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AND AFRICA**



Valorizing EO data from the GMES and Africa's agriculture monitoring service to produce seasonal crop-types maps (Jendouba and Kairouan, Tunisia)

BACKGROUND:

The GMES and Africa Consortium in charge of developing EO-based services on Water and Natural resources in North Africa, led by the Sahara and Sahel Observatory (OSS), has been implementing the project **"Earth Observation for Sustainable Land and Water Management in North Africa"** under the GMES and Africa Support Program since 2017. Among the operational services developed by the Consortium, the MISBAR platform, which provides the key outputs for the seasonal agriculture monitoring and water abstraction assessment, has recorded a real success in the North Africa region and beyond. The success of this service is based on the breadth and diversity of data and products derived from the EO, which it provides timely to its panoply of end-users. These end-users represent the two institutions affiliated to the Minister of Agriculture in Tunisia: the Commissariat for Agricultural Development of Jendouba (CRDA of Jendouba), and the one of Kairouan (CRDA Kairouan). The forthcoming use case will concentrate on both of the aforementioned institutions.

END-USER'S PROFILE (BENEFICIARY ORGANIZATION):

The CRDA of Jendouba (in north-western Tunisia) and the CRDA of Kairouan (in central Tunisia) are part of 24 decentralized regional institutions responsible for managing agricultural activities such as water resource mobilization, soil conservation, management of public irrigated areas, and agricultural extension within the administrative entity of their governorates under the Ministry of Agriculture and Fisheries in Tunisia.





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These two institutions encompass various services, including the **“Plant Production”** and **“Agricultural Statistics”** departments which support the management of public irrigated areas by providing technical assistance to farmers and irrigation managers. Additionally, they regularly provide information and data on seasonal agricultural lands to the Ministry of Agriculture and Fisheries.



END-USER'S NEEDS:

The need of the beneficiaries (the **Plant Production** and **Agricultural Statistics** departments team) of the two CRDAs of **Jendouba** and **Kairouan** mainly concern the **acquisition of detailed seasonal crop-types map (with emphasis on wheat) over the entire governorate to help monitor crop growth condition and support agricultural campaign monitoring.** The two CRDAs have been part of the project's pilot zones since 2017 where regular field visits were conducted for many years to collect in-situ information/data, which were further used to develop and validate seasonal crop-types maps. These activities have been supported by one of the GMES and Africa partner, the Tunisian National Center for Mapping and Remote Sensing (CNCT), which serves as the national coordinator, facilitating liaison with beneficiaries at the Tunisian level.



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INFORMATION PROVIDED:

To address both CRDAs' needs, the OSS consortium, with support from the private sector, developed an online platform called MISBAR (<https://misbar.oss-online.org>). This platform allows OSS to **collect timeseries Sentinel-2** Analysis Ready Data (ARD) data in raster and Web Map Tile Service (WMTS) formats. The Sentinel-2 data have been used to produce the seasonal crop type maps (with emphasis on wheat). The maps were produced by OSS in close collaboration with experts from both CRDAs of Jendouba and Kairouan, especially the "Plant Production and Agricultural Statistics Departments.

USAGE:

GMES and Africa has provided training to the CRDAs of Jendouba and Kairouan and other beneficiaries on using the MISBAR tool and exploiting the EO-based products that it contains, including Sentinel-data, and NDVI maps. Training has been conducted through summer schools, a series of online sessions, and on-demand technical support. They benefited from training on: (i) the approach of getting the Sentinel EO data directly from MISBAR, and (ii) the processing of this EO data to produce seasonal crop-type maps. Both CRDAs of Jendouba and Kairouan applied this approach and produced crop-types maps. Within these two CRDAs and Tunisia's Minister of Agriculture (MoA), these crop-type maps were used to help: identify the seasonal agricultural lands (especially wheat) at governorate levels, update the seasonal database on cultivated area, monitor the distribution and extension of cultivated areas (seasonally), assess the impact of drought and growth anomalies at the parcel level. the crop-type maps were also used as analysis support to estimate crop yield (especially wheat).

IMPACT:

The service provided by GMES and Africa has enabled the Plant Production and Agricultural Statistics Departments team in the two CRDAs to save time, money, and intensive effort which were usually allocated to field activities. The service has thus contributed to optimize their workflow and their working time in terms of seasonal crop-types maps production (2-month versus 1 week) and skills (in GIS/RS). In addition, the valorization of such maps has contributed to improve the time taken to obtain accurate information on crops yields. Through the MISBAR platform, the essential Copernicus Sentinel-2 timeseries Analysis Ready Data are used to produce detailed large-scale seasonal crop-type maps, which were not commonly utilized as support for crop monitoring, stats production, and decision-making. To date, the two CRDAs can now produce such maps regularly. Based on this success, GMES & Africa has extended this cation by performing a series of training activities to cover all the 24 CRDAs of Tunisia, in order to ensure appropriation and sustainability of the service.

