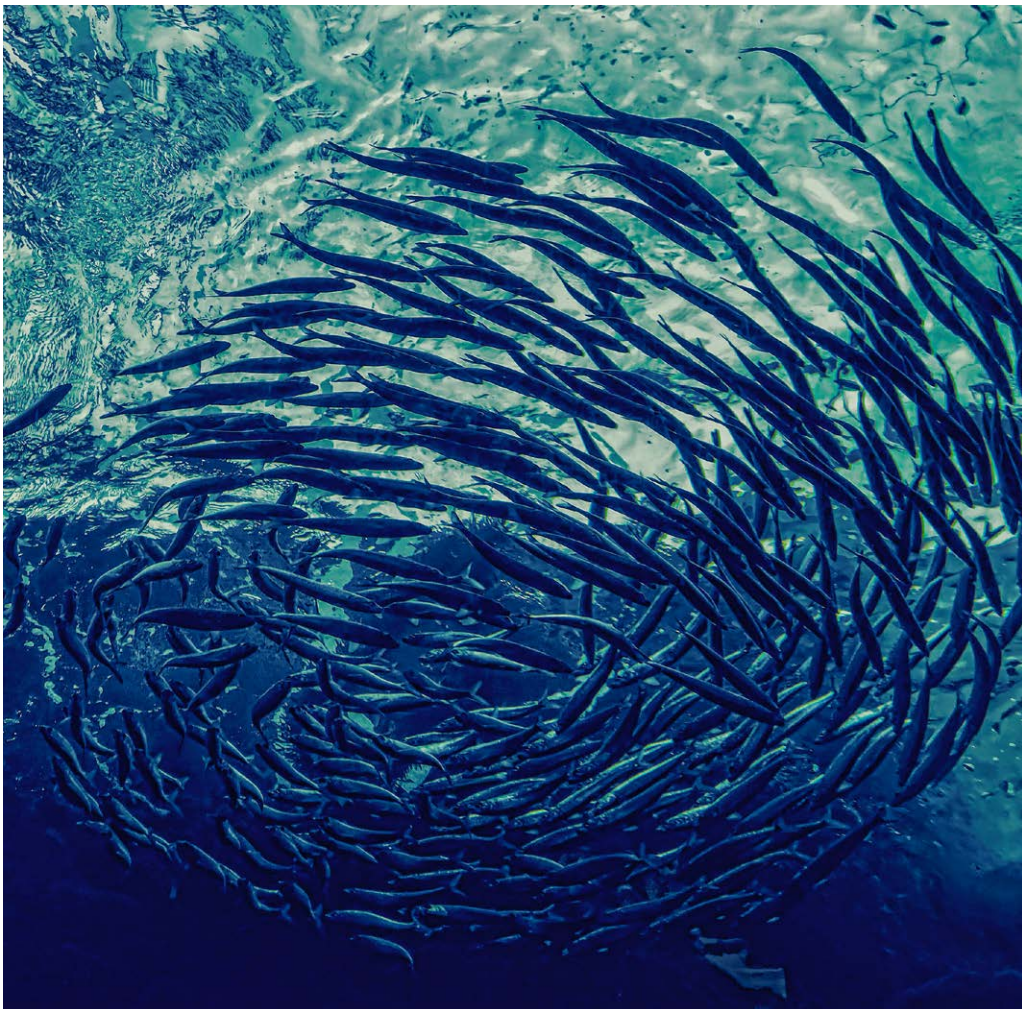


# Blue Economy

*Promoting resource-efficient and circular production practices in Morocco's fish processing value chain*



Implemented by:



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## *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*

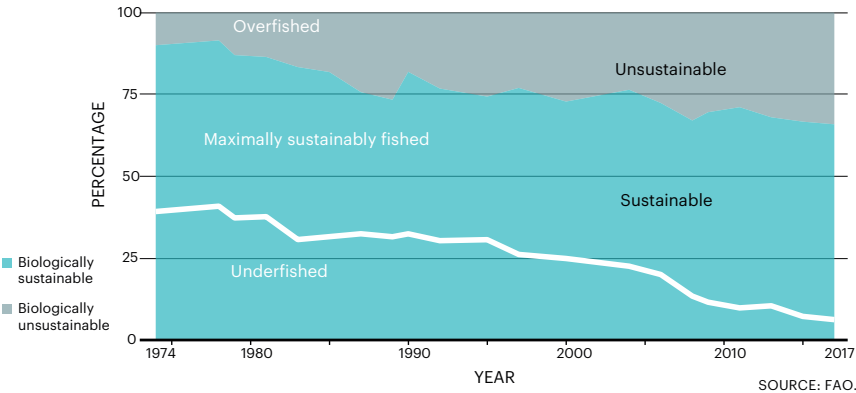
For centuries, the sea has enabled trade, offered livelihoods, and defined the socio-economic development of the Mediterranean region. Economic activities emanating from the sea continue to play an essential role in providing the region's income and food. According to a report from the Food and Agriculture 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.

