

Institut de Ciència i Tecnologia Ambientals (ICTA-UAB)

An interdisciplinary centre
that promotes academic
research and
postgraduate **education**
on environmental
sciences



Director: Xavier Gabarrell Durany

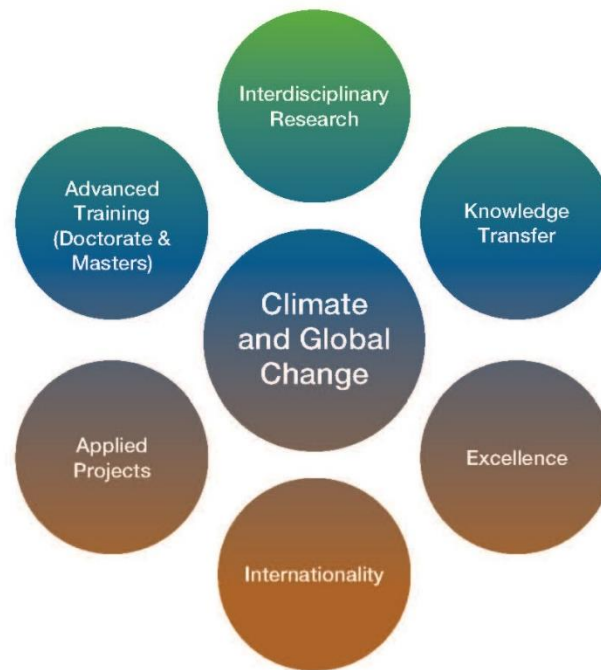
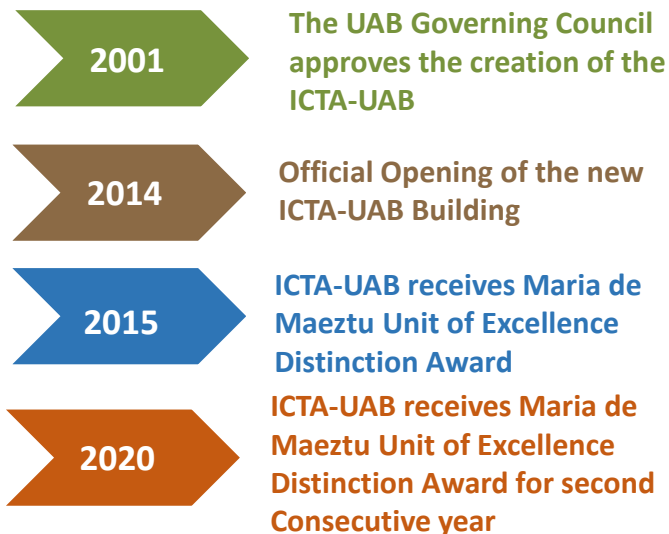
ICTA-UAB MISSION

“Undertake cutting-edge research and training on interactions between humans and Earth systems, to build integrative knowledge for sustainable futures”

The background of the slide features a faded architectural rendering of a modern, multi-story building with a prominent glass facade and a complex structural frame. In the foreground, a paved courtyard area shows several small figures of people walking, suggesting a campus or public space environment. The overall aesthetic is clean and professional, with a blue header and footer.

WHO WE ARE...

History



High impact scientific publications. 2021.

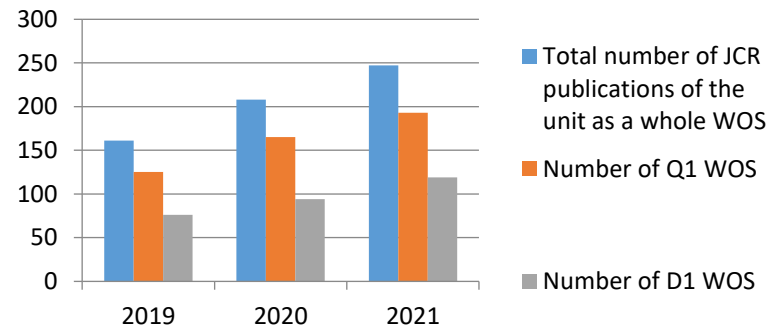
SCI/SSCI Publications: **247** (published), **162** Open Access

193 first quartile
42 second quartile
8 third quartile
4 fourth quartile

IMPACT FACTOR AVERAGE

6,565

	SCI/SSCI articles	Q1	%	D1	%
	SCI/SSCI articles	Q1	%	D1	%
2015	142	104	73%	64	45%
2016	149	114	77%	52	35%
2017	166	134	81%	59	36%
2018	207	150	72%	78	38%
2019	161	125	78%	76	47%
2020	208	165	80%	93	44%
2021	247	193	78%	119	48%
(2015-2021)	1280	985	77%	542	42%



WHO WE ARE...

