MICROPLASTICS
From Knowledge to Action through Transdisciplinarity

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Workshop: Marine plastics: a review of impacts and solutions. May 18th 2017
Why transdisciplinarity?
Why transdisciplinarity?

Blanchard 2010
Dissipating the fuzziness around interdisciplinarity: the case of climate change research

Transdisciplinarity to encourage citizen participation and empowerment
Transdisciplinarity for the pleasure of seeing the world as one

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Attitudes/Actions be the results of a balance between three dimensions

- Material constraints
- Moral constraints (Values)
- Understanding of the way the world functions

These constraints will appear under the guise of

- Pertinence claims
- Normative claims
- Evidence claims

"The knowledge used to frame risk belongs to the world of individual and collective experience; values and norms occupy most of the cognitive space when framing risk. There is very little consideration of science-based knowledge. It appears first and foremost that stakeholders' perceptions of risk are driven by considerations that have very little to do with the hazards and associated probabilities outlined by the scientific community. For local stakeholders, risk management is mostly associated with the ability to make decisions that are compatible with the core values of the affected communities. For local communities, if a solution is to be found for overexposure to risk, it lies in better risk governance rooted in an explicit taking into account of the values expressed by potential victims. In more general terms, it is of critical importance that science production takes place through processes that allow for continual interactions with those at risk and an understanding of their values." (Vanderlinden et al., 2017)
How transdisciplinarity?

the MICRO network

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This story began in 2008: Lanzarote, Famara beach

What can we do to truly solve the problem?
Are papers enough to solve the problem? definitely not...

What can we do to truly solve the problem?

Share efforts;
Establish common methodologies;
Move from “research team-centered” approaches to “community-centered” approaches;
Work WITH and FOR communities;
...collaborate, collaborate and collaborate.
Abandoned plastic: risks and consequences

More than a third of "accidental" deaths in sea turtles are due to ingesting plastic. Beyond this, many others become fatally enmeshed in netting or plastic sheets.

Cetaceans and other marine mammals are victims of our dependence on plastic. When these magnificent creatures confuse plastic with food, they are unable to digest it, so it accumulates inside them and kills them by blocking their digestive system.

Oceans have absorbed the waste of humanity for centuries. Currently, plastics make up more than 60% of the debris that accumulates on beaches and coastlines.

Birds of all kinds become trapped in nets, bundles, and other plastic snags. Ingesting plastic is also lethal for birds, and for all animals.

Transdisciplinarity as an integrative process

Origin, types, uses and toxicity

In 1869, Wesley Hyatt created the first plastic: celluloid. Now there are more than twenty basic categories of polymers and over 17,000 different varieties of plastic, which makes recycling them difficult. Approximately 4% of all consumed oil and gas becomes the primary material for creating plastics and another 4% is used to generate the energy needed for plastic production.

Resins codes

- PET (Polyethylene Terephthalate)
- HDPE (High density polyethylene)
- LDPE (Low density polyethylene)
- PVC (Polyvinyl chloride)
- PP (Polypropylene)
- PS (Polystyrene)
- Others

Everyday items

- 1 hour: 10 years
- 1 hour: 100 years
- 15 hours: 100 years
- 1 hour: 500 years
- 30 minutes: 1000 years
- 10 minutes: 50 years
- 1 week: 50-100 years

A study published by Saïdo Matsuziko's team in 2009 shows that plastics like polystyrene (PS) start to break down at 30°C, producing highly toxic monomers. Plastic is not an inert material; components such as Bisphenol A (BPA) cause hormonal disruption associated with breast cancer (López-Carrillo et al., 2010), and phthalates can disrupt the hormonal development in babies (Swan et al., 2009).

In 1980, approximately 3,000,000 metric tonnes of plastic was produced. By 2012, annual production rose to over 280,000,000 metric tonnes. This is the situation today.
Transdisciplinarity as an integrative process

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Chapter 11

Protected Shores Contaminated with Plastic: From Knowledge to Action

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Foreword

“Overall, the book provides innovative approaches by which coastal communities around the world may address their coastal zone management issues through inclusive governance that is inspired by multidisciplinary science and active, meaningful intersectoral stakeholder Engagement.”

Wendy Watson-Wright, PhD

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In “Protected Shores Contaminated with Plastic: From Knowledge to Action” (2015)

COASTAL Communities-based ObservationS Tackling marine Litter
The observations are available on the CSIC citizen science platform, Seawatchers:

* **Spanish** version:

* **English** version:

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After years of common efforts and learning, in August 2015 coastal communities began sampling along vulnerable and/or protected areas in the Atlantic-Mediterranean system.

The reference site is the Biosphere Reserve of Lanzarote, Famara beach*, where the present initiative began in 2008.

The first four monitoring sites are:

- Famara (Lanzarote, Spain)*
- Lóngara (Lugo, Spain)
- Lostmarc’h (Bretagne, France)
- Popham (Maine, USA)

Additional areas will begin participating in 2017, and they include members of the Biosphere Reserve network and other vulnerable areas interested in joining this effort.

The objective is to work with affected communities to collaboratively build understanding around questions like:

- Where does this pollution come from?
- What routes does it travel to get here?
- How can we solve the plastic pollution problem?

The work is based on the implementation of a network of participative observatories created through collaboration between affected communities, involved researchers and governing administrations.

*Note: Additional areas will begin participating in 2017, and they include members of the Biosphere Reserve network and other vulnerable areas interested in joining this effort.
MICRO 2016 is an initiative of the Lanzarote Biosphere Reserve within the UNESCO MAB programme and the network of scientists Marine Sciences For Society.

Lanzarote, May 2016

MICRO 2016 was a great collaborative experience

Under the patronage of UNESCO
See you in Lanzarote for MICRO 2018 19-23 Nov. 2018
Let’s move from common values to better transdisciplinary approaches to better answer the question:

*Which sciences do we want for which society?*
MLTDM # is a joint programme led by:
- Marine Sciences For Society, contact: Juan Baztan*
- CEARC-UVSQ, contact: Jean-Paul Vanderlinden
- Le théâtre du Grain, contact: Lionel Jaffrès

Thanks!

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