CGIAR | INITIATIVE ON Asian Mega-Deltas

CGIAR Research Initiative on **Asian Mega-Deltas**

Annual Technical Report 2023

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Acknowledgements

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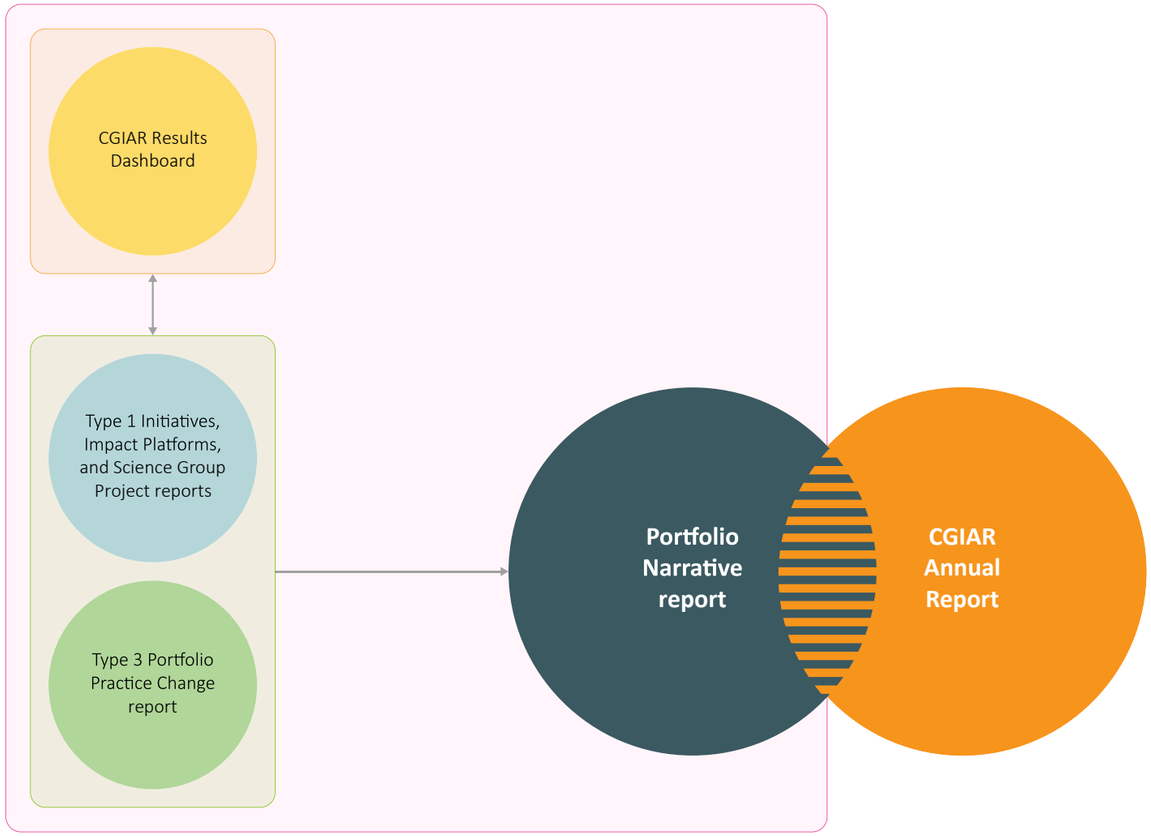
CGIAR Technical Reporting 2023

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	Securing the Food Systems of Asian Mega-Deltas for Climate and Livelihood Resilience
Initiative short name	Asian Mega-Deltas
Initiative Lead	Bjoern Ole Sander (b.sander@irri.org)
Initiative Co-lead	Khondker Murshed-e-Jahan (K.Murshed-e-Jahan@cgiar.org)
Science Group	Resilient Agrifood Systems
Start – end date	01/04/2022 – 31/12/2024
Geographic scope	**Countries** Bangladesh · Cambodia · India · Myanmar · Viet Nam
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 1B: Gender responsive** On top of the minimum requirements for 1A, the Initiative/project includes at least one explicit gender equality outcome, and the Initiative/project team has resident gender expertise or capacity. The Initiative/project includes indicators and monitors participation and differential benefits of diverse men and women.
Website link	https://www.cgiar.org/initiative/asian-mega-deltas/

[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

Launched in 2022, the CGIAR Research Initiative on Asian Mega-Deltas (AMD) has started implementing its activities and forging partnerships in its priority countries of Bangladesh, Cambodia, and Viet Nam. Additionally, activities have been initiated in India and Myanmar.

AMD aims to create resilient, inclusive, and productive deltas by removing systemic barriers to the scaling of transformative technologies and practices at community, national, and regional levels. AMD is empowering not only the research partners but most especially the smallholders and vulnerable sectors whose livelihoods depend on the deltas, by building learning alliances, promoting nutrition-sensitive interventions, developing digital climate advisory and bundled services (DCAS+), designing socially inclusive policies, and supporting evidence-based delta development planning.

In 2023, AMD made significant strides in advancing its activities across its focus countries, producing a total of 365 outputs and outcomes supporting the Initiative's various research areas. The year was marked by a prolific output of more than 70 high-quality knowledge products, ranging from peer-reviewed journals and technical publications to extension materials. AMD's activities extended to 93 capacity-sharing for development activities, stakeholder consultations, and workshops, benefiting nearly 14,000 stakeholders. With a keen focus on innovation adoption, AMD reported 56 innovations under development, including agronomy packages, DCAS+ technologies, and tools and approaches for nutrition-sensitive interventions, inclusive governance, and climate adaptation–oriented planning.

In terms of innovation use, various DCAS+ technologies implemented by AMD were successfully utilized by farmers in Bangladesh, Cambodia, Myanmar, and Viet Nam. Specifically, the interactive voice messaging deployed for harvest warnings was received by more than 10,000 mung bean farmers in Bangladesh, while agroclimatic bulletins (ACBs) reached more than 220,000 farmers in the Mekong River Delta (MRD). Additionally, in Viet Nam, rice farmers adopted the alternate wetting and drying method (AWD), and provincial planners utilized climate-smart maps and adaptation plans for climate change adaptation in rice production.

Stressing the significance of policy outcomes, AMD was instrumental in influencing and shaping policies at the local and national levels in Bangladesh, Cambodia, and Viet Nam. AMD's science contributed to the design and approval of the One Million Hectares Program for high-quality and low-emission rice by the Ministry of Agriculture and Rural Development (MARD) in Viet Nam. AMD's partnership with MARD resulted in policy decisions supporting the institutionalization and scaling of several AMD innovations, such as rice straw-based circular economy, ACBs, and the rice activity monitoring and reporting system (RiceMoRe).

AMD also contributed to the development of Cambodia's 3rd National Strategy for Food Security and Nutrition for 2024–2028 and Viet Nam's National Action Plan on Zero Hunger. As an additional investment outcome, the New Zealand government committed climate finance funding to support AMD's work.

AMD further prioritized gender equality and social inclusion, signifying its commitment to empowering women and youth in the delta regions through gender-responsive practices and capacity-building activities. Moreover, AMD provided a platform to integrate numerous CGIAR Research Initiatives operating in South and Southeast Asia by implementing joint activities with several key stakeholders. AMD also actively contributed to global and national policy events and continued to engage stakeholders through various modalities.

With efforts from seven CGIAR Centers working under the Initiative, the year's achievements were a testament to AMD's unwavering commitment to advancing sustainable and resilient delta development and addressing critical agricultural challenges across the region.

	2022	**2023**	2024
PROPOSAL BUDGET	$8.00M	**$11.00M**	$11.25M
APPROVED BUDGET [1]	$3.99M	**$6.92M [2]**	$6.41M [3]

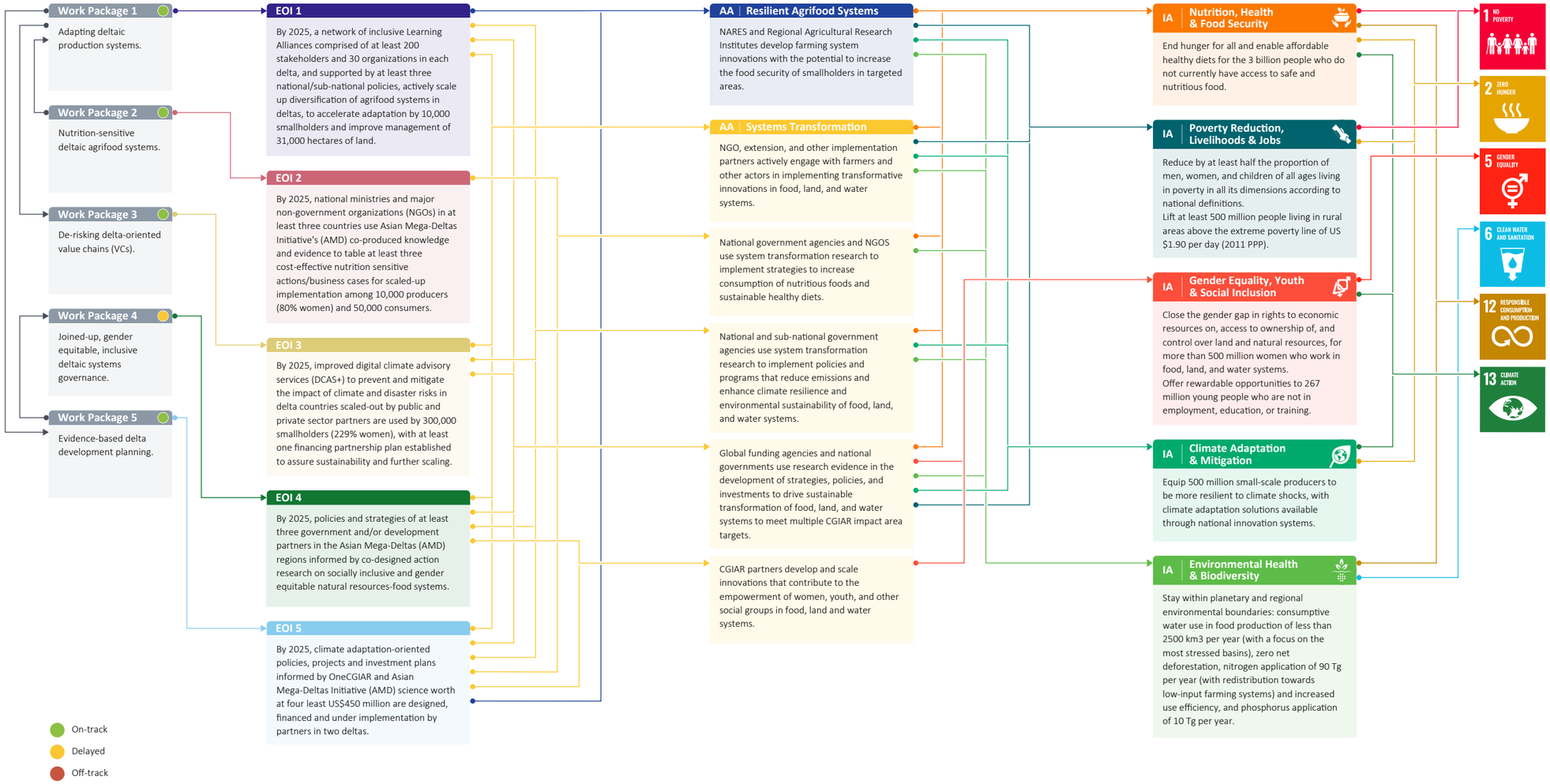
[1] The approved budget amounts correspond to the figures available for public access through the Financing dashboard.
[2] This amount includes carry-over and commitments.
[3] This amount is an estimation of the 2024 annual budget allocation, as of the end of March 2024.

