Climate Smart WATer Management
and Sustainable DEVelopment
for Food and Agriculture in East Africa

ITALIAN AGENCY FOR DEVELOPMENT COOPERATION

CIHEAM BARI

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WATDEV BENEFICIARIES ATTEND TRAINING ON INNOVATIVE AGRICULTURAL AND WATER TECHNOLOGIES AT CIHEAM BARI

The second module of the "Water, Soil, and Crop Management in a Climate-Smart Agriculture" Course was successfully held from September 9th to 20th, 2024 at the **CIHEAM Bari** headquarters. This module focused on **"Innovative Technologies in Agriculture and Water Management"** and provided participants with the latest knowledge in new technologies and their applications in water management for agriculture. Twenty participants from Egypt, Ethiopia, Kenya, and Sudan attended the course, which combined theoretical lessons with hands-on experience in advanced agricultural practices. Conceived as **training for trainers** (ToT), the training also prepared participants to become trainers in their countries, ensuring that the knowledge they gained could be shared with local farmers, authorities, and stakeholders.

This second module was divided into two phases: virtual training from September 9th to 13th, followed by in-person sessions at CIHEAM Bari, Italy, from September 16th to 20th.

The training covered Precision Agriculture (PA), including its applications, mechanization, robotics, AI, socio-technical challenges, sustainability, and CIHEAM Bari's pest surveillance and water management innovations. In Italy, participants practiced using drones for agricultural monitoring and solar-powered irrigation, explored smart water management and wastewater reuse, and attended workshops on plant phenotyping and saline agriculture. Visits to innovative businesses highlighted sustainable practices like gluten-free pasta production and spirulina algae farming.

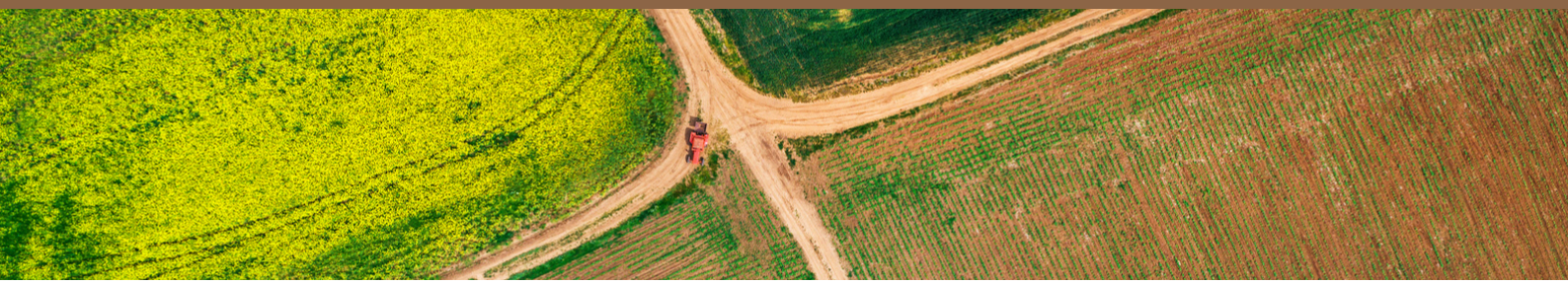
Find out more

WATDEV FINALIZED BASELINE ASSESSMENTS IN FOUR AFRICAN COUNTRIES TO BOOST SUSTAINABLE AGRICULTURE

Koga surface irrigation, Ethiopia.

In the framework of WATDEV, baseline studies have been finalized in the target countries as part of the feasibility studies to set the foundation for analyzing the impacts of technical solutions on soil and water management in **Egypt, Sudan, Ethiopia, and Kenya.** The objectives of the assessments were to: establish a baseline for WATDEV feasibility indicators, establishteams and credible data sources for monitoring the performance of agreed indicators, identify gaps and opportunities for improving the implementation of the WATDEV project for wider impact, and facilitate the assessment of climate change impact on water and agricultural development in North and East Africa. The established baseline dataset will facilitate modelling the impact of the BMPs serving as an entry point for unlocking the potential of BMPs in fostering sustainable agricultural development in the Horn of Africa and Egypt, an area significantly battered by climate change. Activity2.3 of the WATDEV project is centered on the feasibility study of the BMPs and Innovations. It is led by the **Association for Strengthening Agricultural Research in Eastern and Central Africa** (ASARECA) and kick started in March 2024 as a collaborative work with the African Partners of the project (HU, KALRO, WLRC, and WRC), in close cooperation with CIHEAM-BARI as the technical and scientific lead partner. The implementing partners supported the selection of the final list of indicators, identified the data sources for both primary and secondary data, and led data collection exercises in the target countries. Data collected was then analyzed and used to develop the inception reports.

