LIFE iSEAS: Knowledge-Based Innovative Solutions to Enhance Adding-Value Mechanisms towards Healthy and Sustainable EU Fisheries

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The LIFE iSEAS Project

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• **BUDGET** → Total: 3,866,342 €; % EU Co-financing: 1,919,325 € (49.79%)

• **DURATION** → Begins: 01/07/2014  Ends: 30/06/2018 (48 Months)

• **BENEFICIARIES:**

  ➢ Coordinating Beneficiary:

  AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS (CSIC) – INSTITUTO DE INVESTIGACIONES MARINAS

  ![CSIC Logo]

  ![IIM Logo]

  ➢ Associated Beneficiaries:

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<tr>
<th>Centro Tecnológico del Mar – Fundación CETMAR</th>
<th>Centro de Supercomputación de Galicia - CESGA</th>
<th>Universidad de Santiago de Compostela</th>
<th>Instituto Español de Oceanografía - IEO</th>
<th>Organización de Productores de Pesca Fresca del Puerto y Ría de Marín</th>
<th>Talleres Josmar, S.L.</th>
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Discards are one of the most important issues in fisheries, both from an socio-ecocomic and environmental point of view.

“Discards or discarded catch is that portion of the total organic material of animal origin in the catch, which is thrown away or dumped at sea for whatever reason. It does not include plant materials and post-harvest waste such as offal”

Food and Agriculture Organization of the UN

It is a fact that any fishing operation has an unavoidable percentage of discards, from long-liners (2-10%) to trawlers (up to 90%), for a total of up to 7 millions of tons/year of discards.
Why LIFE iSEAS

**Economic**
- little or no market
- To maximise the value of the catch
- larger specimen (*high-grading*)

**Regulatory**
- Exceeded or No Quota
- Minimum Landing Sizes (MLS)
- Protected species

**Technical**
- Poor selectivity
- The multi-species nature of some fisheries
**Why LIFE iSEAS**

* **Discards** constitute a purposeless waste of valuable marine resources which plays an important role in the depletion of marine populations.

* **Ecological adverse impacts:**
  a) **Changes in the ecosystem** and in the overall structure of trophic webs take place.
  b) Discarding of **juveniles** of target species results in a future reduction of spawning biomass.
  c) Discarding of **mature specimen** of target species inmediatelly reduces the spawning biomass of the stock.

* **Socio-economic adverse impacts:**
  a) Fish which is killed without contributing to the income to the sector will not contribute to the **income in the future** either (non-discarded fish will be a resource in the future).
  b) Fishing industry is affected in the **longer term** since it is dependent on a healthy marine ecosystem.
Discards are considered as an unacceptable waste of resources and a New Common Fisheries Policy has been set up by the European Commission to mitigate and prohibit them.

REGULATION (EU) No 1380/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 11 December 2013

Article 15
Landing Obligation

“All catches of species which are subject to catch limits ... caught during fishing activities in Union waters ... in the fisheries and geographical areas listed below shall be brought and retained on board the fishing vessels, recorded, landed, and counted against the quotas where applicable, except when used as live bait.”
* In this new legal framework defined by the new CFP, the pursued objectives are:

* **Reduce/Eliminate discards** (by improving fishing selectivity, avoiding non-targeted species zones or seasons).

* **Make the best possible use of unwanted biomass in a sustainable manner and avoid its waste**, also reducing the costs derived from shortage the storage capacity in the vessel.
## Previous work to LIFE iSEAS

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<th><strong>BIOTECMAR</strong></th>
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<td>IIM-CSIC, CETMAR, IFREMER, IPIMAR, Autoridad Portuaria de Vigo, Espaderos del Atlántico, HRG, S.L.</td>
<td>IIM-CSIC, CETMAR, IEO, IPIMAR, CESGA, Autoridad Portuaria de Vigo</td>
<td>UEB-UBO, CSIC, MNHN, IPIMAR, Technopole-Quimper, Université de La Rochelle, Irish Seaweed Centre, Université de Nantes, IFREMER, Indigo Rock, CETMAR, NET, S.A.</td>
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**The BE-FAIR Project**

**Benign and Environmental Friendly Fish Processing Practices to Provide Added Value and Innovative Solutions for a Responsible and Sustainable Management of Fisheries**

*MAIN OBJECTIVE:* Development and implementation of an effective and integrated management system both on board and on land in order to reuse the waste produced by the fishing industry, including discards and by-catch.