Integrated rice-fish technology.
Credit: WorldFish Bangladesh

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.

Field trials of Generation 3 rohu from the Carp Genetics Improvement Program. Credit: WorldFish Bangladesh

Summary of progress against the theory of change

AMD advanced its mission to support resilient and inclusive deltas by generating 365 outputs and outcomes across Bangladesh, Cambodia, India, Myanmar, and Viet Nam. In 2023, AMD produced high-quality knowledge, organized capacity-building activities, enhanced innovations, and influenced policy and investments, including contributing to 29 results in partnership with other Initiatives. Key areas of focus included diversified production systems, nutrition-sensitive interventions, DCAS+, socially-inclusive policies, and evidence-based delta development planning.

AMD produced more than 70 new knowledge products, which are mostly open access and available online. These include journal articles, research reports, policy briefs, technical guidelines and manuals, and training materials. Among the several articles published in peer-reviewed journals, one was featured as the cover story in Nature Food's October 2023 issue on integrated aquatic and terrestrial food production for nutrition-sensitive food systems.

AMD conducted 93 capacity-sharing-for-development activities, reaching nearly 14,000 stakeholders. In Bangladesh and Cambodia, AMD organized stakeholder consultations and workshops to establish learning alliances on climate-related challenges in rice-based cropping systems. In Bangladesh, AMD conducted agronomy trainings and specialized in-person sessions for local service providers and aquaculture professionals to improve agricultural practices, crop-specific needs, and sustainable fish farming practices. Training programs in West Bengal, India, focused on zero tillage potato with rice straw mulching, and use of the rice crop manager digital app, among other topics. Events and workshops in Viet Nam strengthened capacity and cooperation for nutrition-focused agricultural and food systems by exploring the food balance sheet framework, training local staff, consulting stakeholders, and refining training materials.

In Cambodia, Myanmar, and Viet Nam, AMD organized training workshops, stakeholder consultations, and strategic meetings on developing and disseminating ACBs, digital climate advisory services, and climate-risk management. AMD held workshops on climate-smart mapping and adaptation planning (CS-MAP) for national and local research partners in Bangladesh, and similar workshops to create CS-MAPs occurred in Cambodia. Training sessions in Viet Nam aimed to equip agricultural officers and local trainers with skills in utilizing RiceMoRe, a digitized system for efficient, accurate, and standardized rice production management and reporting.

In 2023, AMD reported 63 innovations, including advancements in Bangladesh to improve farming practices through diversified rice cropping, water governance, climate justice, and farmer field schools. Several AMD innovations for the MRD and Ganges Delta focused on creating digital crop and forecasting maps for salinity-prone areas, establishing inclusive assessment frameworks for salt and water dynamics, conducting hydrological modeling for sustainable water resources and climate resilience, and crafting models and maps to evaluate the impact of climate change on hydrology, crop production, and salinity. AMD supported the development and promotion of monitoring, reporting, and verification (MRV) tools in Viet Nam, including the cost-impact analysis for emission reduction projects, the digital information system for rice product labeling of carbon footprints, an application programming interface for the source-selective and emission-adjusted greenhouse gas (GHG) calculator for cropland, the RiceMoRe website, and a smartphone application for MRV of carbon credits in rice production.

AMD made substantial progress toward its End of Initiative outcomes, particularly in innovation use. In Bangladesh, mung bean farmers received harvest warnings via interactive voice messaging. Cambodian farmers used agroclimatic advisories, while in Viet Nam, 221,061 farmers accessed climate advisories through ACB. Myanmar fisherfolk obtained climate advisories with microfinance information. Viet Nam saw the adoption of the AWD method by rice farmers and the use of CS-MAP by provincial planners for climate adaptation in rice production. MRV innovations received stakeholder endorsement, including a Gold Standard–validated method for reducing methane in rice farming, digital GHG tools for researchers, and the RiceMoRe System in Viet Nam.

AMD also influenced policies at the local and national levels in Bangladesh, Cambodia, and Viet Nam. AMD's science contributed to the design and approval of Viet Nam's policy and strategy for the sustainable development of the One Million Hectares Program. MARD also recognized and adopted guidelines for rice straw management toward circular and low-emission agriculture in MRD.

For DCAS+, AMD's work in Viet Nam shows how working with the government can produce a series of policy outcomes that support various stages of project implementation. MARD has taken comprehensive steps, including recognizing ACB as a technical advancement, approving work plans and budgets, establishing technical working groups, directing provincial departments to implement ACBs, and awarding a certificate of merit for ACB's contributions to agricultural and rural development.

In Cambodia, AMD played a crucial role in shaping the 3rd National Strategy for Food Security and Nutrition for 2024-2028 and the Food System for Sustainable Development 2030 Roadmap, while also providing valuable technical support to the food security and nutrition working group. Viet Nam's Department of Cooperatives and Rural Development (DCRD) established an expert group with AMD scientists to create training materials on nutrition-sensitive agrifood systems interventions in MRD, and recognized AMD's technical support on the National Action Plan on Zero Hunger.

Additional policy and investment outcomes include the commitment of the regional integrated multi-hazard early warning system on data sharing to provide climate information services in Bangladesh; institutionalization of RiceMoRe in Viet Nam; inclusion of AMD-promoted low-emission rice production in Thailand's Nationally Determined Contribution (NDC); and commitment from the New Zealand government to climate finance funding to support resilience and food security across major Asian river deltas.

AMD emphasized gender equality and social inclusion in its efforts, conducting gender and climate resilience workshops in Bangladesh and for youth in in Viet Nam's MRD region. In Bangladesh, AMD provided aquaculture training to promote gender-responsive fish farming. Efforts also included a women-to-women digital extension service, gender-inclusive climate-smart plan validation, agricultural mechanization to aid women and youth in coastal areas, climate justice and gender equality efforts, and a zero tillage potato method.

AMD acts as a platform for the integration of other CGIAR Initiatives operating within the region, and implemented joint activities with eight other Initiatives. AMD organized the inaugural CGIAR Science Day in Viet Nam as a platform for in-depth discussions and presentations on the latest research findings and innovations from the Initiatives working in the country. AMD also co-facilitated the workshop on CGIAR's Innovation Package and Scaling Readiness to equip development practitioners with transformative strategies for scaling agricultural solutions in the region.

In 2023, AMD played an active role in global and national policy events, such as organizing a side event at COP28 on finding collaborative solutions for climate impacts in Asian mega-deltas, contributing a discussion on coping with salinity at the International Rice Congress 2023, exploring how to secure food and agriculture systems for climate and livelihoods resilience at the South Asia Resilience Hub Virtual Event, and engaging in the International Conference on Water and Flood Management 2023 with a session on transition pathways in water management and agriculture. AMD also supported the Viet Nam International Rice Festival 2023, hosting various technical sessions and a field demonstration event.

Demonstration of Rice straw baler. Credit: IRRI Vietnam

AMD used a range of platforms and modalities to engage with stakeholders. AMD held its 2023 Annual Meeting and Pause, Reflect, and Plan workshop in Cambodia, which included key partners and stakeholders. Additionally, AMD conducted country consultation workshops, such as the Cambodia Technical Working Group and CGIAR listening sessions for Viet Nam and Bangladesh. The Delta Talks platform facilitated the joint exchange of research outcomes and ongoing work between AMD and Wageningen University & Research, with an online forum at the Netherlands Food Partnership's NFP Connect. The Quarterly AMD Newsletter provided news, multimedia, and knowledge products to ensure comprehensive and transparent communication with stakeholders.

As of 2023, AMD's team includes 95 members from seven CGIAR Center and has actively engaged around 200 external research partners at international and national levels.

Progress by End of Initiative Outcome

EOIO 1: By 2025, a network of inclusive learning alliances with at least 200 stakeholders and 30 organizations in each delta, and supported by at least three national/sub-national policies, actively scale up diversification of agrifood systems in deltas, to accelerate adaptation by 10,000 smallholders and improve management of 31,000 hectares of land.

