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WORKSHOP REPORT

CGIAR Climate Action Program in Tamil Nadu, India

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CGIAR Climate Action Program

The science program aims to drive science, innovation, and collaboration to transform food, land, and water systems for a climate-resilient, net-zero, and equitable future. in Bangladesh, Cambodia, Côte d'Ivoire, Ethiopia, Honduras, India, Kenya, Nepal, Nigeria, Pakistan, Philippines, Senegal, Sr Lanka, Sudan, Tanzania, Zambia, Zimbabwe.

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Summary

Tamil Nadu faces escalating climate risks—from droughts and heatwaves to floods and cyclones—placing major pressure on agriculture, water systems, and vulnerable communities. The CGIAR Climate Action Program was formally launched in the state to support government efforts with science-driven, locally tailored climate solutions. The workshop brought together senior officials, researchers, and development partners to define priorities for a collaborative adaptation and resilience agenda. State leaders emphasized Tamil Nadu's strong progress in climate action—including data-driven planning systems, village-level adaptation initiatives, and proactive recognition of heatwaves—while highlighting persistent gaps in climate analytics, localized forecasting, and integrated water management. CGIAR's tools and expertise, such as SADMS, AWARE, and the Climate-Smart Governance Dashboard, were identified as key enablers to strengthen anticipatory planning, digital advisories, and evidence-based decision-making.

Panel discussions underscored sector-specific needs:

• Agriculture: crop diversification, soil health, digital advisories, and improved insurance.

• Water resources: tank restoration, sediment management, flood forecasting, and hydrological modelling.

• Disaster management: multi-hazard early warning, impact-based forecasting, and anticipatory action.

• Research and extension: localized climate services and climate-smart agronomic tools.

Participants called for co-development of climate information systems, model climate-resilient villages, and joint capacity-building programs. They also stressed the importance of convergence across departments and long-term partnerships to sequence priorities effectively.

The workshop concluded with a shared commitment to develop a five-year roadmap, identify pilot districts, establish a multi-stakeholder advisory platform, and mobilize state-level financing to scale climate-smart innovations. This marks the start of a deeper collaboration between Tamil Nadu, IWMI, CGIAR, and regional institutions to accelerate climate-resilient development across the state.

Tamil Nadu's Climate Imperative

Tamil Nadu, like many climate-vulnerable states in India, faces intensifying risks from climate extremes—ranging from prolonged droughts and erratic monsoons to increasing incidences of floods, cyclones, and heatwaves. These events are disrupting agricultural productivity, threatening food and water security, and undermining rural livelihoods, particularly for smallholder farmers, women farmers, and marginalized communities (Figure 1). Key sectors such as paddy cultivation, horticulture, inland fisheries, and livestock are already experiencing the cascading impacts of changing rainfall patterns, temperature variability, and land degradation.

At the same time, Tamil Nadu is undergoing a major transformation in its climate and development policy landscape, guided by its commitments to India's Nationally Determined Contributions (NDCs), State Action Plans on Climate Change (SAPCC), and emerging initiatives such as the Tamil Nadu Green Climate Company. The state's push toward digital agriculture, climate-smart water management, and resilient infrastructure provides an important opportunity to integrate cutting-edge science and innovation into policy and practice.

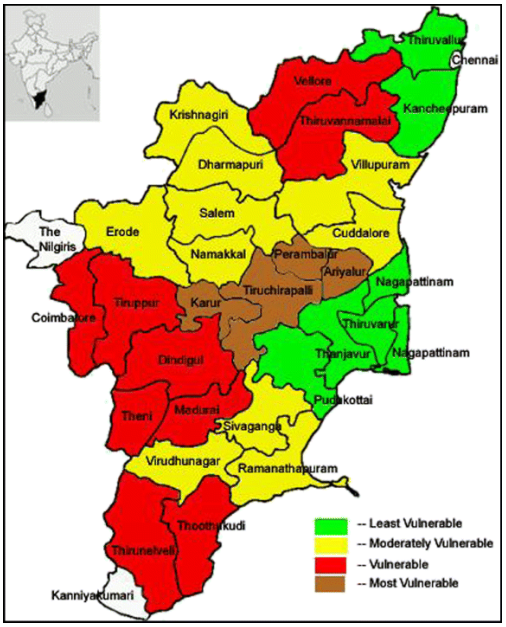

Figure 1. Climate-vulnerable districts in Tamil Nadu

Workshop Objectives

The official launch workshop aims to:

• Introduce the CGIAR Climate Action Program and its relevance to Tamil Nadu's climate and development priorities.

• Identify collaborative entry points for co-developing adaptation and mitigation strategies across agriculture, water, and food systems.

• Engage national and state stakeholders (government, research institutions, private sector, civil society) to shape a locally-led research and action agenda.

• Discuss opportunities for policy alignment, capacity sharing, and resource mobilization to scale climate action.

The CGIAR Climate Action Program: A Strategic Opportunity

The CGIAR Climate Action Science Program emerges as a timely and strategic initiative, complementing ongoing efforts by the State and Central governments. The program is designed to support states like Odisha in advancing toward a just, climate-resilient, and low-emissions future by leveraging actionable science, technological innovations, and inclusive partnerships. Building on CGIAR's decades of research leadership in climate change,

agriculture, water systems, and food security, the program brings together global expertise and local knowledge to co-develop solutions tailored to Odisha's development goals.

