KERA-AWD Connect

Insights from research and field actions from **Kerala's** low-emission rice systems

Vol I, Issue 1, Jan 2026

The Government of Kerala is taking a significant step toward climate-resilient agriculture through the Kerala Climate Resilient Agri-Value Chain Modernization Project (KERA), supported by the World Bank. Within this broader initiative, the KERA–AWD component focuses on co-developing and targeted scaling of low-emission agronomic and water management practices. These efforts aim to transition Kerala's rice-based production systems towards low-emission pathways, with implementation concentrated in the rice-growing landscapes of Thrissur and Palakkad districts.

The initiative is anchored in a strong, knowledge- and solution-driven partnership involving Kerala Agricultural University (KAU), the International Rice Research Institute (IRRI), and the Centre for Water Resources Development and Management (CWRDM), with the Department of Agriculture, Department of Irrigation and Padasekhara Samithis play a critical enabling role in supporting implementation and field-level engagement.

Groundwork for evidence-based implementation

Landscape assessment

Extensive preparatory groundwork was carried out across the project landscapes through close engagement with various partnering institutions and key stakeholders. A comprehensive Landscape Crop Assessment Survey (LCAS) was conducted across the project study regions in integration with KAU-RAWE programme. The survey aimed to develop an integrated agricultural landscape framework and support the development of a robust emissions inventory.

Fig 01. Landscape assessment survey

Pre-panning meetings and field visits

Extensive field visits and consultations were also undertaken across the target geographies to identify, select and geo-tag experimental and control pilot padasekharams (n=17) representing diverse agro-hydrological and management conditions in the agricultural landscape of the study region.

Fig 02. Field visits and deliberations

Fig 03. Station trials at ARS Mannuthy and RARS Pattambi

Station-based trials

In parallel, station-level experiments were carried out at the Agricultural Research Station (ARS), Mannuthy, and Regional Agricultural Research Station (RARS), Pattambi to scientifically test and validate low-emission agronomic and water management practices for rice. Together, these efforts informed the design, calibration, and implementation of subsequent project activities.

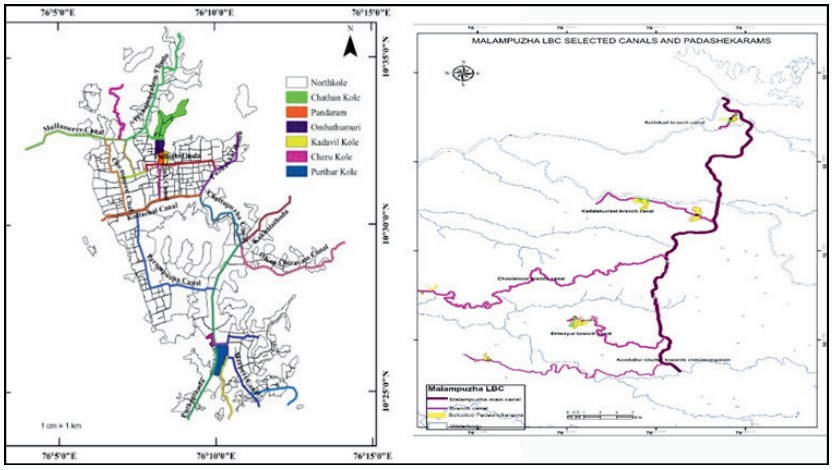

Fig 04. Spatial distribution of canals and padasekharams in Thrissur & Palakkad

Translating evidence into action

KERA–AWD launch

The journey officially began with a three-day inception workshop held at Kerala Agricultural University (KAU), 9-11 October 2025. The event brought together experts from all national and international partnering institutions, along with key stakeholders, to collectively strategize for a sustainable future.

Fig 05. Inauguration of workshop done by shri. Skaria Pillai at KAU

Key highlights of the workshop

Fig 06. AWD brochure

- Technical discussions: Expert panels deliberated on agricultural landscape mapping, low-carbon and greenhouse gas mitigation strategies, and the use of digital and satellite technologies for the development of robust monitoring, reporting, and verification (MRV) systems
- Stakeholder interaction: Direct engagement with the farming community and field visits to Kole lands and Palakkad padasekharams.
- Capacity building: Interactive sessions with student communities to introduce the KERA PhD Network programme, aimed at building skills and fostering research that supports the development and scaling of low-emission agricultural systems.

