

National Workshop on Drought Management: Knowledge Products and Tools for Sri Lanka

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CGIAR Climate Action Program

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Table of Contents

List of Figures	3
Introduction	4
Workshop Objectives	5
Workshop Proceedings	5
Setting the Scene	5
Welcome Remarks	6
Opening Remarks	7
Drought Risk in Sri Lanka	8
Introduced Drought Risk Management Framework	9
IWMI's Digital Tools for Drought Monitoring and Risk Management	10
Drought Financing Tool	11
Introduction to the National Drought Action Plan	12
Introduce the IWMI/CGIAR Drought Action Catalyst	13
Rice Mapping Innovation in Sri Lanka	13
Discussion	13
Closing Remarks	14
Annexures	15
Annexure 1: Workshop agenda	15
Annexure 2: List of Participants	16

List of Figures

Figure 1: Dr Giriraj Amarnath is setting the scene for the workshop.....	6
Figure 2: Prof Ian Overton provided the welcome remarks.	7
Figure 3: Ms Nilmini Wickramarachchi, Director, Natural Resources Management Division of the Ministry of Environment, provided the opening remarks.....	8
Figure 4: Dr Giriraj Amarnath is introducing the drought risk in Sri Lanka.	9
Figure 5: Ms. Sepali de Silva, Assistant Director, Ministry of Environment is introducing the drought risk management framework for Sri Lanka.....	10
Figure 6: Dr Niranga Alahacoon introduce the IWMI tools on drought risk management.	11
Figure 7: Dr Menuka Udugama is introducing the drought financing tool.	12

National Workshop on Drought Management: Knowledge Products and Tools for Sri Lanka

Introduction

Drought is a slow-onset, highly complex natural hazard that often develops quietly yet causes widespread, long-lasting damage to communities, economies, and ecosystems. Unlike sudden disasters such as floods, landslides, or cyclones, droughts emerge gradually and can last for months or even years, making them difficult to forecast, track, and manage. In Sri Lanka, droughts have become more frequent, longer-lasting, and severe in recent decades. Many districts face repeated dry spells that disrupt rural livelihoods, reduce household incomes, and deepen social and economic inequalities. Climate variability has worsened this situation by altering rainfall patterns, increasing evapotranspiration rates, and shifting the timing and severity of seasonal droughts. These issues are further aggravated by growing water demand, land degradation, and fragmented institutional responses. Although awareness of drought impacts is increasing, most national and local responses remain reactive, focusing on relief after a crisis rather than on preparedness and resilience-building.

In the context of growing climate uncertainty, this approach is no longer adequate. A transition toward proactive drought risk management (DRM) is urgently needed. To address this, the International Water Management Institute (IWMI), in partnership with the Ministry of Environment's Natural Resource Management Division, organized a national workshop on drought management. The event will showcase IWMI's drought resilience efforts, with special attention to the Sri Lanka Drought Management System (SL-DMS) and the AWARE platform, both designed to support anticipatory action, risk mapping, and evidence-based decision-making. The workshop aims to strengthen the capacity of key actors across government, NGOs, development organizations, and humanitarian agencies to shift from reactive crisis management to proactive, coordinated drought risk strategies. It will also host a multi-agency dialogue on national drought management planning, led by the Sri Lanka Drought Management Technical Working Group (TWG).

IWMI will share lessons from its role in creating Zambia's National Drought Action Plan. Additionally, IWMI, representing CGIAR, will introduce the newly launched Drought Action Catalyst initiative, presented at United Nations Convention to Combat Desertification (UNCCD) COP16 - The sixteenth session of the Conference of the Parties in Riyadh, which promotes an integrated approach to drought management by combining advanced technologies (such as AI and decision-support systems) with social innovation to strengthen resilience. These shared experiences will offer critical guidance for enhancing Sri Lanka's drought preparedness. The CGIAR Climate Action Initiative supports the event. Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF) workshop focuses on enhancing drought management strategies in Sri Lanka, a collaborative effort between the Sri Lankan government and the International Water Management Institute (IWMI), emphasize a critical shift from a reactive to a proactive approach in handling droughts.

