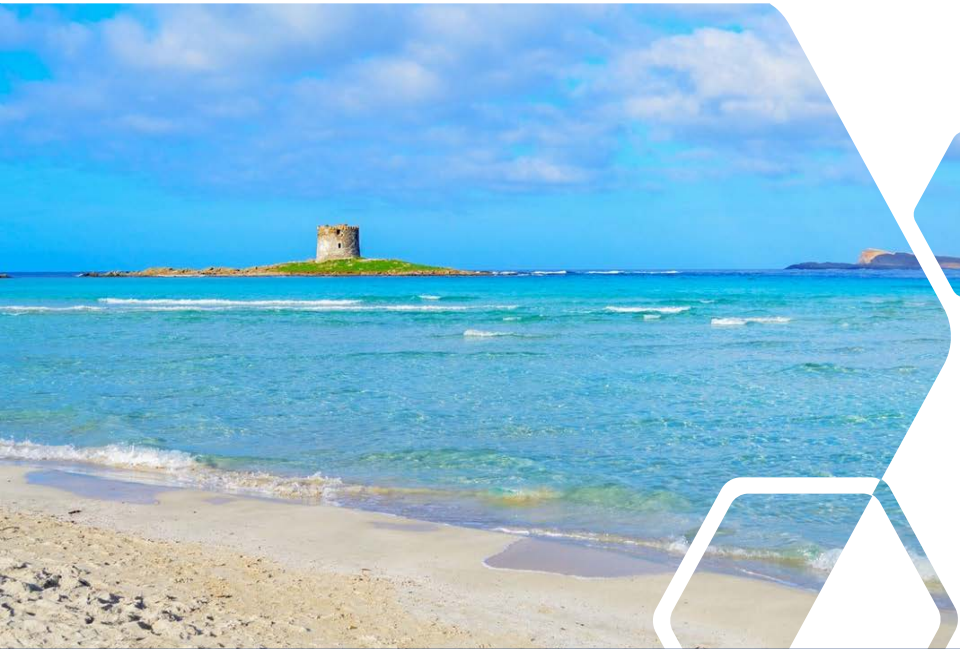




Setting up a circular and sustainable business model for sea urchin

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Outline

1. The Aim of the study
2. The sea urchin supply chain
 - o Global production (harvest)
 - o Sea urchin fishing techniques
 - o Sea urchin processing methods
3. From waste to new-eco-friendly products
4. The Triple-Layered Business Model Canvas
5. The Environmental and Social Layers in the sea urchin industry
6. Conclusions



