PRELIMINARY **CGIAR**
INITIATIVE OUTLINES

Securing the Asian Mega-Deltas from Sea-level Rise, Flooding, Salinization and Water Insecurity

Initiative Lead and Co-Lead	Primary CGIAR Action Area	Estimated 2022 - 2024 Budget
Bjoern Ole Sander Shakuntala Thilsted	Resilient Agri-food Systems	$40 - $60 M

Challenge

Home to 400 million people, the densely populated AMDs are biodiverse, fertile and productive food baskets dominated by rice, fisheries and aquaculture that support millions beyond delta dwellers.\ Deltas are however reaching a significant tipping point1. Over 100 million small-scale producers and value chain actors face grave risks to food and nutrition security and livelihoods from direct and indirect impacts of climate change, aggravated by unsustainable development. Recent models of coastal elevation show that the AMDs are much lower in elevation than previously assumed, and thus, will be severely affected by increased incidence and intensity of floods, sea-level rise, salinization of soil and freshwater but also water shortage, severe cyclones and climate extremes2, leading to an annual loss of 6% of GDP in SEA, over twice the global average expected loss3. Furthermore, freshwater withdrawals far exceeding sustainable capacity contribute to land subsidence4. Rapid biodiversity loss caused by human activities particularly threatens protective mangrove forests, thereby reducing resilience5. Small-scale producers are critically vulnerable to these impacts with limited ability to independently manage risks. These trends will displace and disenfranchise people, threaten regional and global food and nutrition security, and will put increased pressure on those remaining, who are often aging women facing labor shortages, decreased productivity, and reduced livelihood opportunities. In response, AMD provides evidence and aligns partnerships to sustainably manage socio-economic development, including migration and its consequences that result in equitable and positive impacts for people and food systems while minimizing negative consequences within the diverse societal contexts of AMDs.

1 Renaud, F.G., Syvitski, J.P., Sebesvari, Z., Werners, S.E., Kremer, H., Kuenzer, C., Ramesh, R., Jeuken, A.D. and Friedrich, J., 2013. Tipping from the Holocene to the Anthropocene: How threatened are major world deltas?. Current Opinion in Environmental Sustainability, 5(6), pp.644-654.

2 Kulp, S.A. and Strauss, B.H., 2019. New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding. Nature communications, 10(1), pp.1-12.

3 Weiss, John. 2009. The Economics of Climate Change in Southeast Asia: A Regional Review. © Asian Development Bank. http://hdl.handle.net/11540/179. License: CC BY 3.0 IGO.

4 Minderhoud, P.S.J., Middelkoop, H., Erkens, G. and Stouthamer, E., 2020. Groundwater extraction may drown mega-delta: projections of extraction-induced subsidence and elevation of the Mekong delta for the 21st century. Environmental Research Communications, 2(1), p.011005.

5 DasGupta, R. and Shaw, R., 2013. Cumulative impacts of human interventions and climate change on mangrove ecosystems of South and Southeast Asia: an overview. Journal of Ecosystems, 2013.

Objective

Our objective is to support the creation of resilient, inclusive and productive deltas, capable of maintaining socio-ecological integrity; adapting to, even thriving, in the face of climatic and other stressors, and supporting human prosperity and well-being. Achieving this will require attention to both the agro-environmental and human landscapes as interconnected social-ecological systems, whereby, technical interventions are tied to broader enabling environments so that technical 'wins' manifest themselves in human development outcomes and impacts, through continued opportunities, especially for women and youth within expanding market economies.

AMD will manage critical risks specific to AMDs such as flooding, salinity, water shortage and dependence on upstream activities for freshwater flows, with climate change exacerbating these challenges. Concurrently, conscious of the often-unequal social contexts in which risk management, climate adaptation, and food production occur, AMD will support enabling policies and regulatory systems, implement evidence-based adaptation and diversification technologies/practices, and advance decision-support tools across food system value chains to address capacity inequalities and poor cross-sector coordination while enhancing community-based resilience choices. This initiative will deliver inclusive adaptive research outputs for equitable and sustainable management of AMD landscapes, supported by multi-stakeholder exchanges informing investments in resource-efficient and environmentally-responsible practices. AMD will stimulate investments in sustainable production systems by co-developing inclusive business plans with value chain actors. Co-development of solutions with government, civil society and private sector are foundational. A hypothesis in our ToC is that improved decision support tools will help navigate the political economy around decision making.