The CGIAR Climate Action Program integrates climate foresight, digital climate services, early warning systems, locally led adaptation (LLA), resilient water and food systems, and low-emission transitions. It provides a platform for multi-stakeholder collaboration to build systemic resilience, enhance adaptive capacities, and accelerate climate-resilient development pathways across Odisha's diverse landscapes—from coastal zones to drought-prone hinterlands.

Areas of Work Relevant to Tamil Nadu

The Climate Action Program is structured around five integrated Areas of Work (AoWs) that directly address Sri Lanka's urgent climate needs. These AoWs include (1) Strategic Foresight and Climate Intelligence for Agri-Food Action, (2) Digital Advisories and Climate Risk Management to enhance early warning systems and farmer services, (3) Locally-Led Adaptation to empower communities and strengthen institutional capacities, (4) Low-Emission Innovation to reduce greenhouse gases in agriculture and water systems, and (5) Climate Transitions to scale impacts through policy reform and climate finance. These interconnected areas provide a comprehensive framework for research, implementation, and scaling of climate-smart solutions across Sri Lanka's food, land, and water systems.

Focus Regions and Programmatic Priorities

Given Tamil Nadu's exposure to monsoon variability, droughts, floods, and extreme heat, the CGIAR Climate Action Program will initially focus on both drought-prone and flood-prone districts. Drought-prone areas such as Ramanathapuram, Sivagangai, and Virudhunagar face frequent water scarcity, prolonged dry spells, and agricultural distress. This initiative will be aligned to the ongoing Tamil Nadu Drought Mitigation Project supported by NDMF and implemented by SDMA / TNDRRA, other institutions namely DoA, TNAU and IWMI.

At the same time, flood-prone districts including Chennai, Cuddalore, Nagapattinam, Thanjavur, Tiruvarur, and Tirunelveli are increasingly vulnerable to riverine and urban flooding, especially during the northeast monsoon season. These regions are acutely sensitive to seasonal rainfall failures, extreme weather events, and water-related risks, critically impacting food production, water security, infrastructure resilience, and rural and urban livelihoods. Through integrated climate risk management, digital advisory services, anticipatory action, and locally-led adaptation pathways, the program will strengthen local capacities to manage these risks, build resilient agri-food systems, and support sustainable development transitions in Tamil Nadu.

Through integrated climate risk management, digital advisories, and anticipatory action, the program will strengthen local capacities to manage current and emerging risks. These districts are also key to the country's rice, high-value crop, and livestock systems, making them ideal for piloting and scaling low-emission food system transitions—including alternate wetting and drying (AWD) in paddy fields, sustainable livestock practices, and water-smart innovations. The program will leverage established partnerships, institutions, and digital infrastructure in these provinces to co-develop locally-led adaptation pathways, strengthen early warning systems, and catalyze policy and investment reforms under the Climate Transitions Area of Work.

Expected Outcomes and Next Steps

- Alignment of CGIAR research and innovation agenda with Tamil Nadu's State Action Plan on Climate Change (SAPCC), NDC, and Sustainable Development Goals (SDGs).
- Identification of pilot sites and priority initiatives (e.g., digital advisory services, drought risk management, locally-led adaptation pilots, anticipatory action systems).
- Launch of joint capacity development programs with government departments, research institutions, and development partners.
- Establishment of a state-level multi-stakeholder advisory platform to co-design and scale climate innovations.

Contribution to Global CGIAR Outcomes

Climate Action activities in Tamil Nadu are expected to contribute to the following overall outcomes of the global CGIAR Climate Action Science Program.

- 38 million Producers and other FLW system actors use climate adaptation or low emissions solutions by 2030.
- Public and private sector actors mobilize US$ 15B new finance for just, low emissions climate action and just transitions by 2030.
- 100 new climate/sectoral policies are informed by climate data and evidence by 2030.
- Avoid, reduce, or sequester 1 Gt of CO2.

Opening Session

Welcome Remarks

Dr Alok Sikka, Country Representative -India & Bangladesh and Senior Fellow at IWMI, opened the inaugural session by welcoming all participants and introducing International Water Management Institute (IWMI), highlighting its mission and long-standing commitment to water and climate management, notably through the Tata Water Policy Programme, which recently completed 25 years. Dr. Sikka emphasized IWMI's policy influence both nationally and globally, as well as its extensive field presence across India, Asia, and Africa. He underscored IWMI's strategic partnerships with central and state governments, reinforcing the institute's relevance in shaping policies and delivering on-ground solutions. He also introduced CGIAR's Science Programs that integrate research on water, land, climate, and food systems.

During presentation, he focused on strengthening water system resilience as a key pillar for climate adaptation, food security, and sustainable rural development in Tamil Nadu. He emphasized the need for context-specific water management approaches that consider the diverse agro-ecological zones of the state. Presenting typologies of agricultural water use, he highlighted variations in water sources, cropping intensity, and rainfall patterns across regions—insights that are vital for tailoring resilience strategies.

He introduced the Water Productivity Atlas developed by IWMI, a tool to assess water use efficiency across crops and regions, enabling better-informed irrigation and cropping decisions. Dr. Sikka differentiated between green and blue water footprints and explained their significance for sustainable water planning. He also introduced the concept of nutritional water productivity, promoting the idea of optimizing both water use and nutritional outcomes.

