LIFE15 ENV/ES/000373

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Safe discharges, life source

Strategies for the minimization of highly polluted effluents and secondary raw material procurement to achieve a circular economy in fish canning industry

1 July 2016 – 31 Dec 2019

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PREVENTION AND INTEGRATED MANAGEMENT OF HIGH POLLUTED EFFLUENTS FROM FOOD SMEs TO URBAN SANITATION SYSTEMS

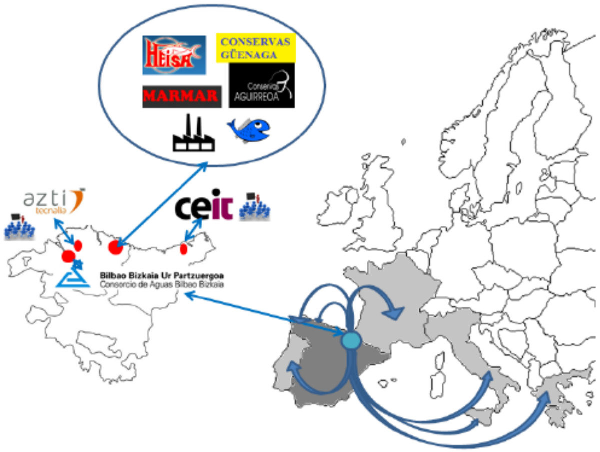
PROJECT LOCATION: Basque Country

BUDGET:

Total: 1,958,998 €

% EC Co-FINANCED: 56.02

DURACION: July 2016 – December 2019



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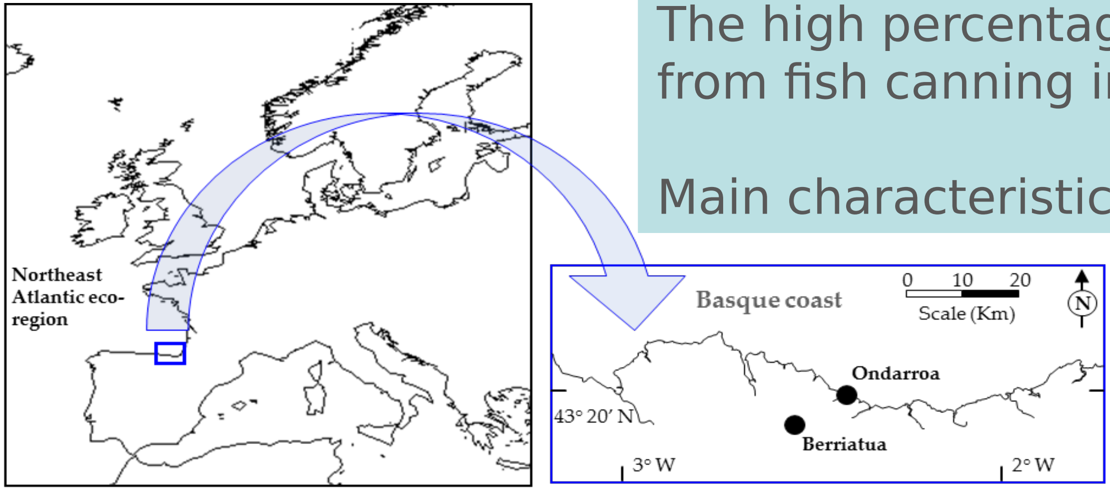
Environmental Issue



The high percentage of the industrial sewage from fish canning industry in the urban WWTP.

Main characteristics or the sewage:

-High Organic load
-High salinity load
-Discharged loads

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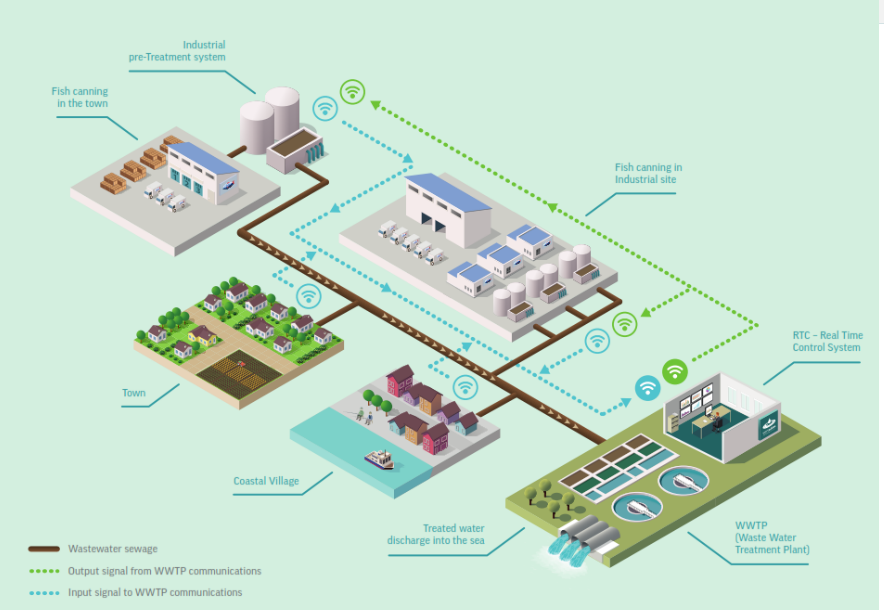
Objective:

Demonstration of an integrated solution (technical, legislative and environmental) for reduction at the origin and the controlled integration of high organic and saline load discharges from the SME’s canning industry in the urban sanitation system.

