Estimated impact of the landing obligation on raw material supplies

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The project

Multiscale baselines and assessments

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Ecosystem scale assessment

WP2
Fishery scale assessment

TRANSVERSAL THEMES:

Stakeholders Involvement
Technological Innovation
Cost Effectiveness
Control and Monitoring
Dissemination and Outreach

Avoiding unwanted catches

WP3
Adaptation of gear technology

WP4
Adaptation of fishing strategies

Optimal use of unwanted catches

WP5
From deck to first sale

WP6
Products to the value chain

Policy outreach

WP7
Framing and implementing the discard policy

WP8
Bringing results to users and spreading the word

CASE STUDIES

WP9
Project management
The Project

9 Case Studies

- Barent sea
- Iceland
- Celtic sea
- North Sea-West of Scotland
- Eastern Channel
- Bay of Biscay
- Eastern Mediterranean Sea
- Western Mediterranean sea
- Azores

Main focus areas and partners in Europe
### Unavoidable Unwanted Catches (UUC)

Some criteria that generate UUC:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation</td>
<td>No quota available</td>
</tr>
<tr>
<td></td>
<td>Protected species</td>
</tr>
<tr>
<td></td>
<td>Under minimum legal size</td>
</tr>
<tr>
<td>Quality</td>
<td>Poor quality or quality considered as being insufficient</td>
</tr>
<tr>
<td></td>
<td>Degraded quality because scavenging or predation</td>
</tr>
<tr>
<td></td>
<td>Female carrying eggs (crustaceans)</td>
</tr>
<tr>
<td>Market</td>
<td>Absence of a market or no commercial opportunity</td>
</tr>
<tr>
<td></td>
<td>Unattractive price</td>
</tr>
<tr>
<td>Handling on board</td>
<td>Unsorted or spoiled fish</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapes (Lophius spp.)</td>
<td>5%</td>
<td>12%</td>
<td>14%</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merluza (Merluccius merluccius)</td>
<td>49%</td>
<td>19%</td>
<td>43%</td>
<td>20%</td>
<td>44%</td>
<td>54%</td>
<td>21%</td>
<td>38%</td>
<td>0%</td>
</tr>
<tr>
<td>Jurel negro (Trachurus trachurus)</td>
<td>44%</td>
<td>13%</td>
<td>11%</td>
<td>1%</td>
<td>8%</td>
<td>13%</td>
<td>0%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Gallos (Lepidorhombus spp.)</td>
<td>37%</td>
<td>44%</td>
<td>41%</td>
<td>1%</td>
<td>5%</td>
<td>6%</td>
<td>0%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Caballa (Scomber scombrus)</td>
<td>86%</td>
<td>51%</td>
<td>66%</td>
<td>7%</td>
<td>45%</td>
<td>11%</td>
<td>2%</td>
<td>21%</td>
<td>20%</td>
</tr>
<tr>
<td>Bacaladilla (Micromesistius putassous)</td>
<td>81%</td>
<td>44%</td>
<td>0%</td>
<td>82%</td>
<td>48%</td>
<td>63%</td>
<td>27%</td>
<td>12%</td>
<td>7%</td>
</tr>
<tr>
<td>Bocanegra (Galeus melastomus)</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Ochavo (Capros aper)</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Sub-total catch (tn)</td>
<td>6159</td>
<td>7460</td>
<td>9023</td>
<td>13283</td>
<td>7898</td>
<td>9405</td>
<td>7916</td>
<td>11029</td>
<td>19892</td>
</tr>
<tr>
<td>% total discards</td>
<td>60%</td>
<td>30%</td>
<td>29%</td>
<td>6%</td>
<td>32%</td>
<td>17%</td>
<td>13%</td>
<td>24%</td>
<td>7%</td>
</tr>
<tr>
<td>Total catch (tn)</td>
<td>93703</td>
<td>85976</td>
<td>153855</td>
<td>24022</td>
<td>24570</td>
<td>13235</td>
<td>22351</td>
<td>36512</td>
<td>43257</td>
</tr>
<tr>
<td>Total discards (tn)</td>
<td>87902</td>
<td>75886</td>
<td>137909</td>
<td>981</td>
<td>843</td>
<td>1072</td>
<td>2211</td>
<td>9799</td>
<td>16612</td>
</tr>
<tr>
<td>% total discarded</td>
<td>94%</td>
<td>88%</td>
<td>90%</td>
<td>6%</td>
<td>6%</td>
<td>11%</td>
<td>10%</td>
<td>27%</td>
<td>38%</td>
</tr>
</tbody>
</table>

**OTB_DEF_>=55_0_0** Arrastre de fondo con puertas dirigido a peces demersales (Baca).
**OTB_MPD_>=55_0_0** Arrastre de fondo con puertas dirigido a peces pelágicos y demersales (Jurelera)
**PTB_MPD_>=55_0_0** Arrastre de fondo a pareja pesquería mixta

## Unavoidable Unwanted Catches

(New) Common Fisheries Policy (Regulation EU No 1380/2013).