A water security framework was shared, integrating availability, access, quality, and governance, with a recommendation to include community-level indicators. Concluding his address, he reiterated the importance of collaboration, stressing that IWMI's value lies in delivering science-backed, evidence-based, and stakeholder-driven outcomes through strong partnerships.

Overview of CGIAR Climate Action Program

Dr. Giriraj Amarnath, Principal Researcher at IWMI and Interim Deputy Director of the CGIAR Climate Action Science Program, delivered a detailed overview of the CGIAR Climate Action Program, framing it against Tamil Nadu's rising climate risks and the need for integrated, long-term resilience strategies.

He highlighted IWMI's commitment to science-based solutions for water management, disaster risk reduction, and climate adaptation, stressing the importance of harnessing data, AI models, and early warning systems. Drawing on real examples such as the 2015 Chennai floods, he illustrated how IWMI's tools—including SADMS and the AWARE platform—are shifting disaster management from reactive responses to proactive, data-driven planning.

Dr. Amarnath reiterated IWMI's active collaboration with Tamil Nadu's government agencies and recommended co-developing a customized Climate-Smart Governance (CSG) Dashboard. This tool would enable the state to track climate performance, integrate sectoral actions, and support real-time decision-making.

He underscored the importance of evidence-based planning, emphasizing the need to strengthen convergence between scientific data, local governance systems, and investment planning. He proposed tailoring the CSG Dashboard for key state departments to integrate climate information, sectoral indicators, and risk analytics into daily governance workflows.
A central theme of his address was inclusion and equity. He stressed that climate interventions must deliberately benefit vulnerable groups—including women, tribal communities, and smallholder farmers—and called for mainstreaming gender and social inclusion across all program components. Noting that climate action often remains fragmented, he advocated for a co-design approach involving multiple government departments, NGOs, technical institutions, and communities.

He concluded with a call to action for stronger data integration, interdepartmental coordination, and sustained stakeholder engagement to ensure effective and scalable climate adaptation. Dr. Amarnath encouraged policymakers, researchers, and practitioners to leverage IWMI's scientific expertise and digital platforms to advance a more climate-resilient Tamil Nadu.

Special Remarks

Tmt. Sudha Ramen, IFS, Member Secretary of the State Planning Commission, Government of Tamil Nadu, underscored the state's strong and measurable progress in climate action, noting Tamil Nadu's remarkable rise from 16th to 1st place in NITI Aayog's national assessments within just four years. She emphasized that Tamil Nadu's leadership

goes beyond policy formulation to ground-level implementation, particularly through decentralized, village-focused climate adaptation initiatives.

She highlighted the state's proactive recognition of heatwaves as a state-specific disaster, which has enabled the development of a comprehensive, multi-sectoral heat mitigation strategy led by the Department of Public Health. This approach, she noted, reflects the government's ability to anticipate emerging climate risks and act decisively.

Tmt. Sudha outlined Tamil Nadu's increasing reliance on data and digital systems—including the Disaster Data Portal and the Tamil Nadu Land Use Information System (TNLUIS)—to support evidence-based planning, real-time monitoring, and coordinated response. She also emphasized the importance of collaborative governance, acknowledging the contributions of UNDP and various state departments in shaping the Chennai Climate Strategy and broader resilience initiatives.

Balancing recognition of progress with constructive critique, she called for greater coherence among the many agencies engaged in climate work. She stressed the need for practical, actionable recommendations, noting that the state requires implementable solutions rather than additional reports.

She concluded by reaffirming Tamil Nadu's openness to long-term partnerships and invited IWMI/CGIAR, and other stakeholders to work closely with the state over the next five years to advance climate resilience, strengthen institutional capacity, and scale transformative solutions.

Special Remarks

Smt. Madhavi Yadhav, IFS, from the Tamil Nadu Climate Change Mission, Department of Environment, emphasized that while Tamil Nadu has shown strong commitment to climate action, critical information and research gaps continue to constrain progress. She highlighted the need for collaborative and science-informed approaches to bridge these gaps and ensure that research is effectively translated into operational strategies.

She outlined several proactive initiatives undertaken by the Government of Tamil Nadu, including programs promoting solar energy adoption, kitchen gardens, environmental education through nature camps, and the creation of carbon-neutral urban hubs and climate-resilient villages. These initiatives, she noted, reflect the state's effort to embed climate action across sectors and communities.

Tmt. Yadhav underscored the importance of sustained investment in both mid-term and long-term adaptation planning, stressing that scientific research must continue to guide policy decisions and on-ground implementation. She highlighted the state's flagship missions—the Green Mission, Climate Change Mission, Wetland Mission, and Coastal Restoration Mission—as key pillars advancing multisectoral mitigation and adaptation efforts.
She also shared notable achievements, including the planting of over 10 crore saplings and the conservation and restoration of 20 Ramsar wetlands, demonstrating the scale and impact of Tamil Nadu's environmental leadership.

She concluded with a call for urgent, inclusive, and sustained collaboration, emphasizing that collective action across government, scientific institutions, civil society, and communities is essential to meet the state's climate resilience goals.