A learning alliance network was established to facilitate learning and alignment among stakeholder groups in scaling in all AMD regions, including in Bangladesh, Cambodia, and Viet Nam. MARD acknowledged and implemented guidelines for rice straw management, steering agriculture toward circular and low-emission practices in MRD. Additionally, agronomy packages focusing on rice straw management and mechanized direct-seeded rice (mDSR) will be integrated into Viet Nam's One Million Hectares Program.

EOIO 2: By 2025, national ministries and major NGOs in at least three countries use AMD–co-produced knowledge and evidence for at least three nutrition-sensitive interventions to reduce mortality, DALYs, and micronutrient deficiencies for 10,000 producers (80 percent women) and 50,000 consumers.

AMD played a pivotal role in shaping Cambodia's 3rd National Strategy for Food Security and Nutrition for 2024–2028 and the Food System for Sustainable Development 2030 Roadmap. In Viet Nam, DCRD established an expert panel with AMD scientists to develop training materials for nutrition-sensitive agrifood system interventions in the MRD. DCRD also acknowledged AMD's technical support on the National Action Plan on Zero Hunger.

EOIO 3: By 2025, at least 300,000 smallholders (at least 29 percent of them women) use DCAS+ provided by public- and private-sector partners, with at least one financing partnership plan established to ensure sustainability and further scaling.

ACBs enhanced the accessibility of climate advisories in Viet Nam to reach 221,061 farmers, a significant achievement. MARD recognized ACBs as a technical advancement, leading to the establishment of a regional ACB technical working group, approval of the tasks and budget to implement ACBs in all MRD provinces, and a certificate of merit. Other outcomes under DCAS+ include interactive voice messaging for harvest warnings in Bangladesh (received by more than 10,000 mung bean farmers), commitment to climate information–sharing from the regional integrated multi-hazard early warning system in Bangladesh, use of agroclimatic advisories by Cambodian farmers, and enhanced climate advisories for fisherfolk and rice farmers in Myanmar.

EOIO 4: By 2025, co-designed action research on socially inclusive and gender- equitable natural resources-food systems inform policies and strategies of at least three government and/or development partners in AMD regions.

AMD produced several knowledge products and communicated preliminary results to inform policymaking toward socially inclusive and gender-equitable natural resources–food systems management. Knowledge products and communications materials provided evidence on local water resources and management and social inclusion, and implications for local food systems, including recommendations for improved water management and food system governance.

EOIO 5: By 2025, partners in two deltas design, finance, and implement climate adaptation-oriented policies, projects, and investment plans (worth at least US$450 million) informed by CGIAR and AMD.

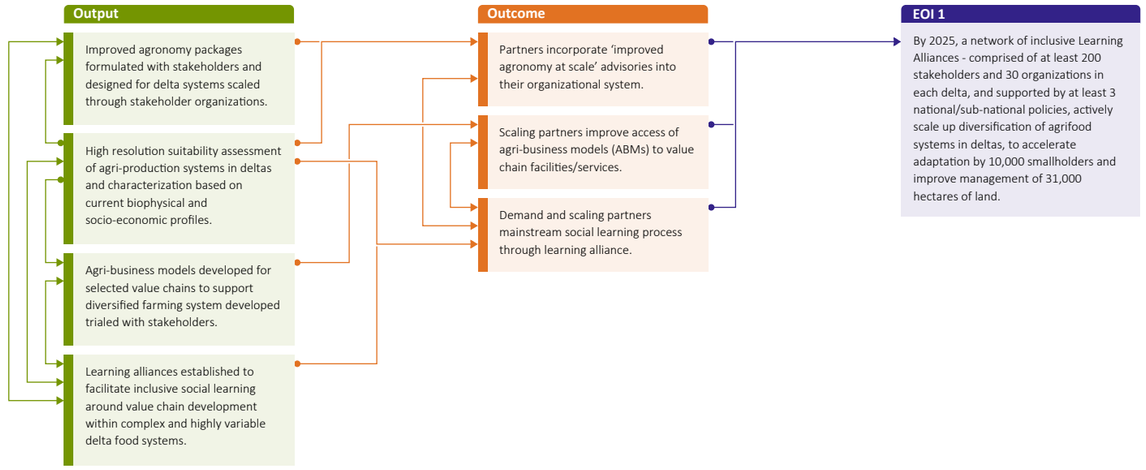
Excellence in Agronomy adopted the CS-MAPs approach for climate adaptation planning, and decision-makers in Viet Nam implemented CS-MAPs at the provincial level to identify climate change adaptation measures in rice production. Rice farmers in Viet Nam adopted the AWD method. AMD's science contributed to the design and approval of Viet Nam's One Million Hectares Program, and AMD established a long-term partnership with MARD to institutionalize RiceMoRe, with plans for scaling. Additional outcomes include the inclusion of AMD-promoted low-emission rice production in Thailand's NDC and New Zealand's increased commitment to climate finance funding, through AMD, to support resilience and food security across major Asian mega-deltas.

In Bangladesh, AMD highlighted the potential of roots and tubers as climate-resilient crops, particularly in the context of potato zero tillage using rice straw mulch. Credit: CIP

Section 3: **Work Package progress**

WP1: Adapting deltaic production systems

On track



Work Package 1 progress against the theory of change

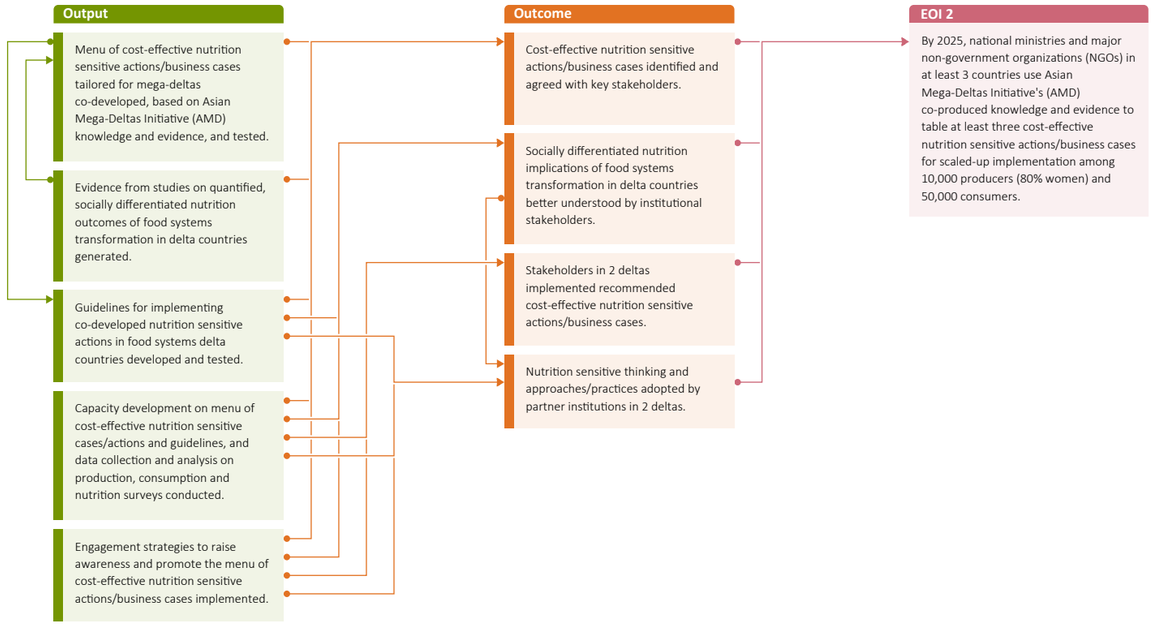
Co-designed climate-resilient agronomic packages were tested in-situ under varying climate conditions across multiple seasons and years in Bangladesh, Cambodia, India, and Viet Nam, (output 1.1.1). In the MRD region of Viet Nam and Cambodia, mDSR, improved rice straw management, and bio-circular economy were co-developed with stakeholders and tested in farmers' fields and demonstration sites (output 1.1.1; output 1.2.1). In 2023, Viet Nam's government prioritized mitigation options with adaptation co-benefits. Work Package (WP) 1 responded by developing and demonstrating agronomic packages for low-emission and high-quality rice production (output 1.1.1). To address both climate and gender impacts, WP1 has tested demonstrations for rice-fish, rice-potato, and rice-sweet potato farming systems in India, Bangladesh, and Viet Nam (output 1.1.1; output 1.2.1). Further demonstrations on a range of diversification options, including more resilient and profitable cropping systems, were tested for suitability in Cambodia and India (output 1.1.1; output 1.2.1). In Bangladesh, field trials of WorldFish's Generation 3 rohu from the Carp Genetics Improvement Program showed a 32 percent performance improvement over traditional varieties in the polder zones.

WP1 established learning hubs covering 127 hectares and 766 farmers, which allowed for demonstration and knowledge exchange on climate-resilient production systems in Bangladesh, including crop diversification options and improved water management at the community level to build farmers' adaptive capacity (output 1.3.1). The learning hubs, which were supported by USAID's Feed the Future Innovation Lab for Collaborative Research on Sustainable Intensification in 2017–2023, were established jointly this year by IRRI, CIP, and WorldFish in the Bangladesh polder zones to promote diverse production systems, covering agronomy and aquaculture. By adjusting the crop calendar TO USE short-duration rice, these learning hubs demonstrated the possibility of cultivating dry season crops such as chili, fodder, maize, mung bean, okra, potato, sweet potato, and sunflower that enhance crop biodiversity in the polders. In Cambodia, an agribusiness acceleration hub was established to facilitate and enable the scaling of climate-resilient agricultural innovations, with a focus on women, youth, and social inclusion (output 1.3.1).

The partnership with the Southern Institute of Water Resources Research in Viet Nam improved knowledge and understanding of the impacts of soil and water salinity. Suitability mapping has provided a range of adaptation options available to farmers in transition zones (output 1.1.1.1).

WP2: Nutrition-sensitive deltaic agrifood systems

On track



Work Package 2 progress against the theory of change

In 2023, WP2 collaborated with partners on designing cost-effective, nutrition-sensitive interventions.

