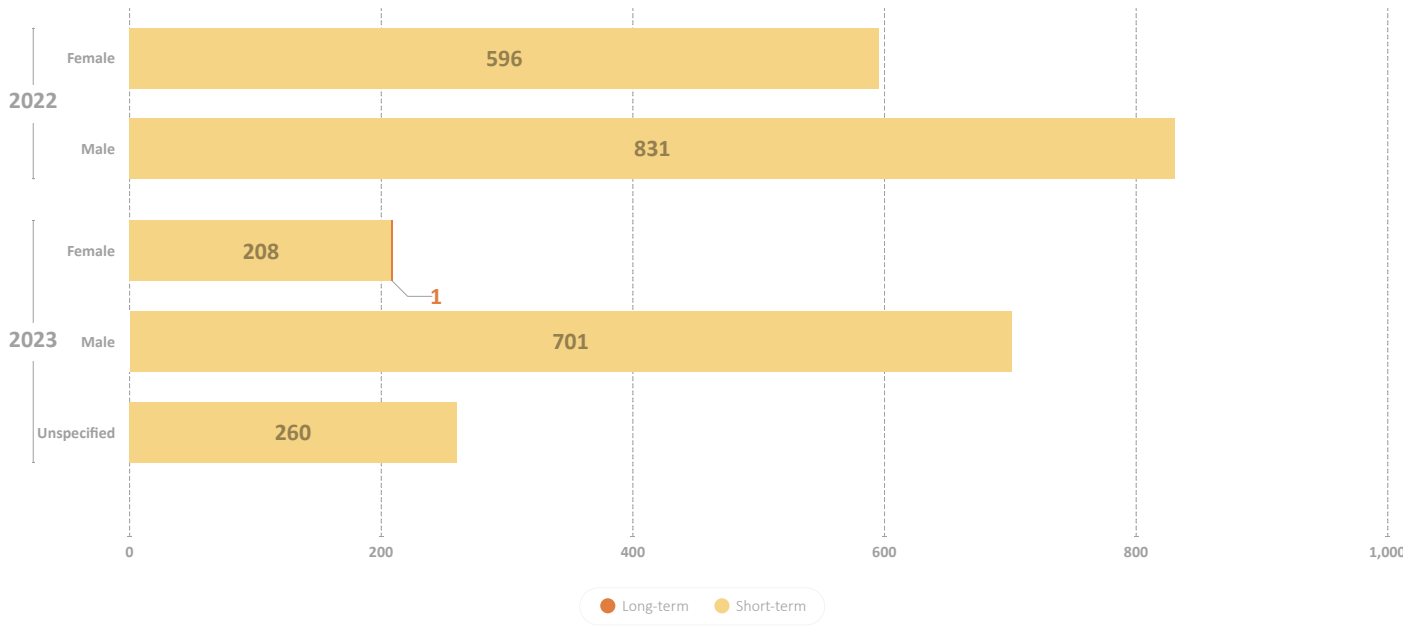
OVERVIEW OF REPORTED RESULTS

F2R-CWANA reported 167 results in 2023, including 59 knowledge products, 39 innovation development outputs, 36 other outputs mainly related to stakeholder engagement, 23 capacity development outputs, seven other outcomes mainly related to teams’ successes achieved after participating in an Agritech Innovation Challenge, and three innovation use outcomes. Diagram sourced from the [CGIAR Results Dashboard](#) on 11 March, 2024.



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

In 2023, F2R-CWANA provided short-term training to 1,169 people, including at least 701 men and 208 women, and long-term training to one MSc student. Diagram sourced from the [CGIAR Results Dashboard](#) on 11 March, 2024.