Panel Discussion: Transforming Vulnerability to Resilience: Shaping Climate Action Pathways for Tamil Nadu

Moderator: *Dr. S. Kanmani, Professor and Head, Department of Civil Engineering, Anna University*

Panellists:

- **J. Venkataramanan**, Deputy Director of Agriculture and Special Officer to the Agriculture Production Commissioner, Government of Tamil Nadu
- **G. R. Radhakrishna**, Deputy Chief Engineer, Water Resources Department, Government of Tamil Nadu
- **M. S. Vaidyanathan**, Tamil Nadu Disaster Risk Reduction Agency
- **Prof. N. K. Sathyamoorthy**, Professor and Head, Agro Climate Research Centre, Tamil Nadu Agricultural University (TNAU)
- **Prof. Balaji Narasimhan**, Professor, IIT Madras

Pictured above: Moderator and panellists seated at the launch of the CGIAR Climate Action Program in Tamil Nadu (*photo:* Tanmoy Bhaduri/IWMI)

Question to J. Venkataramanan
How is the Department of Agriculture integrating climate-smart agriculture into its programs to build resilience among farmers in vulnerable districts? How can collaboration with the CGIAR Climate Action Program enhance evidence-based decision-making, digital advisories, agriculture-related early warning systems, and access to climate finance for Tamil Nadu's agri-sector?

Response
J. Venkataramanan emphasized Tamil Nadu's long-standing commitment to climate-smart agriculture, anchored in the State Action Plan on Climate Change (2011–12, updated in 2020). He highlighted major initiatives including:
• Promotion of organic and natural farming, with an annual allocation of ₹200–250 crore
• Crop diversification, enhanced soil organic carbon, and region-specific climate-resilient practices
• Expansion of soil testing laboratories and provision of bio-organic inputs
• Regular evaluation of schemes and modernization of outdated practices such as SRI
• Distinguishing short-term weather variability from long-term climate trends for better planning
He noted that crop insurance is being expanded—especially in horticulture—and advocated for targeted, region-specific interventions supported by structured planning, strong monitoring, and clear timelines.

Mr. Venkataramanan welcomed deeper partnership with the CGIAR Climate Action Program to strengthen digital advisories, early warning systems, climate finance linkages, and data-driven decision-making, and expressed readiness to share Tamil Nadu's experiences for aligned action.

Question to G. R. Radhakrishna
What are the department's strategies to improve water governance and infrastructure resilience under climate variability? How might the CGIAR Climate Action Program support water productivity assessments and data-driven planning in Tamil Nadu's water sector?

Response
G. R. Radhakrishna highlighted Tamil Nadu's heritage of community-managed water systems, particularly the vast network of nearly 40,000 tanks and lakes, which historically provided exceptional climate resilience. Over 30,000 of these water bodies are now managed by the Water Resources Department.
He described current priorities:
• Revival and modernization of tanks through integrated water resources management, supported by the World Bank
• Upgrading tank infrastructure and improving flood forecasting systems
• Implementing real-time reservoir operations for improved water allocation
• Addressing sedimentation that has reduced tank storage by up to 60%

He stressed the need for partnerships with IWMI and CGIAR to advance climate-resilient planning, dynamic decision tools, engineer capacity building, and restoration of traditional systems to strengthen rural and agricultural resilience.

Question to M. S. Vaidyanathan
How is TNSDMA institutionalizing anticipatory action and early warnings for hydro-climatic risks? How can CGIAR partnerships strengthen impact-based forecasting and early finance in Tamil Nadu's disaster risk management?

Response
M. S. Vaidyanathan outlined Tamil Nadu's transformation in disaster preparedness since the 2015 Chennai floods, including:
• Establishment of a Multi-Hazard Monitoring and Early Warning Centre aligned with international best practices
• A 24/7 Disaster Management Smart System for real-time monitoring

• Public alerting tools such as the TN Alert app and expanding siren networks
• Recognition that Tamil Nadu now faces a “new climate reality,” with extreme events occurring across both monsoons
He highlighted challenges:
• Nearly half of Tamil Nadu experiences drought-like conditions, despite adequate annual rainfall
• Sudden rains in the Cauvery delta often damage harvest-ready crops
• Crop insurance cannot always keep pace with recurring losses
He emphasized the potential of traditional land classifications (Kurinji, Mullai, Marutham, Neytal, Palai) for sustainable land-use planning.

Mr. Vaidyanathan urged IWMI and CGIAR to provide technology and solutions for both flood and drought resilience, emphasizing stronger institutional convergence and partnerships to support state-wide adaptation.

Question to Prof. N. K. Sathyamoorthy
What innovations from TNAU help farmers manage climate risks through improved forecasting and agronomic decision tools? How can TNAU’s platforms be leveraged with CGIAR to co-develop climate-smart extension models?

Response
Prof. N. K. Sathyamoorthy highlighted TNAU’s leadership in climate-informed agriculture, including:
• A three-tier forecasting system: Seasonal (3 months), extended-range (15–21 days), and short-term localized forecasts
• District-level seasonal rainfall predictions to guide crop choices
• A holistic “smart” framework: climate-smart, water-smart, breed-smart, carbon-smart, and market-smart practices
• Integration of weather data with pest and disease alerts delivered through mobile applications
• Use of drone and satellite data for five-yearly crop zoning and climate suitability mapping

He emphasized TNAU’s robust remote-sensing and gridded data capabilities as ideal for collaboration with CGIAR to co-develop:
• Localized digital advisories
• Methane mitigation practices in rice
• Climate-smart extension models
• Weather-indexed insurance products

Question to Prof. Balaji Narasimhan
What role do hydrological and systems modeling play in climate-resilient infrastructure and urban flood mitigation? How can CGIAR support the integration of multi-hazard modeling into district-level climate planning?