Find out more



THE ROAD TO A WATDEV MODELLING TOOLBOX: AN UPDATE

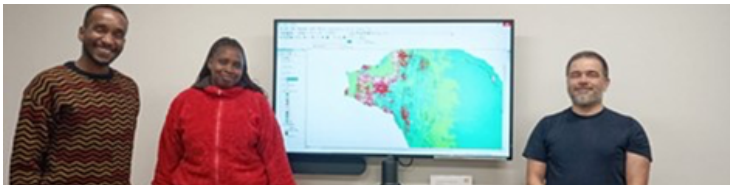
Since the **Turin meeting**, the modeling working group has had a series of regular online meetings with participants from SYKE (Finland), ISRIC (The Netherlands), and CIHEAM-Bari (Italy). Moreover, the working group has had a series of **workshops with the local partners**. In the working group meetings, several topics were discussed in various rounds:

- The data collection and setting up of the models, which is mainly taken on by the four PhD students from the partner countries in Africa (see article here)
- The post-processing of the output of biophysical models to enable socio-economic assessment of BMPs within the toolbox
- The general outline of and functioning of the toolbox

During the workshops with the local partners, participants were divided into groups. Each group discussed which BMPs they would consider and specified them (for example, for intercropping, which species they would consider to be combined), as well as looking into where spatially in the area the BMPs would be best to be implemented. With the results of the local workshops in mind, the modelling working group then conducted a further **scenario development** session during the WATDEV Stakeholder meeting in Bari where participants were asked to discuss three topics: (i) interest in indicators that the model can produce (so that the modelling team can pay attention to these indicators); (ii) interest in different types of scenarios, ranging from blanket scenarios to spatial differentiation, combinations of BMPs and optimization and finally (iii) participants were asked to draft an ideal scenario for their specific location. Currently, the modelling team is working on the technical coupling of the models, as well as the post-processing steps that will be part of the toolbox. Simultaneously, the models are being set up and data is being collected for running the models in the case study areas. The team has started designing the Toolbox component, user interface, and features.

Find out more

THE ONGOING WORK ON MODELLING CROP GROWTH AND WATER RESOURCES IN THE WATDEV STUDY AREAS



WATDEV PhD students Samar Gomaa (Egypt) and Mulugeta Melese (Ethiopia) recently had their work plans approved by Wageningen University (Netherlands). They are making significant progress in applying the SWAT-MODFLOW model to Ethiopian and Egyptian WATDEV study sites, laying the foundation for the project's modeling toolbox in these regions. The SWAT-MODFLOW model is well-suited for **Ethiopia's Koga watershed**. Mulugeta's model domain includes both the irrigation area —where it simulates the impact of Best Management Practices on crop production and water use—and the upstream watershed draining into the Koga reservoir, assessed for water resources and climate change impacts. **Egypt's El-Sharkia study area,** near the SEKEM farm, presents a greater challenge for simulation due to reliance on artificial canals for irrigation and Nile River water. Despite this complexity, Samar has successfully designed a model incorporating the main irrigation canals and dependent areas. This design enables her to assess not only the localized impacts of Best Management Practices on crop production and water use but also broader consequences for water demand and availability across the entire system. Progress is also advancing in the Sudanese and Kenyan study areas. For Sudan's Gezira area, WATDEV PhD student Mohammed Barsi is finalizing his work plan, which includes the application scheme for his model. Notably, he aims to address the challenge of simulating water flow in the canal between the dam and the Gezira irrigation scheme within the SWAT-MODFLOW framework, using a specialized hydraulic model. In **Kenya's Tana watershed study area**, the modeling tasks are being undertaken by Hellen Sang from Egerton University (Kenya). Hellen visited Wageningen University for two weeks in November 2024, during which she collaborated with João Nunes from ISRIC (Netherlands) and other Wageningen PhD students to compile and process geographical and numerical data for her model application.

Find out more

THE SIDE EVENT AT COP16 UNCCD, CO-ORGANIZED BY WATDEV, IN RIYADH ON DECEMBER 10, 2024

The 16th session of the Conference of the Parties (COP16) under the United Nations Convention to Combat Desertification (UNCCD) addresses desertification, land degradation, and drought (DLDD). Taking place December 2–13, 2024, in Riyadh, Saudi Arabia, COP16 marks the 30th anniversary of the UNCCD and the first time the event is hosted in the Middle East and North Africa—regions severely affected by DLDD, underscoring the urgency of global action. Global land degradation poses serious threats to ecosystems, biodiversity, and human well-being. According to UNCCD:

Extent of Degradation: 40% of the world's land is degraded, affecting 3.2 billion people globally.