Inclusive aspect:

It brings together all the agents involved in the problem in order to reach an integral solution jointly:

- Fish canning industries
- Water management entities
- Administrations



Solutions proposed:

- **Eco-efficient and Clean production Plan implementation**, providing low-cost innovative solutions.
- Implementation of **Real Time Control System** (RTC) in the sanitation network for the remote and intelligent management of different discharges, urban and industrial, based on the modelling of:
  - Colector Network

Demonstration of the project:

Artibai Area

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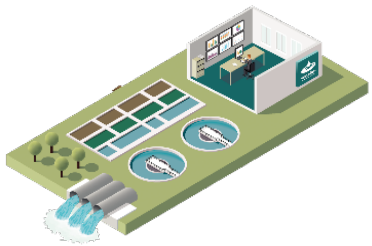
Levels of LIFE VERTALIM Project performance

Level 1_
Tuna canning industry

Strategies for the minimization of highly polluted effluents and secondary raw material

Level 2_
Sewerage system



Develop and model a virtual simulation platform integrating industrial pretreatments, collector network and WWTP

Level 3_
Environment

Monitoring the impact of the project actions on the environment

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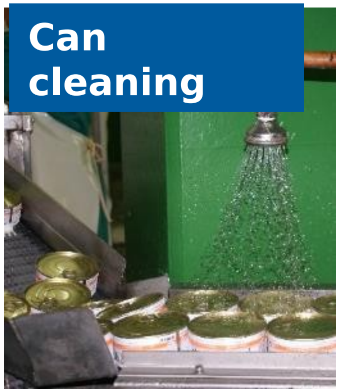
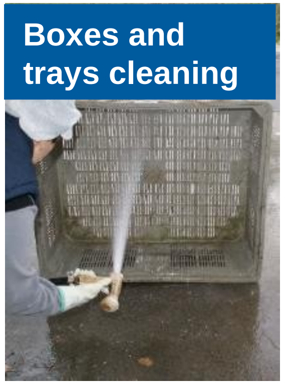
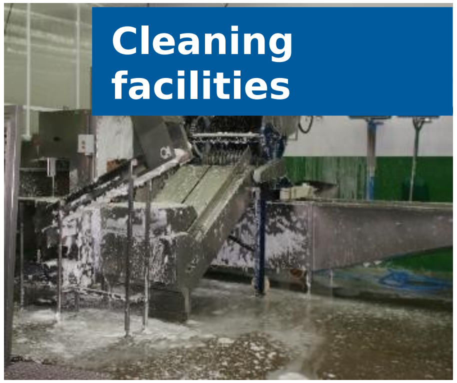
Level 1_Tuna canning industry

Minimization of discharges at source

Objective: Minimize discharges in each company (20-40%) to reduce their impact on the sanitation system, through actions to improve eco-efficiency in the selected industry