Maria de Maeztu Unit of Excellence

Esteve Corbera (SC), Xavier Gabarrell, Isabelle Anguelovski, Giorgios Kallis, Patrizia Ziveri, Victoria Reyes-García, Jordi García-Orellana, Mario Giampietro and Jeroen van den Bergh (Guarantors)

Consolidated Research groups and ERC projects

- Multi-Scale Integrated Assessment of Societal and Ecosystem Metabolism **IASTE** (2017SGR-230) M. Giampietro
- Group of aerobiological research, atmospheric transport and health **AEROBIOTAS** (2017SGR-1692) J. Belmonte
- Ecological Economy **ECONECOL** (2017SGR-1126) G. Kallis
 - *ERC projects:* **EnvJustice** (J. Martinez Alier); **EVOCLIM** (J. van den Bergh); **GREENLULUS** (I. Anguelovski)
- Conservation, Biodiversity and Global Change group. M. Boada
- Marine and environmental biogeosciences research group **MERS** (2017SGR-1588) P. Ziveri
- Sustainability and Environmental Protection **SOSTENIPRA** (2017SGR-1683) X. Gabarrell
 - *ERC project:* **URBAG** (G. Villalba)
- Dynamics of natural systems and the anthropic impacts **IMPACTANT** (2017SGR-1320) A. Rosell
 - *ERC projects:* **BIGSEA** (E. Galbraith); **PALADYN** (A. Rosell); **TRADITION** (A. Colonese); **LAO** lab (J. A. Morguí)
- Laboratory for the Analysis of Social-Ecological Systems in a Globalized world **LASEG** (2017SGR-775) V. Reyes-García
 - *ERC project:* **LICCI** (V. Reyes-García)

PhD programme Adriana Artola (coordinator)



STEERING COMMITTEE



Esteve Corbera
SCIENTIFIC DIRECTOR
GUARANTOR



Xavier Gabarrell
ICTA-UAB DIRECTOR
GUARANTOR



Isabelle Anguelovski
GUARANTOR



Giorgos Kallis
GUARANTOR



Patrizia Ziveri
GUARANTOR



Jordi Garcia-Orellana
ICTA-UAB
MANAGEMENT TEAM



Victoria Reyes-García
GUARANTOR



Mario Giampietro
RESERVE
GUARANTOR



Jeroen van den Bergh
GUARANTOR

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CONSOLIDATED RESEARCH GROUPS & ERC PROJECTS





Multi-Scale Integrated Assessment of Societal and Ecosystem Metabolism

Led by Mario Giampietro

1. Complexity theory applied to the governance of sustainability challenges: the water-energy-food-land nexus (MAGIC)

- 'Nexus' refers to the entanglement between water, energy, food, land and climate that escapes the reach of conventional scientific approaches.
- Multi-scale integrated analysis of societal and ecosystem metabolism generates a rich 'living information space' useful for contingent analysis (what if) in DIAGNOSTIC and ANTICIPATORY mode.
- Checking the quality of the process of production and use of information in policy making by opening dialogue spaces transcending the mechanistic scientist-policy maker separation. Developing qualitative-quantitative tools (quantitative story-telling) that can be used in participatory processes.
- Responsible use of quantitative analysis: moving from 'matters of fact' (fact sheets), to 'matters of concern' (concern sheets), crunching numbers to check the plausibility and fairness of dominant narratives in policy making.
- Post-normal science approach: from 'speaking truth to power' to 'stimulating reflexivity about desirable futures'.

2. Examples of Quantitative Story-Telling: checking the plausibility and fairness of proposed energy transitions

- A. EFFICIENCY:** energy efficiency is a simplistic concept that should be replaced by energy performance. Energy performance policies must be combined with energy sufficiency ones, the contrary would be not effective for reducing energy demand due to the Jevons Paradox.
- B. INTERMITTENT** energy sources: they cannot be compared to other forms of energy sources without also considering grid flexibility measures (such as storage) or demand flexibility and prioritization of social practices (end-uses). Scaling-up intermittent electricity sources will require huge storage capacity that currently is simply not available.
- C. EXTERNALIZATION:** outsourcing leads to the externalization of productive activities and their associated environmental impacts. In making and assessing energy policy, these macroeconomic dynamics need to be considered. If industrial production is outsourced to China and other countries, GHG emissions are not reduced but just geographically relocated (carbon leakage).
- D. DECARBONIZATION:** The EU commission is endorsing a narrative of a quick decarbonization of the economy associated with a monotonic reduction of emissions in the next 30 years. Unfortunately this rosy scenario is implausible considering that a radical transformation would require a huge investment of fossil energy (emissions!) to be carried out .