Theory of Change

Building on inclusive 'Two Degrees Initiative' partner engagements1 in 2020, and aligned with the CGIAR 2030 Innovation and Research Strategy2, AMD mobilizes broad and impactful partnerships supporting the creation of resilient, inclusive and productive deltas, capable of maintaining socio-ecological integrity, adapting to climatic and social stressors, and supporting human prosperity.

Leveraging existing science and capitalizing on demand, innovation, and scaling partners, we will address key barriers that hinder widespread adoption of improved climate-adapted and diversified systems. These include: 1) Insufficient synthesis, contextual translation and explicit guidance has been provided to support farmers, policy-makers, investors to tap into potential solutions; 2) Transformative options have not adequately considered broader socio-economic challenges including shrinking agricultural workforces due to migration, greater commercialization of agri- and aquaculture, entailing significant socio-economic opportunities but also negative externalities on ecosystem functions; and 3) systemic barriers that arise from a disconnect between local communities and decision makers, and inequitable planning and governance of critical common resources like 'water'.

Our work packages address these barriers to change, unlocking and adding value from existing and new research generated by CGIAR and innovation partners. We will co-develop spatially explicit adaptation matrices for farming systems to guide development programs (WP1), co-design investment cases and digital tools strengthening socially-inclusive and environmentally-responsible value chains (WP2), leverage more efficient and equitable water and land management systems (WP3), co-design processes enabling marginalized groups, women and youth to better access resources and technologies (WP4), and build transboundary change scenarios to facilitate urgent policy interventions(WP5).

1) https://www.wri.org/publication/two-degree-initiative-listening-sessions

2) https://cgspace.cgiar.org/bitstream/handle/10568/110918/OneCGIAR-Strategy.pdf

Securing the Asian Mega-Deltas from Sea-level Rise, Flooding, Salinization and Water Insecurity

Highlights

Strong buy-in achieved from local and regional stakeholders through five "listening events", with 168 strategic participants from multiple sectors spanning demand, innovation and scaling, in 2020. With stakeholder inputs incorporated and key partnerships identified AMD is ready to immediately initiate impactful joint adaptive research.

Contextually relevant institutional models enabling marginalized groups, women and youth to inform and benefit from inclusive transformations in AMDs. These models are guided by local voices, and respond to gender-power barriers while legeraginglocal governments, assuring technical investments and interventions result in inclusive development outcomes.

Working with government, civil society, financial institutions and development partners to co-design targeted financial investment opportunities, AMD facilitates the adoption of inclusive, resilient and environmentally responsible practices. These include the initial operation of digitally-driven agro-climatic advisories, transparency and traceability tools, and proven options for circular agro-economy.

Use of system transformation and remittances to open avenues for youth participation and rural-urban linkages that supports dynamic and inclusive growth in the AMDs. These will improve food and nutrition security, livelihoods and well-being, whilst reversing feminization and aging within rural economies.

AMD catalyzes transformative change in water and land governance for more efficient and equitable use of water and land at the field- and landscape-scales to enable adaptation, support diversification and develop more inclusive participation in food systems with higher water and land use productivity.