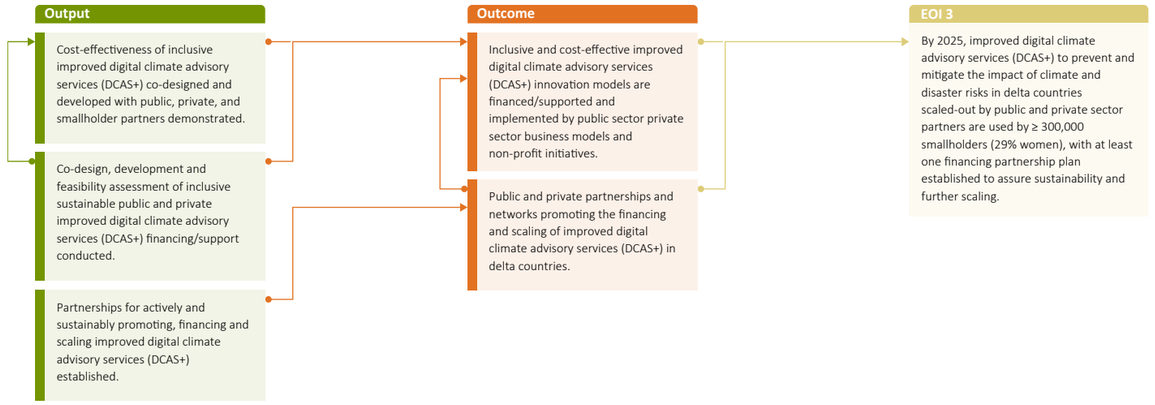
In Bangladesh, WP2 conducted three major surveys with 2,000 households to understand changes in production practices and their implications for consumption and nutrition (output 1.1.1). Leveraging findings from these surveys and previous CGIAR studies (output 1.1), WP2, with partners, successfully secured US$170,000 in funding from a private-sector financial institution to disseminate nutrition-sensitive technologies to 20,000 farmers (output 1.1; output 1.3). As part of this program, the WP2 team developed training materials and guidelines (output 1.2) and trained 30 aquaculture market chain actors and about 800 farmers, 20 percent of whom were women (output 1.3), in 2023. Additionally, the team published four science papers in prestigious journals such as Nature Food, Aquaculture, Frontiers in Aquaculture, and Food Security (output 1.1.1).

In Cambodia, WP2 activities centered on data collection, analysis, and intervention assessments to promote nutrition-sensitive agrifood systems. Surveys of 1,100 households and 500 food vendors, stratified by demographics, offered insights into consumption patterns and livelihoods (output 1.1.1). Analysis of existing datasets revealed consumption trends over time. Stakeholder workshops engaged 91 participants to discuss intervention outcomes and develop guidelines (output 1.3). Furthermore, WP2 partners contributed significantly to the technical working group (output 1.4), aiding government strategy development for food security and nutrition (output 1.2).

In Viet Nam, WP2 collaborated closely with national stakeholders to integrate nutrition-sensitive approaches into the national action plan and strategic documents on food security and nutrition. An evaluation of the food balance sheet and consultation workshops with 23 experts supported Viet Nam's National Action Plan on Food Systems Transformation (output 1.3). Co-designing training materials with the DCRD, involving 22 multisectoral experts, was pivotal (output 1.2). WP2's participation in national platforms and chairing of a side event at a global conference on sustainable food systems underscored its commitment. Collaboration with stakeholders in national platforms, such as the technical working group on nutrition and Scaling Up Nutrition (output 1.4), further supported the integration of nutrition-sensitive approaches in Viet Nam (output 1.2 and output 1.3).

WP3: De-risking delta-oriented value chains

On track



Work Package 3 progress against the theory of change

Building on initial scoping studies that prioritized delta-oriented value chains, WP3 conducted additional value chain climate risk and vulnerability assessments in each country (such as on inland fisheries, livestock, pulses, and rice,), as well as farmer surveys on climate service needs and a digital landscape study of climate service tools to identify DCAS+ opportunities (such as for rice in Bangladesh). Multiple innovation models have been identified, modified, and adapted in each country based on local contexts and initial business opportunities (such as mung bean in Bangladesh) (output 1.1.1). Meanwhile, progress has been made in co-developing, improving, and scaling climate services with public- and private-sector partners (output 1.1 and output 2.1).

In Viet Nam, ACBs have reached 221,061 farmers with seasonal, monthly, and 10-day advisories, and have been adopted by MARD as a climate advisory approach in all 13 MRD provinces (output 1.1; output 1). We also piloted improved 10-day digital advisories as a first step to a digital platform. In Cambodia, the government-supported local technical agroclimatic committee reached another 6,042 farmers from 26 cooperatives with seasonal and monthly climate advisories in Prey Veng and Takeo Province (output 1.1; output 1). In Myanmar, a private sector collaboration targeting 5,000 crops and 5,000 fish farmers with monthly and weekly digital climate advisories generated an average of 76,727 views per advisory among crop farmers and 98,808 views per advisory among fish farmers; survey results on use are expected in 2024 (output 1.1; output 1). In Bangladesh, and in partnership with TAFSSA, advisories were deployed to farmers to protect mung bean from extreme rainfall. Partnering with MWorld, Interactive Voice Response (IVR) advisories were sent by mobile device to 10,552 farmers, with an 86 percent and 62 percent use rate by men and women, respectively (Output 1.1; output 1).

In all countries, meetings and workshops were held to strengthen collaboration with public and private partners and establish policy linkages to enhance scaling and financial sustainability. We developed knowledge products, including policy briefs, manuals, and guidelines, as well as economic valuations on the importance of climate services (output 2.1; output 2).

WP4: Inclusive deltaic food-systems governance

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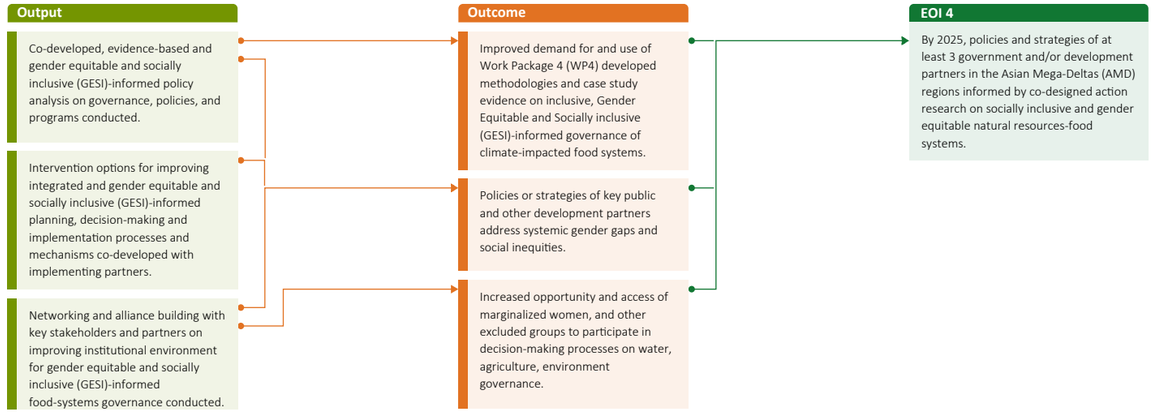


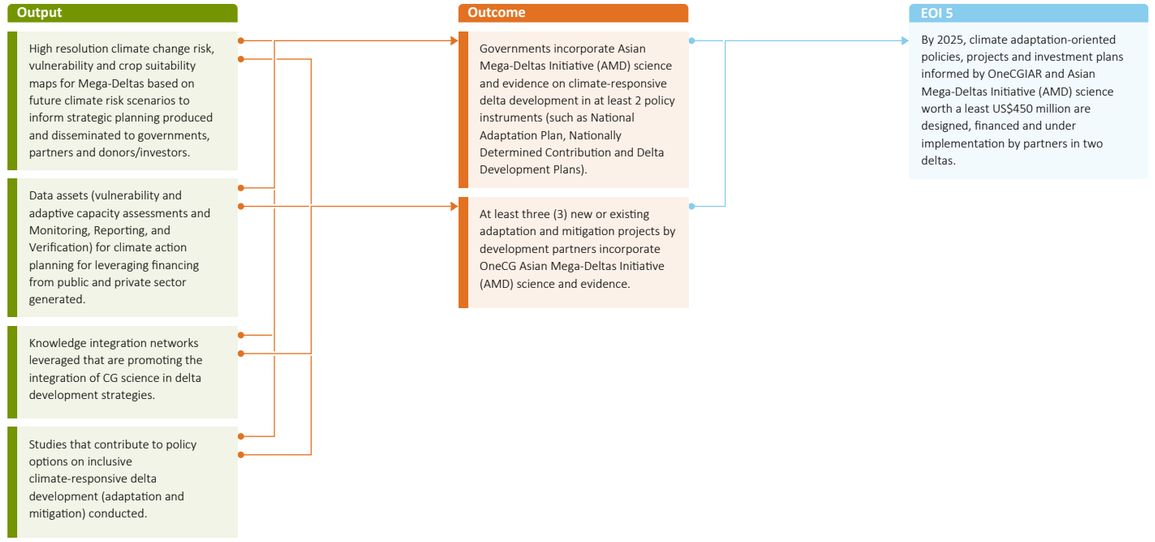
Work Package 4 progress against the theory of change

In Cambodia, WP4 built evidence on the state of local-level water resources management and impacts on food production, emphasizing trade-offs between irrigation infrastructure and inland fisheries that have provided most animal protein for rural Cambodians. Evidence from four field sites across Prey Veng, Takeo, and Kampong Thom provinces informed multistakeholder provincial dialogues followed by a national dialogue, where participants recognized the multifunctionality of water resources and prioritized needs for improving its management. Partnerships with the Inland Fisheries Research and Development Institute and Ministry of Water Resources and Meteorology ensured their role as co-investigators and dialogue conveners. This evidence-based approach resulted in membership in the provincial- and national-level working groups on food and nutrition security—significant entry points for leveraging policy-level action in 2024—and an invitation from the Council for Agricultural and Rural Development to contribute to the 3rd National Strategy for Food Security and Nutrition during 2024—a significant policy outcome opportunity. This progress, including several journal articles and reports, aligns strongly with WP4 outputs (co-developed evidence, intervention options, networks) and outcome 1 (demand for WP4 evidence).

