Evaluation of irrigation infrastructure, crop mapping and estimation of agricultural water use in Libya (IagWat)

In Libya there is a need to strengthen national capacities to monitor water consumption and productivity through remote sensing and to adopt effective options for increasing irrigation infrastructure assessment and water productivity in Fezzan region, as a pilot to be scaled up throughout the country. The impact of this project is that food security in Libya in general and in Fezzan region, in particular, is improved through more performant use of agricultural water.

THE PROBLEM TO BE ADDRESSED

In Libya, reliable data on accurate crop area and extent are not always available and are affected by serious discontinuities across the different regions. Moreover, available data suffer from inconsistent quality and spatial resolutions, and are often derived from different and incompatible methodologies and classifications. The agricultural cropland estimation, assessment and monitoring is imperative for estimating crop water productivity and ensuring a sustainable use of water in agriculture. To help decision makers for taking quick action and mitigate the negative effects of emergencies, conventional surveys and assessments of agricultural production are far too expensive to be conducted regularly and with sufficient frequency.

HOW TO ADDRESS THIS PROBLEM

Considering the special context in Libya, it is proposed to extend the use of remote sensing as a key technology to increase the accuracy and frequency of key parameters like spatial extent of croplands and to produce reliable and economically affordable results. Several studies have reported the use of multi-spectral and multi-temporal data to map irrigated areas, land use, land cover, and crop type. Satellite imagery is progressively less costly and more available at higher temporal and spatial resolutions, making them specifically suited to agriculture applications.

**Government counterparts**

- Ministry of Water Resources (MoWR)
- Ministry of Agriculture and Livestock (MoA)
- Ministry of Finance (MoF)
- Libyan Center for Remote Sensing and Space Science (LCRSSS)
- National Meteorological Center (NMC)
- University of Tripoli (UoT)
EVALUATION OF IRRIGATION INFRASTRUCTURE, CROP MAPPING AND ESTIMATION OF AGRICULTURAL WATER USE IN LIBYA.

Contribute to food security, poverty reduction and resilience to climate change through improved performance of water harvesting, conveyance and use for agriculture sector in Libya.

**Baseline study and assessment of the damage to the national irrigation systems**
- baseline study report prepared with recommendations for irrigation infrastructure rehabilitation / construction as well as on efficient agricultural water use practices;
- irrigation practices and their efficiency are assessed, and efficient practices identified;
- damage to irrigation infrastructure evaluated and corrective measures identified.

**Cropland mapping and water consumption estimates using remote sensing data**
- optimal remote sensing information and practices for agricultural water use efficiency introduced;
- cropland mapping developed, and the agricultural water consumption estimated.

**Capacity development program in crop and water resources monitoring**
- the expertise and capacity of national institutions involved in agriculture and water resources management improved enhanced;
- capacity building program on: field surveys, questionnaire, methodologies, assessment of water use by the agricultural sector, remote sensing data collection, processing, analysis and validation, crop classification, land cover and crops mapping, evapotranspiration-assessment models and water consumption estimation techniques.

**Operational Country Action Plan for monitoring, evaluating and rationalizing of water use for agriculture sector.**

**Digital data sharing and dialogue platform for information and knowledge transfer.**

**RESULTS**

**Improved knowledge on the irrigation infrastructure damages and the impact on water efficiency.**

**Cropland mapping developed, and water consumption estimated using remote sensing data.**

**Cropland mapping developed, and water consumption estimated using remote sensing data.**

**IMPACT**

Food security is improved through more performant and efficient use of agricultural water with the contribution to SDG2 and SDG6.