What can we do with UUC once landed?

<table>
<thead>
<tr>
<th></th>
<th>Size &lt; Min legal size</th>
<th>Size &gt; Min legal size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species with</td>
<td>• Mandatory landing</td>
<td>• Mandatory landing</td>
</tr>
<tr>
<td>quota</td>
<td>• Can not go for direct human consumption =&gt; Valorisation</td>
<td>• Can be commercialized (direct human consumption or other channel)</td>
</tr>
<tr>
<td>Species</td>
<td>• Can still be discarded</td>
<td>• Can still be discarded</td>
</tr>
<tr>
<td>without quota</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1 January 2015 pelagic fisheries (mackerel, herring, horse mackerel, ...)
- 1 January 2016 demersal fisheries (hake, cod, haddock, ...)
- 1 January 2019 all other fisheries
**Objective:** to obtain maximum use of fish resources, but:
- In compliance with landing obligation
- Not encouraging overfishing
- Not distorting current markets and commercialization channels

Possible uses:
- New strategies for commercialization (HORECA)
- New seafood products
- Food ingredients
- Added-value compounds
- Feed ingredients
- Other uses
  (adjusting catches to market demand)
Alternative uses

What is going on in other areas: Iceland (LO from 1977)

Estimated discards: 0-2% for most important species

Focused at full utilization of by-products

Cod utilization: around 80%
(Uutilization factor in most fisheries is <50%)

* Salted and dried products are calculated to wet weight - (dried x 4,8 and salted x 1,2)
What is going on in other areas: Iceland (LO from 1977)

Examples of products

Figure 3: Dried whole fish (stockfish), dried frames (bones) and dried fish head

Figure 5: Premium products made from cod liver, roe and milt

Figure 6: Cod liver oil and block frozen roes and milt
Alternativas de Uso

What is going on in other areas: Iceland (LO from 1977)

Examples of products

Figure 7: Block of frozen mince and salted belly flaps

Figure 8: Viscera and other raw materials block frozen as animal feed

Figure 10: Wound patches from Kerecis

Figure 11: Fashion clothing and accessories made from fish skin
Opportunity: New concepts adapted to the USER - CUSTOMER

- Re-structured value-added products: fillets, loins ...
- Re-structured high quality: filled products (two-three layers, different shapes: balls, dumplings.. .), surimi concepts: spaghetti, balls, fish-chips...
- Sushi products.
- Products for kids/seniors: burgers, patties, nuggets, sausages, sliced cooked products...
- Ready-to-eat meals and minimally-processed foods “gourmet” quality: Salads, side dishes, “semi-prepared” foods...
Ingredients for feed (dried, ensiled, ...):
- Pet-food
- Aquaculture
- Livestock
Alternative uses

HIGH-ADDED VALUE COMPOUNDS

Fish Flesh:
- Surimi, Minced fish, Marine Nutraceuticals, Hydrolisates, Bioactive peptides

Skin:
- Collagen + Gelatin for human and animal nutrition and cosmetic applications

Eyes:
- hyaluronic acid

Heads:
- enzymes, protein

Omega-3 Oil
Omega-6
Fatty Acids

Liver:
- fish oil

Viscera:
- enzymes, protein

Roe and Milt:
- Traditional source of Aa in Asian cuisine for food and nutraceutical applications

Dried frames and bones:
- Calcium + Minerals in product formulations and animal feed (pet-food, aquaculture, livestock)

All Ingredients: For foods, dietary supplements, animal nutrition, medicine, cosmetic Ingredients, and what cannot be used previously can go ultimately to bioenergy (biogas)

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Implications

A. Regulations
B. Environmental prioritization
C. Determining factors: technical, market and economical
D. Control and traceability
# REGULATIONS: Human consumption

## Implications

### Rule | Subject
--- | ---
Regulation (EC) 852/2004 | the hygiene of foodstuffs
Regulation (EC) 853/2004 | Specific hygiene rules for food of animal origin in order to guarantee a high level of food safety and public health
Regulation (EC) 178/2002 | General principles of food law and food safety procedures
Regulation (EU) 1169/2011 | provision of food information to consumers
Regulation (EC) 258/1997 | Novel Foods and novel food ingredients
Regulation (EC) 1333/2008 | Food additives
Directive 2009/32/EC | extraction solvents used in the production of foodstuffs and food ingredients