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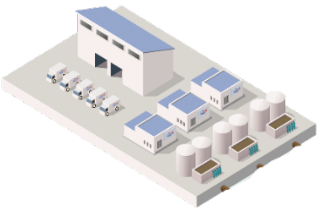
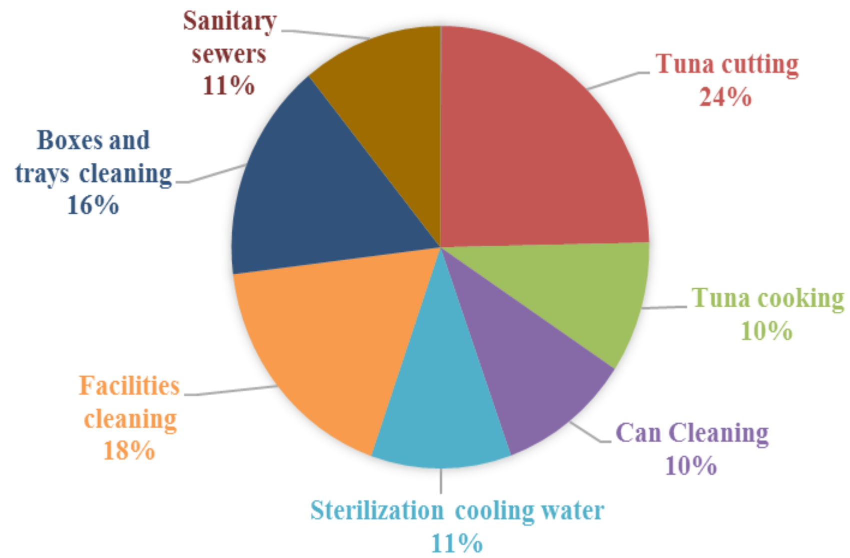
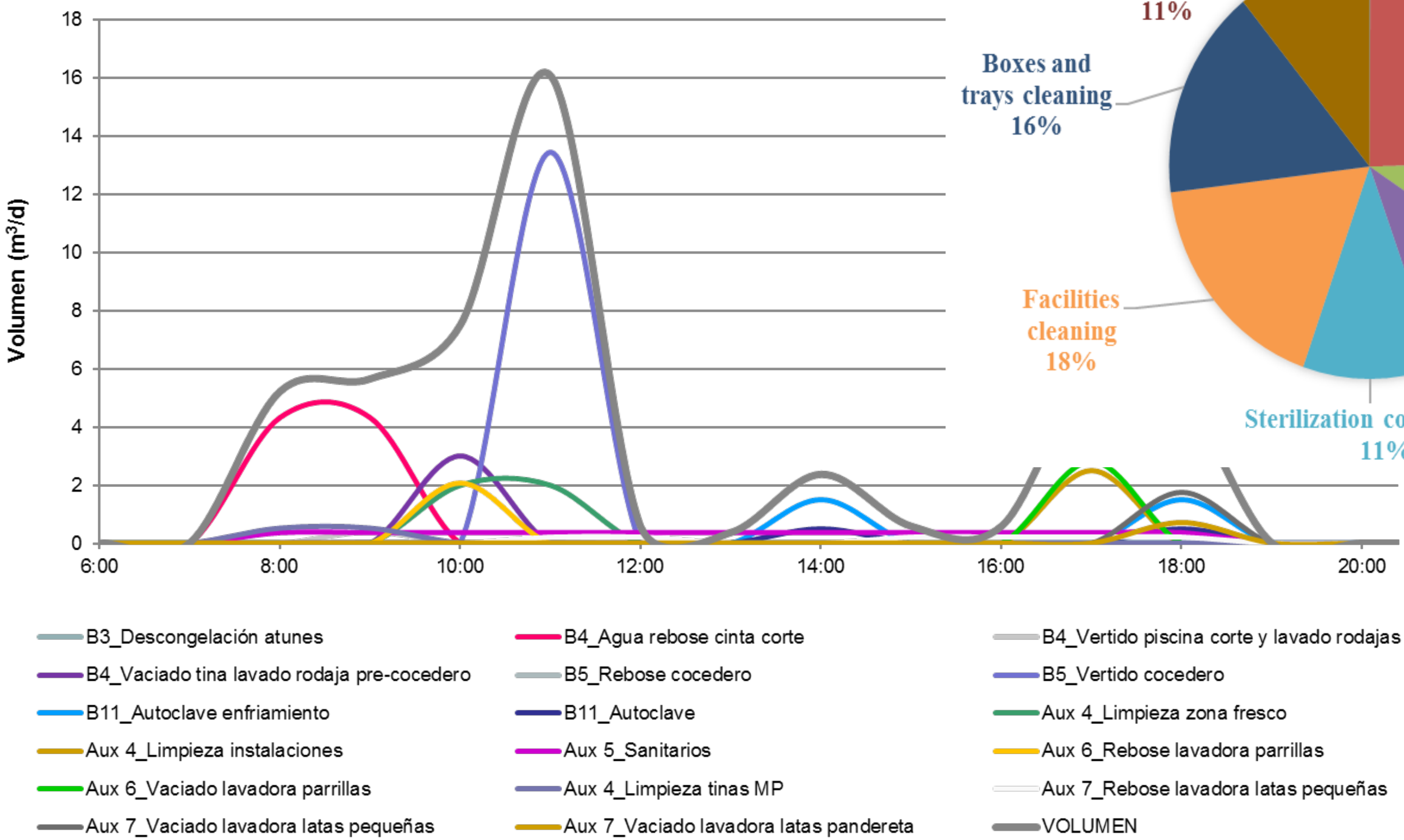


