



Food and Agriculture
Organization of the
United Nations

Capacity Development for the Sustainable Management
of Soil Resources in the NENA Region to Achieve
the Sustainable Development Goals

TECHNICAL COOPERATION PROGRAMME



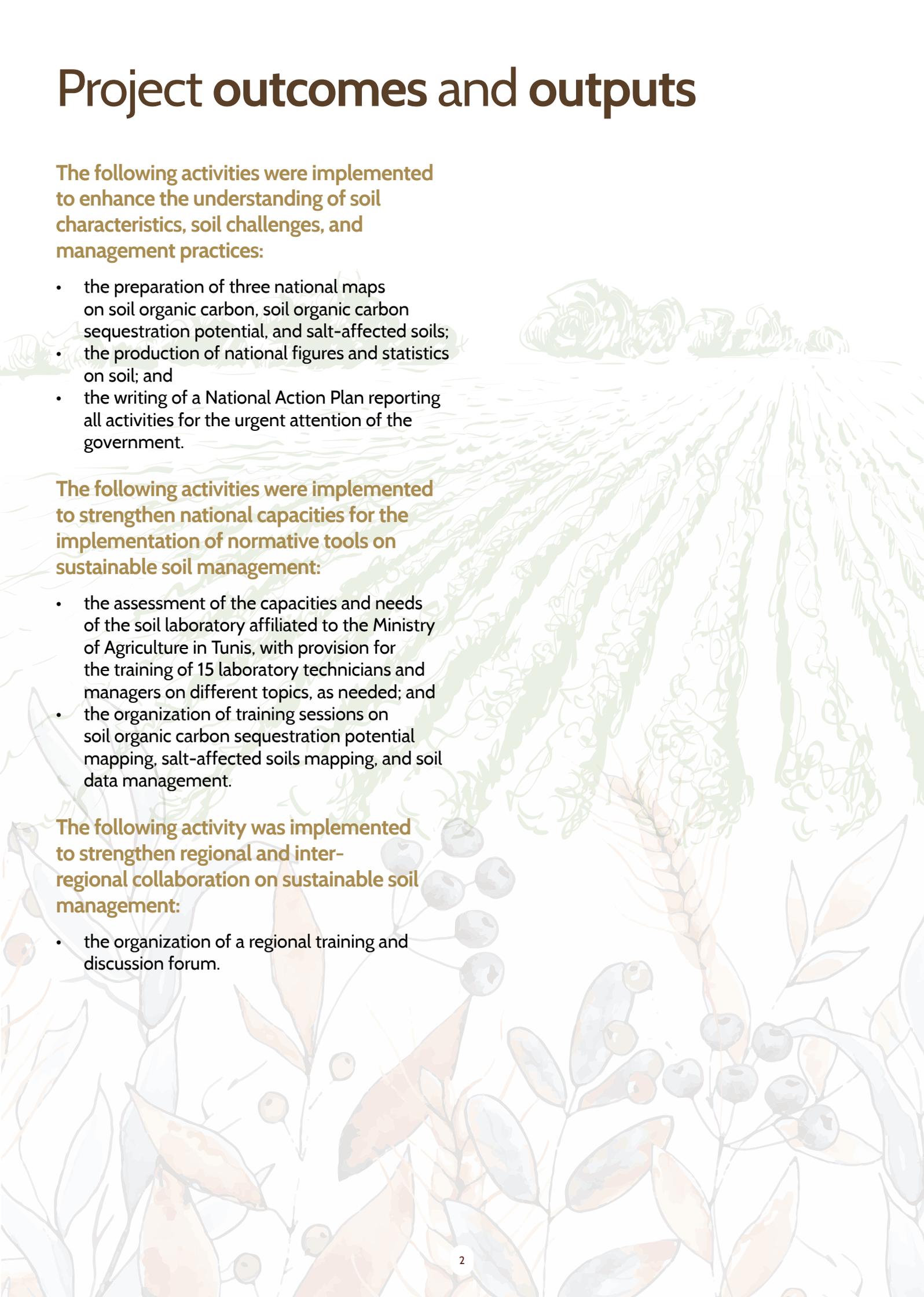
PROJECT ACHIEVEMENTS AND KEY FACTS IN **TUNISIA**

BETWEEN 2020 AND 2022



GLOBAL SOIL
PARTNERSHIP

Project outcomes and outputs



The following activities were implemented to enhance the understanding of soil characteristics, soil challenges, and management practices:

- the preparation of three national maps on soil organic carbon, soil organic carbon sequestration potential, and salt-affected soils;
- the production of national figures and statistics on soil; and
- the writing of a National Action Plan reporting all activities for the urgent attention of the government.