Workshop Objectives

The workshop concentrates on the following key objectives:

- Enhance Understanding of Drought Risks to build foundational knowledge on the causes, types, and impacts of droughts in the Sri Lankan context and globally.
- Strengthen Capacity in Proactive Drought Management by introducing principles and practices of drought risk reduction, including risk assessments, early warning systems, and preparedness measures.
- To familiarize participants with the concept and operationalization of anticipatory action in rough contexts, including the development and validation of protocols.
- Promote the use of Tools and Technology to train participants in the application of geospatial data, forecasting models, and risk mapping tools for informed planning and decision-making.
- To encourage dialogue and collaboration between government officials, academia, and humanitarian actors for integrated drought risk management.

Workshop Proceedings

Setting the Scene

Dr Giriraj Amarnath, Research Group Leader, IWMI, opened the workshop by highlighting its timeliness, given Sri Lanka's increasing climate variability, which leads to both floods and droughts (Figure 1). He described drought as a slow-onset, crippling disaster that often receives less attention than more sudden events like floods or landslides. Detailing the cascading impacts of drought, he explained that it is a multi-sectoral issue affecting crop failure, livelihoods, hydropower, drinking water supplies, and public health.

The primary purpose of the workshop, he stated, was to showcase existing knowledge products and tools that can help Sri Lanka shift towards a more proactive disaster risk management strategy. He emphasized the need for collective action and partnership, as drought management is too complex for any single ministry to handle alone. He mentioned the importance of institutionalizing these tools so they can be effectively used nationally. As shown in Annexe 2, 30 participants from different ministries and institutions attended the workshop.



Figure 1: Dr Giriraj Amarnath is setting the scene for the workshop. (Photo: Sampath Ranawaka/IWMI)

Welcome Remarks

Prof Ian Overton, the Country Manager for IWMI Sri Lanka, welcomed the participants on behalf of IWMI, noting the organization's long history in Sri Lanka (Figure 2). He discussed growing drought challenge in Sri Lanka, emphasizing that its slow onset often leads to a lack of preparedness. He pointed out that the national response has historically been reactive, providing aid only after the damage has been done.

The workshop, he says, represents a critical shift from a reactive to a proactive approach. He proudly introduces two key IWMI initiatives designed for anticipatory action: the Sri Lanka Drought Management System and the AWARE platform, which use data and forecasting to enable timely decisions. Dr. Overton framed the event as an opportunity to build capacity, share knowledge, and foster collaboration while appreciating key partners like the CGIAR Climate Action initiative and the Ministry of Agriculture, Forestry, and Fisheries of Japan for their support.



Figure 2: Prof Ian Overton provided the welcome remarks. (Photo: Sampath Ranawaka/IWMI)

Opening Remarks

Ms Nilmini Wickramarachchi, Director of the Natural Resources Management Division of the Ministry of Environment, spoke on behalf of the Ministry (Figure 3). She reiterated Sri Lanka's commitment to the UN Convention to Combat Desertification and Drought (UNCCD). She recounted the Ministry's efforts, including the development of a National Drought Plan in 2020. A subsequent review found that while many agencies were active in drought management, coordination was significantly lacking. To address this gap, she announced that a national technical working committee on drought management is being established.

She explained that this workshop was organized in collaboration with IWMI to share the institute's valuable tools and experiences with the agencies that will form this committee. She highlighted that the main goal of the new committee will be to promote proactive measures against drought hoping that the workshop will equip stakeholders with the knowledge and understanding needed to achieve this.



Figure 3: Ms Nilmini Wickramarachchi, Director, Natural Resources Management Division of the Ministry of Environment, provided the opening remarks. (Photo: Sampath Ranawaka/IWMI)

Drought Risk in Sri Lanka

Dr. Giriraj Amarnath continued his presentation on drought management, using Zambia as a case study (Figure 4). He explained that Zambia's economy suffered a significant blow when El Niño-induced drought wiped out over \$300 billion in tourism revenue. The lack of water had led to wildlife migrating away from national parks, leaving little for tourists to see. He highlighted the importance of watershed management and soil moisture retention. The degradation of forest cover not only impacts the energy and tourism sectors but also worsens the overall environmental crisis. He pointed out that while Sri Lanka may not appear in global drought statistics, the country was still heavily impacted. The role of scientific advancements, such as genetically modified crops and improved food storage systems, in mitigating the impact of drought on food security. He introduced the five main types of drought —meteorological, agricultural, hydrological, socioeconomic, and political, and stressed the need for a comprehensive drought manual to guide government response. A matrix of drought indicators was showcased which can be used to quantify the economic impact of drought and emphasized the importance of utilizing satellite data to fill information gaps. He mentioned that over 100 drought indices are available, but Sri Lanka must identify and use the ones most relevant to its specific context. He reviewed the Integrated Drought Management Program's three-pillar framework:

