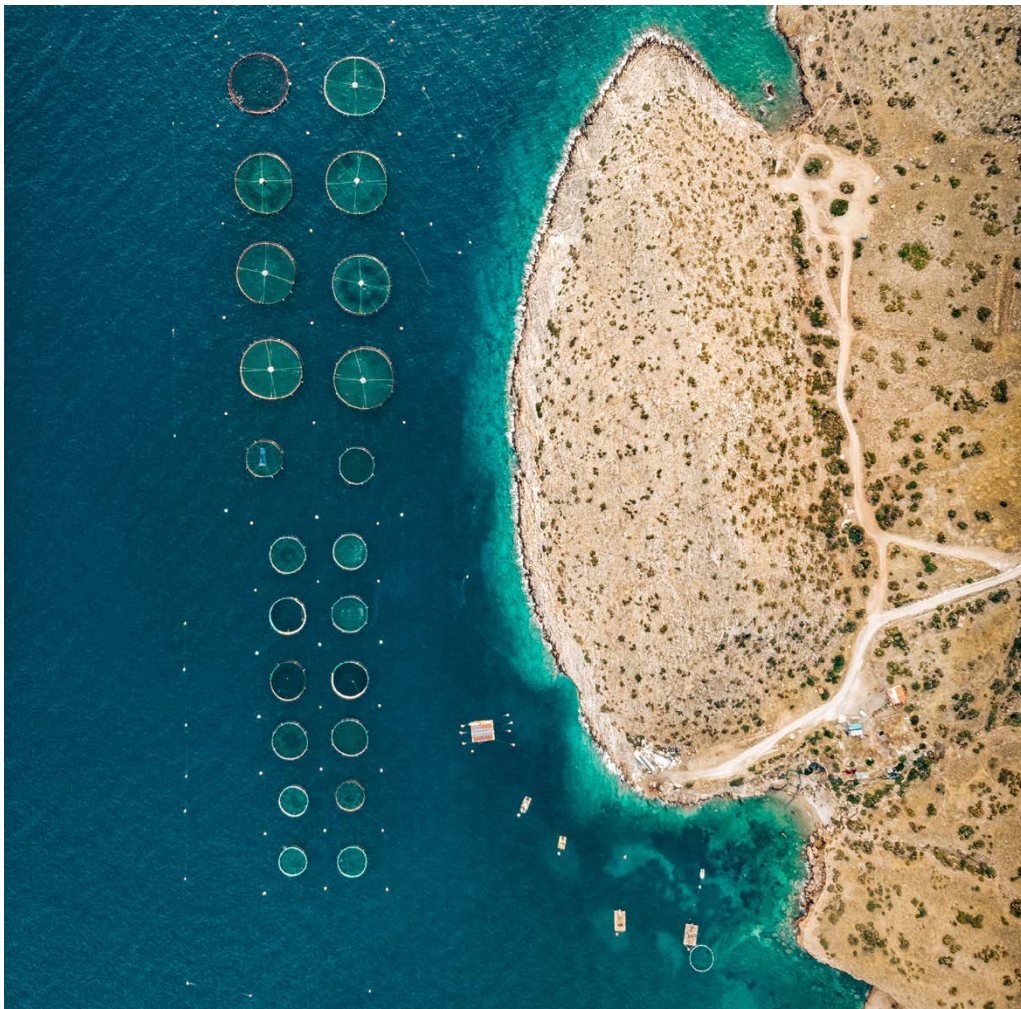


Blue Economy

*Promoting a sustainable and resource-efficient
aquaculture in the Mediterranean*



Implemented by:



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SwitchMed is co-funded by:



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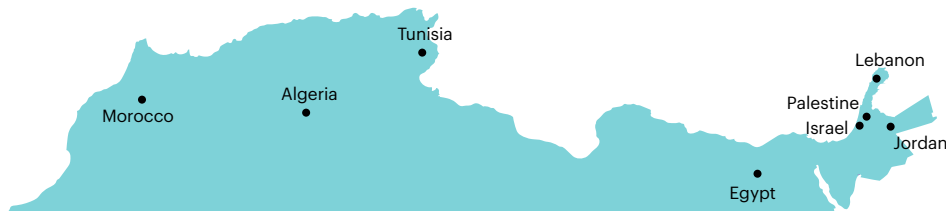
Italian Development
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and International Cooperation

The SwitchMed Programme

Launched by the European Union (EU), the SwitchMed Programme has since 2014 demonstrated the potential for a green and circular economy in Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, and Tunisia. Through industry demonstrations, policy development, networking opportunities, and support for start-ups and green entrepreneurs, SwitchMed up-scales the transition towards Sustainable Consumption and Production (SCP) practices in the Southern Mediterranean region.