Level 1_Tuna canning industry

Wastewater generation curves



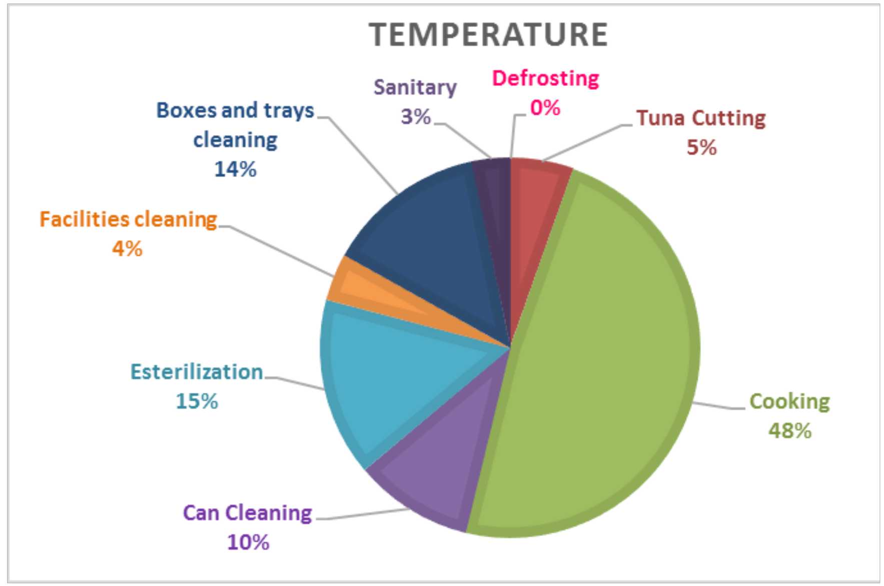


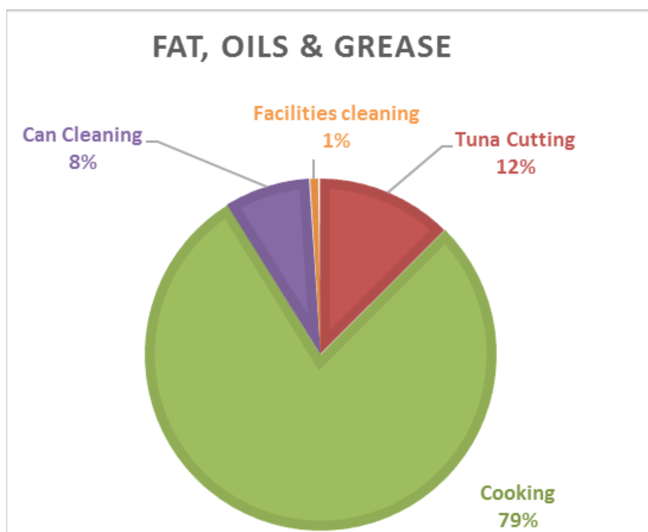
Level 1_Tuna canning industry

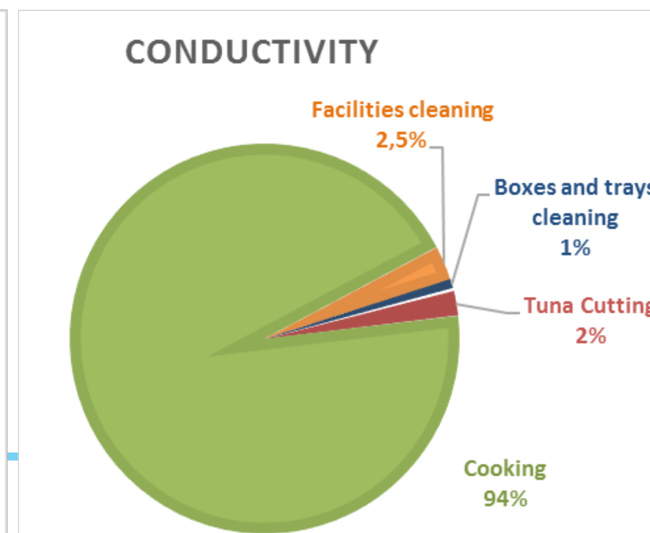
Pollution of

General Results:

- → Sewage load
- → High fats and grease content
- → High salinity
- → High temperature







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Level 1_Tuna canning industry

Minimization of discharges at source

Efficiency Indicators

Environmental Aspect	Units	Ratio	BREF Recomendations
Raw material yield	$=\frac{Tn\ product}{Tn\ raw\ matter}x100$	43-50 %	35-70%
Water Consumption	$=\frac{m^3\ water}{Tn\ product}$	10-17	9-11
Energy Consumption	$=\frac{kwh}{Tn\ product}$	240-532	150-250
By-products	$=\frac{Tn\ fish\ subproduct}{Tn\ product}$	0.4-0.63	0.5 – 0.69
Sewage	$=\frac{m^3\ effluent}{Tn\ product}$	10-14	5 – 12

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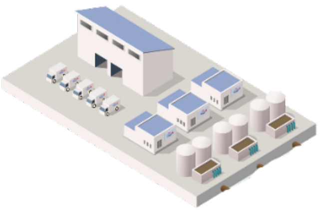
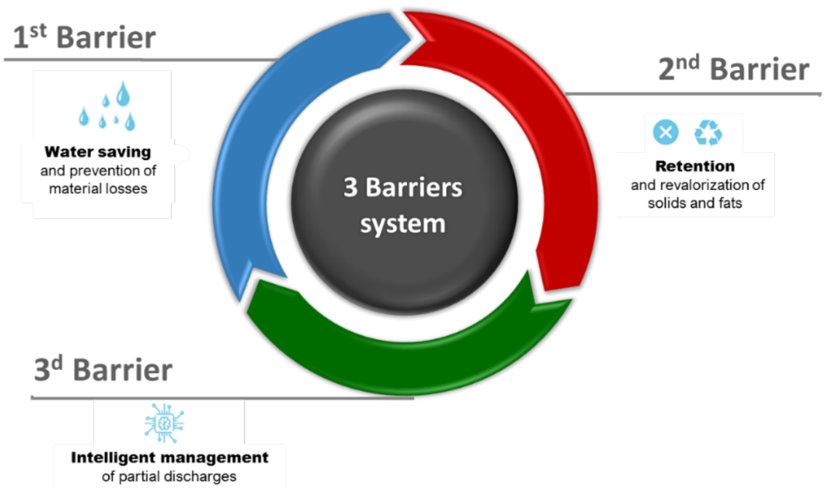


Level 1_Tuna canning industry



1ª BARRIER

Water Consumption reduction in productive and auxiliary processes
Avoid the loss of raw material and products and its disposal in wastewater

2ª BARRIER

Retention of solids and food fractions in a hygienic way through specific systems and technologies that allow their recovery

3ª BARRIER

Intelligent internal management of partial discharges, through temporary storage, partial treatment, reuse and controlled dosages before being discharged to the final treatment, sanitation network or aquatic environment.