1. Monitoring and early warning
2. Vulnerability and impact assessment
3. Mitigation, preparedness, and response

While Sri Lanka has made good progress in the first pillar, he noted that more work is needed in the other two areas, particularly in developing agricultural contingency plans and ensuring strong institutional coordination. He concluded by emphasizing that innovation and technology are central to tying all these efforts together.

Participants from the audience agreed with Dr Amarnath's assessment, stating that while some progress has been made, Sri Lanka has a long way to go in implementing a comprehensive drought management strategy. He acknowledges that monitoring and early warning systems have improved, but there is still room for better institutional coordination and governance. Another participant added that the country needs to be more proactive, highlighting that the current response is often reactive. At the same time, another agreed that institutional coordination has improved but stressed that there is still a significant need for further development and implementation.



Figure 4: Dr Giriraj Amarnath is introducing the drought risk in Sri Lanka. (Photo: Sampath Ranawaka/IWMI)

Introduced Drought Risk Management Framework

Ms. Sepali de Silva, Assistant Director, Ministry of Environment, provided a comprehensive overview of the United Nations Convention to Combat Desertification (UNCCD) and its relevance to drought management in Sri Lanka (Figure 5). UNCCD is a unique, legally binding international agreement that links the environment, development, and the promotion of sustainable land management. Its primary goals are to combat desertification, mitigate the effects of drought, and restore degraded land, aligning with Sustainable Development Goal (SDG) 15.3. Drought was officially recognized as a core issue at COP13 in 2017.

The UNCCD provides countries with resources like the Drought Toolbox for early warning and vulnerability mapping and supports financing for resilience projects through its Global Mechanism. Sri Lanka developed and submitted its National Drought Plan to the UNCCD in 2020. This plan serves as a strategic framework that aligns with the country's climate change policies and disaster risk reduction strategies. Workshops have identified over 20 government agencies involved in drought-related activities.

A significant challenge she noted was the lack of coordination between these bodies. To address this, a proposal has been made to establish a Technical Working Group for drought management, co-chaired by the Disaster Management Center (DMC) and the Ministry of Environment. She also mentioned that Sri Lanka is actively involved in a regional strategy for drought risk management in South Asia, conducting case studies on insurance and the role of women, and developing project proposals for international funds like the Adaptation Fund.



Figure 5: Ms. Sepali de Silva, Assistant Director, Ministry of Environment is introducing the drought risk management framework for Sri Lanka. (Photo: Sampath Ranawaka/IWMI)

IWMI's Digital Tools for Drought Monitoring and Risk Management

Dr. Niranga Alahacoon, Regional Researcher for IWMI, demonstrated the Sri Lanka Drought Management System, a powerful online tool designed to support these efforts (Figure 6). Sri Lanka Drought Management System, a web-based platform, part of the wider South Asia Drought Monitoring System, provides critical data and analysis.

It offers short-term (10-day), sub-seasonal, and seasonal forecasts for rainfall and temperature, allowing users to anticipate future conditions. The tool uses various indices to track and monitor different types of droughts in near real-time

- Meteorological Drought: Standardized Precipitation Index (SPI) and Dry Spell duration.
- Agricultural Drought: Vegetation Condition Index (VCI) and Soil Moisture data derived from high-resolution (250m) satellite imagery.
- Hydrological Drought: Streamflow Drought Index (SDI).

The system includes a comparison tool to analyze current conditions against historical data. Although not yet fully implemented for Sri Lanka, the framework includes a contingency planning module that links specific drought triggers (e.g., low SPI values) to pre-defined actions for various sectors, as demonstrated with an example from India.