Response
Prof. Balaji Narasimhan stressed that hydrological and systems modelling is central to climate-resilient infrastructure design, particularly for managing urban floods. He highlighted:
• A pioneering real-time data acquisition and syncing system developed with the State Planning Commission and Water Resources Department, currently piloted in Chennai, forming the backbone of a future state-wide urban flood strategy
• The critical role of Tamil Nadu’s 42,000 water bodies and their cascading networks in ensuring resilience

• Challenges such as siltation, encroachment, and untreated urban waste, which are degrading these systems, especially in small cities
He warned that without structured planning, these tanks—once assets—may become liabilities for climate adaptation.

Prof. Narasimhan recommended large-scale studies to repurpose and rehabilitate tanks and invited IWMI / CGIAR to lead such research with their modelling and data expertise. He emphasized integrating multi-hazard modelling, risk mapping, and urbanization trends into district-level climate adaptation plans.
He concluded by advocating for participatory, localized water governance and welcomed deeper collaboration with CGIAR and IWMI to advance Tamil Nadu's water resilience agenda.

Interactive session with the participants

The session was held by recalling the day's discussions on the focus areas including climate services, state government disaster management, locally led adaptation, and the intersections of policy, institutions, and finance. The participants were encouraged to share information about their respective organizations and ongoing work related to these thematic areas.

Dr. Pradeeps from Council on Energy, Environment and Water (CEEW) discussed their ongoing collaboration with the Tamil Nadu State Disaster Management Authority on the development of a Heat Wave Action Plan. A central focus of this initiative is the integration of environmental elements, particularly the role of water bodies as non-structural measures to mitigate the risks of heat waves in urban areas. He emphasized the importance of conserving and revitalizing both major and minor water bodies—such as tanks, lakes, and ponds—within city landscapes. The Heat Wave Action Plan takes a granular approach by mapping these water bodies and assessing their potential to reduce temperature impacts during summer.

He also highlighted the integration of blue and green infrastructure as part of a nature-based solution framework. This includes the revival of water bodies and the use of treated wastewater to support urban green cover, thereby enhancing resilience through the creation of green belts and buffers.

In response Dr. Giriraj Amarnath, suggested that such Heat Wave Action Plans could be further strengthened by formal linkages with the State Disaster Management Authority. He noted that tools being developed under this framework could be aligned with water-level interventions and integrated with forecast data from agencies such as the TNAU and the Meteorological Department. This would enhance the practical utility of the action plans and enable more robust planning and coordination.

Following this, Sh. G.Amuthan from the Department of Agricultural Engineering, Government of Tamil Nadu, introduced his department's work and its relevance to the themes discussed during the day. He shared insights on their pioneering efforts in catchment-area treatment and the distribution of dammed river water to both valley and head regions. Tamil Nadu is the first state in India to implement such an approach, aimed at addressing localized water scarcity by channelling available resources efficiently. He emphasized the importance of water conservation as a core element of climate adaptation.

Over the past seven to eight years, the department has created approximately 20,000 farm ponds under various state government schemes to enhance water harvesting. He noted that these initiatives are being actively promoted and supported through targeted

programs for farmers. Furthermore, the department has undertaken extensive tank infrastructure improvements. Out of the 14,000 tanks in the state, about 12,000 have been strengthened in the last four years through multiple schemes.

He also detailed advancements in water use efficiency through pressurized and micro-irrigation systems, covering around 900 hectares over six years, making Tamil Nadu a leader in this area. In addition, approximately 12,000 solar pumps have been distributed to farmers over the past decade. The department is also implementing drought-oriented irrigation programs, particularly in hilly regions using reservoir-fed systems. In rural areas, about 800 new water facilities have been developed in villages over the last six years. They are also introducing water recharge structures using borewells and open lands to improve local water availability.

Importantly, the department plays a dual role in both flood and drought relief measures. In delta regions, it has taken on the responsibility of desilting C, D, and D+ irrigation channels—work that was previously carried out by farmers as needed. Over the past four years, this effort has been institutionalized to reduce water stagnation and improve irrigation efficiency. While A and D+ channels fall under government purview, the inclusion of C and D+ channels in desilting programs marks a significant shift in policy implementation. Mr. Amudan concluded by mentioning that 27 project proposals have been submitted by the department, with some expected to be implemented under the recently updated MNREGA framework.

Dr. Oliver King, Director, Water Technology Centre, M. S. Swaminathan Research Foundation (MSSRF), , shared key insights into the Foundation's work across various agro-ecological regions. He emphasized MSSRF's focus on climate adaptation and building resilience among indigenous and tribal communities, as well as in urban and peri-urban areas. One of the central themes he discussed was the promotion of spring-shed development in hilly regions, where falling water tables threaten food security—particularly in rice-producing valley belts. To address this, MSSRF is working to restore traditional water bodies by combining indigenous knowledge with modern technology, aiming to meet both drinking and irrigation water demands.

