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Land Degradation Monitoring and Assessment in Governorates of Matrouh, Alexandria, and Sinai, Egypt

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 an EO-based service to support the stakeholders in better understanding and monitoring the processes behind land degradation in the North Africa region. The service has proven beneficial to numerous end-users, including agricultural and environmental engineers, experts, and technical staff. Specifically, in Egypt, the service operates through the collaboration between the lead consortium (OSS) and the Egyptian Desert Research Center (DRC) as the national partner and a key user of the service. The DRC is mandated to provide technical support and EO-derived information to stakeholders from the Ministry of Agriculture and Land Reclamation (MALR) and the Ministry of Environment (MoE), especially the Egyptian Committee for Land Degradation Management (ECLDM).

END-USER'S PROFILE (BENEFICIARY ORGANIZATION):

The DRC in Egypt plays a crucial role in addressing the country's environmental and agricultural challenges, particularly those related to arid and semi-arid lands. It contributes to Egypt's national and regional efforts to manage land degradation, protect arable lands, and support sustainable development in arid and semi-arid regions.





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The DRC in Egypt collaborates with a range of key institutions to address challenges related to land degradation and sustainable agriculture, namely the Egyptian Committee for Land Degradation. It regularly provides information and data to many governorates such as Matrouh, Alexandria, and Sinai since GMES and Africa Phase-1.

END-USER'S NEEDS:

The DRC is an actively member of GMES and Africa since the first phase launched in 2017. As the national institution in charge of coordinating GMES and Africa in Egypt, DRC was involved, not only, in the testing and operationalization of the Land Degradation Service, but also capacity-building, dissemination, and awareness-raising toward its better uptake of the service. Through these engagement activities, the needs of the DRC are related to timely and regular access to EO-based information and thematic indicators on land degradation monitoring and the SDG indicators 15.3.1 reporting along with LDN, in support of the ECLDM.



INFORMATION PROVIDED:

To address DRC, and therefore ECLDM's needs, the GMES and Africa, with support from the private sector, developed an online platform called MISLAND (<http://misland.oss-online.org/>). This platform allows them to access geospatial information and indicators maps respectively on the: SDG indicator 15.3.1 (Proportion of land that is degraded over the total land area), vegetation loss and gain hotspots, forest change, forest fires, soil erosion, coastal erosion, and the Mediterranean Desertification and Land Use Model (MEDALUS) to assess desertification. These resources provided in the map interface of MAILAND platform. The data types are Landsat, Modis, Merra, Era-1, Chirps, Soil-grid... generated from the many sources such as ESA, ISRICS, USGS, etc. customized in type Tagged Image File Format (TIFF). The resources from MISLAND platform relies on international standards and approved methods and models. They can be accessed on the fly (Figure 1), within a few seconds to 5 minutes, based on the size of the considered zone and the Internet connection speed. For the biggest zones, the platform processes the request and sends back the outputs' download link to the end-users via email.

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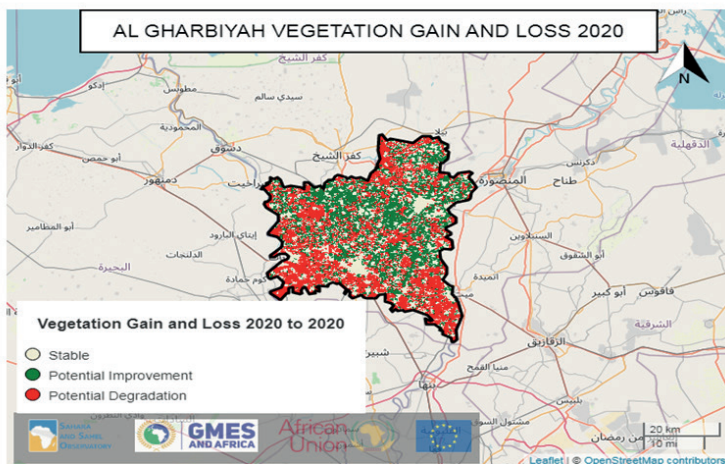




USAGE:

GMES and Africa has strengthened the capacities of the DRC through several online and facet-to-face training sessions on the use of the MISLAND functionalities, so that the DRC, once it has mastered the tool, is itself responsible for strengthening the capacities of its partners in Egypt. The MISLAND platform is thus utilized by DRC to perform analysis on the fly and to harvest thematic statistics used to monitor land degradation at various scales (Figures 1). The platform is also used to collect geospatial data on land degradation indicators in raster format, which is further uploaded on a local GIS and combined with other thematic data to derive customized information and maps of land degradation (. This information is then transmitted to the Egyptian Committee for Land Degradation Management (ECLDM) to help highlight degradation hotspots, and to orient the decision-making process about the areas where priority actions need to be undertaken.