The following activities were implemented to strengthen national capacities for the implementation of normative tools on sustainable soil management:

- the assessment of the capacities and needs of the soil laboratory affiliated to the Ministry of Agriculture in Tunis, with provision for the training of 15 laboratory technicians and managers on different topics, as needed; and
- the organization of training sessions on soil organic carbon sequestration potential mapping, salt-affected soils mapping, and soil data management.

The following activity was implemented to strengthen regional and inter-regional collaboration on sustainable soil management:

- the organization of a regional training and discussion forum.

Investing in Tunisia's soil resources

Why?

To achieve food security, reduce poverty, halt land degradation and biodiversity loss, and adapt to climate change in the medium and long term.

When?

Now!

How?

By implementing the National Action Plan on Soil, developed under the project.

Building on the project findings, six targets (TGs) were included in the National Action Plan on Soil for Tunisia:

TG1: Revise, devise and implement soil policies and legislations to scale up sustainable soil management.

TG2: Establish mechanisms to promote cooperation among national institutions.

TG3: Build capacities on sustainable soil management.

TG4: Develop a national framework on sustainable soil management to coordinate actions among stakeholders.

TG5: Develop a Tunisian Soil Information System (TSIS).

TG6: Invest in research and development.

Soil laboratories require the urgent action of the Tunisian government on the following:

- the establishment of a regular recruitment system to strengthen the human capacity of the laboratory and to ensure the replacement of retiring technicians;
- the installation of a unit to perform soil microbiological analysis;
- the granting of permission to the laboratory to charge clients for the costs of soil analysis (allowing the laboratory to be partially self-financing);
- the establishment of a national training programme for laboratory managers, researchers, and technicians, including national and international exchange programmes;
- the establishment and implementation of policies and regulations that:
 - support the establishment of protocols for laboratory management and health and safety, including the installation of suitable health and safety equipment;
 - provide protocols for a laboratory waste management system, including the safe disposal of expired chemicals; and
 - support and organize the removal and safe disposal of hazardous waste from soil laboratories.
- putting policies and regulations in place that set minimum data quality requirements for decision making (thus encouraging both the government and the private sector to engage and promote soil analysis); and
- the establishment of information days involving the agricultural extension and training agency to present the lab activity and the different soil measurements (this activity to be implemented across Tunisia).

Main project findings

Soil organic carbon stocks

Soil organic carbon (SOC) is the carbon (C) that remains in the soil after partial decomposition of any material produced by living organisms. It constitutes a key element of the global C cycle through atmosphere, vegetation, soil, rivers and the ocean. Figure 1 shows SOC stocks in tonnes per hectare (t/ha). Darker colours indicate a higher concentration of SOC stocks.

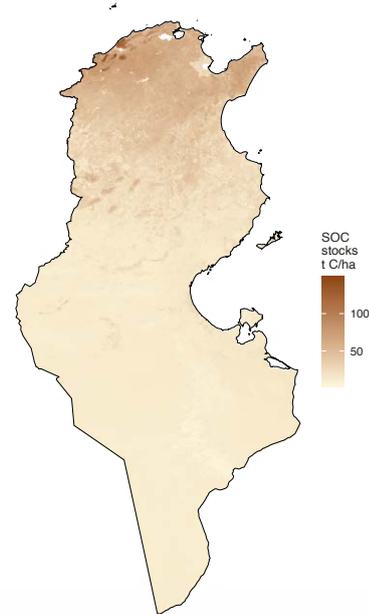


FIGURE 1. SOIL ORGANIC CARBON STOCKS (T/HA)
SOURCE: UNITED NATIONS GEOSPATIAL, 2020. MAP GEODATA [SHAPEFILES]
NEW YORK, USA, UNITED NATIONS, MODIFIED BY THE AUTHORS.

Salt-affected soils map

Salt-affected soils (SAS) include saline, sodic, and saline-sodic soils and also include many sub-categories depending on the type of salts. Saline soils contain an excessive amount of soluble salts

that reduce the ability of plants to take up water from the soil. Figure 2 shows the areas of topsoils and subsoils that are salt-affected.