He also addressed climate risks impacting local cropping systems, especially those based on pulses and millets. He explained how MSSRF supports the adoption of climate-adaptive farming practices that safeguard food and nutritional security for smallholder farmers. He highlighted ongoing work by MSSRF, who is advancing an integrated framework that connects biodiversity, nutrition, and health. A key element of this framework is the "OneHealthConcept," which aligns with state-level climate action and integrates Water, Sanitation, and Hygiene (WASH) as a critical pillar of climate resilience. Sh. Oliver noted that the restoration and interlinking of traditional water systems is foundational to this approach.

Sh. Bharath J, Meteorological Expert at the Tamil Nadu State Disaster Management Authority (TNSDMA), provided updates on meteorological innovations being implemented in the state. He shared that the newly established meteorological centre under TNSDMA has made significant progress with the installation of Automatic Weather Stations (AWS) across Tamil Nadu, which are now operational year-round and offer real-time data. Mr. Bharath emphasized the importance of leveraging this data for planning and decision-making across sectors and encouraged its use for generating value-added services that can benefit both government agencies and citizens.

He also introduced the KMLF mobile application developed by TNSDMA, which delivers real-time weather information and multi-hazard forecasts. The app, which continues to evolve, integrates forecasting models from global to local scales and

serves as a tool for improving public awareness, research, and preparedness. He encouraged participants to promote the app through their networks to broaden its impact.

Dr. Giriraj Amarnath contributed to the discussion by focusing on climate services and investment models. He introduced the Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA) program, a large-scale initiative supported by the World Bank. The program addresses climate services across the full value chain, particularly within agriculture. A notable component he discussed was the Accelerator Grant Program, which supports startups and small and medium enterprises (SMEs) in delivering services—such as market linkages and renewable energy integration—to an estimated 75,000 smallholder farmers. He emphasized the need for financial sustainability in operating weather infrastructure like AWS. While he acknowledged the importance of open-access climate data, he stressed that its true value lies in developing meaningful, value-added products that engage end-users. He cited a compelling figure—that for every dollar invested in climate services, the return can be as high as twenty-two dollars—illustrating the strong case for sustained investment. He concluded by offering to share successful investment models and case studies from the AICCRA program to help guide future efforts in developing climate-smart, user-centred solutions.

Dr. K P Raghunath, Professor at Tamil Nadu Agricultural University (TNAU) emphasized the urgent need to translate existing climate adaptation technologies into practical applications for farmers. He pointed out that although many site- and occupation-specific innovations have been developed over the past decade, the real challenge lies in their effective and sustained implementation to ensure agricultural resilience. He highlighted the importance of hyper-localized forecasting, arguing that current climate forecasts—often generated at district or block levels—must be scaled down to village or sub-village levels to be genuinely useful for farmers and local decision-makers.

Dr. Raghunath also stressed the significance of long-term sustainability for adopted technologies, advocating for institutional support, structured capacity-building programs, and government involvement to ensure continuity. He brought attention to the critical role of irrigation tanks in Tamil Nadu, noting that while major reservoirs are monitored by the Public Works Department (PWD), smaller tanks lack comprehensive data management despite their key role in determining local cropping patterns. Furthermore, he shared findings from TNAU's research on the Length of Growing Period (LGP), which has shown a reduction in rainfall intensity and duration over the last 10–15 years. This trend has led to shorter viable cropping periods, increasing the risk of crop losses due to adverse weather during harvest. He emphasized that adjusting sowing windows in response to these shifts could mitigate risks and improve outcomes. His remarks reinforced the call for data-driven planning, localized interventions, and the integration of traditional water systems into climate adaptation frameworks.

In response, Dr. Giriraj Amarnath welcomed the insights shared by TNAU and invited the team to contribute summarized inputs to inform future collaborative efforts. He underscored the importance of assessing tank storage volumes for improved water resource planning. Dr. Amarnath introduced a recent initiative conducted in partnership with the Central Water Commission (CWC) and the National Institute of Hydrology (NIH), which uses satellite-based techniques to estimate the storage capacity of small tanks and reservoirs, including those as small as one hectare. This initiative employs data from Sentinel satellites and other remote sensing tools to generate time-series estimates of storage volumes, and it has been operationalized through a tool known as

the TRACE Toolbox. The approach offers a next-generation method for tracking volumetric changes in small reservoirs using space-based observations. He also discussed the application of this methodology in larger regional studies, such as in the Ganga Basin, with potential for multi-basin and inter-basin assessments. A web-based platform has been developed to allow users to access time-series data for any mapped water body, with visible trends during periods of drought. He expressed his willingness to share access to this tool with stakeholders and stated that the platform would be hosted under CWC's authority while also being made available to state governments, including Tamil Nadu, to support better-informed decision-making and resilience planning.

Dr. Kirthiga Murugesan from the World Resources Institute (WRI) emphasized the transition from deterministic to probabilistic, impact-based weather forecasting.

Another representative from the Tamil Nadu State Disaster Management Authority (TNSDMA) highlighted the ongoing efforts to strengthen the state's meteorological observation infrastructure. While Tamil Nadu has about 1400 Automatic Rain Gauges (ARGs), older units have been decommissioned, and expansion of the Automatic Weather Stations (AWS) network is a priority, especially in regions like Ramanathapuram and Chennai. The representative highlighted neighbouring state, Karnataka's use of a mobile application that delivers advisories through messages and interactive voice calls, suggesting Tamil Nadu consider adopting a similar model. However, challenges remain in ensuring that farmers actively use such technological platforms, underscoring the need for improved outreach and accessibility.