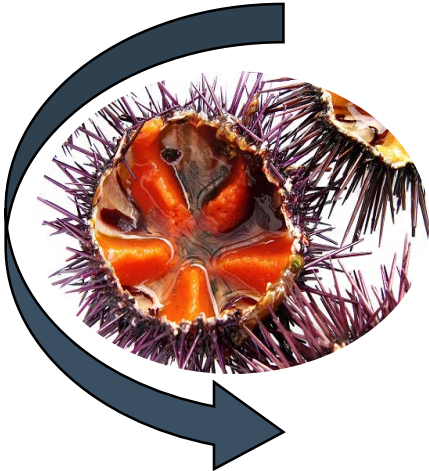
The Aim of the study



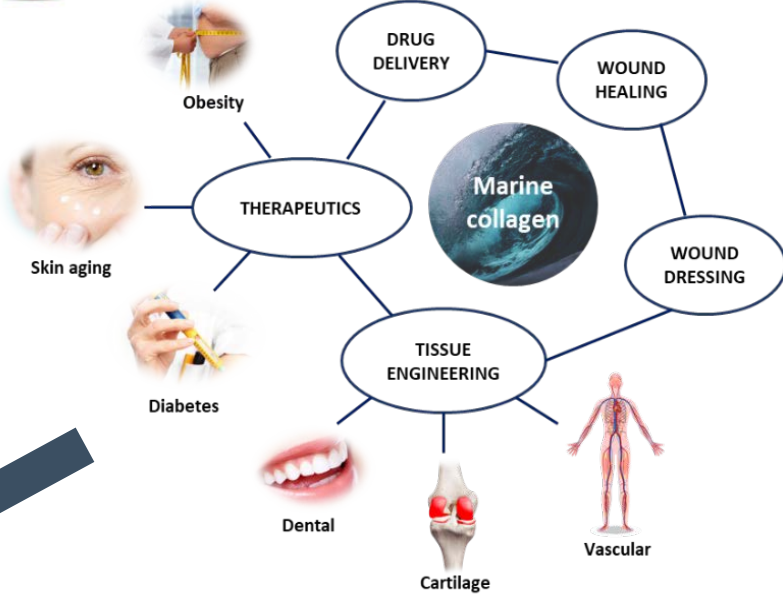
1 From linear economy model



2 To circular economy approach



3 New eco-sustainable products

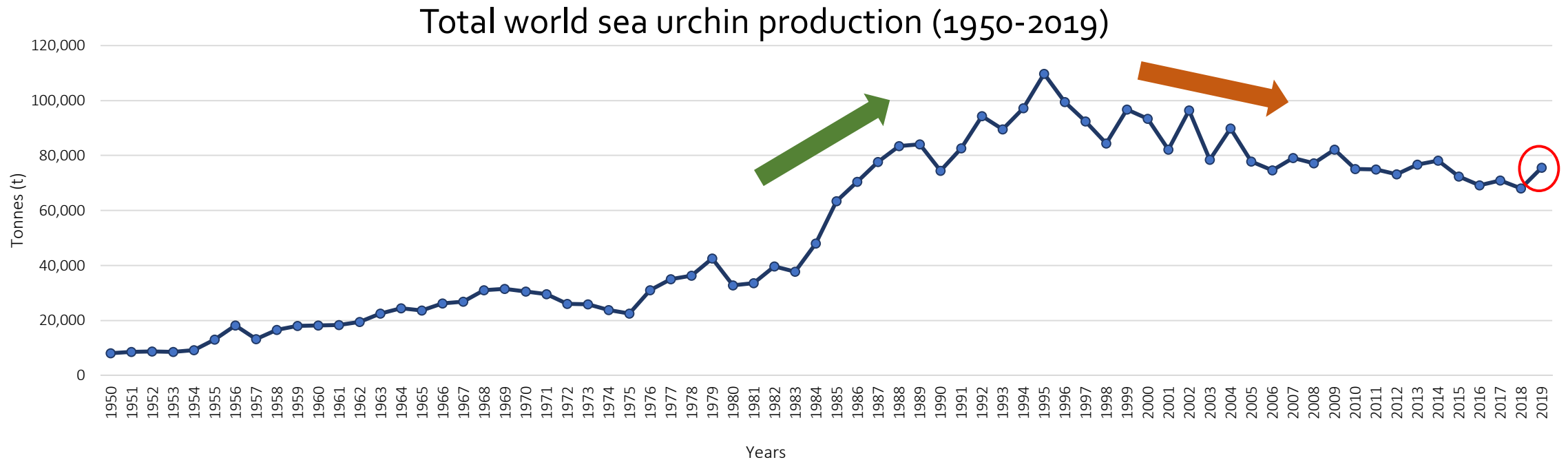


4 Sustainable transition in the sea urchin industry using the Triple-Layered tool



These two research projects on the reuse of sea urchin waste are conducted by the University of Milan

The sea urchin supply chain – Global production (harvest)