- Hygienic design and process
- Records
- HACCP
- Good handling practices, preservation, etc
## Implicaciones

**REGULATIONS: Animal feed**

Discards are considered raw material and not by-product

<table>
<thead>
<tr>
<th>Norma</th>
<th>Temática</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation (EC) 882/2004</td>
<td>official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules</td>
</tr>
<tr>
<td>Regulation (EC) No 767/2009</td>
<td>The placing on the market and use of feed</td>
</tr>
<tr>
<td>REGULATION (EU) No 68/2013</td>
<td>Catalogue of feed materials</td>
</tr>
<tr>
<td>Regulation (EC) No 1831/2003</td>
<td>Additives for use in animal nutrition</td>
</tr>
<tr>
<td>Regulation (EC) Nº 183/2005</td>
<td>Requirements for feed hygiene</td>
</tr>
<tr>
<td>REGULATION (EC) No 1069/2009</td>
<td>Health rules for animal by-products and derived products not intended for human consumption</td>
</tr>
</tbody>
</table>
Implications

ENVIRONMENTAL PRIORITIZATION

Prevention and reduction

Human Consumption

Animal Feed

Industrial uses

Production of Energy

Composting

Incineration

Landfill

Quality of raw material needed

Investments, operational costs...

VALUE
**Implications**

**Determining factors:**

**TECHNICAL:**
- Variability, dispersion of landing
- Characteristics of landed catches
- Ratio, quality and purity of product obtained
- Availability of technology and equipment at industrial scale
- Feasibility of modifications on boat
- Availability of storage, preservation and other facilities, equipment, logistics, etc. in port and region

**MARKET:**
- Compliance with health, environmental and other specific regulations for each use
- Existence of potential clients interested
- Market demand for the product produced, actual availability of acceptance
- Enough quality and volumes of product to satisfy demand

**ECONOMICAL:**
- Minimum volume of raw material for sustainable production
- Final value / price of product
- Cost / benefit expected
- Capacity to make use of current infrastructure to reduce costs
All options should comply with control and traceability regulations and standards related to:

- Evaluation and monitoring of landing obligation compliance
- Guarantee the correct destination of each discards type
- Quality and Safety assurance of the process and product

Management, Control & Traceability:
- On board
- During landing operation
- At land
- Distribution
- Processing
- ...
Methodology for selection of best option

Discard / UCC valorisation steps

Inventory, characterization and classification

• Volume of unavoidable unwanted catch
• Species involved and percentage
• Physicochemical characterization
• Dispersion of generation
• Seasonal variability
• Classification technologies available

Evaluation of alternatives

• Amount of new-product generated.
• Added (market price in €/kg) value.
• Existing market.
• International market demand.
• Competition from other equivalent products.
• Degree of investment required.
• Existence of infrastructure.
• Legal aspects.
• Environmental aspects.

Prioritization

Selection based on:
• Economic value (volume and market price).
• Demand and market developments
• Immediacy of commissioning
• Investment required

Immediate alternative:
• Existence of buyer and infrastructure
• Comprehensive solution to 100 % of landed ex-discards.
• Delivery without pre-treatment.

More viable alternatives for the future:
• Greater economical value but requiring investments and additional R&D.
Methodology for selection of best option

**Discard / UCC valorisation steps**

**Process Definition**
- Analysis of technical feasibility:
  - Processing and variables
  - Technological alternatives.
  - Availability of technologies
  - Logistics
  - Availability of infrastructure
  - Prototype development
  - Small-scale test.

**Pilot Testing**
- DEFINITION AND SIZING of EQUIPMENT, INFRASTRUCTURE, LOGISTICS AND ORGANIZATION:
  - Initial storage, handling, transport, centralization, processing, delivery and sale.
  - Technology providers
  - Evaluation of legal aspects.

  PILOT testing:
  - Validation of the organizational, technical and economical feasibility

**Industrial Transfer**
- Plant lay-out project.
- Safety and hygiene aspects.
- Compliance process specifications.
- Control parameters (HACCP).
- Training.
- Start up.
- First industrial batch.
- Verification and validation process settings.
- Product Validation (customer, market).
Each scenario need an *ad hoc* solution: different UUC quantities, quality, dispersion, available infrastructures...

No clear future scenario: application of selective gears, new fishing strategies, new rules...

We are working in short term solutions to facilitate rapid adaptation and simultaneously in mid and long term for a sustainable future:

- Short term: feed products / application *de minimis/ exemptions*
- Mid term: minced fish, pulps, intermediate products with stable markets and mature technologies (e.g. gelatin, omega-3,...)
- Long term: high value options that require important investments (e.g. specific biomolecules)
Thank you for your attention
Muchas gracias por su atención

DiscardLess

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www.discardless.eu
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