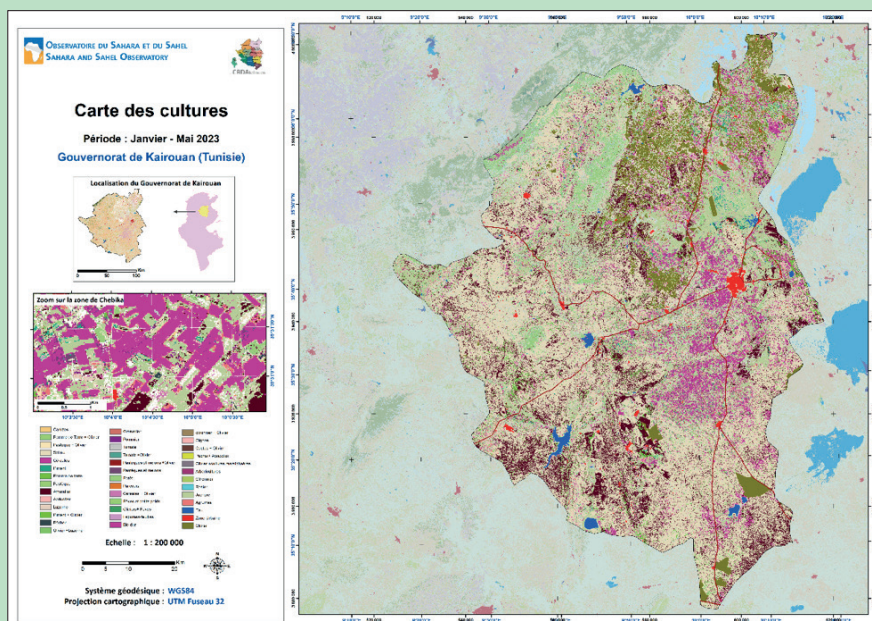




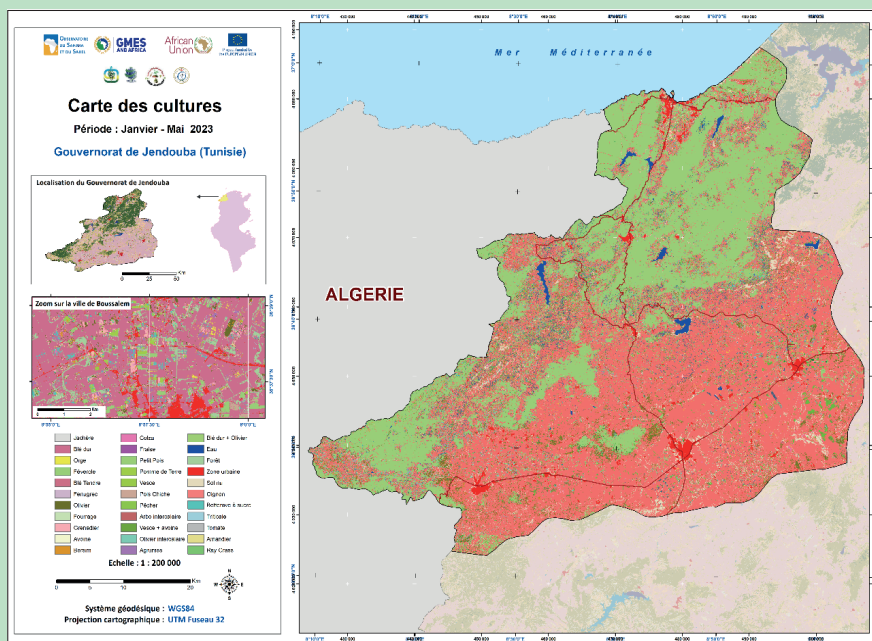
OUTREACH:

The GMES and Africa has gathered feedback from both the CRDAs of Jendouba and Kairouan through Google forms, emails, bilateral consultations, and the MISBAR reporting tool. Positive feedback has encouraged the GMES & AFRICA to raise awareness on the importance of the MISBAR platform through national and regional workshops, bilateral meetings with high-level decision makers, social media, and dissemination platforms, resulting in increased interest from other stakeholders. The results of the awareness-raising actions have been

positively reflected in the sphere of high-level decision-makers. Tunisia's Minister of Agriculture (MoA) expressed the need to have its various institutions adopt and utilize MISBAR as a preferred tool for monitoring seasonal agricultural campaigns. In response to this request, the GMES and Africa proceeded to strengthen the capacity of engineers and technical teams from all 24 CRDAs in the country, including actors from key MoA institutions such as the General Directorate of Agricultural Production, General Directorates of Studies and Planning, etc.



Detailed wheat crop mapping over Kairouan Governorate (Tunisia) produced by the GMES Management Unit at OSS in collaboration with experts from CRDAs of Jendouba and Kairouan



Detailed wheat crop mapping over Jendouba Governorate (Tunisia) produced by the GMES Management Unit at OSS in collaboration with experts from CRDAs of Jendouba and Kairouan