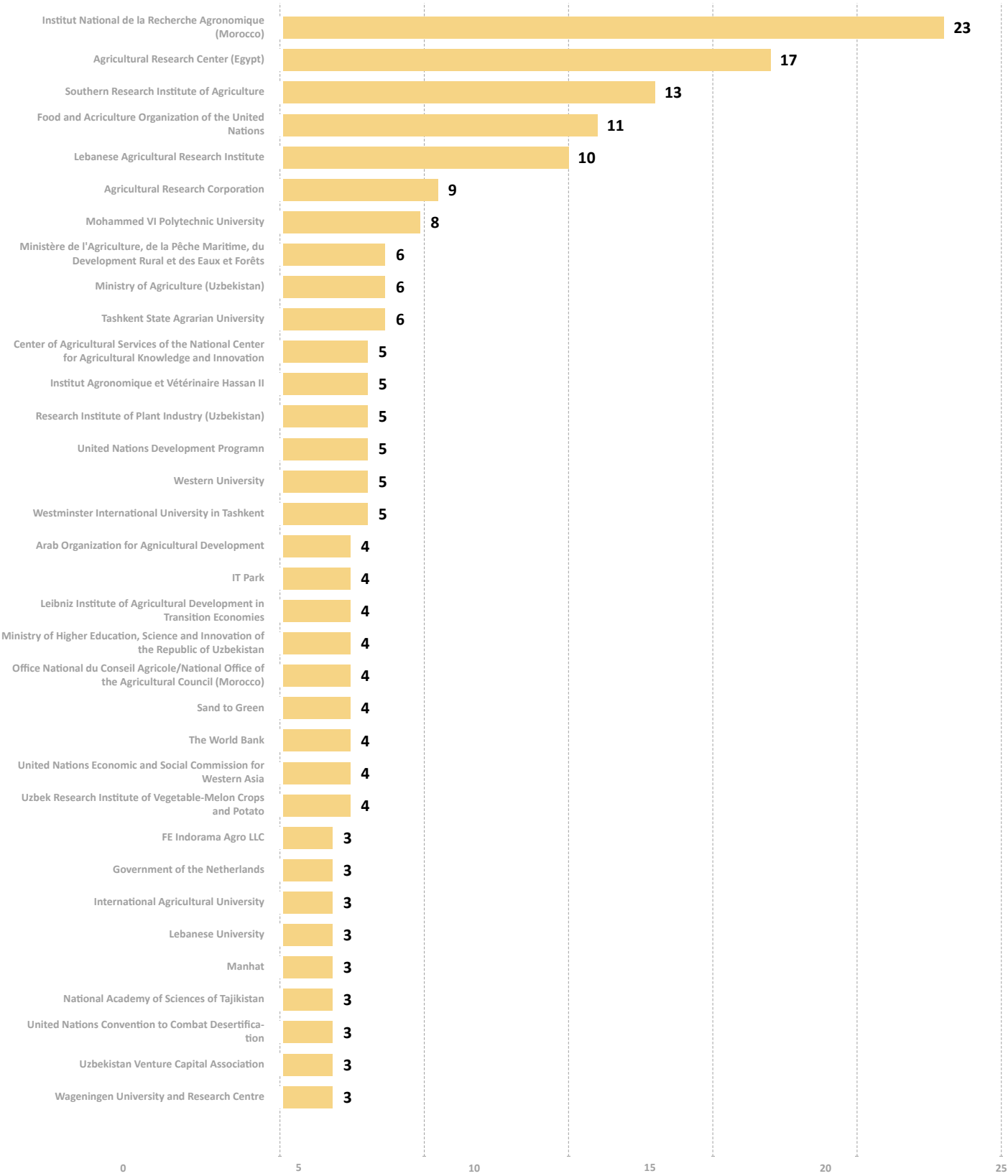
NUMBER OF INNOVATIONS BY READINESS LEVEL

F2R-CWANA has profiled 39 innovations ranging from genetic innovations being evaluated in field trials at an Innovation Readiness Level (IRL) 4 to proven innovations such as the Agritech Innovation Challenges, the climate data extractor, and IAA systems at an IRL of 9. Diagram sourced from the [CGIAR Results Dashboard](#) on 11 March, 2024.



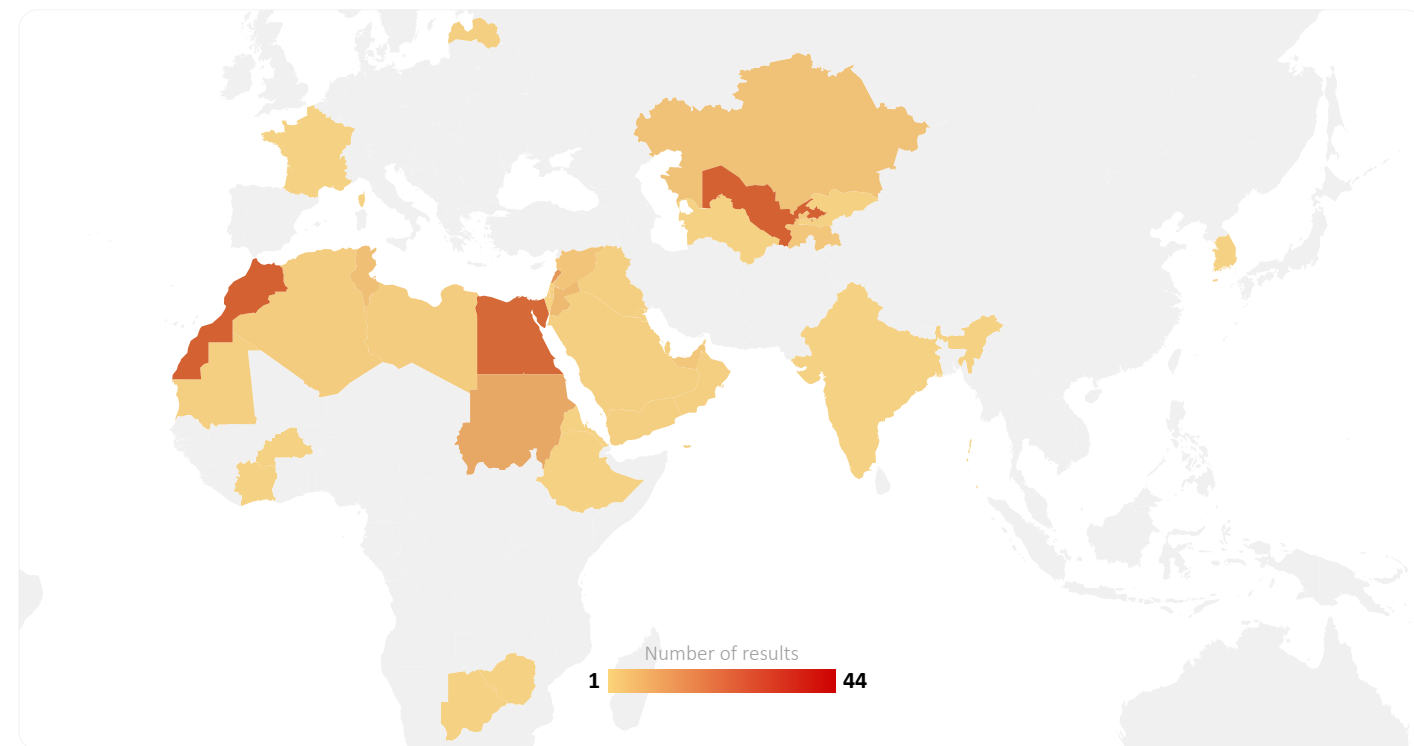
EXTERNAL PARTNERS COLLABORATING TO 2023 RESULTS