3. *Can technological innovations really solve our problems?*

- Development of accounting tools based on the concept of societal metabolism to study: (i) feasibility (compatibility with environment), (ii) viability (compatibility with technical and economic constraints) and (iii) desirability (compatibility with normative values) of the metabolic pattern of social-ecological systems across levels of analysis (EU level, national level, urban level).
- Moving away from rational behavior to **social practice analysis**. Sustainability governance requires a better understanding of the role played by social practices in the stabilization of the social fabric.

Massive Open Online Course (MOOC) on Coursera:

Sustainability of Social-Ecological Systems: the Nexus between Water, Energy and Food

<https://www.coursera.org/learn/sustainability-social-ecological-systems>

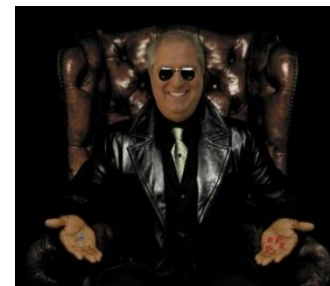
A total of 4,146 learners on 04/03/2019

Recent Projects:



Contact person

Mario Giampietro, ICREA professor
mario.giampietro@uab.cat



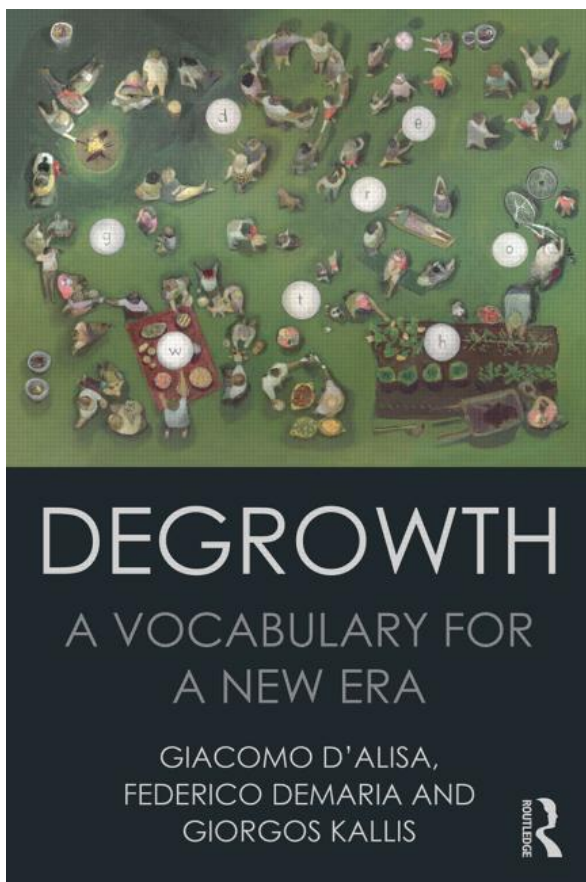
Themes

1. **Research on Degrowth** (**Giorgos Kallis**, funded by MINECO)
2. **Environmental conflicts and justice** (**Joan Martinez-Alier**, ERC)
3. **Evolutionary models and climate policy** (**Jeroen van den Bergh**, ERC)
4. **Cities, health and environmental justice** (**Isabelle Anguelovski**, ERC)
5. **Community-based natural resource governance and urban commons** (**Sergio Villamayor-Tomás**, Ramón y Cajal).