In 2023, 20 knowledge outputs were co-produced with local partners, including three published journal articles, a working paper, a research report, a policy brief, and two innovation briefs. In 2024, knowledge products will inform key intervention options, including a proposed case study with OXFAM and the National Centre for Scientific Research to enhance the agency and capacity of marginalized fishers in water governance in Bangladesh, analysis of agricultural extension and social inclusion in response to a request from Bangladesh Agricultural Research Council (BARC), a decentralized intersectoral technical working group piloting in Cambodia, piloting of a nature-based viability innovation framework in the Sundarbans of India, and the application of data-driven decision-support modeling tools in the Ganges and MRD regions for improved governance.

WP5: Evidence-based delta development planning

On track



Work Package 5 progress against the theory of change

In Viet Nam, the Department of Crop Production (DCP) and the Digital Transformation and Statistics Department signed an memorandum of agreement with IRRI on the institutionalization of the digital rice monitoring and reporting platform (RiceMoRe) (output 5.1.2). Nine provinces across Viet Nam's Mekong Delta and Red River Delta were trained and began using RiceMoRe to track progress toward meeting NDCs (output 5.1.2). Viet Nam acknowledged the importance of CGIAR support during the launch of its program to transform one million hectares toward low-emission and high-quality rice (5.2).

In Cambodia, the MAFF technical working group on climate change requested the inclusion of AMD tools and materials in the Ministry of Agriculture, Forestry and Fisheries (MAFF) repository (output 5.1.2; output 5.2.1). The Department of Agricultural Extension in Bangladesh recognized the CS-MAP approach as an important tool to prepare adaptation plans for risks associated with crop production in the coastal regions (output 5.1.2; output 5.2.1). In Viet Nam, CS-MAP, together with land suitability of rice and other major crops, has been completed for the whole MRD delta (output 5.1.1). Findings from CS-MAP implementation in Bangladesh and Cambodia are being validated at the community level for men and women to evaluate the recommended adaptation responses and the potential effects to their workload.

Areas vulnerable to drought, flooding, heat, and salinity stress were identified and mapped. The economic, human, social, and physical capital of delta districts were analyzed with climate risks to assess vulnerability and adaptive capacity (output 5.1.1) and inform practitioners on the ability of target communities to adapt to a wide range of shocks, identify potential program risks, and determine necessary measures to enhance resilience (output 5.1.2).

AMD is on the steering committee of the Gobeshona Network for climate action (output 5.2.1) and AMD organized exclusive sessions for COP28 together with national and international partners (output 5.2.1). A Delta Talk monthly series of knowledge sharing was launched between AMD and partners from Wageningen University (output 5.2.1).

Work Package progress rating summary

WORK PACKAGE	PROGRESS RATING & RATIONALE
1	**Progress rating** Outputs 1 and 2 are progressing as scheduled, with anticipation for completion, while outputs 3 and 4 are also making substantial advancements. Learning alliances have been established but with the aid of other approaches, significant progress is noted in incorporating improved agronomy advisories and enhanced access to value chain facilities/services by scaling partners.
2	**Progress rating** All outputs related to evidence generation, nutrition-sensitive interventions, manual development, capacity building, and stakeholder engagement in Bangladesh, Cambodia, and Viet Nam are on-track, culminating in outcomes that include secured funding for technology dissemination, contributions to the development of food security strategies, and facilitation of nutrition-sensitive project development and integration into national action plans and strategic documents.
3	**Progress rating** WP3 outputs and outcomes collectively demonstrated successful achievement on targets for feasibility studies and innovations, engagement of public/private sector partners, promotion and scaling, and reaching of smallholder farmers, with plans for further sustainable financing and validation in 2024.
4	**Progress rating** Eighty percent of knowledge outputs were completed, leading to improved demand and use of WP4 outputs, the implementation of intervention options for more inclusive governance, establishment of networks and alliance-building with key partners, and a delay in implementing data-driven decision-support modeling tools, causing a delay in relevant outcomes.
5	**Progress rating** Climate risk, vulnerability, and crop suitability maps, along with vulnerability assessments and adaptive capacity mapping, have been completed, and plans are in place to develop and disseminate climate projections linked to yield projections for rice and at least one non-rice crop, as well as MRV for climate action planning. Additionally, IRRI is supporting the launch of the One Million Hectares Program in the MRD, and AMD was featured at COP28 at the Viet Nam pavilion.

Definitions

On track

- Annual progress largely aligns with Plan of Results and Budget and Work Package theory of change.
- Can include small deviations/issues/delays/risks that do not jeopardize success of Work Package.

Delayed

- Annual progress slightly falls behind Plan of Results and Budget and Work Package theory of change in key areas.
- Deviations/issues/delays/risks could jeopardize success of Work Package if not managed appropriately.

Off track

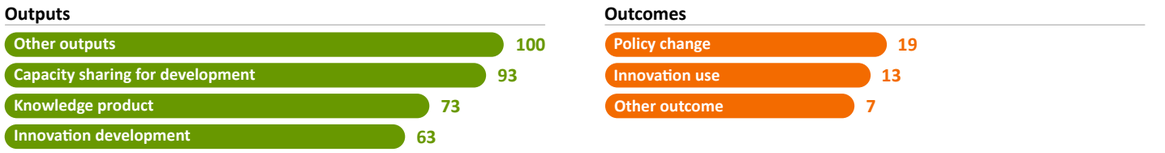
- Annual progress clearly falls behind Plan of Results and Budget and Work Package theory of change in most/all areas.
- Deviations/issues/delays/risks do jeopardize success of Work Package.

Community Fish Refuges.
Credit: WorldFish Cambodia

Section 4: **Key results**

This section provides an overview of results reported by the CGIAR Research Initiative on Asian Mega-Deltas in 2023. These results align with the CGIAR Results Framework and Asian Mega-Deltas' theory of change. Source: *Data extracted from the* CGIAR Results Dashboard *on 29 March 2024*.

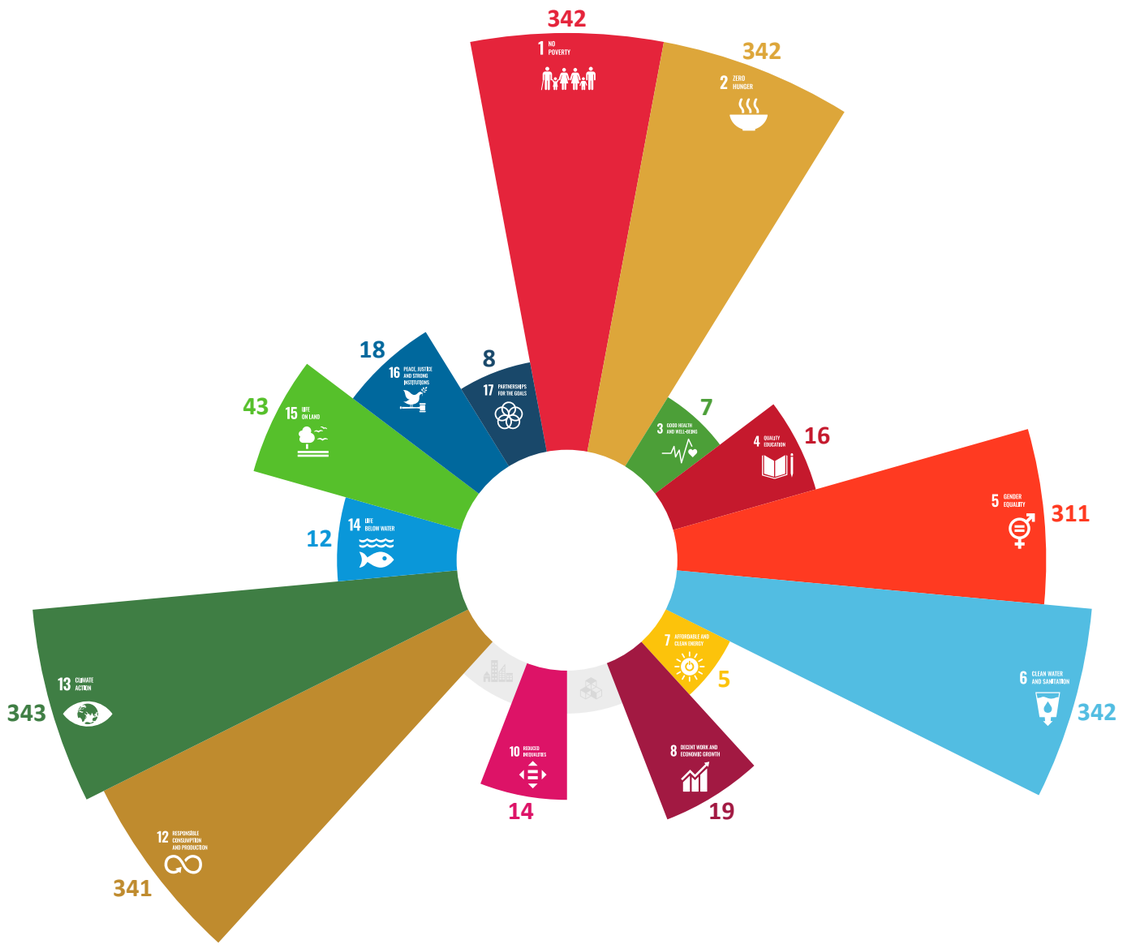
Overview of reported results



Most of AMD's outputs are categorized as capacity-sharing-for-development (93) activities, followed by knowledge products (73) and innovation development (63). Other outputs (100) are mostly engagement activities, such as participation in international conferences, engagement meetings with partners, communication materials not classified as knowledge products (such as videos, blog posts), data sets, and establishment of partnerships.