Through the promotion of business models that can reduce the inefficient use of resources and the environmental footprint of existing economic activities, the SwitchMed Programme supports long-term resilience and an economic transformation of the region to meet economic, social, and environmental challenges related to the climate change.

Designing out waste, reducing pollution, and keeping products and materials longer in use are all cornerstones of a circular economy. These principles also outline the activities of the United Nations Industrial Development Organization (UNIDO) in developing resource-efficient and circular industries under the second phase (2019-2023) of the SwitchMed Programme.



SwitchMed and the Blue Economy

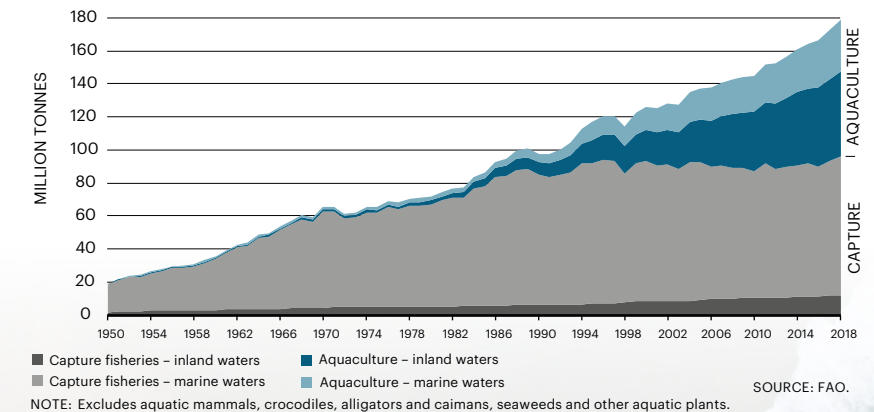
For centuries, the sea has enabled trade, offered livelihoods, and defined the socio-economic development of the Mediterranean region. Economic activities emanating from the sea continue to play an essential role in providing the region's income and food. According to a report from the Food and Agriculture Organization (FAO), fisheries and aquacultures employed in 2018 59.5 million people worldwide, and the total production of marine fish and seafood from the Mediterranean region was estimated to be two million tonnes, out of which 43% were from marine aquacultures. Still, unsustainable practices in these sectors threaten ocean ecosystems, biodiversity, and the long-term viability to deliver for future generations.

The Blue Economy concept, aspires to manage a sustainable transformation of associated maritime economic activities, such as fisheries and aquaculture, to reduce their negative impact on maritime and coastal ecosystems. With funding from the European Commission Directorate-General for European Neighbourhood Policy and Enlargement Negotiations (DG NEAR), and the support of the Directorate-General for Maritime Affairs (DG MARE), the second phase of the SwitchMed Programme will, until 2023, extend circular economy principles to the eight SwitchMed countries by introducing a Blue Economy component.

Under the SwitchMed Blue Economy component, SCP practices, policy recommendations and eco-innovative business models will be demonstrated in vital marine economic sectors, selected in line with the EU Blue Growth strategy, to support the development for more resilient Blue Economy sectors in the Mediterranean region.

Under the second phase of SwitchMed UNIDO has identified priorities that can reduce the environmental impact and increase profitability and resilience in Morocco's fish processing industry and the aquaculture sector of Tunisia. Together with industry stakeholders, UNIDO will provide technical support to address inefficiencies in resource consumption and demonstrate the best available technologies and practices to showcase the potential for business models that can turn challenges into opportunities while managing marine resources in an eco-efficient way.