1. Research on Degrowth

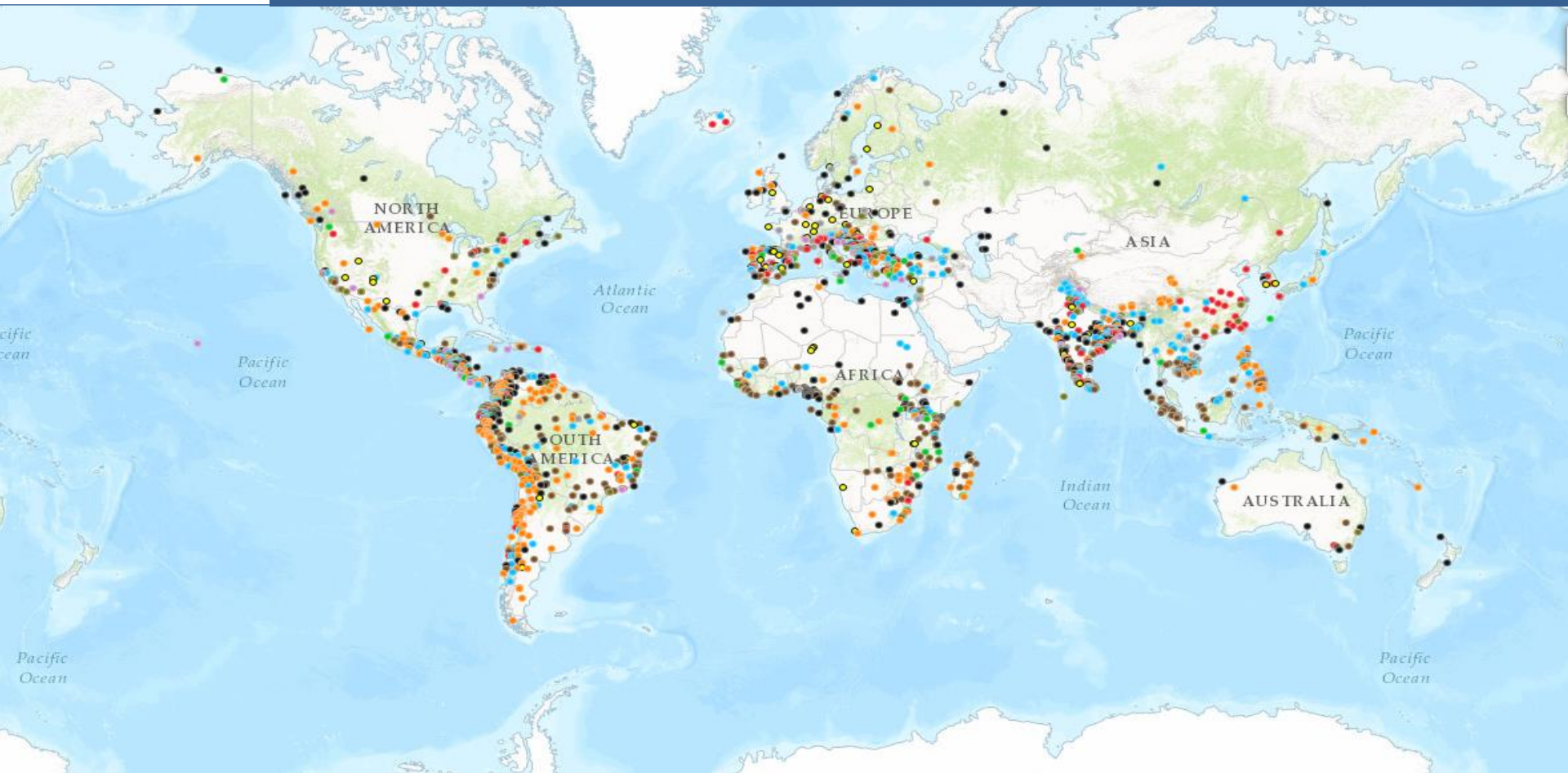
Led by Giorgos Kallis



- *Policies for managing without growth* (Riccardo Mastini)
- *Energy and carbon emissions involved in a clean energy transition* (Aljoša Slameršak)
- *Blue Degrowth – undoing the logic of growth in the Mediterranean Sea* (Borja Nogué Algueró)
- *Solidarity economies and reclaiming the commons* (Angelos Varvaroussis – COSMO project funded by MINECO)
- *The pluriverse of alternatives to development* (Marta Music)

2. EAtlas EnvJustice Project 2016-2021

ERC Advanced Grant - Led by Joan Martinez-Alier



European
Research
Council

ERC Advanced Grant, ICTA-UAB

<http://www.envjustice.org/><http://ejatlas.org/>

Objectives

- EnvJustice is a ERC Advanced Grant to Prof. Joan Martínez-Alier (2016-2021) that aims to study and contribute to the global environmental justice movement.
- Its main objectives are:
 - ✓ The expansion and updating of the [EJAtlas](#) database.
 - ✓ The production of scientific papers based on analysis of the [EJAtlas database](#).
 - ✓ The expansion of the vocabulary of the Degrowth and Environmental Justice movements.
 - ✓ Activities to spread awareness and contribute to the global environmental justice movement.
 - ✓ Links between Degrowth and Env. Justice.

The Environmental Justice Atlas

What? A tool for mapping and understand **environmental conflicts** around the world.

How? A collaborative research process that integrates the work of academic researchers and **environmental justice organizations** (Ejos) on the ground claiming for **environmental justice**.