Work Packages

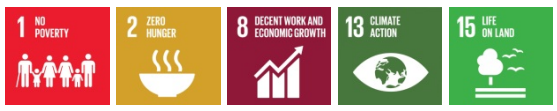
	Scope of Work	3-year Outcomes
Adapting deltaic production systems	Together with farming communities and local governments, we will scientifically validate the feasibility, resilience and social-acceptance of more diversified and resource-efficient farming systems based on salt-, flood- and drought-adapted technologies and practices (T&P)s. We will then identify context- and system-specific scaling strategies to guide decision-making for wide-scale impact.	At least 5 national/international public/private development/investment programs use our adaptation matrices to decide which climate-adapted agronomic, aquacultural and livestock technologies, which farming systems, can and should be scaled where and how, thereby initiating the scaling process and targeting least $100M in evidence-based support for millions of producers.
Smart investments and digital solutions to de-risk value chains	To operationalize circular agro-economy and inclusive, sustainable production models, we will, together with public-private sector stakeholders, 1) prioritize and quantify investment impacts, 2) support development of inclusive investment packages, 3) identify innovative financing models/partnerships and 4) co-design de-risking strategies. This will be supported by digital transparency, advisories and traceability tools.	Public and private sector investor groups in 5 countries actively pilot with value chain stakeholders priority investment opportunities, innovative financing solutions, advisory services and insurance products. Such investments increase the willingness to adopt inclusive and resilient climate-, biodiversity- and environmentally-responsible value chain practices amongst 200,000 farmers and value chain actors.
Aligning policy and regulatory frameworks for integrated land/water management	Using evidence-based decision support tools, we will co-convene multi-sector and national, sub-national and local stakeholder dialogs to explore and prioritize inclusive land-water management options, to identify contextually appropriate, efficient and productive water and land use solutions, and faciltitate supportive policy and regulatory reforms to be implemented.	More multi-functional and climate resilient deltas, supporting diverse and equitable food systems through better aligned land/water policy/regulatory frameworks and investments, informed by appropriate adaptation T&Ps (WP1), new scaling strategies and interventions (WP2), institutions for managing stakeholder inequalities (WP4) and anticipated socio-economic and environmental outcomes of development pathways (WP5).
Addressing resource access inequalities through multi-scale institutional strengthening/developmentt	With communities, local governments and civil society partners, we will co-design and implement social processes that enable marginalized groups, women and youth to better access delta resources and technologies to become more equal partners in food systems innovation.	Women/youth/other marginalized groups empowered to access delta resources and technologies; becoming more equal partners in food systems innovation, by shaping adaptation T&Ps (WP1) and new scaling strategies/interventions (WP2), while benefiting from more inclusive water/land policies/rules (WP3); thereby better adapting to anticipated socio-economic and environmental outcomes of development pathways (WP5).
Transboundary development scenarios and Monitoring, Evaluation & Learning	WP5 will assess climatic and socio-economic trends (e.g. migration, youth aspirations, economic development, trade), develop transboundary change scenarios and organize and facilitate policy and collaborative dialogues to co-develop appropriate policies and collaboration mechanisms. We will coordinate across AMDs to ensure a coherent research-development-deployment approach and distill and apply lessons.	At least 3 policy interventions have been formulated by government agencies in AMDs and at least 3 development programs are being designed based on increased understanding of drivers and tade-offs in change processes. Actors in AMDs engage in cross-learning resulting in greater capacity to develop and scale appropriate interventions.

Securing the Asian Mega-Deltas from Sea-level Rise, Flooding, Salinization and Water Insecurity

Impact Area Contributions

Nutrition, health & food security	Diversification and intensification of food systems with micronutrient-rich fish and livestock, vegetables and pulses, alongside staple foods, increase opportunities for diet diversity and quality available to communities. Equitable access to sufficient, nutritious and safe foods addresses the demands and aspirations of different population groups. (actioned through WP 1, 2, 4)
Poverty reduction, livelihoods & jobs	Tailored climate resilient and diversified farming and food systems have large potential to attract investment by managing risk, offering income stability and reducing out-migration. Nature-based adaptation services can buffer the impacts of climate shocks for local communities as well as for poor consumers in urban areas. (actioned through WP 1,2,3,4)
Gender equality, youth & social inclusion	Women, youth and other marginalized groups are effectively engaged in designing and implementing adaptive land and water use and management solutions; benefit from inclusive food systems through broader governance reform; thereby improving livelihoods and socio-economic empowerment. (actioned through WP 1, 2, 3, 4)
Climate adaptation & greenhouse gas reduction	At AMD's core is developing and scaling socially-inclusive climate adaptation measures against sea-level rise, floods, water shortage, soil and fresh water salinization. Smallholders and policy-makers will have access to timely, relevant information and financial solutions supporting adoption of improved coping strategies (digital advisory services, early warning). (actioned through WP 1, 2, 3, 4, 5)
Environmental health & biodiversity	Catalyzing adoption of nature-based, resource-conserving, efficiency-enhancing food systems through digital solutions, index-based actions, incentive mechanisms, AMD will reduce pressure on natural resources, accelerate ecosystem restoration, and curb habitat and biodiversity loss. AMD will catalyze intensification and diversification of food systems through sustainable approaches employing integrated, equitable water and land governance. (actioned through WP 1, 2 and 3)