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Sistema 3 Barreras

1ª BARRIER

Examples

Water savings

- Installation of a pass sensor for tuna pieces
- Replacement of more efficient diffusers

Avoid loss of raw material

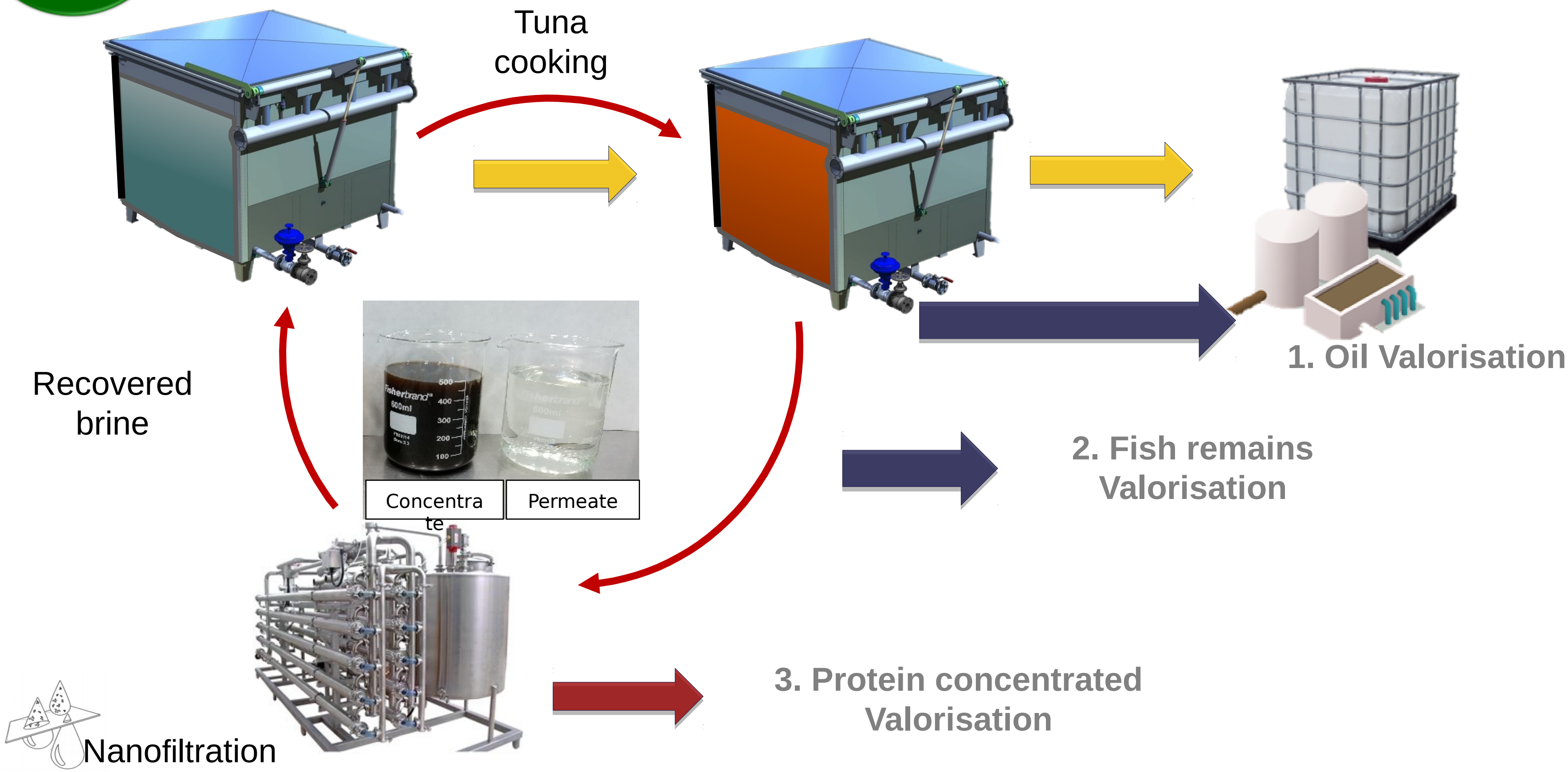
- Installation of baffles to avoid loss of raw material
- Include dispensers and presence sensors for coverage liquids addition
- Install trays for the hygienic collection of tuna crumbs

Sistema 3 Barreras

2ª BARRIER

Example:

Integral recovery of cooking brines



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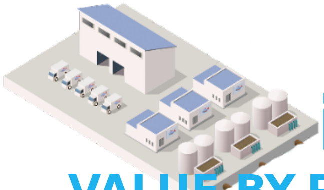
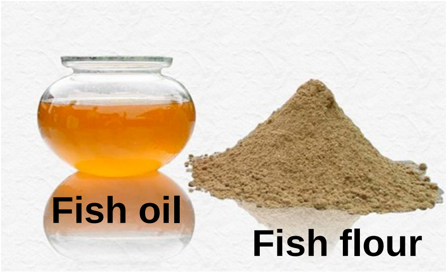


Level 1_Tuna canning industry

FISH CANNING VALORIZATION VALUE BY-PRODUCTS:

1. **Fish Oils** with abundant richness of omega-3 acids, therefore, it is an ingredient of **high commercial value**
2. **Fish flour** are a valuable sources of protein and essential amino acids for animal feed
3. Other **wastes** are a source of nitrogen, phosphorus and potassium, which makes them ideal as a supplement for fertilizers
4. Soluble protein concentrate for **aroma ingredients**
5. **Brine** can be reuse with the proper treatment and then avoid its disposal



Animal feed

Fertilizers

Pharmaceutical Industry

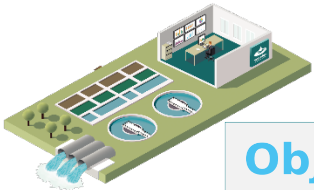
Nutraceutical Industry

3ª
BARRIER

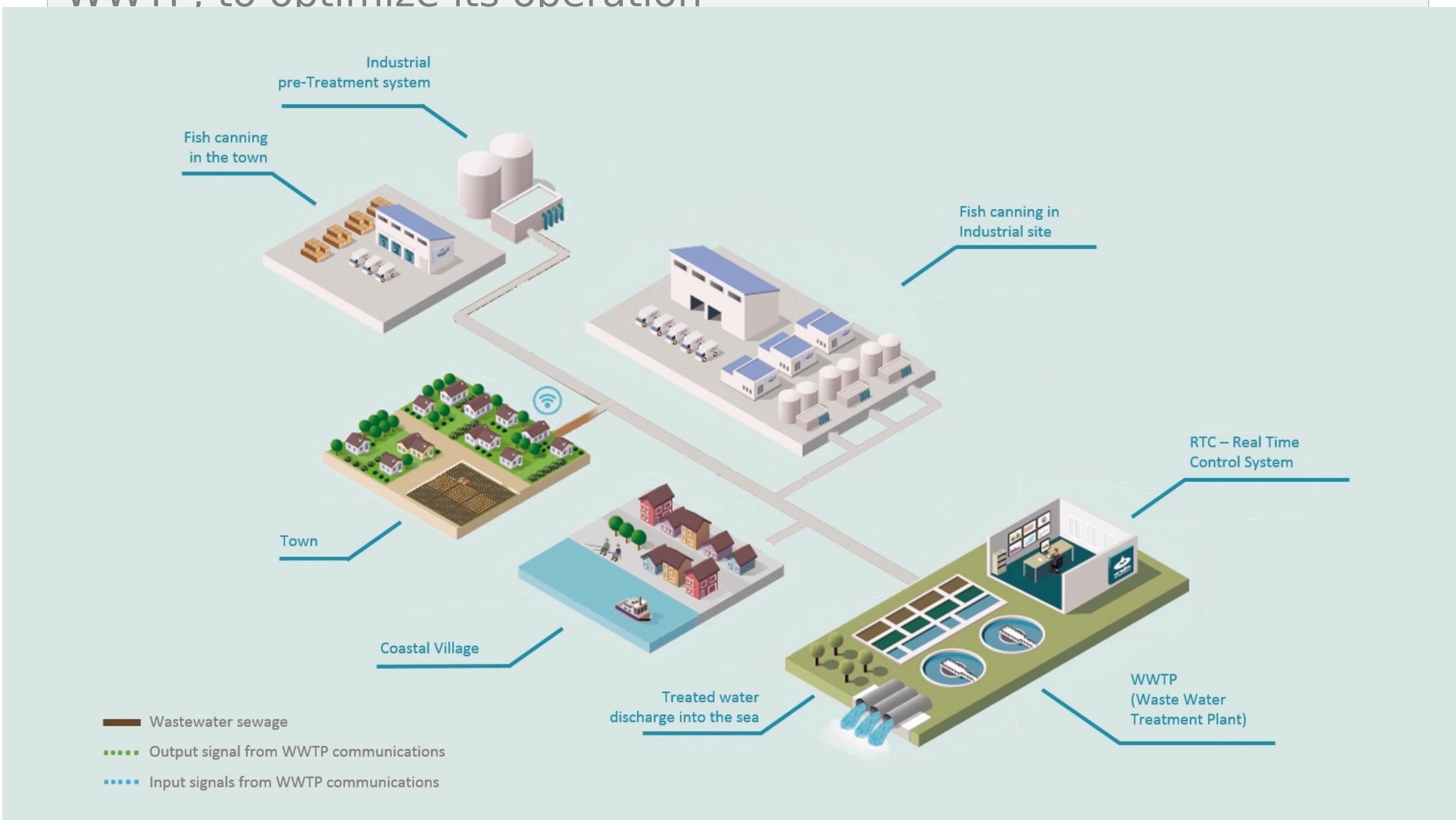
Example:

Recovery of sterilizer cooling water for internal reuse in floors cleaning or other uses

Level 2_Sewerage system



Objective: Develop and model a virtual simulation platform integrating pretreatments at canning, collector network and WWTP, to optimize its operation



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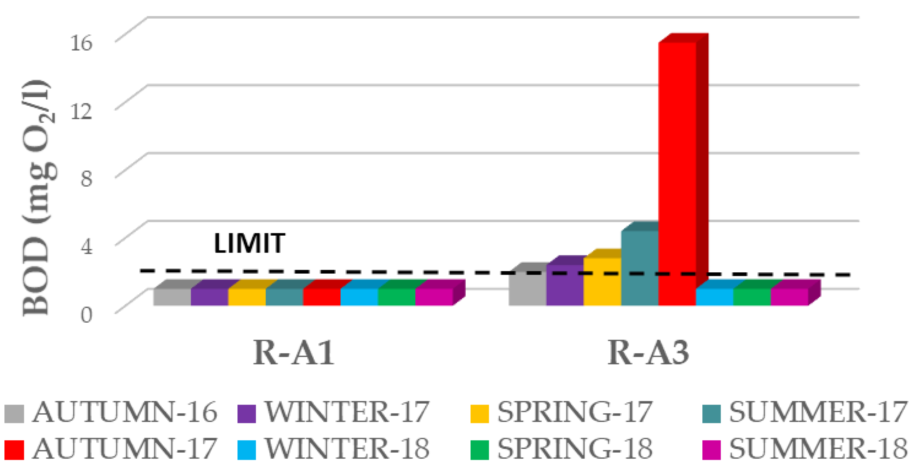
Level 3_Environment

Physico-chemical water quality

Study area: Sampling stations for the measurement of different variables in surface water

- **2 stations in the river**: R-A1, R-A3
- **4 stations in the estuary** (saline gradient): E-A5, E-A8, E-A10, E-A12 (Sampling at low tide)
- **3 stations in the sea** (WWTP discharge area): OND_01, OND_02, OND_03.



Analytical Parameters:

Parameter	Units	Artibai Basin		Estuary	Coastal zone - WWTP
		R-A1 Before Canneries	R-A13 After Canneries	E-A8 (Bridge)	OND_02
T	ºC	12.4	12.3	13.6	14.6
CE	mS/cm	0.30	0.29	7.3	36.8
Salinity	UPS	0.20	0.20	7.0	34.8
pH		8.8	8.0	7.6	8.1
Dissolved Oxygen	mgO_2/l	11.5	9.7	8.9	6.5
Solids	mg/l	15.5	21.0	17.4	8.2
Amonium	mgN/l	2.9	19.0	9.7	2.0