Why? The EJAtlas fosters and strengths networking and capacity building among environmental justices organizations around the world. And, to study and understand patterns, comparative analysis of environmental conflicts around the world.

www.ejatl.org

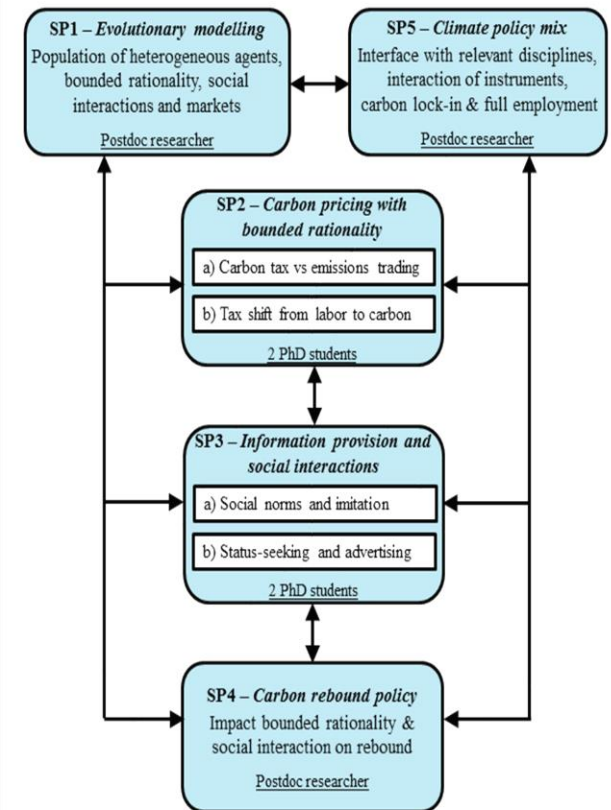
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3. EVOCLIM Project

ERC Advanced Grant- Led by Jeroen van den Bergh

- **Title: Behavioral-evolutionary analysis of climate policy: Bounded rationality, markets and social interactions (EVOCLIM)**
- **Team (8 people):
PI, 3 postdocs, 4 PhD students**



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Goals

Overall: Unite distinct climate policies that are currently being studied using incomparable approaches, and evaluate the effectiveness of very different climate policy instruments in a consistent and comparative way, allowing to assess complementarity in a policy mix.

Specific:

1. Test robustness of insights on carbon pricing from benchmark approaches that assume representative, rational agents
2. Test contested views on joint employment-climate effects of shifting taxes from labor to carbon
3. Examine various instruments of information provision under distinct assumptions about social preferences and interactions
4. Study regulation of commercial advertising as a climate policy option in the context of status-seeking and high-carbon consumption
5. Explore behavioral roots of energy/carbon rebound (systemic effect)





Behavioral-evolutionary method

1. General & specific models (agent-based or dynamic systems) that link climate policies to populations of heterogeneous consumer & producers characterized by bounded rationality and social interactions. Allows to simultaneously assess policy impacts mediated by markets & social interactions, possibly up to a macro(evolutionary) level.
2. Questionnaire-based surveys among consumers and firms. One survey examines information provision instruments and social interaction channels, while another assesses behavioral foundations of rebound.
3. Experiments to test effectiveness and social acceptability of policies: bounded rationality, social factors (norms, status, advertising), nudging (framing, priming) and equity.
4. Interaction between the three methods – formal modelling exercises suggest questions and experiments, while surveys/experiments inform models.



4. Barcelona Lab For Urban Environmental Justice and Sustainability

ERC Starting Grant - Led by Isabelle Anguelovski

Cities and Environmental Justice

For whom is the new green, healthy, and resilient city?