World capture Fisheries and Aquaculture production



Improving the efficiency and environmental performance of Tunisia's aquaculture sector

The farming of fish and seafood, is globally the fastest-growing animal-food-producing sector. According to the FAO, the global aquaculture production increased from 1990 to 2018 by 527% and was 2018 estimated to be 114,5 million tonnes. In Tunisia, aquaculture is also growing, currently, producing about 23,000 tonnes per year, accounting for almost 18% percent of Tunisia's total fish production. The Government of Tunisia seeks to develop this sector, with the promising outlook of producing 60,000 tonnes/year fish by 2030.

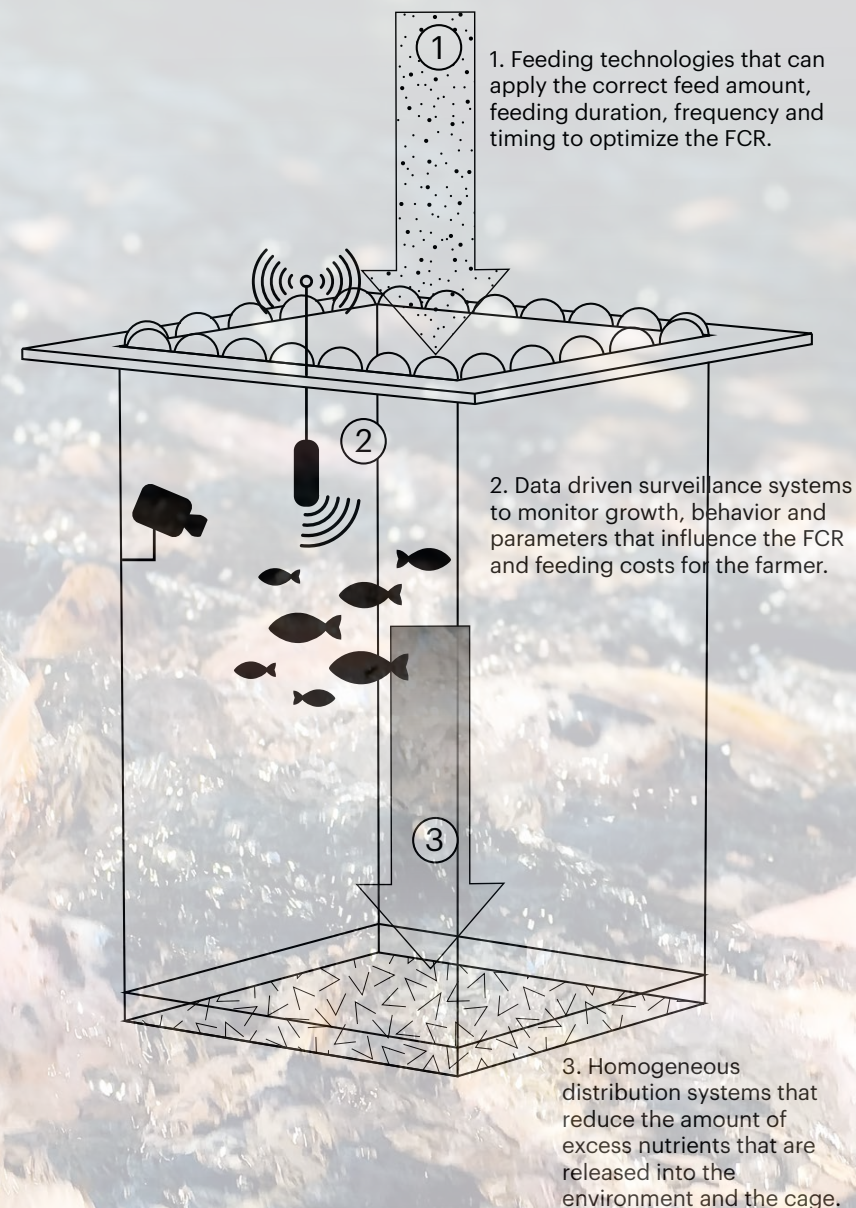
In 2021, UNIDO commissioned under the SwitchMed Programme a mapping study of the aquaculture value chain in Tunisia across four subsectors (Fish Farming, Aquaculture feed production, Hatcheries, and Shellfish farming.) The value chain mapping identified priorities areas of intervention in line with the Tunisian aquaculture development strategy established by the Ministère de l'Agriculture, des Ressources Hydrauliques et des Pêches (MARHP.) The MARHP strategy aims to develop more sustainable management production models that can meet the need to increase production while improving sustainability aspects of the aquaculture sector.