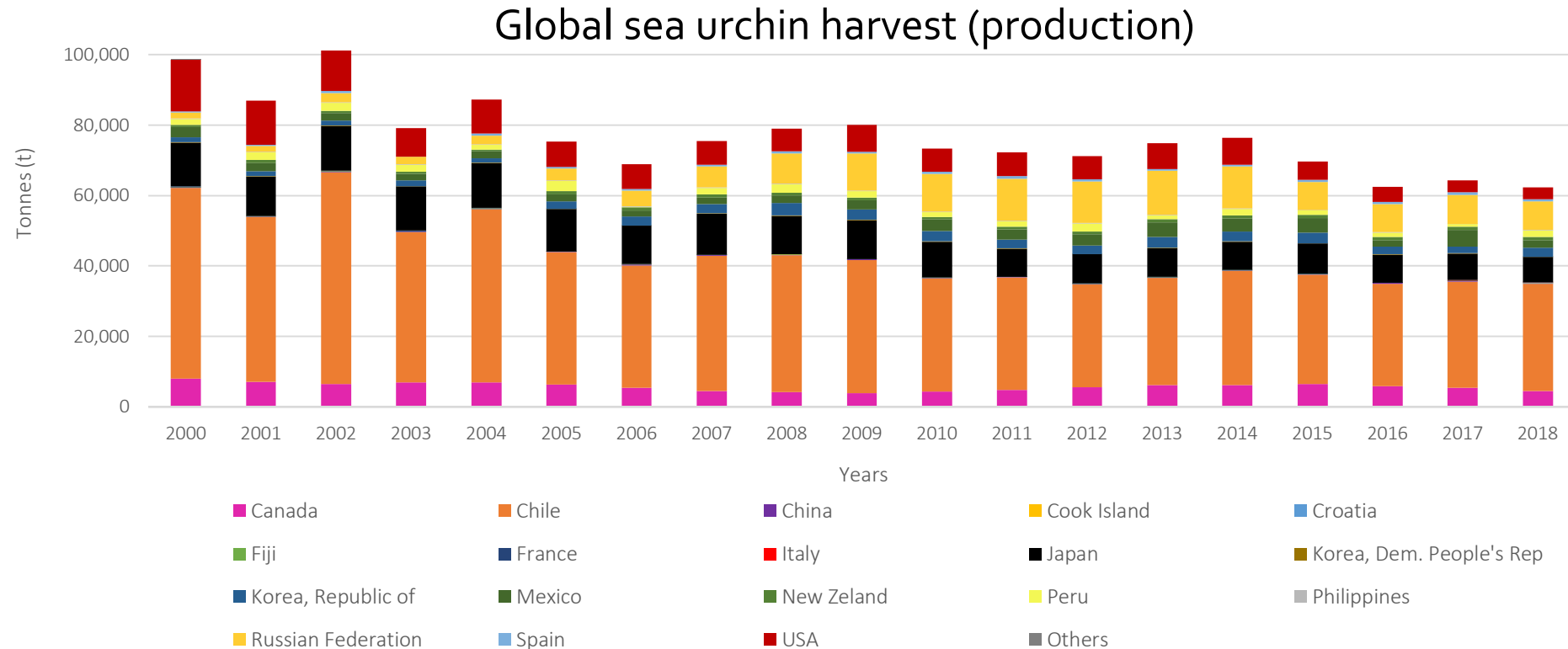
Data collected using FAO [FishStatJ](#) database

The trend of world sea urchin production followed two different performances

Last available FAO data: **75,636 t**



The sea urchin supply chain – Global production (harvest)



Chile is the dominant producer of sea urchin with **30,446 t** in 2018

Japan is the main consumer of sea urchin: 80-90% of the global supply (50,000 t per year) → imports

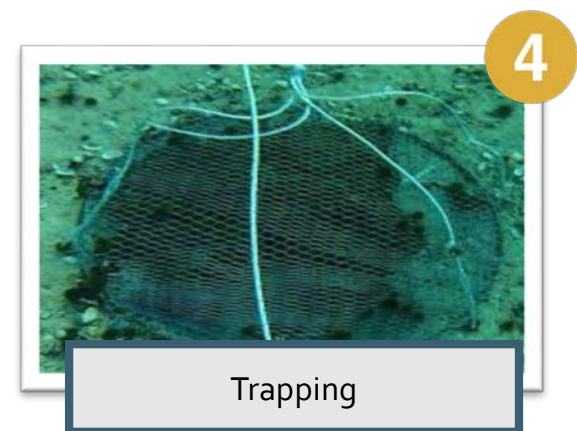
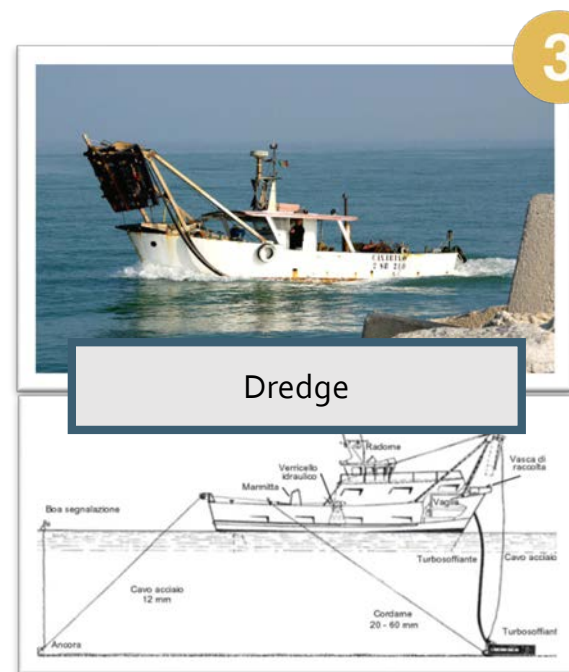
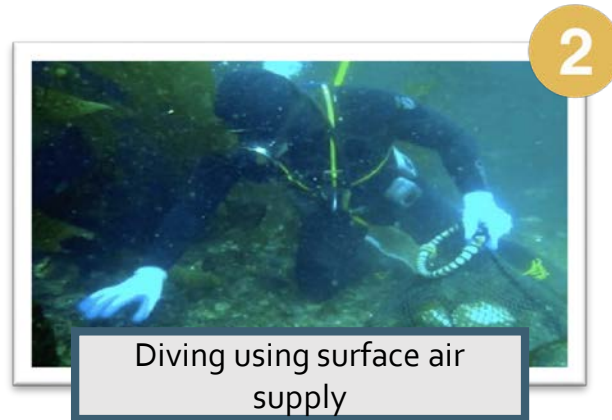