Impact on SDGs



Regions

South Asia (SA), South East Asia and the Pacific (SEA)

Countries

Securing the Asian Mega-Deltas from Sea-level Rise, Flooding, Salinization and Water Insecurity

Innovations

Locally-verified adaptation matrices describe which validated T&Ps can be scaled where and how. These spatially-explicit matrices can be visualized and build on adaptive research, resilience assessment, suitability and trade-off analyses of adapted farming systems and improved resources management. Development programs, government agencies use matrices as scaling 'blueprints' for intervention targeting.
Tools and advisories for smart investments and digital solutions to prioritize and quantify the impact of climate, biodiversity and environmentally smart investments, design innovative financing solutions and develop insurance products to de-risk investment. The tools/advisories will be used by public-private stakeholders to develop a portfolio of verified investment opportunities.
A portfolio of demonstrated and emerging options for better adapted and more equitable systems of water and land management that build resilience against intensifying cycles of water scarcity and excess, unlocking opportunities for enhancement and diversification of inclusive food production systems.
Existing institutional models, including Community Fish Refuge management and Water User Associations, that support multi-stakeholder benefits and ecosystem services through systems-level adaptation scaled. Iterative learning from scaling processes will facilitate the development, testing, and nurturing of new innovations.
Spatially-explicit scenarios for development pathways of AMDs will bring together socio-economic and climatic assessments. These scenarios will include insights from community and youth aspiration assessments as well as projected migration trends. They will provide a basis for appropriate policy and rulemaking.

Key Partners

Demand	Government	Water Resources Management units (e.g. Bangladesh Water Development Board, National Water Resources Comission in My, Dept. for Water Resource Management in VN, Tonle Sap Authority in Cam)
	Local Government	Provincial Departments of Agriculture, Environment and Rural Development and their ministries (e.g. Provincial Department of Water Resources and Meteorology, Cambodia; Provincial Fisheries Departments, Myanmar)
	Partner Country based NGO	Local NGOs, e.g. BRAC, Bangladesh; Cambodia Development Resource Institute (CDRI); Greenovator, Myanmar
	Private Sector in Aid Recipient Country	Farmer/fisher groups, cooperatives, e.g. within the 'One Cooperation, One Product' (OCOP) scheme in Vietnam, Fisheries Research and Development Network, Myanmar
Innovation	Academic, Training and Research	CSIRO, Living Deltas Hub, Deltares
		Danish Hydraulic Institute, Institute of Water modeling (Bangladesh), Southern Institute of Water Resource Planning (Vietnam)
		Local universitis (e.g. Can Tho Uni, Bangladesh Ag. Uni.; Yezin Ag. Uni, Myanmar; Royal University of Cambodia; International Center for Climate Change and Development)
		National research organizations, e.g. Cambodian Agricultural and Development Institute (CARDI), Vietnam Academy of Agricultural Sciences, Bangladesh Agricultural Research Council (BARC); Bangladesh Fisheries Research Institute (BFRI);ICAR (Indian Council of Agricultural Research); Centre for Ganga River Basin Management and Studies
	Private Sector in Aid Recipient Country	Local communities and local governments (e.g. water user associations (Myanmar); Community Fish Refuge Management Committees, Cambodia
Scaling	Government	GIZ programs (e.g. Green Innovation Center, Mekong Delta Climate Resilience Program)
		Governmental extension services (e.g. Dept. Ag. Extension in BD, Nat. Ag. Extension Center in VN, Extension Division in My)
	International NGO	Dutch Gov/ SNV (e.g. Ag. Transformation program in MRD); AGRITERRA
	Multilateral	World Bank (e.g. 2030 Water Resources Group, Ayeyarwady Intergrated River Basin Management Project
	Private Sector	Sustaimable Rice Platform members, Loc Troi Group, impact investors, insurance companies, Myanmar Rice Federation

Theory of change for Asian Mega-Deltas (AMD) Initiative