The study indicates that the Tunisian aquaculture sector is characterized by good performance indicators (growth performance, survival rates). However, the Feeding Conversion Rate (FCR) for aquacultures in Tunisia remains too high compared with international standards.

The FCR is the amount of feed it takes to grow a kilogram of fish and is a critical parameter when determining the sustainability of aquacultures. As the required fish/feed ratio varies over time and conditions, an optimization of the FCR can help farmers give adequate feed without over or underfeeding. While underfeeding will inhibit growth, overfeeding can jeopardize the profitability of the farm with a combined impact on the environment due to the dispersion of exogenous substances leading to eutrophication and modification of marine ecosystems.

The use of eco-innovative technologies that can optimize the FCR and improve fish feeding efficiency could be essential to enhancing aquacultures' production capacities, profitability, and environmental performance. Until 2023, UNIDO will, together with the Direction Generale de la peche et de l'aquaculture (DGPA), a consortium of national and international experts and stakeholders from the aquaculture value chain in Tunisia, investigate the applicability of eco-innovative technologies and solutions that can improve efficiency and the environmental performance of Tunisia's aquaculture sector.

Example of eco-innovative technology applications in aquaculture



The UNIDO Blue Economy project in Tunisia's aquaculture sector

Beginning in 2022, UNIDO will review aquaculture technologies and operational best practices along with the current regulatory framework for aquacultures in Tunisia to specify a baseline for advancing resource-efficient production standards and improving the environmental performance of Tunisia's aquaculture value chain.

Identification of eco-innovative technologies applicable to Tunisia's aquaculture

Based on the technological solutions and specifications proposed in the baseline report, eco-innovative technologies that apply to the Tunisian context will be selected for a demonstration pilot. Examples of eco-innovative technologies for aquaculture systems include surveillance systems, digitalized feeding systems and net cage cleaning systems.

Demonstration hub for eco-innovative technologies in aquaculture

A demonstration of the selected technologies will be undertaken within an aquaculture facility in the Monastir Bay to assess the technologies in the industrial context of Tunisia's marine aquaculture. The demonstrations will approximately take nine months and evaluate the applicability, effectiveness, and potential of different technologies, also used in various combinations, in various maritime/weather conditions, considering the fish's development stages and growth periods. Conclusions from the trials, such as life-cycle analysis, environmental impact assessment, and production parameters, will be used in the project's final evaluation. The demonstration hub will also facilitate field training modules for staff from 20 aquaculture production units who will develop their skill-set on the demonstrated technologies, learning operations and maintenance at the demonstration hub.

Raising awareness on sustainable aquaculture

An online training module on the benefits of eco-innovative aquaculture will be offered to government institutions, members of academia, and stakeholders from other sectors to raise and support the exchange on sustainable production solutions. In 2023, a B2B event will be organized in Tunisia for stakeholders from the aquaculture industry and international/national technology providers to promote business partnerships, technology transfer and support exchange on eco-innovative solutions to and from Tunisia.

Roadmap for sustainable aquaculture in Tunisia

Data, information and experiences gathered from the demonstrations will, together with stakeholder consultations, go into the development of a sustainable aquaculture Roadmap in Tunisia. This roadmap will propose recommendations and incentives that can up-scale the adoption of eco-innovative production methods for aquacultures in Tunisia and the Mediterranean region and provide a building block for developing a long-term Blue Economy strategy that also can include other industry actors in the development of a circular sector value chain.



Funded by the European Union, the Government of Catalonia, and the Government of Italy, the SwitchMed Programme is implemented under the lead of the United Nations Industrial Development Organization (UNIDO), and MedWaves, the United Nations Environment Programme Mediterranean Action Plan (UNEP/ MAP) regional activity centre for Sustainable Consumption and Production (formerly known as SCP/RAC). SwitchMed is executed and in close coordination with the Directorate-General for Neighbourhood and Enlargement (DG NEAR). Each implementing organization brings its specialized experience and tools to partner with the eight countries on activities that span policy development, capacity building, business support services, demonstration activities and networking.

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