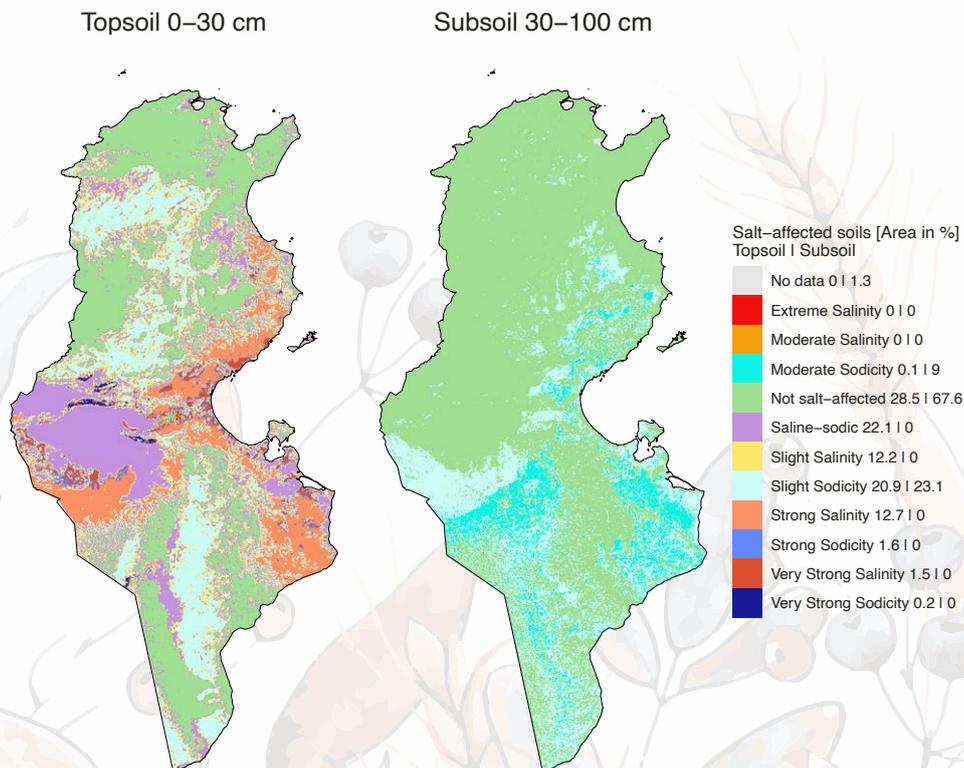


FIGURE 2. DISTRIBUTION OF SALT-AFFECTED SOILS)
SOURCE: UNITED NATIONS GEOSPATIAL, 2020. MAP GEODATA [SHAPEFILES].
NEW YORK, USA, UNITED NATIONS, MODIFIED BY THE AUTHORS.

Soil organic carbon sequestration potential

Sustainable soil management (SSM) practices, (centred on SOC sequestration) are one of the most cost-effective options for climate change adaptation and mitigation, and for combating desertification, land degradation and food insecurity. Figure 3 represents the potential of SOC sequestration in agricultural soils where different

SSM practices are applied, aimed at increasing C inputs in soils, versus business-as-usual (BAU) practices. Table 1 shows that by increasing C inputs to the soil by 20 percent compared to the business-as-usual scenario, 0.351 million tonnes (Mt) of C could be sequestered annually in agricultural areas in Tunisia.

