# CLIMATE SMART IRRIGATION TECHNOLOGY for water use efficiency

## Evapotranspiration-based Irrigation Scheduling for Winter Wheat and Cotton in the Aral Sea Basin, Uzbekistan

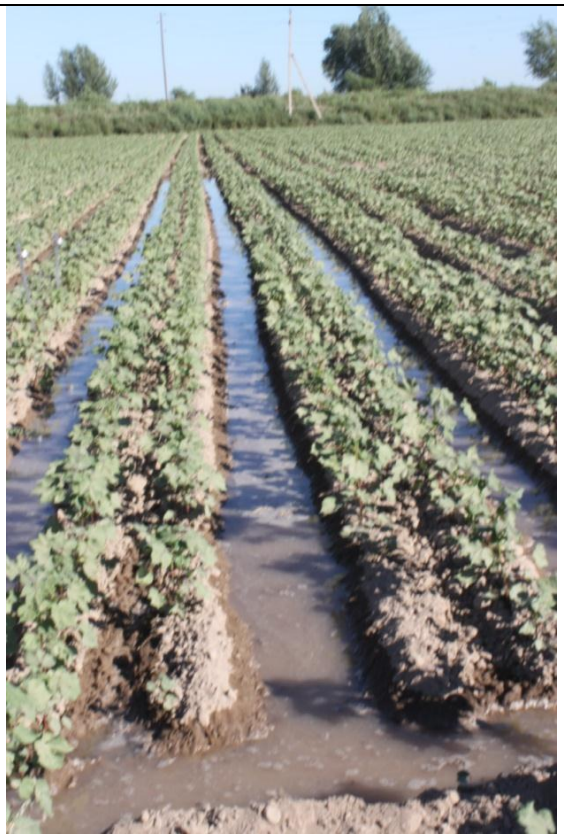
The Aral Sea Basin (ASB) in Central Asia is known for its present and predicted deficiencies in available water which may lead to increased conflicts in the near future. In the last decades the ASB has been suffering from more frequent droughts and unstable water availability from the main feeding Amudarya river due to climate change. The situation is aggravated with land degradation and widespread soil salinization due to intensive agricultural practices. Irrigation water use and water management is inefficient both on field and irrigation system levels due to insufficient irrigation infrastructure and lack of irrigation water management capacities of farmers. All this necessitates a re-thinking and re-shaping of the irrigation practices which consume virtually 95% of all water resources Traditional irrigation practice does not measure water supplied to the field, depends only on water availability in the system, is based on conventional outdated irrigation norms without specification according to real time meteo-data and current site specific field conditions and crop requirements.
Irrigation water amounts, especially for the main and prevailing agricultural crops cotton and winter wheat, should be determined based on crop water demand reflecting soil characteristics and real-time climate data.

Yet, the general lack of research resources limits the necessary field experiments, which can be compensated in part by modelling. Therefore, the The Decision Support System for Agrotechnology Transfer (DSSAT) model was successfully calibrated and evaluated and next used for scenario assessments considering different levels of water availability.
The proposed model has the potential to make present irrigation practices more precise and allows decreasing irrigation water amount at field level during vegetation season by 40% with simultaneous increase in crop yield by at least 15%.
Optimization of irrigation scheduling can in addition reduce irrigation time, energy for water pumps and labor. Regular use of ET based irrigation scheduling on a wider area could increase water use efficiency and provide higher income for farmers.
Against the background of predicted demand under business-as-usual it is argued that the potential for water saving is huge, but this necessitates in-depth change in cultivating practices, which in turn calls for a highly needed institutional and legal backing.

The experiment was tested in 2015 at “Xushnudbek” farm in Yangarik district of Khorezm province of Uzbekistan in the framework of the project entitled “Evapotranspiration-based Irrigation Scheduling for Winter Wheat and Cotton in the Aral Sea Basin, Uzbekistan” led by ICARDA office in Tashkent, Uzbekistan.

Proposed technology proved ecologically sustainable through positive impacts such as irrigation water saving, soil properties improvement, improved conditions for crop development and can improve water supply management, decrease water supply challenges and thus contribute to social sustainability.

Installation of the meteo station at experimental field.
Photo by KRASS



Cotton field where experiment was conducted (left) and
Farmer conventional field (right).