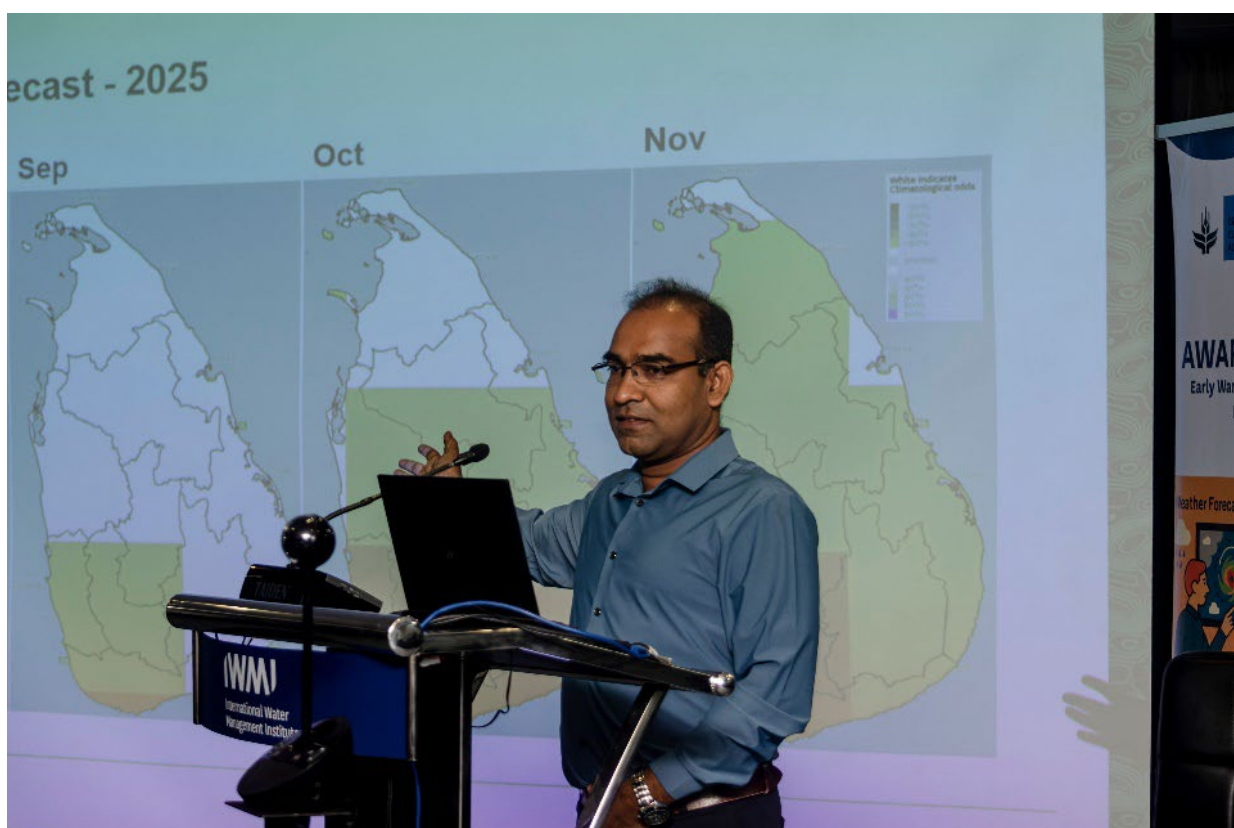


Figure 6: Dr Niranga Alahacoon is introducing the IWMI tools on drought risk management. (Photo: Sampath Ranawaka/IWMI)

Drought Financing Tool

Dr Menuka Udugama, a faculty member at Wayamba University of Sri Lanka, focused on the critical financing of drought resilience and adaptation measures in Sri Lanka (Figure 7). While global development assistance is substantial, funding specifically for natural disaster risk reduction, especially for drought, is comparatively low. According to her, key challenges in the Sri Lankan context include the varied time scales of drought, shifting political priorities, the absence of a universal definition of drought, and a lack of institutional capacity. Opportunities exist to tap government budgets, international climate funds (such as the Green Climate Fund and the Global Environment Facility), multilateral development banks, and the private sector.

She mentioned that key financing instruments include debt, bonds, and insurance. Concessional loans and instruments such as green and blue bonds (in Sri Lanka's pipeline) can fund large-scale projects. Both indemnity-based and index-based insurance can transfer risk. Index-based insurance, while more efficient, faces challenges in Sri Lanka due to limited farmer awareness and trust. There is a growing emphasis on financing nature-based Solutions. Payment for Ecosystem Services (PES) is a key model that incentivizes communities to conserve natural resources, such as forests and watersheds, helping mitigate drought. She concluded that a robust financing strategy requires improving the National Drought Plan through evidence-based prioritization, strengthening institutional support, and developing a comprehensive Drought Investment Plan grounded in cost-benefit analyses.