During the event, Sh. Alagappan Ramanathan from United Nations Development Programme (UNDP) Sustainable Development Goals Coordination Centre (SDGCC), Tamil Nadu, shared their appreciation for the interventions presented by IWMI, particularly in strengthening the food–water–energy nexus and the upcoming CGIAR Climate Action Programme. The SDGCC team noted the programme's potential to support food systems in adapting to climate vagaries and in providing farm-level strategies to mitigate climate risks. They highlighted that SDGCC, established by UNDP as a policy think tank to the Government of Tamil Nadu, works across sectors such as sustainable transport, mobility, skills, employment, and livelihoods, while also focusing on improving low-performing SDG indicators. In the agriculture and allied sectors, SDGCC expressed interest in partnering with IWMI to jointly develop adaptation and mitigation strategies for specific indicators where Tamil Nadu lags behind. These include SDG Indicator 12.4, which measures the percentage use of nitrogenous fertilizers (TN ranks 11th with a score of 59.84 against a target of 55.60), and SDG Indicators 15.3 and 15.4, which track the increase in desertification (TN ranks 16th with a score of 3.63, higher than the national average of 1.5, with a target of 0). In this context, SDGCC looks forward to supporting and collaborating with the CGIAR Climate Action Programme to improve Tamil Nadu's performance on these indicators.
A government representative shared insights into Tamil Nadu's climate-resilient agriculture initiatives, emphasizing the need for expanded observational infrastructure and strategic interventions. The representative highlighted the state's focus on increasing the density of AWS to support parametric crop insurance schemes and emphasized that Tamil Nadu allocates ₹20,000–25,000 crores annually to agriculture within a larger ₹50,000 crore climate-resilient agriculture budget. Collaborations with the Government of India and CGIAR were encouraged to scale up AWS installations.
Dr. Giriraj Amarnath emphasized the importance of coordination and prioritization across departments and stakeholders in the implementation of the six-year climate resilience program. He acknowledged the wide array of interventions and contributions already emerging, while noting the practical need to phase implementation strategically.

Key Takeaways from CGIAR Climate Action Program Launch in Tamil Nadu

Targeted Engagement on Priority Areas:

Stakeholders are encouraged to identify and share specific priority or grey areas where focused interventions are needed. This will help in streamlining actions across departments, research institutions, and development partners.

Smart Governance Dashboard and Early Warning Systems:

Tools such as the Smart Governance Dashboard and multi-hazard early warning systems, as referenced by organizations including UNDP and the M. S. Swaminathan Foundation, will play a central role in improving response capabilities.

Capacity Building through Internship Programs:

IWMI's Climate Action Program includes internship opportunities, with financial support available. He encouraged universities to collaborate in skill development highlighting that IWMI internships have historically led to excellent career opportunities for participants.

Next Steps and Financial Strategy:

The immediate focus will be on finalizing priorities for the next 8 months, while concurrently shaping the five-year programmatic roadmap. Given the limited availability of international funds, efforts will be made to leverage state-level financial support through partnerships with institutions like NDMA and the State Disaster Management and Drought Mitigation Program.

Convergence and Model Villages:

Emphasizing the need for integration of mitigation and adaptation efforts, Dr. Amarnath proposed the selection of model villages—preferably where strong adaptation work is already underway. These would serve as demonstration sites, potentially supported by global and national experts to ensure deeper technical engagement and scalable outcomes.

Dr. Amarnath concluded by encouraging all stakeholders to actively engage in the next phase of program planning and implementation, ensuring resource convergence and local relevance.

Way Forward

Dr. Alok Sikka concluded the session by acknowledging the richness of the discussions and the active participation from all attendees. He emphasized that while the dialogue sparked numerous valuable ideas, it is critical to recognize the need for prioritization emphasizing on time and resources. Dr. Sikka noted that lack of prioritization often hampers effective implementation. In this context, he highlighted the importance of strategic convergence across departments such as water resources, agricultural engineering, and disaster management to align efforts towards a shared goal, even if the approaches vary.

He highlighted the need to select geographic focus areas where both flood and drought risks are prevalent or where multiple hazards exist. This would enable targeted, impactful interventions. He also stressed the importance of parsimony, maximizing value with minimal resources, and encouraged collaborative use of institutional and financial capacities to achieve collective outcomes.

Dr. Sikka reiterated a common challenge where a substantial volume of data exists, much of it remains disparate and siloed, limiting its significance. He urged stakeholders to focus on transforming this existing data into actionable knowledge products and decision-support tools. He pointed out that while government departments may have resource constraints, city centres and research bodies are well-positioned to curate and analyse such data to produce user-centric outputs.

He closed with a forward-looking message, affirming that this engagement marks the beginning of a collaborative journey, not the conclusion. Dr. Sikka extended his thanks to all participants and expressed optimism for building stronger, more impactful partnerships in a phased and prioritized manner.

Annexure A.