In 2023, F2R-CWANA collaborated with 246 non-CGIAR partners, primarily the national and regional NARES, government ministries and agencies, universities, and private companies. This chart displays partners collaborating on three or more results. Diagram sourced from the dashboard on 11 March, 2024.



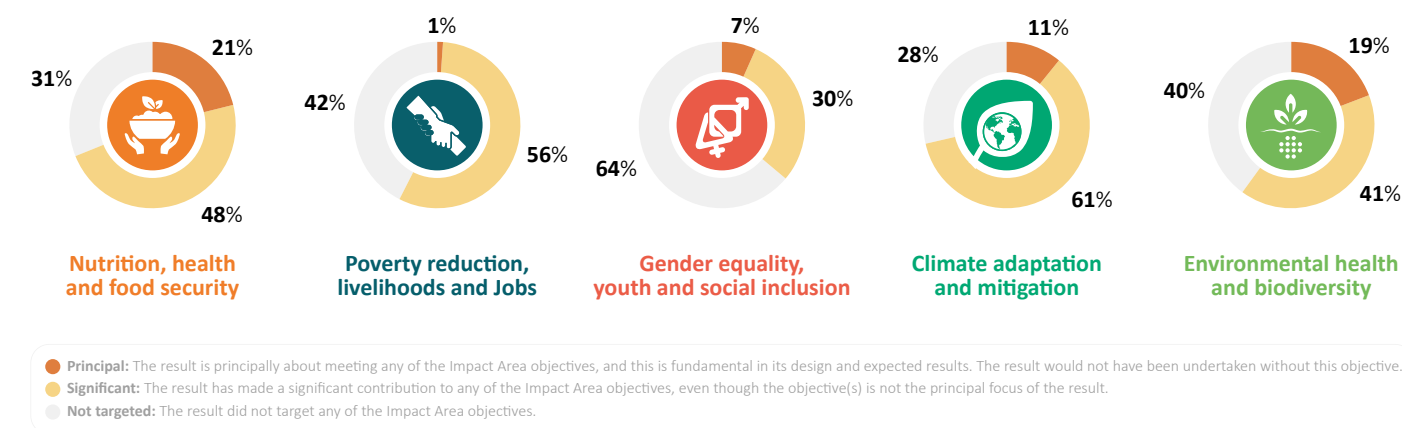
GEOGRAPHIC DISTRIBUTION OF 2023 REPORTED RESULTS

The map illustrates the distribution of results reported by geographic location. In 2023, F2R-CWANA primarily operated in Morocco (44 results), Uzbekistan (44), Egypt (41), Lebanon (23), and Sudan (17), with spillover effects in 30 other countries, including Jordan (10), Tunisia (8), Kazakhstan (7), Syria (6), United Arab Emirates (5), and Tajikistan (5). Diagram sourced from the dashboard on 14 March, 2024.