The sea urchin supply chain – Sea urchin fishing techniques

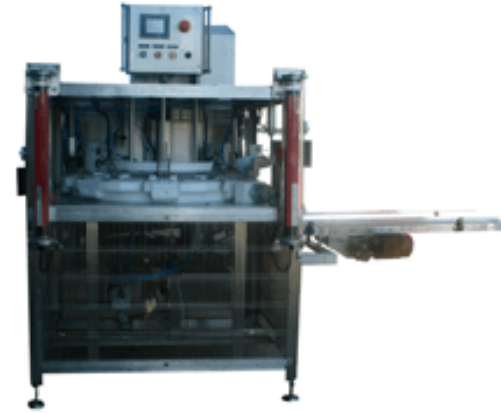
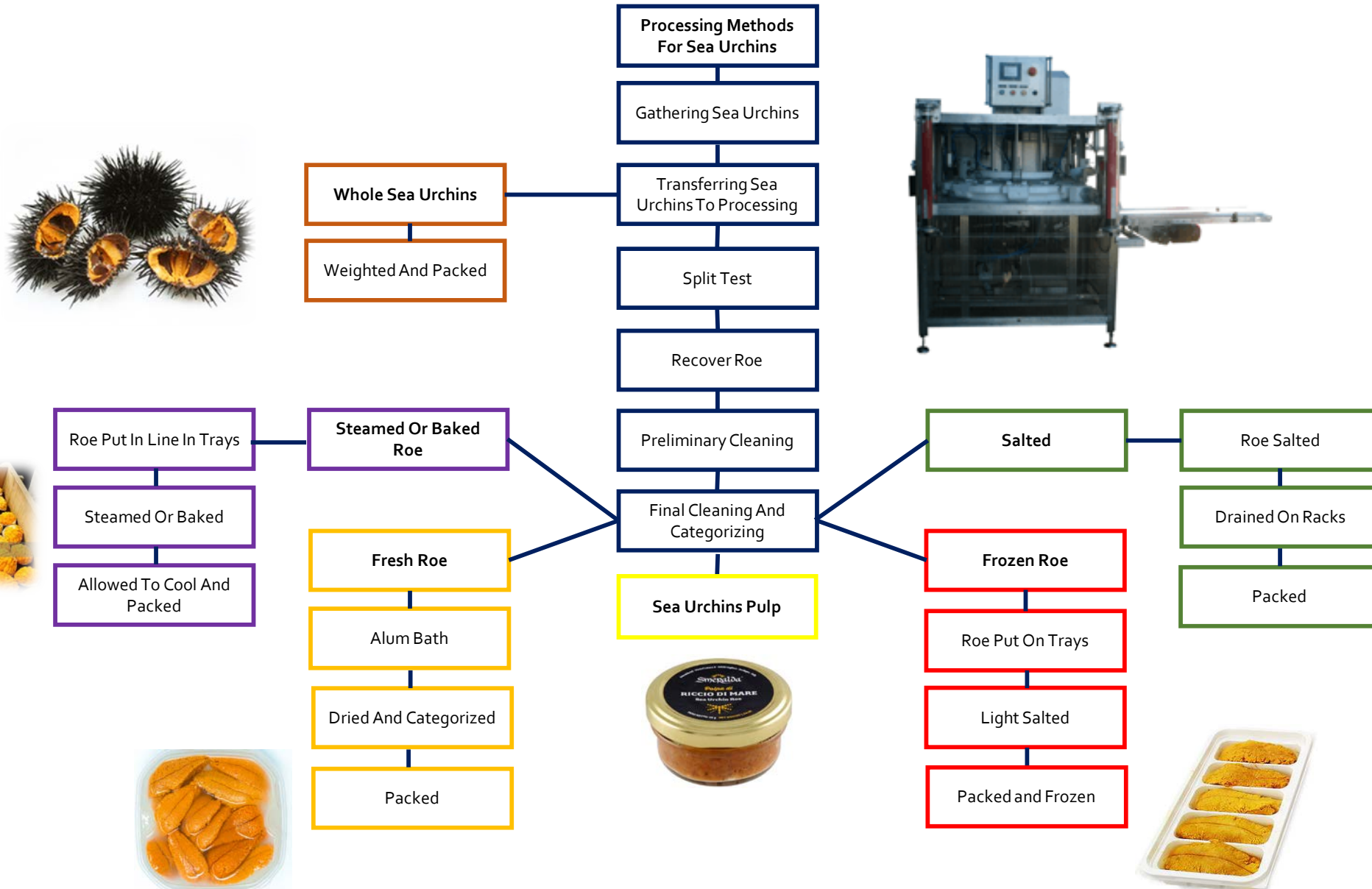
Different techniques to harvest sea urchins