Isabelle Anguelovski, PhD - Director

James JT Connolly, PhD - Associate Director

Specific Research Questions

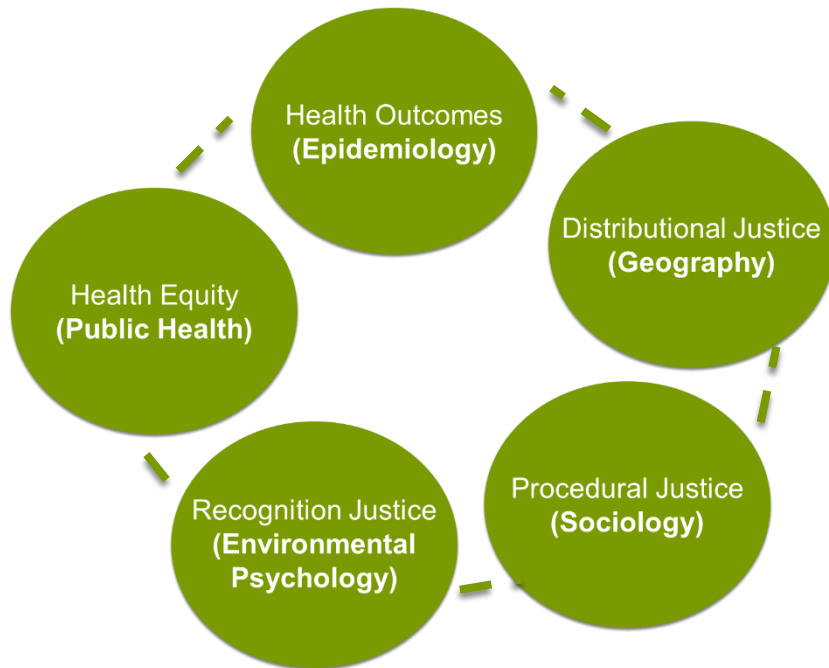
- Who benefits from urban green interventions in the Global North and South?
- How does greening create opportunities for socially vulnerable populations? And how do community organizations mobilize towards equitable greening?
- What are policy and planning tools in place or considered to build green AND equitable cities?
- Does gentrification modify the relationship between green space and health?



Transdisciplinary Approach

Health Justice:

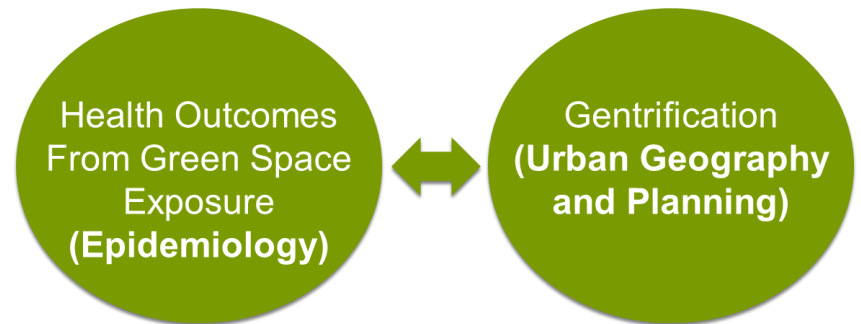
Intersection of health equity and social justice



Green Gentrification:

“The implementation of an environmental planning agenda related to public green spaces that leads to the displacement or exclusion of the most economically vulnerable human population while promoting an environmental ethic.”

(Dooling, 2009)



UrbanA - Urban Arenas for sustainable and just cities

EU Horizon 2020 project



ENABLE - Enabling Green And Blue Infrastructure

BiodivERsA and Horizon 2020



NATure-based URban innovation -- for the governance of nature based solutions in cities

EU Horizon 2020 project

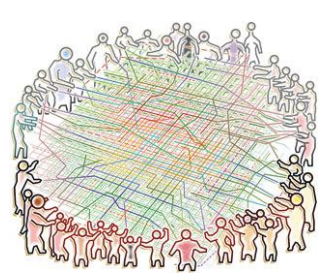
Green locally unwanted land uses (GREENLULUS) on green gentrification in 40 cities in the US, Canada, and Europe

ERC project



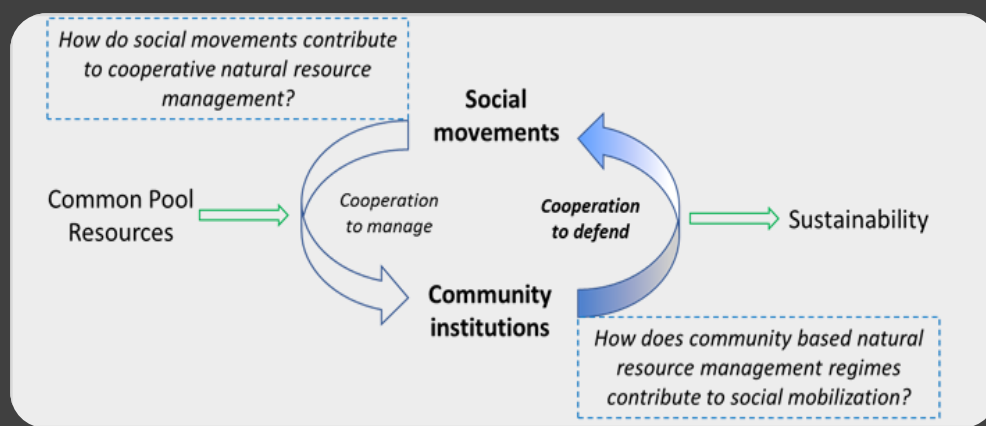
Rooftop Gardens on the health and wellbeing benefits for socially vulnerable residents

IMPD-Ajuntament de Barcelona project



5 • Community-based natural resource governance and urban commons

The commons 3.0: linkages with environmental justice movements in rural areas, and social innovation in cities
 (Sergio Villamayor-Tomas and collaborators)



COMOVE (IF Marie-Slodowska Curie)

How do social movements influence community-based natural resource management (CBNRM)?