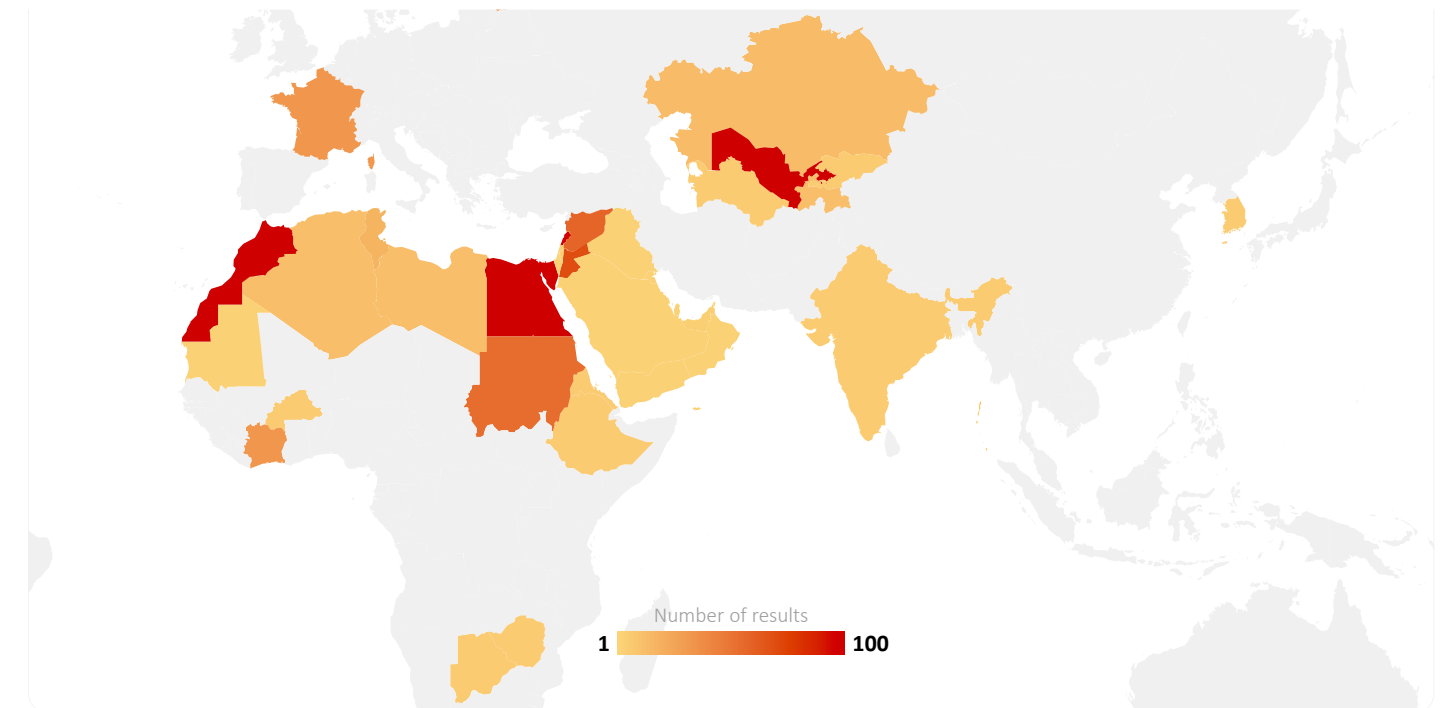
PERCENTAGE OF REPORTED RESULTS TAGGED TO CGIAR IMPACT AREAS

As a regional integrated Initiative, F2R-CWANA aims to achieve impact across all five CGIAR Impact Areas. Tagging of the 2023 results to Impact Areas indicates that nutrition (through food security), environment/biodiversity, and climate change were the main targets of the Initiative, with gender equality and poverty reduction being less explicitly targeted. Diagram sourced from the [CGIAR Results Dashboard](#) on 11 March, 2024.



Section 5: Partnerships

EXTERNAL PARTNERS CONTRIBUTING TO RESULTS, PER COUNTRY



The map illustrates the number of partners in each country that collaborated with F2R-CWANA on results in 2023. F2R-CWANA worked with a total of 246 partners across Morocco (100 partners), Uzbekistan (89), Egypt (80), Lebanon (67), Jordan (48), Syria (40), Sudan (37), and 28 other countries. Diagram sourced from the [CGIAR Results Dashboard](#) on 11 March, 2024.

Partnerships and Fragility to Resilience in Central and West Asia and North Africa's impact pathways

F2R-CWANA's core partners continue to be the agriculture-, water-, and environment-related NARES, ministries, and agencies in the countries, such as the Institut National de la Recherche Agronomique and the Ministry of Agriculture, Fisheries, Rural Development, Water and Forests in Morocco; the Agricultural Research Center in Egypt; the Southern Research Institute of Agriculture and the Ministry of Agriculture in Uzbekistan; the Lebanese Agricultural Research Institute in Lebanon; the Ministry of Equipment and Water in Morocco; the Ministry of Water Resources and Irrigation of Egypt; and Ministry of Water and Energy in Lebanon; and the Agricultural Research Corporation in Sudan. F2R-CWANA works with these partners across all Work Packages on fundamental research and across all the impact pathway types of capacity development, innovation development and use, and policy and strategy development. As a regional integrated Initiative, partnering with NARES and their respective ministries and associated agencies ensures that our efforts align with national priorities and strategies, engage directly with policy- and decision-makers, and have a clear pathway for scaling to beneficiaries to achieve long-lasting development outcomes and impacts.