Factors that influence fishing techniques:

- weather conditions
- geographic area size and characteristics of habitats
- different quality of the harvested product
- different costs



The sea urchin supply chain – Sea urchin processing methods



From waste to new-eco-friendly products

Restaurants

+

Sea urchin processing industries



RECOVERY OF SEA URCHIN WASTE



Marine collagen extraction



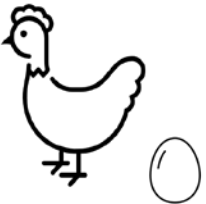
Biomaterial for regenerative medicine



Sea urchin powder (Ca, Mg, antioxidants)



Food supplement for farmed poultry



The Triple-Layered Business Model Canvas

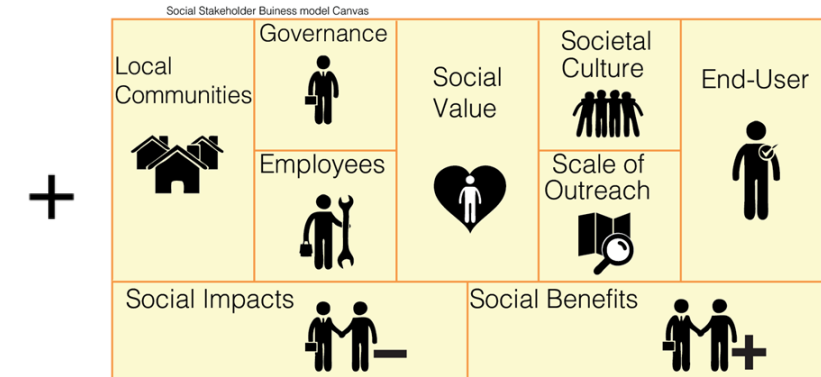
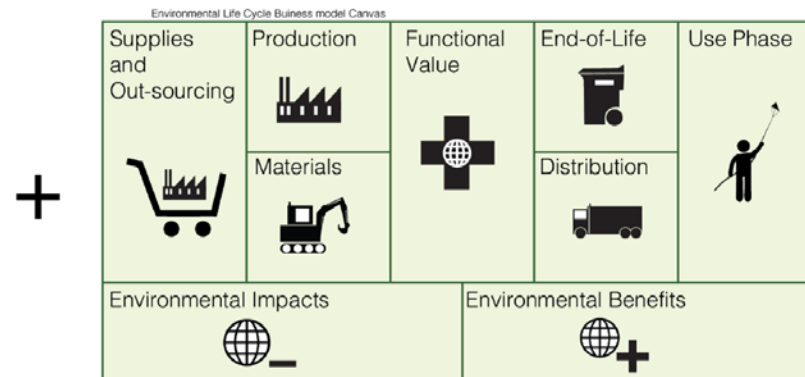
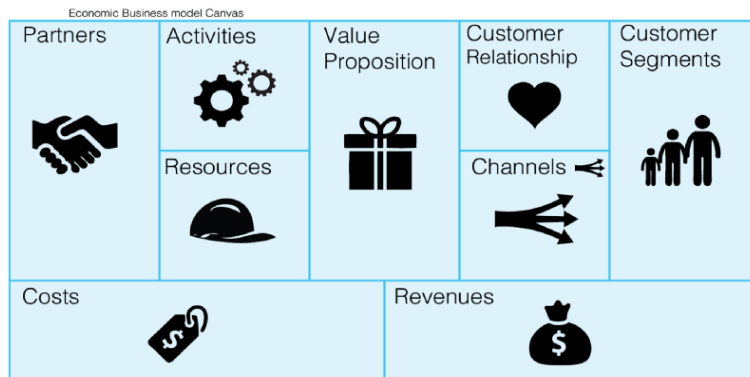
A business model (BM) describes the content, structure and governance of transactions designed so as to create value through the exploitation of business opportunities (Zott and Amit, 2010).