Figure 7: Dr Menuka Udugama is introducing the drought financing tool. (Photo: Sampath Ranawaka/IWMI)

Introduction to the National Drought Action Plan

Dr. Giriraj Amarnath presented Zambia's National Drought Plan as a case study, outlining its core components: early warning systems, water conservation, safety nets for livelihood diversification, public education, and governance. He showed detailed matrices for various sectors (agriculture, water, health) that outline specific outcomes, outputs, and activities planned over different time horizons (1-3 years, 3-5 years, and beyond), emphasizing the importance of linking these plans to existing national policies and budgets. He highlighted several innovative, nature-based solutions. One key example was the Underground Transfer of Flood Water for Irrigation (UTFI) project in India. This system captures excess floodwater, filters it, and injects it deep underground to recharge aquifers. This stored water can then be used for irrigation during dry seasons, effectively turning a flood problem into a drought solution. He discussed a "drought-proofing tool" that operates at a micro-watershed level to identify the best locations for conservation structures like check dams.

Introduce the IWMI/CGIAR Drought Action Catalyst

Dr. Giriraj Amarnath introduced the "Drought Action Catalyst," a new global initiative led by IWMI and CGIAR to help countries better anticipate and respond to drought through innovation and partnership. He unveiled an AI model named "Sukha Rakshak" (meaning "Drought Protector" in Sanskrit). According to him, unlike general AI, this tool is trained specifically on decades of reliable drought data, national drought manuals, and contingency plans to provide accurate, actionable advice in multiple local languages.

Rice Mapping Innovation in Sri Lanka

Ms. Kalpani Jayamini, Research intern, IWMI presented a new rice mapping tool developed for Sri Lanka using Sentinel-1 satellite radar data. According to her, this innovation can accurately map the total area of rice cultivation, with results for the Anuradhapura district closely matching official government statistics (98.9% accuracy). It can track cultivation progress by identifying the start date of planting on a monthly or even 10-day basis. This provides valuable, timely information for water management (e.g., optimising reservoir releases) and for assessing the impact of delayed rainfall on farming activities. She also offered to share this tool with relevant Sri Lankan departments for validation and use.

Discussion

Based on the questions and suggestions raised by the participants, the need for a strong consensus on a more integrated and collaborative approach to drought management in Sri Lanka was highlighted. A central theme was the call to establish a common body, such as an integrated panel or a dedicated technical working group, to foster collaboration among all relevant agencies. Key stakeholders, including the FAO and the Meteorology Department, affirmed the value of the new platform and confirmed their readiness to link existing data and utilize the tool in future projects, underscoring the potential for immediate collaboration.

Furthermore, participants emphasized the importance of enhancing the platform's practical utility. Suggestions included ensuring systematic national-level data reporting and strengthening data validation, with support from the Rice Research and Development Institute for validating rice mapping data. A critical recommendation was to link the platform's outputs directly with disaster relief and distribution systems, transforming it into a vital tool for informed decision-making during crises. The conversation also broadened the strategic scope of drought assessment. Key questions were raised about the need to formally define different types of drought in the Sri Lankan context and to connect these assessments to crucial metrics, such as per capita water availability.

The group advocated for a holistic approach that goes beyond immediate climate data to assess the cascading environmental, social, and economic impacts of drought, while also paying greater attention to long-term resilience strategies like groundwater recharge. Ultimately, the discussion outlined a clear vision for developing a fully integrated platform that unites key stakeholders and data sources to build a more proactive and resilient national drought management framework.

Closing Remarks

Ms. Nilmini Wickramarachchi expressed gratitude to IWMI for sharing valuable knowledge on drought tools, noting that the information provided was both useful and important. She emphasized that these tools could be applied effectively in technical work and extended an invitation to IWMI to collaborate as a technical partner. She also conveyed her sincere appreciation for the opportunity to learn from IWMI.