Empowering communities for climate-smart action: Padasekharam sensitization

To support the transition from evidence generation to on-ground implementation, a structured sensitization programme was conducted across all padasekharams. The programme introduced stakeholders to the rationale behind the proposed climate-smart practices, supported by a dedicated brochure outlining the innovative water management and agronomic practices. The sessions brought together scientists from IRRI and KAU, representatives from the Regional Project Management Unit (RPMU), Project Implementation Unit-KAU (PIU-KAU), Departments of Agriculture, Irrigation, as well as farmers ensuring shared understanding, transparency, and coordinated participation across the study landscapes.

Fig 07. Awareness and sensitization activities at padasekharams

Geo-mapping rice landscapes

Detailed geo-spatial mapping of all experimental and control padasekharams was undertaken prior to the cropping season using transect walk-based field mapping. These spatial layers were subsequently refined and finalized through high-resolution drone-based mapping once the crop was established.

Field-level validation of climate-smart practices: On-farm trials

Guided by a living labs approach, the 17 selected on-farm learning sites form the core of implementation efforts. Along with the modified water management approach, the trials also evaluate soil amendments such as

Fig 08. Transect walk mapping

phosphogypsum, and biochar for their emission-reduction potential.

Fig 10. Treatment evaluation sites under on-farm field trials

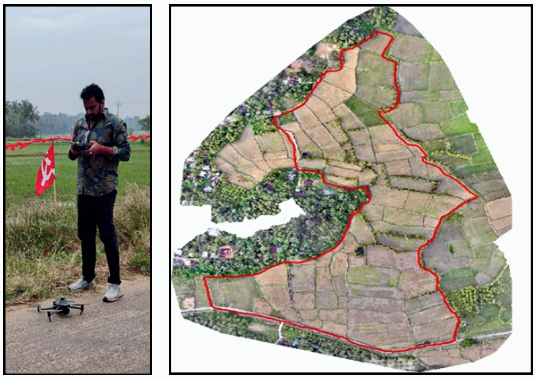

fig 09. Drone imagery capture and drone image: Koorodumannam padasekharam (Cheramangalam branch canal)

In addition, pani pipes and water-level sensors have been installed across representative cross-sections of the padasekharams to record field water levels and support the monitoring and guided implementation of AWD. Trained field assistants regularly observe and record the measurements to support effective AWD implementation.

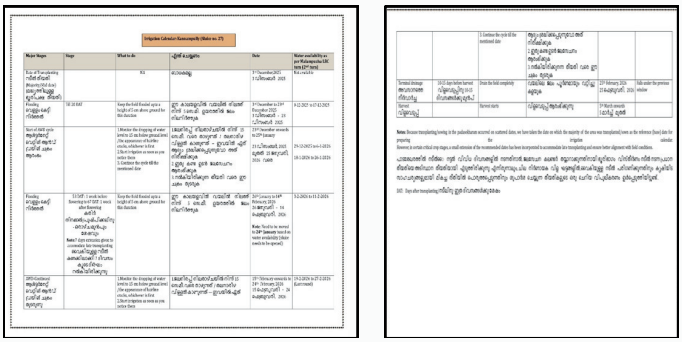

Fig 11. Irrigation calendar (Kannampully padasekharam, Erimayur branch canal)

An irrigation calendar was developed for all experimental padasekharams to facilitate a clear understanding of the AWD schedule in line with local water availability. The calendar outlines key crop growth stages, flooding periods, and AWD cycles, and is aligned with canal water release turns. Farmers are guided on its use to ensure timely irrigation, effective water management, and smooth implementation of AWD in the field

Fig 12. Sensors and panipipes installed at on-farm field sites

Regular monitoring visits are conducted across all study sites by scientists and field staff to track crop growth, identify constraints, and provide timely solutions to issues faced in the field. In parallel, dedicated social media groups have been created for each experimental padasekharam to enable continuous communication, share updates, and support real-time coordination throughout the season.