AMD has effectively accomplished a range of outcomes encompassing 19 policy change outcomes and 13 innovation uses.

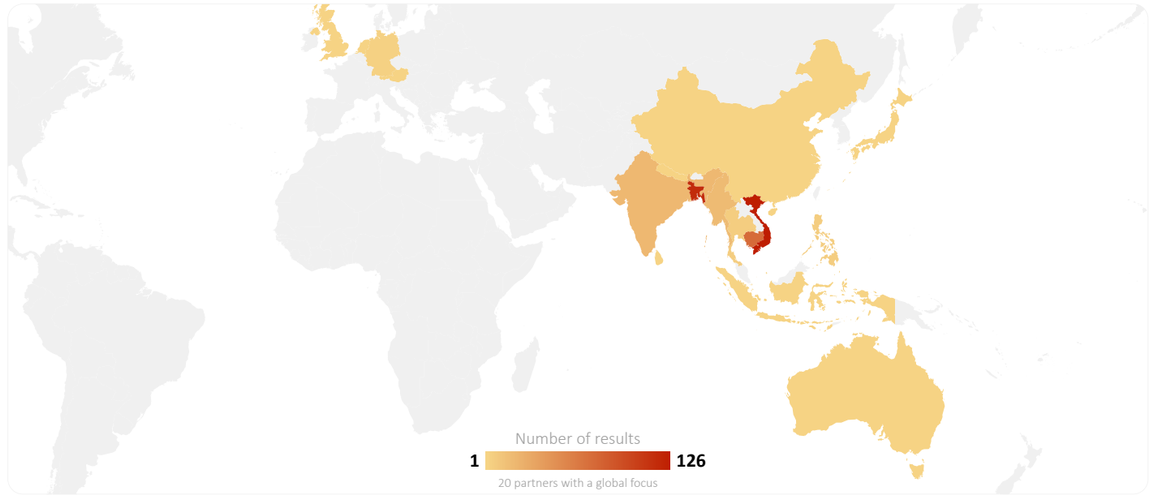
Contributions to the UN Sustainable Development Goals



AMD's outputs mainly contribute to SDG 1 (No Poverty), 2 (Zero Hunger), 5 (Gender Equality), 6 (Clean Water and Sanitation), 12 (Responsible Consumption and Production), and 13 (Climate Action).

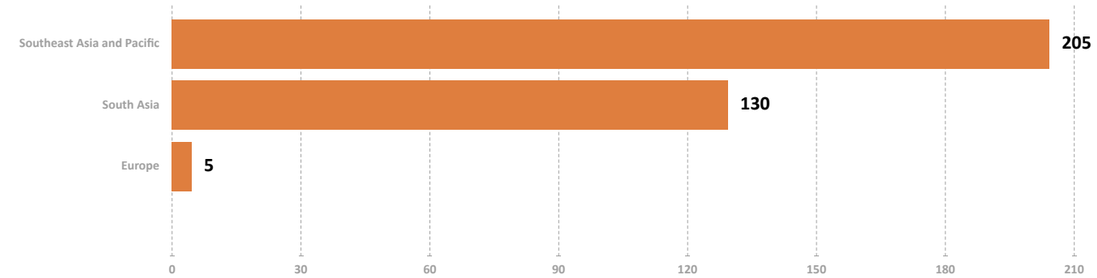
Number of results by country

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.

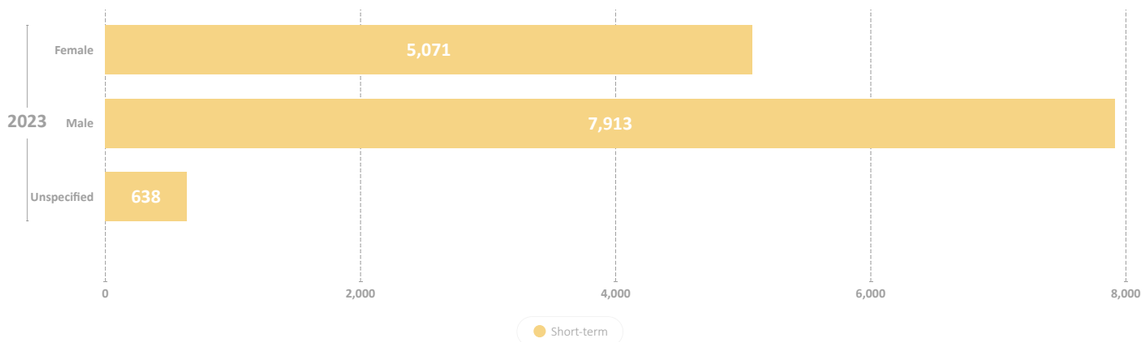


The majority of AMD's results are generated in Southeast Asia (205), particularly in Cambodia, Myanmar, and Viet Nam. A total of 130 outputs and outcomes were produced in South Asia, specifically in the delta regions of Bangladesh and India.

Number of results by region



Number of individuals trained by the Initiative



AMD's capacity-building activities led to the training of nearly 8,000 male stakeholders and 5,000 female stakeholders.

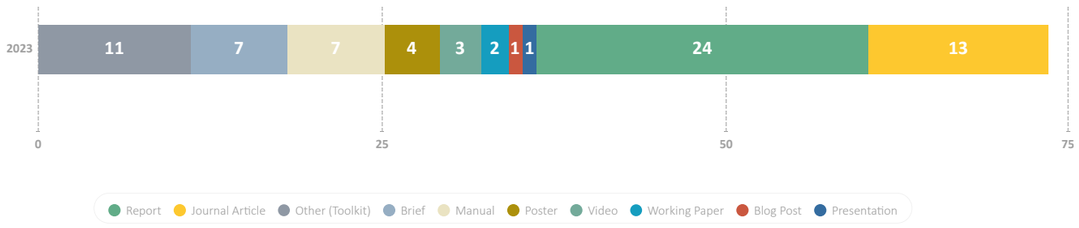
Number of innovations by readiness level

Pipeline overview
# of innovations

9	**Proven Innovation** The innovation is validated for its ability to achieve a specific impact under uncontrolled conditions	7
8	**Uncontrolled Testing** The innovation is being tested for its ability to achieve a specific impact under uncontrolled conditions	11
7	**Prototype** The innovation is validated for its ability to achieve a specific impact under semi-controlled conditions	7
6	**Semi-Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under semi-controlled conditions	11
5	**Model/Early Prototype** The innovation is validated for its ability to achieve a specific impact under fully-controlled conditions	9
4	**Controlled Testing** The innovation is being tested for its ability to achieve a specific impact under fully-controlled conditions	3
3	**Proof of Concept** The innovation's key concepts have been validated for their ability to achieve a specific impact	7
2	**Formulation** The innovation's key concepts are being formulated or designed	5
1	**Basic Research** The innovation's basic principles are being researched for their ability to achieve a specific impact	3
0	**Idea** The innovation is at idea stage	0

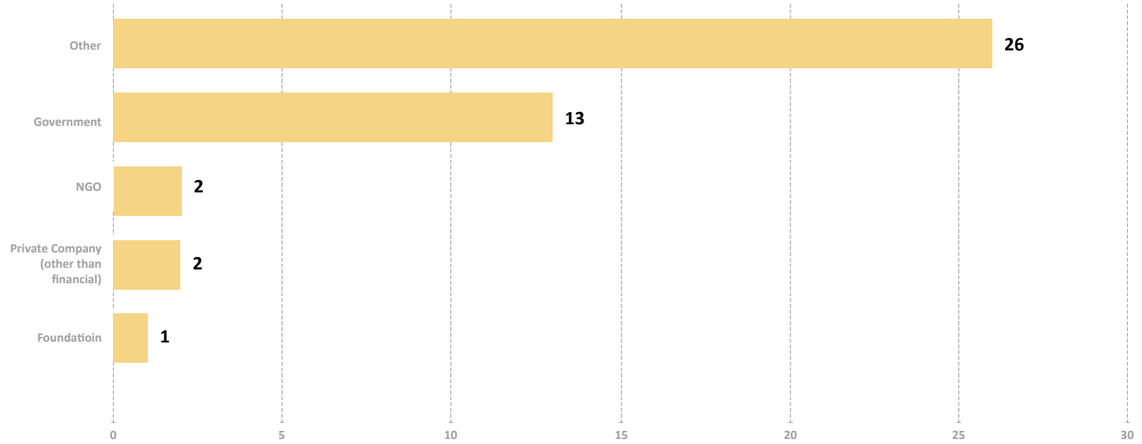
Of the 63 AMD innovations under development, 7 have already reached the proven innovation category, 11 are undergoing uncontrolled testing, and 7 are in the prototype category.

Number of knowledge products by type



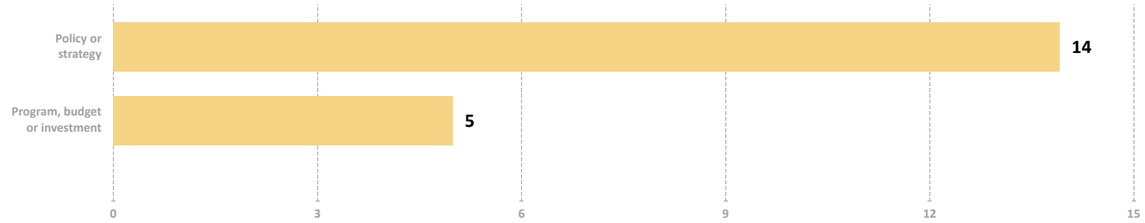
AMD produced a variety of knowledge products, including 24 reports, 13 journal articles, seven briefs, and seven manuals, among other outputs.