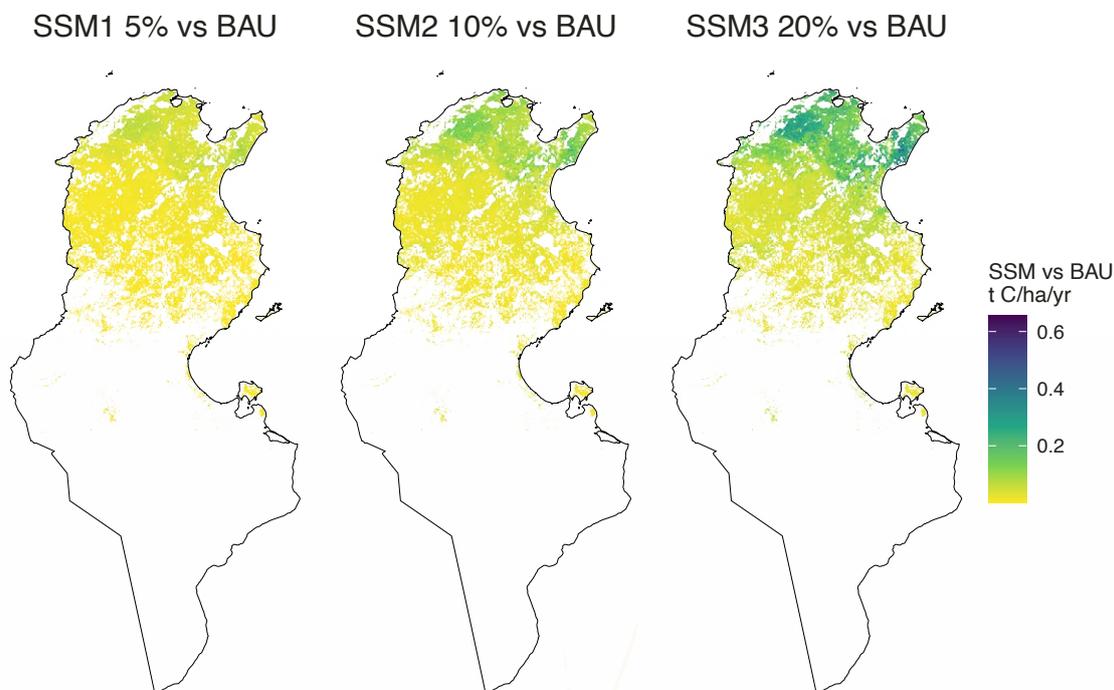


FIGURE 3. SOIL ORGANIC CARBON SEQUESTRATION POTENTIAL BASED ON THREE SUSTAINABLE SOIL MANAGEMENT SCENARIOS (ADDING DIFFERENT CARBON INPUT PERCENTAGES TO THE SOIL VS A BUSINESS AS USUAL SCENARIO)
SOURCE: UNITED NATIONS GEOSPATIAL, 2020. MAP GEODATA [SHAPEFILES] NEW YORK, USA, UNITED NATIONS, MODIFIED BY THE AUTHORS.

TABLE 1. AVERAGE ANNUAL AND TOTAL ANNUAL SOIL ORGANIC CARBON SEQUESTRATION POTENTIAL RATES

Scenario	Mean annual C sequestration rates (t/ha)	Total annual C sequestration rates (Mt)
SSM1	0.020	0.088
SSM2	0.039	0.176
SSM3	0.078	0.351

Soil laboratories: main findings

- The laboratory has a great potential to become a national leader in soil analysis and knowledge transfer, thanks to the aim-based human resources management system established by the head of the laboratory, which has resulted in enhanced working conditions and productivity. However, it is advised that different responsibilities are assigned to each member of the technical team to enhance the organization of analyses and working conditions, such as quality, security, data management, soil testing interpretation. The analysis sheet should also be improved to include more information about the samples (such as geolocation, sampling procedure, plot size, agricultural practices and irrigated or rainfed).
- Beneficiary laboratories to the project all follow standard operating procedures (SOPs). There is a need to train them on the implementation of internationally recognized SOPs like the ones released by GLOSOLAN. This would allow Tunisia to produce standardized and internationally harmonized data.
- Health and safety measures are not fully in place, increasing the exposure and risk of laboratory personnel to accidents and hazards. Support is required in terms of training and equipment.
- The implementation of quality assurance and quality control (QA/QC) procedures is weak. Laboratories need to be trained on QA/QC, and their participation in international and regional proficiency tests (PTs) needs to be fostered and supported. Ultimately, beneficiary laboratories need to be trained on the preparation of soil samples for internal quality control and for the preparation of soil samples to organize national PTs.



BRAINSTORMING WITH TECHNICIANS.
LABORATOIRE CENTRAL D'ANALYSES
DES SOLS (LCAS). TUNISIA



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TRAINING AND SOIL LABORATORY ACTIVITIES.
LABORATOIRE CENTRAL DES ANALYSES DES
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This project was implemented in: the Islamic Republic of Iran, Iraq, Jordan, Lebanon, Morocco, Oman, Palestine, the Sudan, the Syrian Arab Republic, Tunisia and Yemen.

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The Global Soil Partnership (GSP) is a globally recognized mechanism established in 2012. Our mission is to position soils in the Global Agenda through collective action. Our key objectives are to promote Sustainable Soil Management (SSM) and improve soil governance to guarantee healthy and productive soils, and support the provision of essential ecosystem services towards food security and improved nutrition, climate change adaptation and mitigation, and sustainable development.

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