Annual Losses: Between 2015 and 2019, 100 million hectares of productive land degraded yearly—double Greenland's size.

Projected Impacts: By 2050, three-quarters of the global population (~7.5 billion people) could face severe water scarcity due to land degradation and drought. These trends call for large-scale restoration and improved land governance. COP16 focuses on six themes:

- Land Restoration
- Drought Resilience
- Sustainable Agri-Food Systems
- Equitable Land Governance
- Climate and Biodiversity Integration
- Financing Mechanisms

COP16 is a crucial platform to advance land degradation neutrality (LDN) and global sustainability, despite challenges like limited national implementation processes. A side event, **"Rethinking Desertification and Land Restoration: Bridging Science, Policy, and Practice,"** co-organized by WATDEV on December 10, 2024, in Riyadh, showcased WATDEV's research, modeling, and capacity-building efforts. It promoted cross-sector collaboration and practical solutions to combat desertification and enhance global land restoration.

Find out more

WATDEV BEST MANAGEMENT PRACTICES: A STEP TOWARD AGROECOLOGICAL TRANSITION

The WATDEV project has developed Best Management Practices (BMPs) through an extensive process involving local farming communities and decision-makers at various levels. These efforts aim to address critical questions:

1. How can BMPs contribute to achieving the 10 Agroecology (AE) objectives (FAO, 2018)?
2. How can BMPs support the Agroecological Transition (AET) in Eastern African Countries (EAC)?

Exploration of Key Questions

These questions were explored during the 1st Annual Meeting of the European Panel for Agroecological Transition (EPAT), held in Brussels on December 11. Organized by the Agence Nationale de la Recherche (ANR, France), the event brought together experts to discuss AET strategies. As the WATDEV Project Manager, Gaetano Ladisa (CIHEAM Bari) participated as a panelist in a workgroup focused on drought-prone areas. He presented the case study from SEKEM Farm in Belbies, Egypt, which highlighted three BMPs:

- Manuring
- Intercropping with trees
- Water Users Association (WUA)

Workgroup Deliberations

The workgroup, composed of researchers, policymakers, and farmer representatives, examined these BMPs and proposed the following:

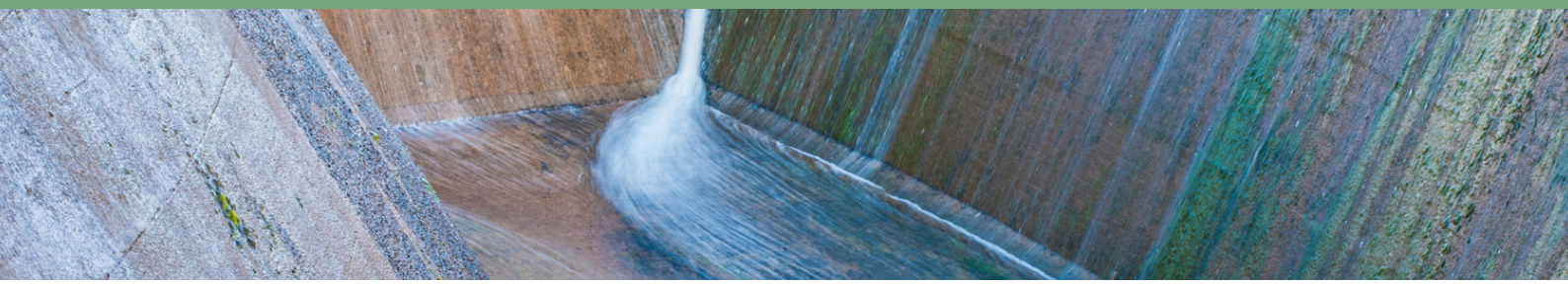
1. Alignment: Strategies to adapt these practices to AET principles.
2. Engagement: Methods to activate political support and encourage community participation.
3. Research: Priority topics for further exploration.

Outcomes and Recommendations

The fruitful discussions confirmed that the BMPs—and WATDEV's activities overall—align well with AET principles (see here). Specific recommendations were made, such as prioritizing the establishment of Water Users Association. This organization should manage not only water resources but also coordinate other activities, such as collecting and composting crop residues for redistribution of green manure to farmers.

Impact and Future Direction

The EPAT meeting provided an excellent platform to showcase WATDEV's work. The insights gathered will help design basin-scale scenarios and guide the implementation of BMPs in the future, advancing sustainable agricultural practices in the EAC.



WATCH THE PROJECT EXPLAINER VIDEO

BEST MANAGEMENT PRACTICES

Join the conversation online

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