WORKING GROUP ON CLIMATE CHANGE AND AGRICULTURAL WATER MANAGEMENT (WG-CLIMATE) Closure Report — May 2024

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1. BACKGROUND

Working Group on Climate Change and Agricultural Water Management (WG-CLIMATE) was granted an extension for its term and mandate during the PCTA meeting in November 2021, held in Marrakesh, and subsequently, a restructure of Working Groups will take place in 2023 in Vizag, India. This report delves into the group's journey since its inception in 2005, chronicling its milestones, activities, achievements, and the essential tasks identified for its upcoming phase.

In 2005, the first Working Group titled “WG on Global Climate Change and Irrigation” was initiated, spearheaded by the diligent efforts of Dr. Mark Svendsen. It underwent a rebranding in 2007 to encapsulate a broader objective, changing its focus from just "irrigation" to the expansive domain of “water management.”

This establishment stemmed from the realization that imminent climate changes would significantly affect agricultural water management. The group aimed to create a collaborative platform for stakeholders to enhance data collection, research methodologies, review storage systems, improve soil water storage, and share invaluable knowledge.

Formal Mandates Setup in 2005:

- To review the progression of and predictions for Global Climate Change (GCC) and climate variability,
- To explore and analyze the medium-term implications of climate change and climate variability for irrigation, drainage, and flood control,
- To stimulate discussion and raise awareness of water-related GCC issues within the ICID family,
- To stimulate discussion at national scales among scientists, policy makers, and, through the media, the public on GCC and water, and
- To join the international dialogue on GCC and water.

In 2015, post the release of AR5, heightened attention was directed towards climate change's effects on ICID activities. A new WG on Climate Change proposal was presented by Tsugihiro Watanabe and Ray-Shyan Wu.

While the group's initial goals remain crucial, the rapidly evolving climate change projections and the swift development of impact assessment models necessitate an updated focus. Specifically, there is an increased emphasis on sharing knowledge, especially regarding global climate change experiences and strategies. Furthermore, it's vital to consider a holistic approach to the multifaceted challenges presented by climate change.

Mandates: Setup in 2015

- To share the information about future prediction of the global and regional climate change and climate variability,

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- To explore and analyze the implications of climate change and climate variability for agricultural water management including irrigation, drainage, and flood control,
- To promote archiving useful information and case studies on climate change for practical use in improved impact assessment and adaptation development.
- To stimulate discussion on climate change and water management at national and regional scales among the stakeholders including academician, practitioners, decision makers, medias and the general public as well, and
- To join the international dialogue on Climate change and water management.

2. ACTIVITIES UNDERTAKEN

❖ *Road Map to ICID Vision 2030 – Activities of WG-CLIMATE*

According to the Action Plan of the Road Map to ICID Vision 2030, WG published a document titled **"Guide to Innovated Irrigation and Drainage Management Under the Changing Climate"** ranging between 100 and 200 pages, which focuses on irrigation and drainage in climate change.

❖ *International Workshops 2023, Vizag*

In 2023, the Working Group in Vizag, India, conducted a workshop on "Innovative Agricultural Water Management under Climate Change". Given the climate-induced threats to water resources for agriculture, there is a pressing need for advanced management techniques to ensure food security. By incorporating technology, these strategies promise efficient irrigation and sustainable water utilization. The curated 15 papers in this collection provide insights into the challenges and potential solutions in the realm of agricultural water management amidst climatic shifts.

❖ *Workshops and Presentations*

Aligned with its mandate, the WG has fostered a space for stakeholders to collaborate and share expertise. Annually, the WG has orchestrated presentations on climate change alongside the ICID's IEC events. These presentations showcased the efforts of WG members and observers, sparking discussions on water-related climate change issues. In addition to the presentations, the WG has organized some mini-seminar with speakers from the WG members as well as the participants at the WG. Presentations in annual meetings are listed as follows:

❖ *Guide to Innovated Irrigation and Drainage Management under the Changing Climate*

During the 2022 meeting, all the WG members were invited to contribute to the publication "Guide to Innovated Irrigation and Drainage Management under the Changing Climate". The WG decided to deliver a 7 chapters publication focusing on tackling the different challenges resulting from climate change in different regions and has those adaptations as case studies. While the publication has not been completed, the WG has put in great efforts and will continue to work on the project.

Chiang Mai, Thailand, 2016

- Impacts of Extreme Flood and Drought on Irrigation and Drainage and Their Adaptation Strategy in Thailand by Dr. Sucharit Koontanakulvong, Chulalongkorn University, Thailand
- Japanese Farmers' Economic Incentive to Implement Prolonging of Midseason Drainage for Reducing CH4 Emission from Irrigated Rice Paddies by Dr. Kazunori Minamikawa, Institute for Agro-Environmental Sciences, NARO, Japan
- Possible Effects of Climate Change on Agricultural Sector in Iran under RCP Scenarios by Dr. Nozar Ghahreman, University of Tehran, Iran
- Impacts of Climate Change on the Hydrological Processes in the Mekong River by Dr. Fuqiang Tian, Tsinghua University, China (Secretary of WG-CLIMATE)

Mexico City, Mexico, 2017

- Dr. Tsugihiro WATANABE (Kyoto University, Japan): Recent progress of the climate change impacts assessment and adaptation strategy development in the Japanese governmental program
- Dr. Mika TURUNEN (Aalto University, Finland): Analysis of water balance and runoff generation in high latitude agricultural fields as affected by climatic variability
- Dr. Nozar GHAHREMAN (University of Tehran, Iran): Response Farming Action Support System for "Climate Smart Agriculture": Experiences of Iran
- Dr. René LOBATO-SÁNCHEZ (Mexican Institute of Water Technology, Mexico): Model Implementation of a drought persistence monitor for water and agriculture sectors