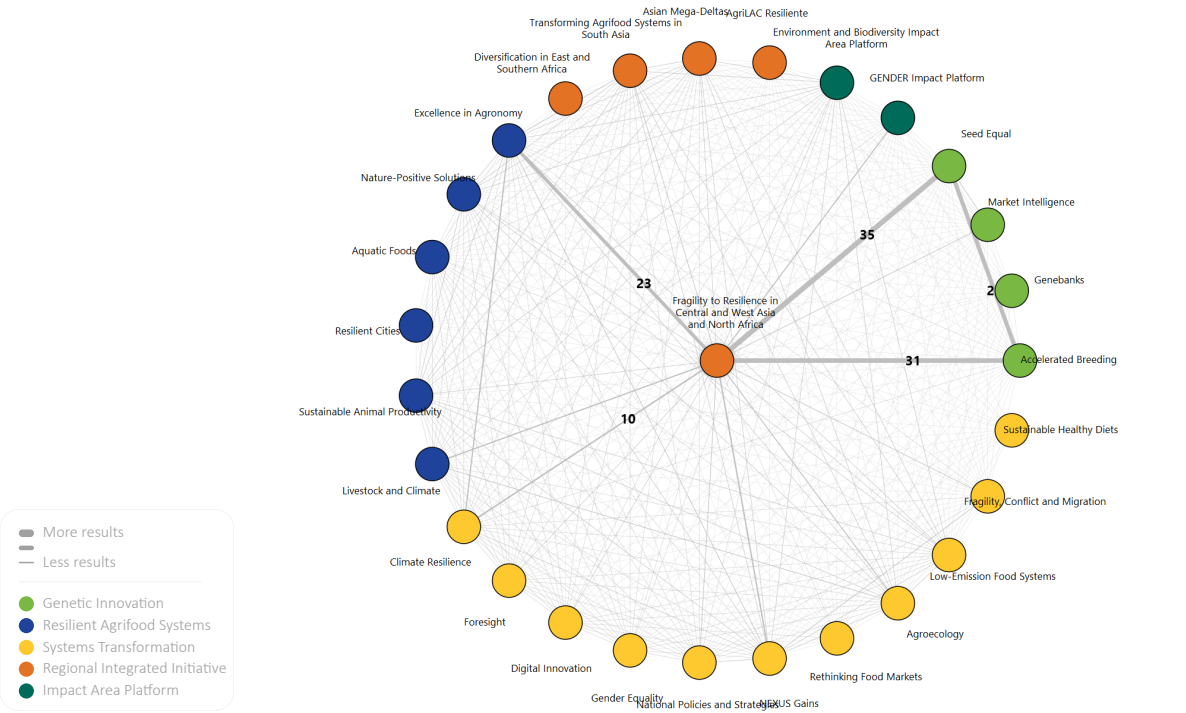
Universities are significant partners, collaborating on fundamental research of local, national, and international importance and the publication of papers, innovation development and testing, and building the capacity of students—the next generation who will continue to confront these issues facing agrifood systems at all levels of society. The universities collaborating with F2R-CWANA on the most results in 2023 were Mohammed VI Polytechnic University and Institut Agronomique et Vétérinaire Hassan II in Morocco; Tashkent State Agrarian University, Westminster International University in

Tashkent, and International Agricultural University in Uzbekistan; Western University in Canada (collaborating on gender research); and Lebanese University, and American University of Beirut in Lebanon.

F2R-CWANA collaborates with key international organizations including FAO, the United Nations Development Program, the Arab Organization for Agricultural Development, the World Bank, UN-ESCWA, AOAD, the Netherlands Embassies in various countries, and UNCCD, among others. Alongside CGIAR, these partners play an immensely significant role in facilitating multilateral cooperation to achieve the transformation of agrifood systems and the Sustainable Development Goals.

Through the Agritech Innovation Challenges held in Morocco (2022) and Uzbekistan (2023), F2R-CWANA connects with many innovation teams and their private companies, NGOs, international organizations, and national and international innovation incubators and accelerators. Facilitating the interactions around national agrifood system priorities, CGIAR research and innovation expertise, and national and international innovation teams, incubators, and accelerators will almost certainly lead to innovative, self-sustaining, scalable solutions to critical issues. To prove this claim, this year we report for the first time on the achievements of two innovation teams that participated in the Agritech4Morocco Innovation Challenge. Sand to Green's core innovation uses agroforestry to fight against desertification and transform degraded land into arable land. Manhat's core innovation uses natural water distillation to sustainably produce water and irrigate crops on floating farms.