Annexures

Annexure 1: Workshop agenda

Time	Session title	Description	Facilitation
08.45 – 09.00	Registration		
09.00 – 09.10	Setting the scene	Workshop scope, objectives and expectations	Dr Giriraj Amarnath, Research Group Leader - Water Data for Climate Resilience, IWMI
09.10 – 09.20	Welcome remarks	Brief introduction to IWMI Sri Lanka Program	Prof Ian Overton, Country Manager, Sri Lanka, IWMI
09.20 – 09.30	Opening Remarks	Expectation of the training	Mrs Nilmini Wickramarachchi, Director –(NRM) Ministry of Environment
09.30 – 09.40	Participant Introduction	Introduce the participants	All participant
09.40 – 10.00	Understanding Drought Risk in Sri Lanka	Types, drivers, impacts, historical patterns and emerging trends, Drought Anticipatory Action	Dr Giriraj Amarnath and Dr Niranga Alahacoon, IWMI
10.00 – 10.30	Drought Risk Management Framework	Risk reduction vs crisis response Global and national strategies	Sepali de Silva (NR) – Ministry of Environment
10.30 – 10.45	Tea	All Participants	
10.45 – 12.00	IWMI's Digital Tools for Drought Monitoring and Risk Management	Sri Lanka Drought Management System (SL-DMS) AWARE platform Drought AI	Dr Giriraj Amarnath and Dr Niranga Alahacoon, IWMI
12.00 – 12.15	Drought Financing Tool	Enabling Institutional Environment for Drought Financing in Sri Lanka	Dr Menuka Udugama Faculty Member – Wayamba University of Sri Lanka
12.15 – 12.30	Introduction to National Drought Action Plan	Case study from Zambia and discuss how appropriate the approach is for Sri Lanka	Dr Giriraj Amarnath, IWMI
12.30 – 12.45	IWMI/CGIAR Drought Action Catalyst	Introduced the Drought Action Catalyst for Sri Lanka	Dr Giriraj Amarnath, IWMI
12.45 – 13.15	Stakeholder Engagement and Coordination in Drought Risk Management	- Roles and Responsibilities of Agencies in Drought -Risk Management Integrating DRM into local planning -Development of National Drought Anticipatory Bulletin	All participants
13.15 – 13.40	Way forward, Project ideas, and joint funding plans	Discuss the joint proposal and funding opportunity aimed at strengthening drought resilience in Sri Lanka.	All participants
13.40 – 13.45	Closing remarks		IWMI/NEM

Annexure 2: List of Participants

List of workshop participants

ID	Name	Organization
1	S. N. L. Rathnaweera	Ministry of Public and Cooperative Infrastructure (MPCI)
2	M. T. A. Bawa	National Water Supply and Drainage Board (NW&DB)
3	Imasha Weerawansa	NRM/Ministry of Environment
4	H. G. K. Priyashantha	Department of Agrarian Development
5	Nalika Batawatta	National Physical Planning Department
6	Tharushi Wijesooriya	Sri Lanka Red Cross Society
7	Irasha Gamage	Ministry of Environment
8	Sepali De Silva	Ministry of Environment
9	Nilmini Deepthi	Ministry of Environment
10	Subhani Gunathilake	Ministry of Environment
11	C. Kudahetty	Water Resources Board
12	M. D. G. M. Siriwardhana	National Physical Planning Department
13	Rupika Bakmeedeniya	Ministry of Environment
14	Dinusha Bambarandage	Ministry of Environment
15	Namal Liyanage	Ministry of Defence
16	Gayana Hendawitharana	Department of Meteorology
17	Viraji Ariyathilake	United Nations Development Programme (UNDP)
18	Himali De Costa	Food and Agriculture Organization of the United Nations
19	M. M. A. Dinusha	Forest Department
20	S. C. Nissanka	Ceylon Electricity Board (CEB)
21	I. A. S. Ranaweera	Ministry of Environment
22	K. K. D. K. Gunarathne	Ministry of Environment
23	S. B. H. Somarathne	Department of Wildlife Conservation
24	Menuka Udugama	Wayamba University of Sri Lanka
25	N. Shanika	Ministry of Environment
26	W. M. C. S. Senevirathne	Ministry of Environment
27	H. M. R. C. Herath	Department of Meteorology
28	Nilantha Dhanapala	Water Management Secretariat
29	N. D. Weerasinghe	Water Management Secretariat
30	K. K. Shyamali Priyanthie	CCS/Ministry of Environment



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

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