Saskatoon, Canada, 2018

- Dr. LIU Jih-Shun (Agricultural Engineering Research Center, Chinese-Taipei): Modeling smart irrigation system for mixed crop field water demand- a case study in central Taiwan
- Dr. Nozar GHAHREMAN (University of Tehran, Iran): Application of RCP scenarios in assessment of climate change impact on extreme events: Experiences from Iran
- Dr. Patrick Cherneski (Agriculture and Agri-Food Canada National Agroclimate Information Service Regina, Saskatchewan, Canada): The Impacts and Costs of Drought to the Canadian Agriculture Sector
- Dr. Jin-Yong CHOI (Seoul National University, Korea): Climate Change Responses for Agricultural Water Management and Institutional Activities in South Korea
- Dr. Sue WALKER et al. (Institute for Soil, Climate and Water, Agricultural Research Council, Pretoria South Africa): Mobile Apps for Small-scale Farmers in South Africa
- Jaepil Cho: Seamless Climate Service and Downscaling for Climate Change Adaptation
- Dr. Tsugihiro WATANABE (Kyoto University), et. al.,: Climate Change Impacts on Basin Agro-ecosystems

Bali, Indonesia, 2019

- Integrated Assessment of Climate Change Impacts on Selective Farming Systems in South Africa
- Assessment of Climate Change Impacts Using Hydrological Drought Index
- Smallholders' Resilience in the Eastern Gangetic Plains, A framework to support productive use of groundwater resources within sustainable limits
- Flood Risk Assessment Due to the Impact of Climate Change, Development of Basin Investment Plans Climate Resilience Improvement Project (CRIP)
- Strategic Action Plan to Combat Climate Change Impact in Irrigation Sector in Sri Lanka
- Assessment of Climate Change Impacts and Adaptation Measures to Malwatu Oya River Basin in North Central Province of Sri Lanka
- Possibilities to optimize irrigation in Lower Saxony, Germany, Irrigation management and capacity building as a key to mitigate the effects of climate change
- Determining irrigation and drainage rates to anticipate extreme weathers
- Value Added Weather Advisories for Small-Scale Farmers in South Africa Delivered via Mobile Apps
- Eng T Janaki Meegastenna, Director of Irrigation (Water Management & Riverine Management) Deputy Project Director (CRIP), Irrigation Department (Sri Lanka): Sri Lanka's Challengers to the Climate Change in Irrigation and Water Resources

- Dr. P. Soman and Atin Kumar Tyagi (Jain Irrigation Systems Ltd., India): Sustainability Impact of JAIN's Hi-Tech Innovations in Agri- Food Sector
- Prof Sue Walker (Agricultural Research Council – Institute for Soil, Climate and Water, Pretoria, South Africa): AgriCloud App
- Dr. Tsugihiro WATANABE (Kyoto University, Japan): Integrated assessment of Climate Change Impacts on Basin Agro-eco-systems
- Dr. Tsugihiro WATANABE (Kyoto University, Japan): Significance of the Envisaged Climate Changes considering the ICID Vision

Marrakesh, Morocco, 2021

- Live video presentation - Climate Change and Agricultural Water Management by Dr. Ray-Shyan Wu, Chairman, WG-CLIMATE, and President, Chinese Taipei Committee (CTCID)
- Live video presentation - Non-Monotonic Changes in Streamflow over Tibetan Plateau at the Warning Levels of 1.5oC, 2.0oC, and 3.0oC by Prof. Fuqiang Tian, Professor, Institute of Hydrology and Water Resources, Tsinghua University, China; and Vice Chairman, WG-CLIMATE
- Live video presentation - Spatiotemporal Assessment of Evapotranspiration of Desert Steppe in Northern China: A Case of Otog Front Banner by Jiabin Wu, China Institute of Water Resources and Hydropower Research.
- The Application of IoT on Irrigation Facilities by Dr. Liu Jih-Shun, Associate Researcher and Deputy Head of Information Division, Agricultural Engineering Research Center (AERC), Taiwan.

3. CONCLUSION AND RECOMMENDATIONS

In reviewing the WG-CLIMATE's activities and achievements, it is evident that the group has effectively executed its mandates. The group agreed to deliver a document titled "Guide to Innovated Irrigation and Drainage Management under the Changing Climate" which focuses on irrigation and drainage in the climate change, though the publication has not been finalized, the team has a lot of progress. While some initiatives have not been fully realized as initially envisioned, the ever-evolving challenges posed by climate change, combined with ICID's new role in sustainable development, underscore the commission's enduring responsibility. Specifically, ICID must continue to assess the ramifications of climate change on agricultural water management, devise intelligent adaptation strategies, and pioneer mitigation efforts.

4. WAY FORWARD

Climate change, with its myriad challenges, deeply influences agricultural water management. This is especially pertinent when tackling issues like water scarcity and flood management. As climate change projections become more precise and dependable, there is an amplified urgency to expedite the development of impact assessment models and craft fitting adaptation strategies. Encouraging open dialogue and experience sharing within the ICID community can substantially enhance this pursuit. A monumental step forward in this context is the 2023 merger of the Working Groups on Climate (WG-CLIMATE), Water Scarcity and Drought (WG-MWSCD), and Adaptive Flood Management (WG-AFM). This union signifies a commendable leap in formulating an integrated approach to climate change adaptation and mitigation."

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