Workshop Agenda

Time	Topic	Speaker
09:00 – 09:30	Participants arrival and registration	IWMI
09:30 – 09:40	Welcome remarks	Dr. Alok Sikka Country Representative, India & Bangladesh/ Senior Fellow, IWMI
09:55 – 10:05	Special remarks	Tmt. S. Sudha, IFS Member Secretary, State Planning Commission, Govt. of Tamil Nadu
10:05 – 10:15		Tmt. Madhavi Yadhav IFS Tamil Nadu Climate Change Mission, Department of Environment
10:15 – 10:25	About IWMI	Dr. Alok Sikka
10:25 – 10:50	Overview of CGIAR Climate Action Science Program	Dr. Giriraj Amarnath Principal Researcher, IWMI / Interim Deputy Director – CGIAR Climate Action Science Program
10:50 – 11:00	Remarks from Mr Pothupani Thilagam, Joint Chief Engineer, Water Resources Department	
11:10 – 11:20	Technical Presentation - Mr. Pradeep John, Manager, Tamil Nadu Urban Infrastructure Financial Services Ltd (TNUIFSL)	
11:20 – 12:20	**Panel discussion - Transforming Vulnerability to Resilience: Shaping Climate Action Pathways for Tamil Nadu** Moderated by Dr. S. Kanmani Professor and Head of Civil Engineering Department of Civil Engineering, Anna University • J. Venkataramanan, Deputy Director of Agriculture and Special Officer to the Agriculture Production Commissioner, Government of Tamil Nadu • G R Radhakrishna, Deputy Chief Engineer, Water Resources Department, Government of Tamil Nadu • M.S. Vaidyanathan, Tamil Nadu Disaster Risk Reduction Agency • Prof. N K Sathyamoorthy, Professor and Head, Agro Climate Research Centre, Tamil Nadu Agriculture University (TNAU) • Balaji Narasimhan, Professor, IIT Madras	
12:20 – 13:15	**Group Discussion**	
13:15 – 13:30	Closing remarks and way forward	IWMI and Partners

Annexure B.

List of Participants

SL No	Name	Designation	Organization
1	Tmt. S. Sudha Ramen	Member Secretary, State Planning Commission	Govt. of Tamil Nadu
2	Tmt. Madhavi Yadhav	Assistant Mission Director, Tamil Nadu Green Mission	Govt. of Tamil Nadu
3	G R Radhakrishna	Deputy Chief Engg, Water Resources Department	Govt. of Tamil Nadu
4	G A Deheebakaran	Professor	TNAU
5	Balaji Narasimhan	Professor	IIT Madras
6	S Kanmani	Centre for Climate Change and Disaster Management	Anna University
7	Dr Pradeeps		CEEW
8	Oliver King	Director, Water Technology Centre	MSSRF
9	Sripriya Paranthaman	Associate Professor	IIT Madras
10	Pradep John		TNUIFSL
11	R Murugesan	Chief Engineer	Agricultural Engineering Department
12	N K Sathyamoorthy	Professor and Head, Agro Climate Research Centre	TNUA
13	K P Raghunath	Professor	TNAU
14	M S vaidyanathan		TNDRRA
15	Alok Sikka	Country Representative	IWMI
16	Giriraj Amarnath	Principal Researcher	IWMI
17	Sudharsan M	Research officer	IWMI
18	Alagappan Ramanathan	Development Goals Specialist- Sustainable Transport and Mobility	United Nations Development Programme
19	Suman Padhee	Researcher	IWMI
20	Gulshan Borah	Coordinator	IWMI
21	Tanmoy Bhaduri	Comms Consultant	IWMI
22	Chitra Yadav	Admin Officer	IWMI
23	Karishma Shalu		TNDRRA
24	Neha Soni	Journalist	The Hindu
25	Mirra M	Journalist	The Hindu
26	C Pothupani Thilagam	Water Resources Department	Govt. of Tamil Nadu
27	Kaveyan S		TNDRRA
28	S Govindaraju	State Planning Commission	Govt. of Tamil Nadu
29	Ahmed Ibrahim	CCCDM	Anna University
30	R Malarriodi	Project Scientist	Anna University
31	Gayathi J	CCCDM	Anna University
32	S pavithrapriya	CCCDM	Anna University

33	Geetha Srimathi	Journalist	The Hindu
34	Girigan Gopi		MSSRF
35	Bavithra R		IIT Madras
36	J Venkataramanan	Spl. Officer, Ag Sec	Govt. of Tamil Nadu
37	Syed Ali G	Officer, APC Cell	Govt. of Tamil Nadu
38	Analiya MJ		TNDRRA
39	Adhirai SJ		The Hindu
40	M R Jaishankar		CRTCL
41	Sai Amritha Varshini S		The Hindu
42	Bharath J		TNDRRA
43	Kavitha Nalargan	Water Resources Department	Govt. of Tamil Nadu
44	Kirthiga SN		IIT Madras
45	G.Amuthan	Agricultural Engineering Department	Govt. of Tamil Nadu

CGIAR is a global research partnership for a food-secure future. CGIAR science is dedicated to transforming food, land, and water systems in a climate crisis. Its research is carried out by 13 CGIAR Centers/Alliances in close collaboration with hundreds of partners, including national and regional research institutes, civil society organizations, academia, development organizations and the private sector. www.cgiar.org

To learn more about this program, please visit: https://www.cgiar.org/cgiar-research-porfolio-2025-2030/climate-action/

Contact
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