FRAGILITY TO RESILIENCE IN CENTRAL AND WEST ASIA AND NORTH AFRICA’S INTERNAL PORTFOLIO NETWORK



Connections are sized by the number of reported results. Collaborations where only one result was reported with a linkage between two Initiatives are excluded.

Diagram sourced from the [CGIAR Results Dashboard](#) on 11 March, 2024.

Portfolio linkages and Fragility to Resilience in Central and West Asia and North Africa’s impact pathways

F2R-CWANA collaborated extensively within the CGIAR portfolio in 2023. Key linkages included the Seed Equal and Accelerated Breeding Initiatives, within the Genetic Innovation Science Group; the Excellence in Agronomy Initiative, within the Resilient Agrifood Systems Science Group; and the Climate Resilience and NEXUS Gains Initiatives, within the Systems Transformation Science Group.

As a regional integrated Initiative that functions as a microcosm of the whole CGIAR system within the CWANA region, F2R-CWANA collaborated extensively with other Initiatives and Platforms in the CGIAR portfolio. Under the Genetic Innovations Science Group, we collaborated with the CGIAR Research Initiative on Accelerated Breeding on 30 crops (barley, bread wheat, chickpea, durum wheat, faba bean, lentil, potato, sweet potato) by country (Egypt, Lebanon, Morocco, Sudan, Uzbekistan) to create target product profiles with elite lines under evaluation in the research stations. The demonstration plots to create demand for newly released varieties were carried out in collaboration with the Seed Equal Initiative, and the gender-sensitive evaluations for both elite lines and newly released varieties conducted by farmers and agrifood processors were done in collaboration with the Market Intelligence Initiative.

CGIAR is supporting the Moroccan government’s aim to have 1 million hectares of land under conservation agriculture by 2023, as stated in their Generation Green 2020-2030 Strategy, through the F2R-CWANA, Excellence in Agronomy, and Climate Resilience Initiatives, alongside non-pooled funding projects. F2R-CWANA’s role is to develop genotype and agronomy management Innovation Packages, or bundled solutions, by conducting experimental trials at

Merchouch research station/innovation platform and farmer capacity building.

Under the Resilient Agrifood Systems Science Group, F2R-CWANA collaborated with the CGIAR Research Initiative on Livestock and Climate in Tunisia on results related to sustainable management and governance of rangelands and on the conservation and restoration of indigenous silvopastoral species. The F2R-CWANA TOC includes outputs related to agrobiodiversity but not specifically rangelands, forage, or livestock because these areas were considered to be sufficiently covered by the Global Initiatives. However, F2R-CWANA plans on updating its TOC to include these, given their importance in the CWANA region and looks forwards to continued collaboration with Livestock and Climate in Tunisia.

Under the Systems Transformation Science Group, F2R-CWANA collaborated primarily with Climate Resilience in Morocco (as already mentioned), the Agroecology Initiative in Tunisia, and the NEXUS Gains Initiative in Uzbekistan. F2R-CWANA and Agroecology jointly developed the kaleidoscope model for policy analysis with the intention that it will be applied in contexts relevant to both Initiatives in 2024. The collaboration with NEXUS Gains is notable for the clear division of research priorities between the two Initiatives in Uzbekistan. F2R-CWANA works in the Amu Darya basin, which is lift-irrigated, concentrated around the Qarshi research station where the genetic innovation and agronomy field trials are taking place, and on innovation development, capacity building, policy, and scaling for the whole agrifood system. NEXUS Gains works in the Aral Sea and Syr Darya basins, which are areas of natural water flow, on more targeted water-energy-food issues.