### Environmental objectives
- Efficient management of discards and sub-products
- Characterization and quantification of materials
- Associated costs and problems

### Processing objectives
- Analysis of the possible processing lines
- Maximization of the yield of the processes
- Flexibilization of design/operation of the plant
- Minimization of utilities consumptions

### Market objectives
- Production of components of high commercial interest
- Market demand analysis

**WASTES** — **VALORISATION** — **MARKET**

- Fleet
- Auctions
- Processing industries
- Classification
- Conservation

\[ P_1 \rightarrow P_2 \rightarrow \ldots \rightarrow P_n \]
The BE-FAIR Project

Results: Some prototypes

Fish oil

Compactation on board

Chondroitin sulfate

Fish Gelatine
The FAROS Project

Integral Networking of Fishing Sector Actors to Organize a Responsible, Optimal and Sustainable Exploitation of Marine Resources

* MAIN OBJECTIVE: To define an efficient and optimal discards management network of actors involved in the fishing activity by exploiting the existing synergies between them.
The On-Board FAROS Technologies

The BEOS system integrates machine vision technologies, optical information processing and feature extraction by means of nonlinear modeling based on artificial neural networks. The steps in the characterization methodology are: 1) Image capturing → 2) Pre-processing → 3) Body shape information extraction → 4) Color modeling → 5) Species classification and Biomass estimator.

The percentage of correct discarded species identification and mass estimation is up to a 90% and 98%, respectively.
The FAROS MGN Environment

- Once the data (species and estimated biomass) is acquired by BEOS, information is pre-processed and sent to land (to the data management servers) by making use of the RED BOX system.

- Based on this data, a fully-operative global operation network aiming an efficient management of discards has been developed. This is the so called FAROS Management Geoportal Network (MGN). It is a real-time web environment based on information flows exchanged between fleets (generated by BEOS and RED BOX) and in land agents.

The idea is that the fishing fleets, acting as OFFER, will know the DEMAND (from processing/valorizing industries) for all the biomass captured during a campaign, generating a market exit to discards.

Finally, the data obtained on-board is the base of developed predictive models of fishing areas for characterization/estimation of discarded volumes.

Such real-time models aim:

a) To know the health of the marine resources.
b) To perform a spatial rating of the fishing areas.
c) To plan in advance (in port) fleet’s future activity, minimizing discard levels, fishing pressure, other negative environmental impacts (like fuel consumption) or legal restrictions over stocks while maximizing their profit.
Fishing patterns

If the areas with higher discards levels (no commercial, no quotas, no size) are precisely known in real time, other vessels, working in the area, would surely try to avoid these specific zones, so reducing the total catch of discards.

Efficient Valorisation

Nowadays, a quite large amount of fishing organic matter is going to produce fish meal/oil, generating products of low-medium value.

If the discards can be kept on board and landed, we think that is an opportunity to use that biomass in a more optimal/efficient way, increasing the socio-economic benefits.

Demonstration Character

It is possible to demonstrate the validity of the proposed approach to guarantee the sustainability of fisheries only by including on it:

1. Accurate data of discards types, volumes and fishing zones.
2. Problems related to management of discards.
3. Technical procedures to obtain more specific products.
4. Socio-economic aspects related to the different steps in the value chain.
The main objective is to demonstrate that a sustainable scenario (in terms of biological and socio-economic indicators) of the EU fisheries is possible through the enhancement of the real application on the fishing sector of existent knowledge and innovative solutions on discards reduction and management.

- To take real time decisions over fishing activity
- To perform more selective fishing

Objectives:

1. **Objective 1**
   To test the implementation and performance of the iObserver

2. **Objective 2**
   To optimize the fishing activity through the definition of a reliable tool based on mathematical models

3. **Objective 3**
   To define a real fully operative inland demonstration facility for discards valorisation (the iDVP)

4. **Objective 4**
   To demonstrate the environmental and socio-economic impacts/benefits of the new management model
The LIFE iSEAS Expected Results

* A complete assessment of the actual situation of discards issues on selected fisheries, focusing on the socio-economic implications/impacts that the new CFP will have on the fishing sector.

* A system able to perform the work of a human observer (identifying class/quantity of discarded/target catch) on-board, without interfering the activity of fishermen: the iObserver.

* A data and metadata model and a complete range of OGC services (Open Geospatial Consortium) for acquired discards information integrable on a fish discards Spatial Data Infrastructure (SDI), satisfying INSPIRE Directive.

* A powerful modelling tool to analyze the spatio-temporal conditions of considered fishing areas in terms of discards(stock status).

* A real pilot service located on the Port of Marín facilities (Galicia, NW Spain) to valorise, manage and trade discards landed: the iDVP.

* An exhaustive analysis of the environmental and socio-economic impacts of proposed solutions over all fishing sector agents as well as over the whole region (Galicia), paying special attention on capacity building for better management/reduction of discards.
LIFE iSEAS Actions

- **A1. Drivers and incentives for discarding: socio-economic implications and quantification of discards in target fisheries.**

  - B1. Definition and testing of an iObserver.
  - B2. Development of a fish discards SDI.
  - B3. Optimization of the fishing activity monitoring towards the sustainability of resources.
  - B4. Definition of a real fully operative on-board and inland pilot facility for discards valorization and management.

- **C1. Monitoring of impacts of the project**
- **C2. Environmental and socio-economic impact assessment of proposed solutions**
- **D1. Diffusion, demonstration and dissemination**
- **D2. After-LIFE+ Communication Plan**
- **E1. Management, coordination and information to the EC**
- **E2. Networking with other similar LIFE+ Projects**
- **E3. External audit**
THANK YOU FOR YOUR ATTENTION
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