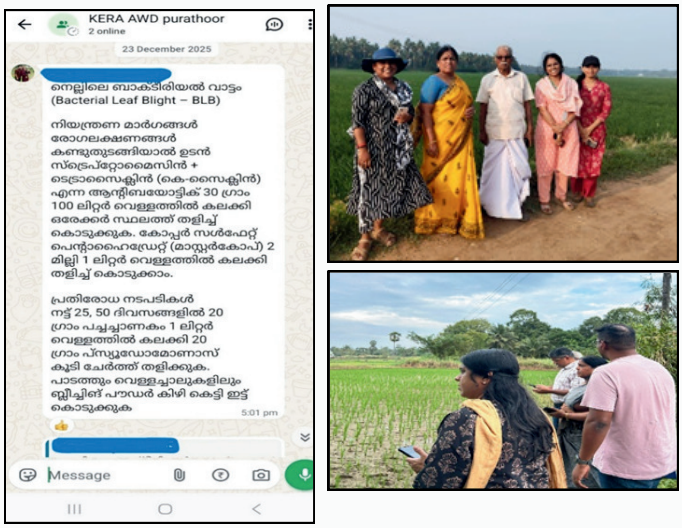

Fig 13. Monitoring Approaches: (a) Social Media (b) On-site Field Visits and Interactions

These sites generate insights into why farmers adopt or do not adopt low-emission practices, shedding light on local motivations, challenges, and potential co-benefits.

Fig 14. Monitoring approaches: On-site field visits and interactions

Strengthening the evidence base

Station trials season 2: Extending the learning

Station-level experiments are being continued this season at ARS, Mannuthy, and RARS, Pattambi. These trials further test and validate low-emission agronomic and water management practices for rice, including different rice varieties and soil amendments such as phosphogypsum, biochar, and microbiome-based inputs. Direct greenhouse gas measurements are being carried out using the closed chamber method and portable gas analyzers. This will support the generation of Tier 3 emission estimates, with plans to extend these measurements to on-farm trials in the next season

Fig 16. GHG observation site at ARS, Mannuthy

Fig 15. Transplanting of micro-biome experiments: ARS, Mannuthy and RARS, Pattambi

Fig 17. GHG observation site at RARS, Pattambi

Development of digital soil map

Georeferenced soil samples were collected from delineated padasekharams of the Kole wetlands in the Thrissur and Palakkad districts at depths of 0–5 cm, 5–15 cm, and 15–30 cm. These samples will be utilized to develop a digital soil inventory of soil properties, which will subsequently be integrated into landscape-level spatial modeling.

Fig 18. Soil sample collection

Detailed landscape mapping

A detailed household survey is being conducted across all farmers in the pilot padasekharams to collect emission-relevant cultivation data.


Fig 19. Detailed landscape assessment survey

The survey will support the development of a comprehensive emissions inventory using open-source tools and ORYZA-type models, and will also inform the testing of Payment for Ecosystem Services (PES) implementation.

From the field: Voices that matter

Mr. Ashokan K. C.
(Padashekaram Secretary, Chemmangad Padasekharam)
Farmer

"We have been hearing about global warming for many years, and farmers are the most affected by climate change, facing heavy losses due to unpredictable weather. Scientists have found that continuous flooding of paddy fields releases harmful gases, and studies show that rice does not need standing water all the time. Therefore, under the KERA project, we should adopt better practices like the AWD method to save water, reduce emissions, and support sustainable rice farming".

Smt. Smitha Balakrishnan
(Assistant Executive Engineer)
Department of Irrigation

"After the completion of maintenance/repair works of Malampuzha LBC, we will be able to reduce the conveyance losses significantly. We will also be able to adjust the irrigation schedules to align with AWD cycles for more efficient water use.".

Dr Anju Jayachandran
(Agricultural Officer, Kannadi Panchayath)
Department of Agriculture

"The department is committed to implementing a synchronized crop calendar in the project regions and will take proactive initiatives to ensure its success. We will also work closely with farmers, leveraging our trusted relationships to encourage full participation and cooperation.".

KERA IRRI CGIAR

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Vol I, Issue 1, Jan 2026, email- keraawdnews@gmail.com

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