Innovation users by institution type



The majority of users of AMD innovations are cooperatives and farmer groups (26), followed by government institutions.

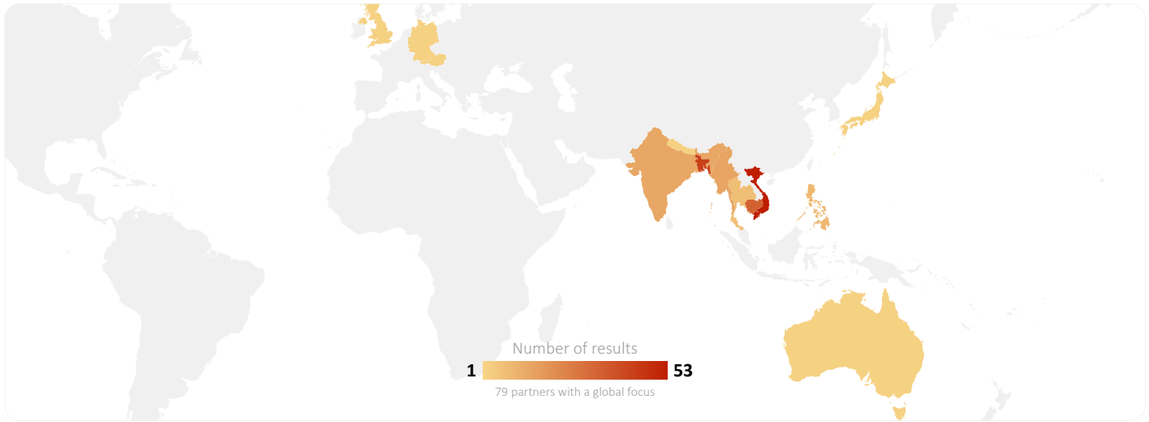
Policies by type



AMD successfully attained policy outcomes in the delta countries, including 14 changes in policies and strategies, as well as 5 in program, budget, and investment.

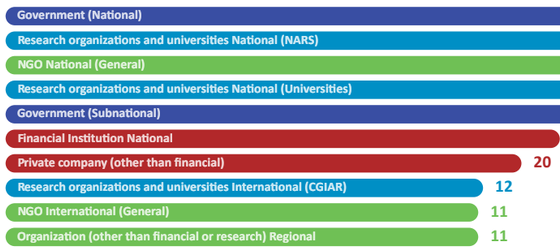
Section 5: **Partnerships**

External partners contributing to results, per country



Colors represent the number of different partners which collaborated on results achieved in a specific country. One result can impact different countries and therefore the same partner can be associated with more than one country. Source: Data extracted from the Results Dashboard on 29 March 2024.

Top 10 partner typologies that contributed to delivering 2023 results



Partnerships and Asian Mega-Deltas' impact pathways

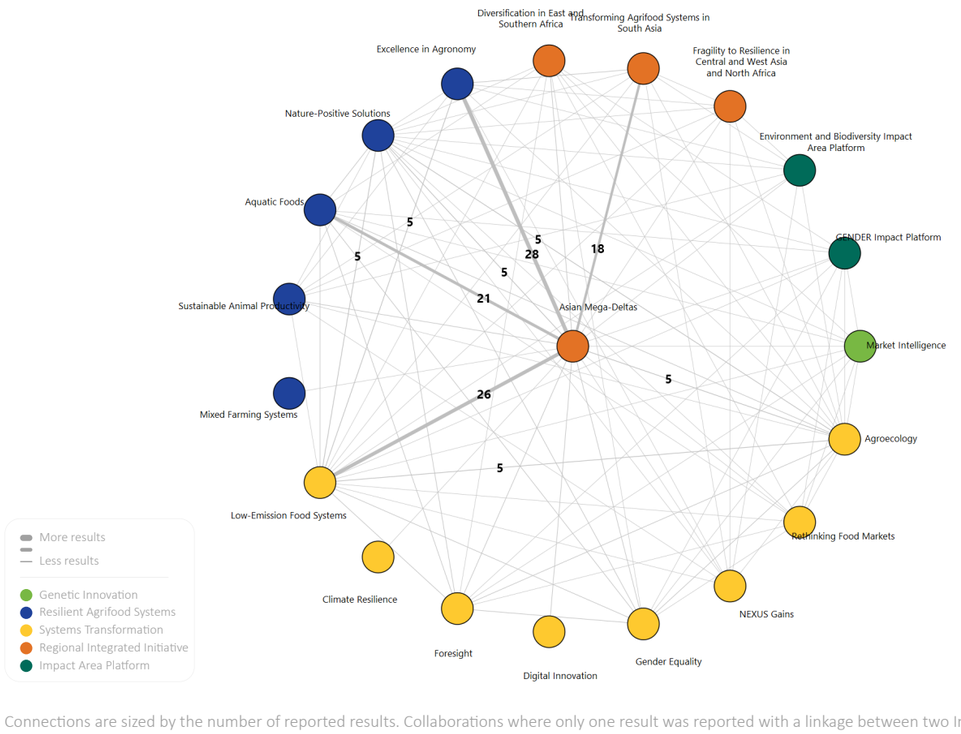
AMD is working with nearly 200 partners in its target countries, including national government agencies, research institutes, academic institutions, international organizations, and funding agencies. In Viet Nam, AMD collaborated with MARD and its associated agencies, resulting in the successful implementation of various AMD activities and achievements in policy and investment outcomes. Among the MARD agencies, the DCP collaborated most with AMD, including in the development of the One Million Hectares Program, scaling of mDSR and the rice straw-based circular economy to development, and scaling of ACBs and the RiceMoRe system in MRD. Aside from DCP, AMD works with the Institute of Policy and Strategy for Agriculture and Rural Development, DCRD, Center for Agriculture Digital Transformation and Statistics, and the local Departments of Agriculture and Rural Department. AMD also works with other agencies outside of MARD, such as the National Institute of Nutrition, which is under the Ministry of Health.

In Bangladesh, AMD's collaborations extend to several key government agencies, including the Department of Agriculture Extension, Bangladesh Agricultural Research Institute, Bangladesh Water Development Board, Bangladesh Rice Research Institute, Bangladesh Agricultural Development Corporation, Bangladesh Meteorological Department, and the Institute of Water Modeling. In Cambodia, AMD has formed partnerships with national agencies such as the General Directorate of Agriculture within the Ministry of Agriculture, Forestry, and Fisheries, the Inland Fisheries Research and Development Institute, the Fisheries Administration, and various provincial Departments of Agriculture, Forestry, and Fisheries. In India, particularly in the West Bengal region, AMD actively engages with government institutes such as the Central Soil Salinity Research Institute.

AMD has established partnerships with international nongovernmental organizations and research institutions to support its work in Bangladesh and Cambodia. In Bangladesh, collaborations include organizations such as Shushilan, International Center for Diarrheal Disease Research, and Center for Natural Resources Studies. In Cambodia, partnerships have been formed with institutions such as the International Institute of Rural Reconstruction, Cambodia Development Resource Institute, and Cambodian Agricultural Research and Development Institute. Additionally, AMD is conducting research activities with academic partners like Wageningen University and Research Centre, Can Tho University in Viet Nam, Royal University of Phnom Penh and Royal University of Agriculture in Cambodia, and Bangladesh Agricultural University. Private sector engagement is also evident in AMD's endeavors, with partnerships established with companies such as Village Link Company Limited in Myanmar and Binh Dien Fertilizer Joint Stock Company in Viet Nam, illustrating a diverse collaborative approach in advancing agricultural and development efforts.

Section 6: **CGIAR Portfolio linkages**

Asian Mega-Deltas' 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.

Portfolio linkages and Asian Mega-Deltas' impact pathways

As a regional integrated Initiative, AMD serves as a platform for integrating other CGIAR Research Initiatives active in South and Southeast Asia. In Bangladesh, AMD actively collaborates with several Initiatives to enhance agricultural practices and address climate-related challenges in the delta regions. Teaming up with Aquatic Foods, AMD is ensuring access to Generation-3 rohu for farmers in its focus areas, providing a significant boost to aquaculture in the southern region. By partnering with Mixed Farming Systems, AMD is striving to develop and scale resilient cropping systems in the coastal region. In collaboration with Fragility, Conflict, and Migration, AMD conducted a choice experiment to explore the connection between climate change and migration decisions in Hatiya Island. Lastly, in partnership with Transforming Agrifood Systems in South Asia, AMD is working to develop and scale an IVR service to deliver timely harvest warnings to mung bean farmers in specific districts, contributing to improved agricultural outcomes in the region.

In Cambodia, Plant Health is implementing a diversification experiment on rice-watermelon systems. Jointly with AMD, participatory learning activities were conducted to ensure that men and women farmers are able to observe and learn from the experiment.

Collaboratively implemented by AMD and Excellence in Agronomy, the scaling of mDSR in the MRD spanning Cambodia and Viet Nam aims to minimize input use, decrease carbon footprint, and enhance seeding precision, seedling vigor, and yield compared to conventional rice cultivation methods.

In Viet Nam, AMD collaborated with Excellence in Agronomy to contribute to the development of the One Million Hectares Program, organizing various events to support the program. These included a regional workshop on high-quality and low-emission rice transformation, a workshop on climate-smart agriculture in Asian mega-deltas, field demonstrations on mDSR and other technologies, a workshop on agronomy-tailored innovations for climate adaptation and mitigation in Viet Nam, and the launch of the One Million Hectares Program.