*Global trends in the state of the world's marine fish stocks. 1974-2017*





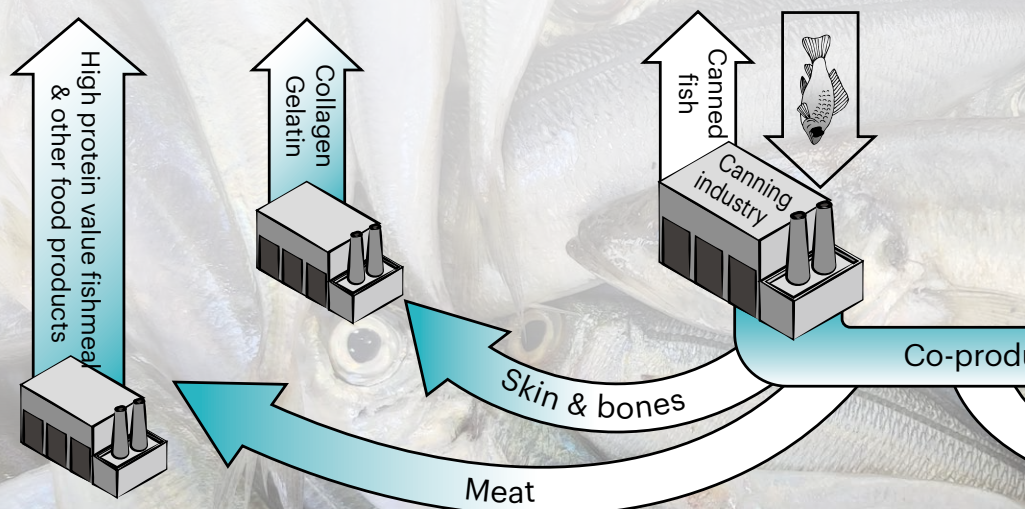
## Upgrading the efficiency and the circularity of Morocco's fish processing value chain

The fish processing industry in Morocco stands for 8% of the total export (2020) and indirectly employs approximately 500,000 people. But depleted fish stocks, faltering catching rates, low efficiency and environmental standards are challenging the sector. Industry demonstration results, undertaken during the first phase of the SwitchMed Programme (2014-2018), indicated that fish processing businesses were operating below international benchmarks with significant saving potential in energy and water consumption. Further, the raw material losses accounted for 50-60%, representing a significant potential for waste valorization into a range of products with higher added value.

In 2021, UNIDO commissioned under the SwitchMed Programme a mapping of the fish processing value chain in Morocco, covering different sub-sectors, such as small pelagic canning and freezing, cephalopods, shrimps peeling, and processing of fishmeal/fish oil. The mapping revealed many opportunities for introducing circular economy business models and one of the main findings was that the fish canning and fish freezing sector generates around 94% of the 280,000 tons of fish waste that the fish processing sector annually generates. This waste goes primarily into the conventional fishmeal/fish oil processing and yields a limited in-country value for Morocco's fish processing industry.

Overall, there is significant potential in better utilizing fish co-products into more diversified products with a higher added value, such as Omega-3 oil, Collagen, and Protein Hydrolysate, which are currently high in demand on the global market. But to achieve this, fish co-products