RECOMMENDATION	SUPPORTING RATIONALE
Continue the work in Sudan to the extent that it remains safe and feasible to do so.	The conflict in Sudan has presented several security, safety, and administrative hurdles for our Initiative's operations. However, ensuring the resilient food security of the Sudanese people remains our paramount concern. While access to Khartoum and Wad Medani is currently restricted, reports indicate that the banking system in Port Sudan is operational. Research stations in areas unaffected by the conflict are also available for continuing genetic innovation and agronomy trials. We will collaborate with our national staff and partners to assess the feasibility of continuing our work in Sudan under these circumstances.
Elaborate the Initiative TOC, PORB, and People Plan to include work related to pastoral and rangeland systems in Tunisia.	The current TOC for the Initiative does not encompass work on pastoral and rangeland systems, livestock, and crop-livestock integration, as they were deemed to be adequately addressed by global Initiatives such as Livestock and Climate and Sustainable Animal Productivity. While this assessment remains valid, F2R-CWANA, as a systems-level regional integrated Initiative, would like to formally recognize the significance of these elements to rural communities in marginal dryland areas across CWANA. Alongside the Initiative on Livestock and Climate, the Agroecology Initiative also currently operates in Tunisia. Therefore, we believe that incorporating some of these components and the country of Tunisia into our TOC will provide a more accurate representation of their importance to the region and the potential impact of CGIAR work on these areas in Tunisia.
Elaborate the Initiative PORB and People Plan to include work in Jordan.	While CGIAR generally emphasizes prioritization and reducing the spread of activities to achieve greater depth in targeted countries, our Initiative operates with an office and staff located in Jordan. We have discovered that conducting synergistic activities in Jordan and building on strong relationships with ministries, NARES, and other partners, including other Initiatives such as Fragility, Conflict, and Migration and NEXUS Gains, is highly beneficial. Therefore, expanding our list of target countries to include Jordan aligns well with our strategic objectives.
Implement the recommendations from the Evaluability Assessment conducted on regional integrated Initiatives.	During 2023, F2R-CWANA participated in an Evaluability Assessment of the regional integrated Initiatives led by the CGIAR Independent Advisory and Evaluation Service. Once the review and recommendations are published, we intend to reflect on and learn from these, putting as many of the recommendations as possible into practice during the final year of the Initiatives Phase 1 (2022–2024).

Section 8: Key result story

Resilience through informed water management in the Souss-Massa basin

The online Water Accounting Dashboard will help Morocco’s Souss Massa Basin Agency manage scarce freshwater resources across multiple sectors.



Primary Impact Area



Other relevant Impact Areas targeted



Contributing Initiative

Fragility to Resilience in Central and West Asia and North Africa

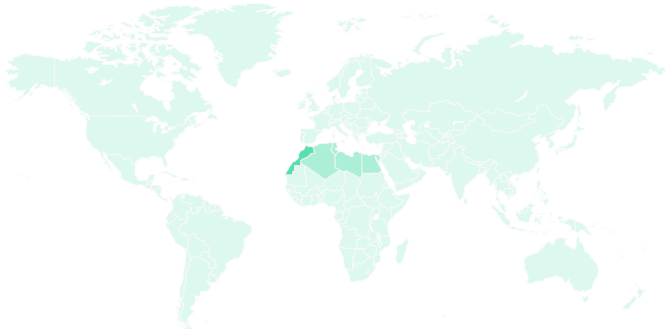
Contributing Center

IWMI

Contributing external partner

Agence de Bassin Hydraulique de Souss Massa (ABHSM)

Geographic scope



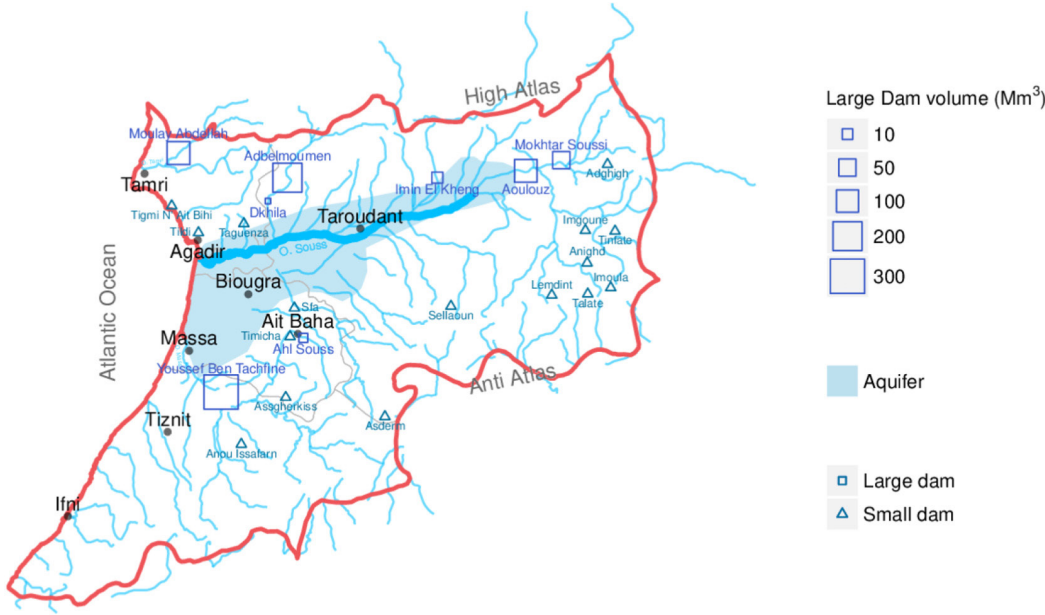
Morocco, North Africa

Morocco’s Souss-Massa basin faces shrinking freshwater resources due to prolonged drought, extreme heat, and unsustainable extraction, threatening the region’s vital agricultural production of cereals, vegetables, fruits, and nuts and the livelihoods of half its workforce. IWMI’s Online Water Accounting Dashboard offers stakeholders a user-friendly visual tool to monitor current water status and trends, empowering informed decision-making for the sustainable and equitable management and cross-sectoral governance of scarce freshwater resources.