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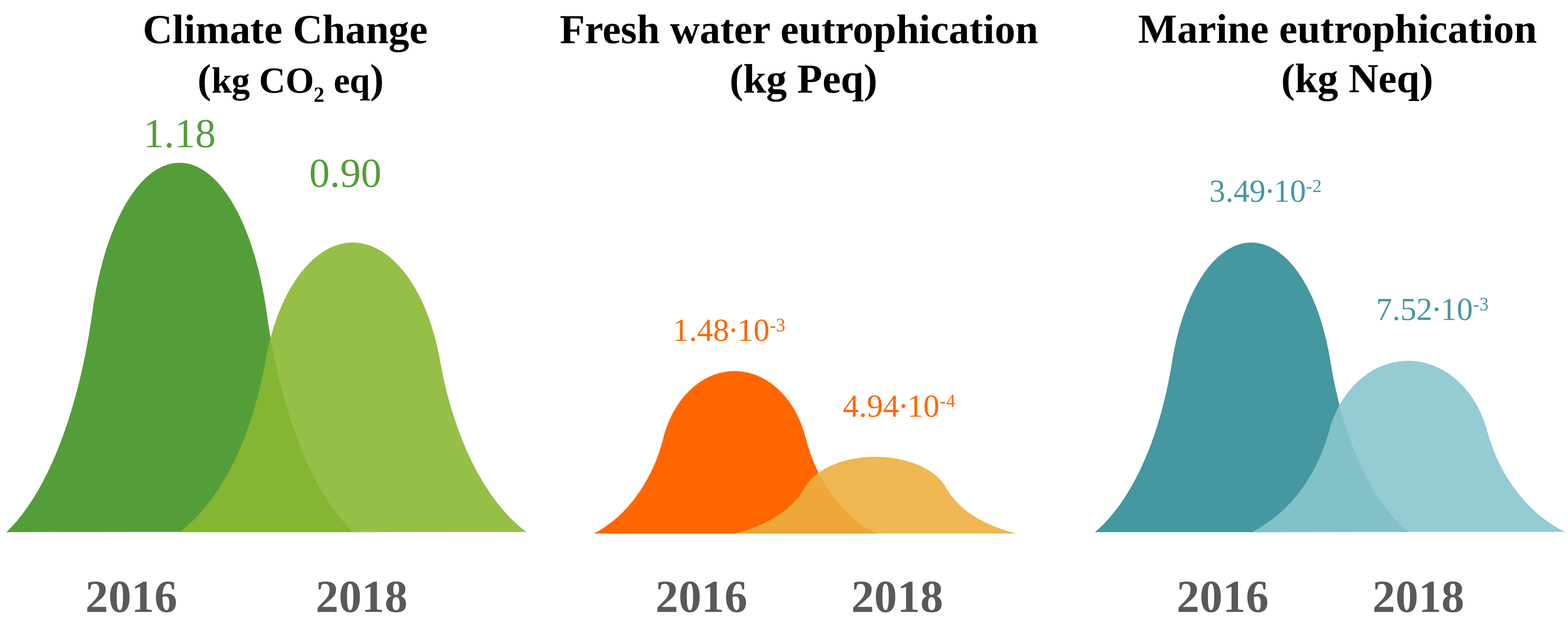
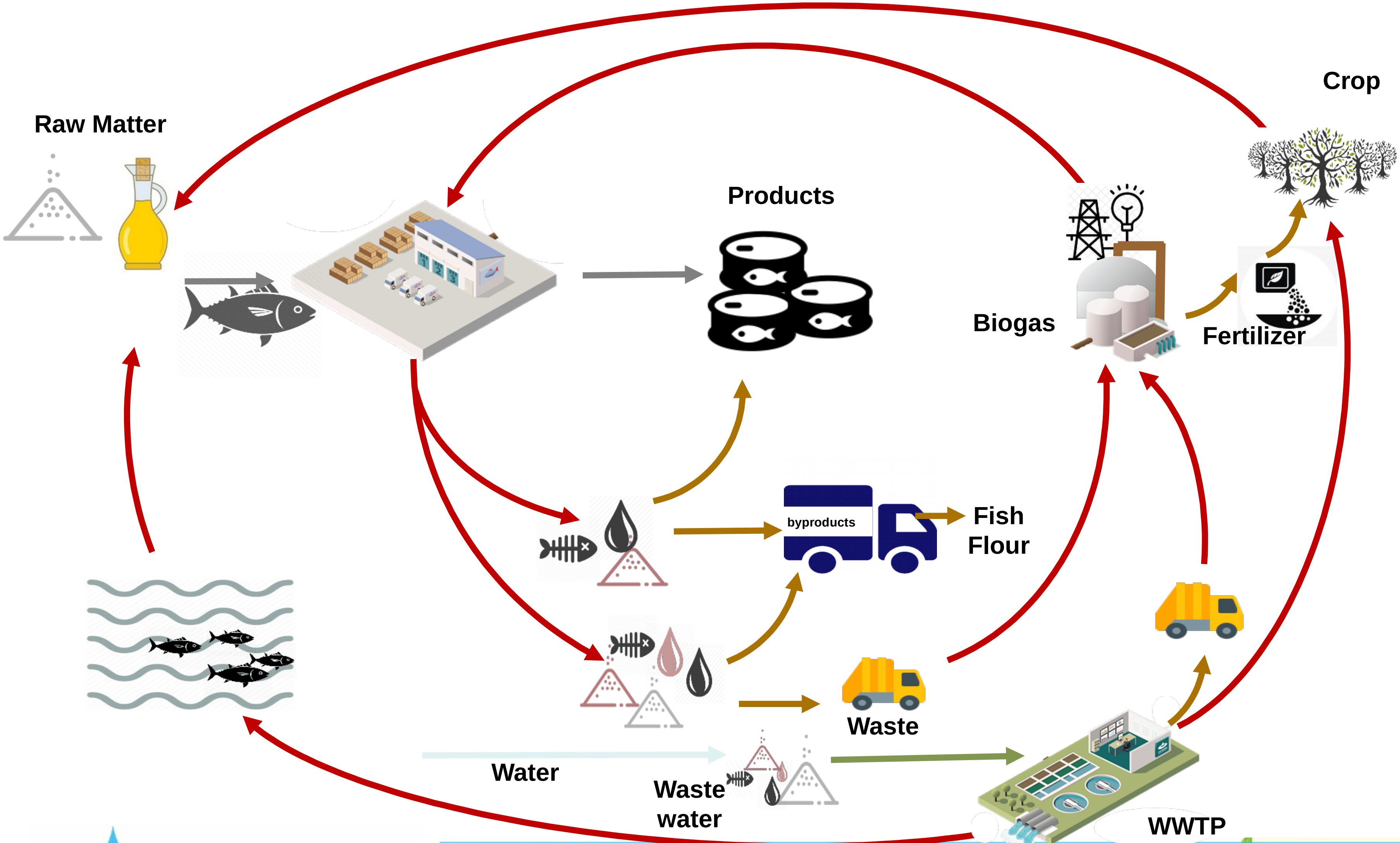
Level 3_Environment

LCA – Life Cycle Assessment



Fish Canning and Circular Economy



Thank you very much for your **attention**

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