### High-value applications from fish co-product valorization

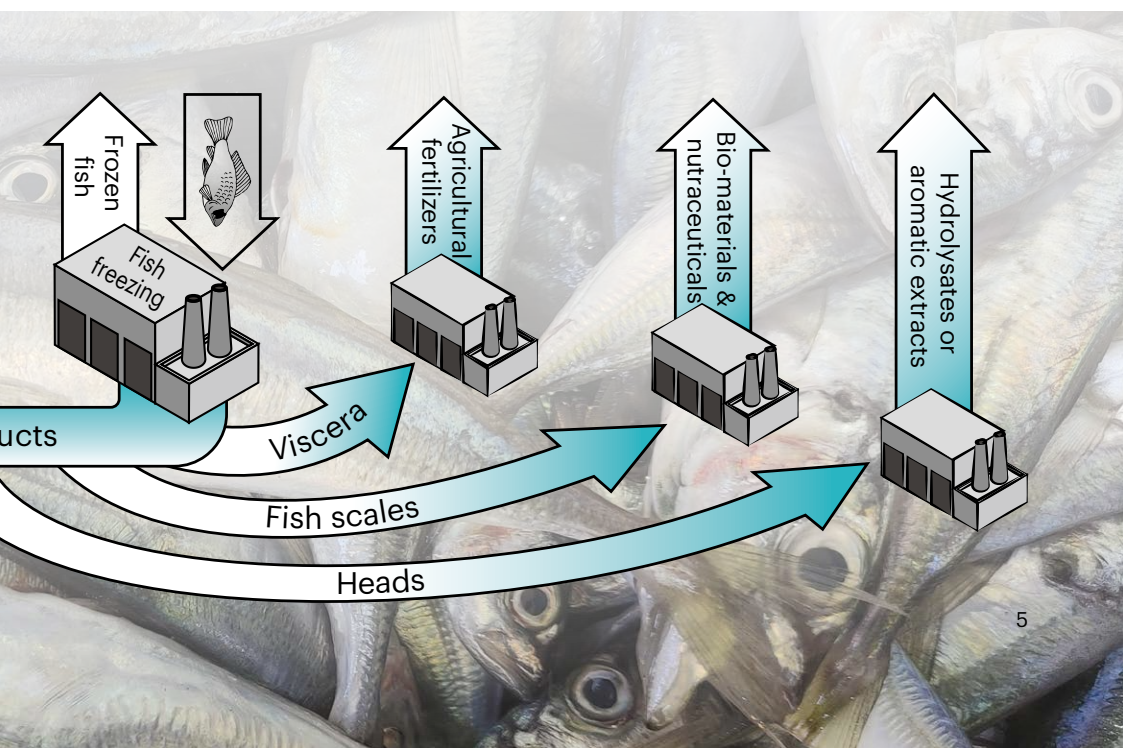


needs to be adequately segregated at the level of the fish freezing/fish canning processing units, and for co-products, better handling processes and improvements in the cold-chain logistics need to be introduced throughout the supply chain. Furthermore, better energy and water consumption standards could increase profitability with new business opportunities for Morocco's fish processing industry.

The fishmeal/fish oil sector plays a crucial role in building and ensuring a sustainable growth for Morocco's fish industry. However, this sector is traditionally the biggest consumer of fish co-products and by-catches. The practice of diverting by-catch and fish co-products, causes significant stress on marine resources and only captures a portion of the value-added potential from these resources.

Together with the Federation National des Industries de Transformation des Produits de la Pêche (FENIP), UNIDO will under the SwitchMed Programme demonstrate business models with better energy, water and material consumption standards and develop new business opportunities that can better utilize fish co-products from Morocco's fish processing industry.

Innovating the processing of fish co-products into products with a higher added value could help the industry become more profitable, diversify the product portfolio, create new jobs, improve the resilience of businesses, and better retain the value from fish co-products in the Moroccan economy. Essentially, every step that can reduce the environmental impact and contribute to the preservation of marine ecosystems, will also contribute in building a long-term strategy for the future Blue Economy in Morocco.



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## *The Blue Economy project in Morocco's fish processing value chain*

Based on the outcomes of the value chain mapping undertaken in 2021, UNIDO will for the next phase, develop scenarios for business models and strategic orientations that can improve the circularity of the value chain and advance resource-efficient production standards in the fish processing sector. This step will include a technical and regulatory baseline analysis and a review of national regulatory frameworks for raw materials and end products. Furthermore, UNIDO will also examine product specifications in line with EU market regulations, labels, and certifications that can improve commercial opportunities for Moroccan exports in EU countries.

### **Industry demonstrations for improving valorization of fish co-products**

Based on the recommendations from the baseline analysis, pilot initiatives will be undertaken in the fish processing and fish meal/fish oil units of CIBEL, in collaboration with INRH Institut National de Recherche Halieutique and team of national and international experts lead by PROCIDYS. The pilot initiatives will demonstrate the business case for valorizing fish co-products into end products with higher added value, focusing on improving the sorting and handling procedures of fish co-products, their preservation, and identifying improvement options for cold chain logistics. Also, valorization of co-products will be implemented at an industrial scale, for producing high-end value-added products (e.g. hydrolysate, etc.) and an economic-environmental impact analysis that can propose a perspective on extending the benefits of the pilot initiatives at a national level.

### **Promoting resource-efficient production standards**

The pilot initiative will also demonstrate the cost-saving potential of resource efficiency measures in CIBEL. An in-plant audit of the production lines will identify priority flows (material, water, energy) to reveal the sources of inefficiencies and propose a set of options that can improve efficiency performance, reduce cost and thus leverage the competitiveness of the production lines.

### **Awareness raising and training on sustainable business models**

Together with national stakeholders, UNIDO will undertake a training and awareness raising programme with professionals from the fish processing value chain in Morocco. The programme will introduce eco-innovative technologies and processes that can promote the adoption of more sustainable and profitable production practices, that eventually also can further the sector in refining the valorization of fish co-products into high-value end products.

The data, information and experience gathered from the demonstration pilots, will together with stakeholder consultations, flow into the development of a Blue Economy Roadmap for Morocco's fish processing industry. This roadmap will provide strategic orientation and propose a set of recommendations and incentives to support a nationwide adoption of circular economy principles in the fish processing industry, in line with the national Halieutis 2030 strategy.





### Baseline analysis and business model definition



### Awareness campaign & training on sustainable business models



### Promotion of resource-efficient production standards

Elaborating solutions with best-available technologies and practices to improve resource-efficiency standards (energy, water, material.)



### Industry demonstrations for improving valorization of fish co-products

Implementing specific tests, protocols and procedures to produce samples of high-end value product fish co-products



### Evaluation and recommendations

- Environmental impact assessments
- Economic potential of the business models
- Regulatory and financial mechanisms
- Replication and up-scaling potential



### Sharing results and developing a Blue Economy roadmap for the fish processing value chain in Morocco

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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