Bounded by the High Atlas Mountains in the north, the Siroua Massif in the east, and the Anti-Atlas Mountains in the south, the Souss-Massa basin holds a complex network of rivers, aquifers, and natural and human-made lakes across 27,000 square kilometers. These freshwater resources support a thriving agricultural hub that employs half of the region’s workforce in the production of cereals, vegetables, fruits, and nuts. The region accounts for 6.6 percent of Morocco’s GDP through the water-dependent sectors of agriculture, tourism, and fisheries. Six consecutive years of drought and record-breaking heat waves, however, have placed a huge pressure on water governance systems to manage the rapidly dwindling freshwater surface and groundwater resources equitably and sustainably across competing sectors.

Under Work Package 4 of F2R-CWANA, IWMI collaborated with the Souss-Massa Basin Agency (Agence de Bassin Hydraulique de Souss Massa [ABHSM]) to run the Water Accounting+ process over the Souss-Massa basin using satellite data to quantify the water balance by tracking water inflows from precipitation, rivers, and groundwater recharge, and water outflows for agriculture and other purposes. The innovative online [Water Accounting Dashboard for the Souss-Massa Basin](#) uses the outputs from this Water Accounting+ to provide a comprehensive overview of the basin’s water status, including (1) water availability per capita each month, environmental water stress percentage, the amount of water available for further use, and the basin closure percentage; (2) water balance considering inflows, usage, and outflows; (3) the impact of climate on rainfall, evapotranspiration, outflow, and water availability; and (4) an analysis of long-term hydrological changes. Moreover, using this data with modeling can simulate the potential impact of climate change on these water flows.

“The new water accounting dashboard has a critical advantage,” says Youssef Brouziyne, IWMI MENA Regional Representative. “It breaks down really complex data into straightforward visual information, helping scientists and policymakers effectively communicate the state of the water resources.”



The Online Water Accounting Dashboard covers the freshwater resources of the Souss-Massa basin, Morocco. Credit: Almulla, Y., et al. (2022)

By offering valuable insights into water supply, demand, and productivity, the dashboard aims to bridge the communication divide between research findings and policy- and decision-makers to facilitate the informed, sustainable planning and management of scarce freshwater resources.

Activities have been conducted to build stakeholders’ capacity to run Water Accounting+ processes and use the dashboard, with participation from the watershed agencies of Bouregreg, Souss-Massa, and Tensift; regional offices of agricultural development in Souss-Massa and Haouz; and private companies.

Mrs. Fatiha Fdili, Head of the Water Resource Assessment and Planning Division at ABHSM, emphasizes its value, saying, “This dashboard is an invaluable tool for effective communication. It allows the Souss-Massa Basin Agency to engage with all its partners in a clear and informative way.”

The usefulness of the Online Water Accounting Dashboard has not gone unnoticed elsewhere—work will start in 2024 to replicate the dashboard in the Okavango Basin, Volta Basin, Zambezi Basin, and various basins in Jordan such as Amman Zarqa and Mujeb at the request of the relevant water authorities and the World Bank Group, the Helmsley Charitable Trust, and the United States Agency for International Development.

Maha Al-Zu’bi, IWMI-MENA regional researcher on sustainable and resilient water systems and F2R-CWANA co-lead, highlights the significance of these efforts, saying, “This demand-driven approach is exactly what the region needs to address its water challenges.”

By providing a clear picture of water availability and usage, the dashboard empowers decision-makers to ensure the long-term sustainability of this precious resource.



This dashboard is an invaluable tool for effective communication. It allows the Souss-Massa Basin Agency to engage with all its partners in a clear and informative way.

Mrs. Fatiha Fdili, Head of the Water Resource Assessment and Planning Division at the Souss-Massa Basin Agency (ABHSM)



Front cover photo

An agrifood processor from a women's cooperative in Morocco makes couscous. Women's cooperatives are a key means through which women in rural areas can organize themselves to generate income. The CGIAR Research Initiative on Fragility to Resilience in Central and West Asia and North Africa supports women and women's cooperatives in the Middle East and North Africa to overcome the obstacles they face in farming, value-addition, marketing, and market access, and in holding management and leadership roles.
Credit: Dina Najjar / © ICARDA

Back cover photo

Climate-smart raised-bed planting of crops in Egypt improves input use efficiency, minimizes production costs, and increases crop yields.

Credit: © ICARDA



INITIATIVE ON
Fragility to Resilience in Central
and West Asia and North Africa