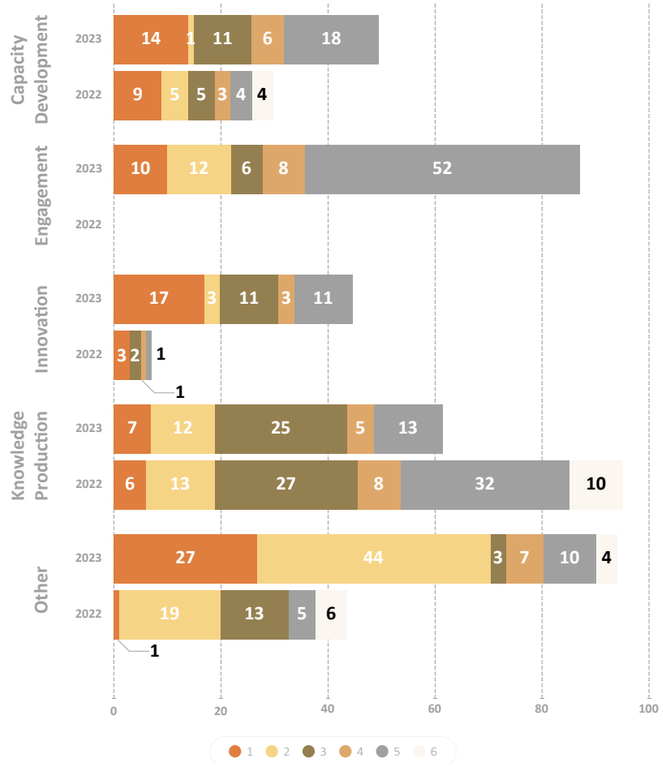
Additionally, AMD conducted joint research with Climate Resilience on farmers' conflict and cooperation behaviors related to land-use transition in rice-shrimp systems in MRD. AMD also collaborated with Low-Emission Food Systems to develop and promote RiceMoRe, a digitized reporting and monitoring system for the rice sector in MRD, and to co-organize a series of consultation workshops to facilitate knowledge exchange among relevant stakeholders, contributing to the sector's readiness to participate in domestic and international carbon markets.

AMD also organized the inaugural CGIAR Science Day in Viet Nam as a platform for in-depth discussions and presentations on the latest research findings from Initiatives working in the country. CGIAR experts from eight Initiatives presented novel scientific research and innovations, which showcased methodologies and results that can inform and impact decision-making in the country.

AMD partners with local government agencies and cooperatives in Can Tho Viet Nam to develop mushroom cultivation using rice straw.
Credit: IRRI

Section 7: **Adaptive management**

RECOMMENDATION	SUPPORTING RATIONALE
In the next six months, facilitate cross-learning among WPs and countries on the outcomes and lessons learned for each thematic area from 2022 to 2023. Thematic areas can be agronomy, aquaculture, nutrition, digital climate services, inclusion of marginalized groups, biodiversity, or policy. From this, identify the main challenges that were addressed and the impact or potential impact in a form that would be useful both for the science teams and policymakers to take learnings forward.	AMD observed a shift in the type of outputs that WPs produced from 2022 to 2023. The figure below shows engagement (orange bar) in 2023. Innovations (green bar) and capacity development (blue bar) increased, as did other outputs (light blue bar), which are mostly knowledge products and engagement. Knowledge products (pink bar) slightly decreased from 2022 to 2023. These changes indicate linkages with more national partners and expansion or integration of innovations. Examples are the expansion of measures addressing salinity and expansion of coverage of climate mitigation options and digital climate services and tools in both MRD and Ganges deltas. Another example is the integration of climate-resilient agronomy and aquaculture systems in Bangladesh, Cambodia, and West Bengal.



Through this initial assessment, the teams determined that more time should be allocated for discussion and agreement on the outcomes and lessons across all WPs to facilitate cross-learning. This will help establish more coherence on AMD's scientific contributions in each country and identify ways that multidisciplinary teams can work more efficiently.

Closely monitor budget spending with all WP leads for the second and third quarter and identify remaining activities for the fourth quarter.	AMD faced significant underspending in the third quarter of 2023, largely due to several contracts with partners and consultants that were under process. We lost sight of all contracts in the pipeline and by the end of November, we had overspent. This reminded us that many things are moving at different paces, and therefore we must more closely monitor budget plans and spending.

Section 8: **Key result story**

Scaling AMD Innovations in the Mekong Delta

The governments of Mekong Delta countries are mainstreaming AMD's innovations into their climate change and food systems policies.

AMD innovations, such as rice straw-based circular economy, mechanized direct-seeded rice, MRV tools for carbon market, and drone technologies, will be mainstreamed in Viet Nam's One Million Hectares program.

Primary Impact Area

Other relevant Impact Area targeted

Contributing Initiatives

Excellence in Agronomy · Low-Emission Food Systems

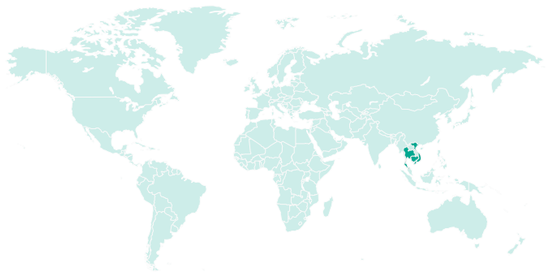
Contributing Centers

Alliance of Bioversity International and CIAT · International Rice Research Institute · WorldFish

Contributing external partners

Ministry of Agriculture and Rural Development Viet Nam · Department of Crop Production · Department of Cooperatives and Rural Development · Council for Agricultural and Rural Development · Cambodia Development Resources Institute

Geographic scope



Cambodia · Thailand · Viet Nam

Lower Mekong River Basin (LMB) countries, such as Cambodia, Thailand, and Viet Nam, are highly vulnerable to climate change. To ensure food and nutrition security, they must intensify efforts in climate adaptation and mitigation, particularly in agriculture. To support adaptation and mitigation efforts by LMB countries, several of AMD's innovations—such as rice straw-based circular economy, RiceMoRe, and ACBs—are being mainstreamed in national and subnational policies and programs such as NDC, One Million Hectares Program, and Zero Hunger.

The LMB, which includes Cambodia, Lao PDR, Thailand, and Viet Nam, is recognized as one of the Mekong region's most vulnerable areas to the impacts of climate change. Largely dependent on agriculture, LMB countries are working toward climate change adaptation and mitigation in the agriculture sector to ensure food, nutrition, and livelihood security.

In 2022, LMB countries such as Thailand and Viet Nam updated their NDC to identify more ambitious mitigation targets and redefine adaptation and resilience areas. For instance, Viet Nam's new NDC nearly doubled its agriculture mitigation targets to reach an 82 percent and 97 percent increase for unconditional and conditional contributions, respectively. At the same time, LMB countries are also prioritizing programs and strategies, namely the National Action Plan on Zero Hunger and National Strategy for Food Security and Nutrition, to ensure national food and nutrition security.

In 2023, the government of Viet Nam approved the implementation of the Sustainable Development of One Million Hectares of High Quality and Low-Emission Rice Associated with Green Growth in the Mekong River Delta By 2030 program, which aims to adapt the rice sector to climate change, reduce GHG emissions, and contribute to fulfilling Viet Nam's international mitigation commitments, including achieving net-zero emissions by 2050. Under the program, GHG emissions from rice farming are expected to be reduced by more than 10 per cent and low-emission, high-quality rice will account for more than 20 per cent of the total for export in the specialized rice farming region.

AMD contributed significantly to the development of the One Million Hectares Program by providing technical inputs and organizing related events to strengthen knowledge exchange, demonstrate relevant innovations, and build collaboration among key stakeholders, including a regional workshop on high-quality and low-emission rice transformation, program launch, and field demonstration. Identifying AMD innovations as mechanisms to achieve program goals, the One Million Hectares Program will be used as a platform to promote the use of AWD, mDSR, and rice straw-based circular economy at the farmer's level, and apply the RiceMoRe and CS-MAP at the management level.

MARD issued policy documents supporting the scaling of AMD innovations for integration in the One Million Hectares Program. MARD recognized and adopted the guidelines for rice straw management toward a circular and low emission agriculture in MRD. AMD's engagement and capacity-building activities led MARD to issue several decisions supporting the institutionalization and adoption of RiceMoRe in the MRD region.

The ACBs were recognized by MARD as a technical advancement, leading to the establishment of a regional ACB technical working group, approval of the tasks and budget for the implementation of ACBs in all MRD provinces, and awarding of a certificate of merit to organizations and individuals for their achievements in developing and disseminating ACBs for agricultural and rural development.

In addition to supporting climate change policies, AMD's science is also mainstreamed in the food and nutrition security policies and programs of LMB countries. MARD's DCRD recognized AMD's technical support in the development of the National Action Plan on Zero Hunger and included AMD scientists in their expert group. In Cambodia, several AMD research outputs and engagements informed the 3rd National Strategy for Food Security and Nutrition for 2024–2028 and Food System for Sustainable Development 2030 Roadmap. These national policies aim to enhance food security, nutrition, and health through sector-led responsibilities such as agriculture and water, while also prioritizing multisectoral coordination, governance, and partnerships. These are centered on the vision of ensuring all Cambodians have access to a healthy diet and safe food by 2030, promoting equitable livelihoods, resilience to vulnerability, and climate change adaptation. Cambodia's Council for Agricultural and Rural Development also included an AMD expert as a member of the technical working group on food security and nutrition.

AMD's engagement with Thailand led to the inclusion of low-emission rice production in the country's updated NDC, and the Initiative consistently collaborated with stakeholders from LMB countries to scale climate-resilient strategies and technologies for sustainable Mekong Delta development.

> As a major contributor to the development of the One Million Hectares Program, AMD's innovations—such as AWD, mDSR, rice straw-based circular economy, RiceMoRe, and CS-MAP—will be integrated in the program. Tested and implemented in the Mekong River Delta, these technologies can contribute to achieving the program goals.
>
> Mr. Le Thanh Tung, Deputy Director for Southern Department of Crop Production, Ministry of Agriculture, Viet Nam

Front cover photo

Integrated rice-fish technology.
Credit: WorldFish Bangladesh

Back cover photo

Field trials of Generation 3 rohu from the Carp Genetics Improvement Program.
Credit: WorldFish Bangladesh

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