Why and how social movements transition into long-enduring CBNRM regimes?

Why and how existing or latent commons serve as the basis for social mobilization?

To which extent can social movement and CBNRM theory speak to each other?

Commons co-production and socio-environmental impacts in the Metropolitan Area of Barcelona (Barcelona-UPF Chair, IGOP)

- Which diversity of experiences and services feature urban commons?
- Which socio-demographic factors are associated to higher concentrations of urban commons experiences?
- Which dynamics feature urban commons populations?



Rivers, Biodiversity and Global Change (RBGC)

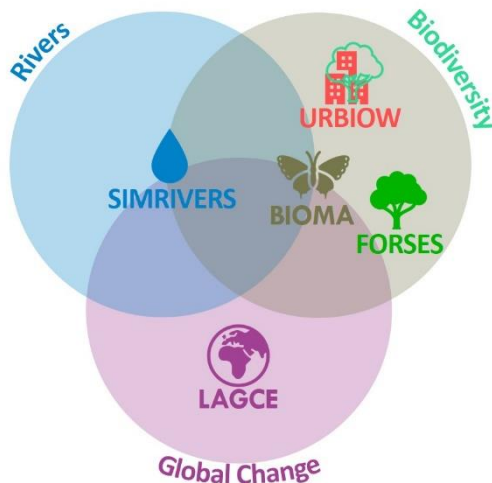
Socioecological applied research, providing tools to face current global change challenges



IP - Post-doc: Sònia Sànchez-Mateo

Pre-docs: Antoni Mas Ponce, Mireia Nicart Arroyo & Juli Mauri de los Rios

Ph.D. Jaume Marlès Magre



Our aim:

Assessing the interface between humans and their environment, the group fosters innovative and replicable research drawn towards offering support in different spheres of the society, integrating knowledge transferability and scientific dissemination as transversal axes.

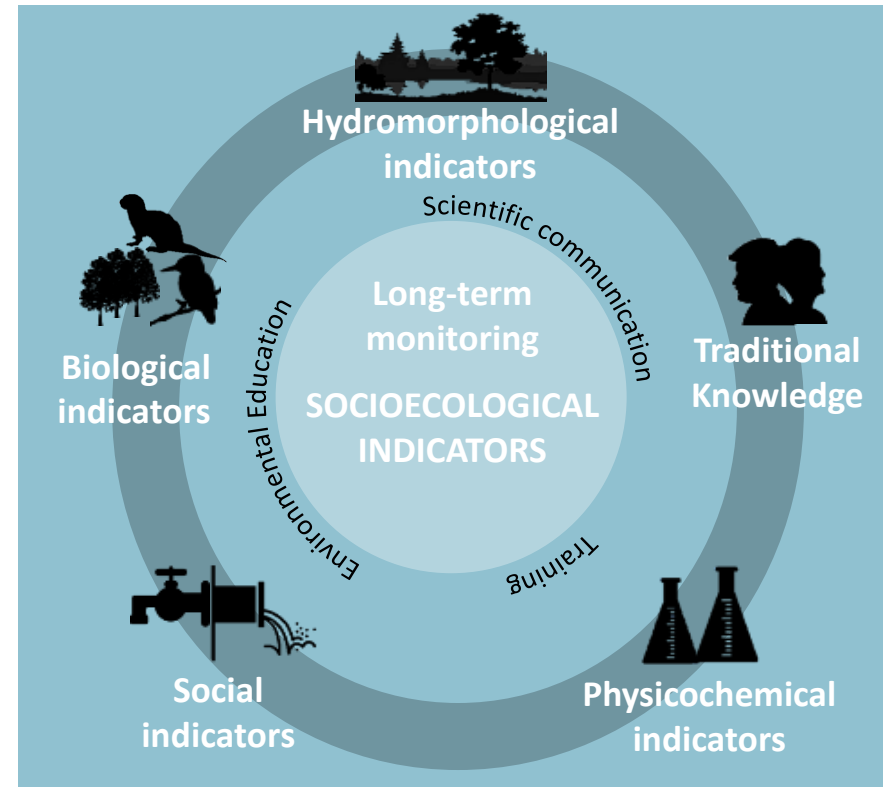


Socioecological indicators monitoring in fluvial systems (SIMRIVERS)

AIM: Long-term data series, obtained by the monitoring of indicators to evaluate **ecological quality status**, are a tool to assess processes of change in fluvial ecosystems dynamics in accordance with the **European Water Framework Directive (2000/60/EC)**. Modelling essays are conducted to build socioecological indicators considering **land use and land cover change analysis (LULCC)**, **traditional knowledge** and **social perceptions** analysis.