There are different ways to view the BM, for example the Business Model Canvas (Osterwald and Pigneur, 2010).

Solution: not to consider only the economic aspects but also the environmental and social one.

Triple-Layered Business Model Canvas is a business model based on **three different frameworks** to support the creative exploration of **sustainable business innovations** oriented toward sustainability more generally (Joyce and Paquin, 2016).

Limit of the BMC: profit first



The Environmental and Social Layers in the sea urchin industry

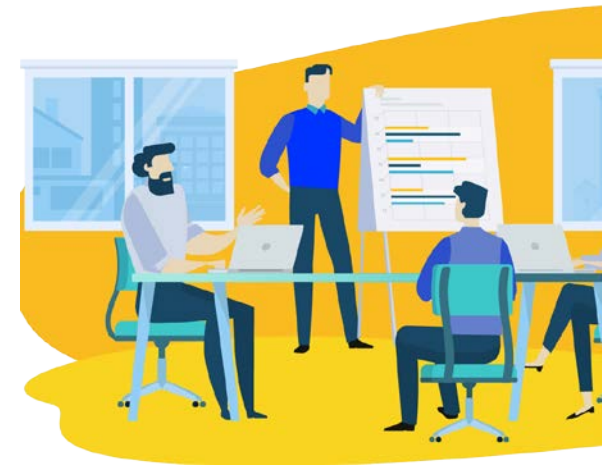


The **environmental benefits** consider the ecological value that the sea urchin industry creates by reducing the environmental impact.

- Reuse of sea urchin waste → solid waste reduction
- Water reuse and energy recovery thanks to technological systems
- Local harvesting

Social benefits deriving from a company that processes sea urchins in an eco-sustainable way and reuse inedible parts:

- new job opportunities and training courses
- improve people's health
- new form of tourism (*ittiturismo*)
- awareness campaign for responsible locale fishing



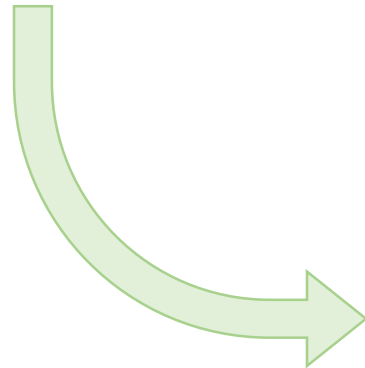
Conclusions

Increase in world population

Overexploitation of the ecosystem

By 2050, global waste will increase by **70%** (**3.5 billion t of solid waste** per year)

Sea urchins generates large quantities of **not reused solid waste**



CE considers waste as a new useful resources

Sea urchin waste can be reused in several fields

New job opportunities

Territorial marketing through new forms of tourism



Acknowledgments

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