The Vegetation loss and gain for Al Gharbiyah in 2020 , indicates that potential, 30.95 % loss, 41.11 % gain, and 27.94 % remained stable.



label	value
Stable	10556
Potential Improvement	15533
Potential Degradation	11695

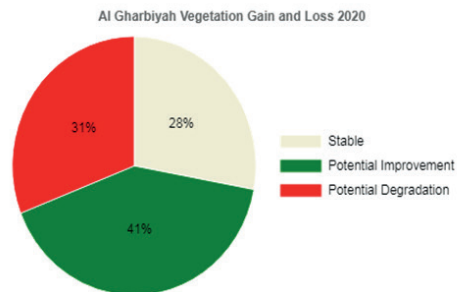


Fig 1: MISLAND platform used on the fly to harvest thematic statistics for land degradation monitor in an area of interest

IMPACT:

The service provided by the GMES and Africa has enabled the DRC and the ECLDM to save time and effort and optimize their workflow. Through the MISLAND platform, the key land degradation indicators - on SDG 15.3.1 (including, Landcover, Carbone, and Land productivity), vegetation loss and gain hotspots, forest change, forest fires, soil erosion, coastal erosion, and desertification - can be accessed in few minutes, from local to national scales, allowing for timely transmission to the ECLDM, which, in turn, can adequately orient land and soils restoration action in the ground. This releases the burden of downloading and raw satellite data over a country that covers more than 1 million Km², and integrating these into procession channels that can take several days.



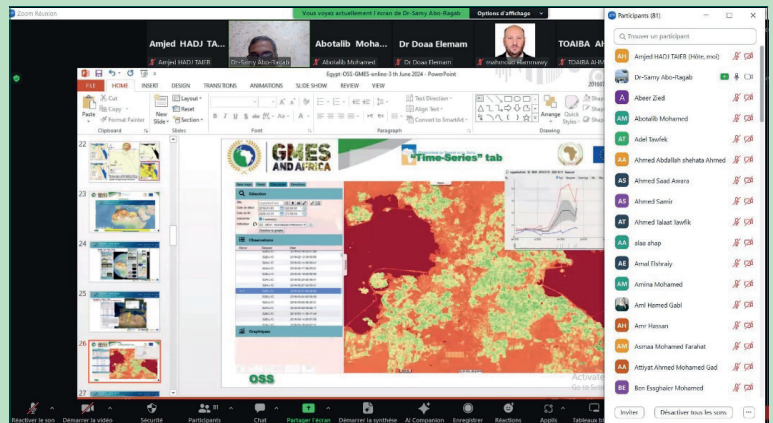
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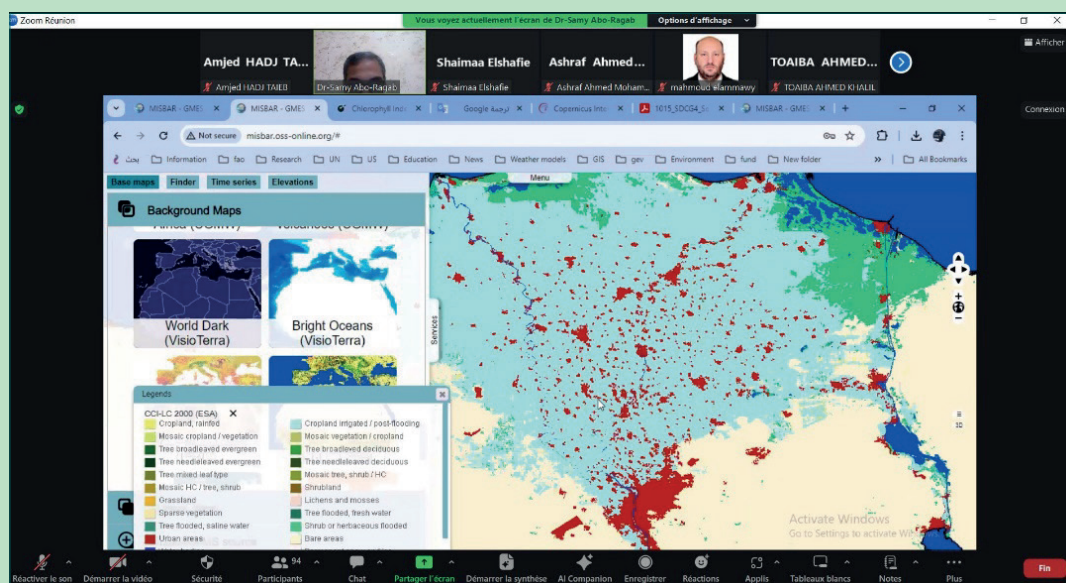
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OUTREACH:

The GMES and Africa has received effective feedback from the DRC concerning the MISLAND platform. Based on this feedback, the Consortium has kept raising awareness about the Land degradation monitoring and assessment service through national and regional workshops, social media, and dissemination platforms, resulting in increased interest from other stakeholders. The platform has even recorded positive echoes in the sphere of high-level decision-makers. The Egyptian Minister of Agriculture and Land Reclamation has expressed the need to get a version of the MISLAND customized to Egypt, hosted and managed by the Ministry. In response to this request, the Consortium proceeded to acquire the necessary equipment that will host the service. As well, the Consortium is planning to strengthen the capacity of engineers and IT staff of the DRC and Ministry to ensure the administration and maintenance of the MISLAND-Egypt.



User's capacity-building session in DRC in face-to-face mode



User's capacity-building session organized by DRC online