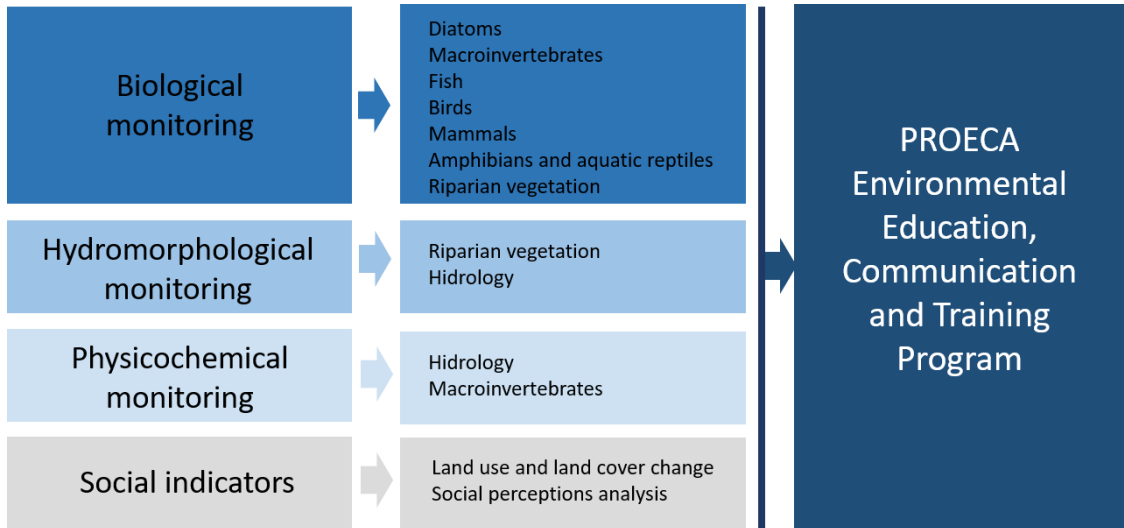
Environmental Education and Communication is essential to **spread** the results of the research with the aim to **reconnect rivers and society** through discovering the socioecological (natural and cultural) heritage of fluvial systems.

RESEARCH TOPICS: Fluvial systems, rivers, socioecological indicators, long-term monitoring, bioindicators, environmental education, management.





Socioecological indicators monitoring in fluvial systems (SIMRIVERS)



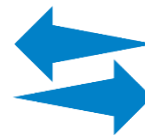
PROJECTS AND STUDY AREA: **Observatori Rivus** focuses the research in **Tordera and Besòs river basins** (NE Catalonia), with **Mediterranean hydrological regime**. With a total surface of 898 km² and 1,038 km², respectively, have a high degree of heterogeneity by the presence of natural protected areas in the upper course, anthropogenic pressures in the middle and lower courses (human settlements, industry, strategic mobility infrastructures, intensive agriculture, massive tourism activities) and their location in the Metropolitan Area of Barcelona.



ICTA



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Forests as socioecological systems (FORSES)

AIM: Development of applied research in **forest ecosystems from a socioecological perspective** to provide tools to approach forest **multi-functionality**. Combining scientific and local traditional knowledge this research area aims at contributing to a better understanding of **forest complexity and its values in a global change context**, promoting applied forest management, ecosystem services evaluation, assessment of forests as indicators of global change effects (sentinel forest landscapes) and education and knowledge transferability.

RESEARCH TOPICS: Ecosystem services, local traditional knowledge, dendroculture, socioecological values, biodiversity, education and transferability, forest management.

PROJECTS AND STUDY AREA: The participation in LIFE BIOEFFORMED, a project implementing a Mediterranean biorefinery to boost forest management through the production of added value products, will be focused on the assessment of cultural ecosystem services.



Urban biodiversity and wellbeing (URBIOW)

AIM: The aim of this research area is to better understand **the role of urban biodiversity and green areas in human wellbeing**. We delve into the **interaction between cities, people and biodiversity** from a multidisciplinary perspective, including ecological aspects and their interactions with humans and their history.

RESEARCH TOPICS: Urban biodiversity, urban ecosystems, urban green spaces, ecosystem services, wellbeing, social perceptions and citizen science.

PROJECTS AND STUDY AREA: We do our research from an environmental sciences perspective, combining methodologies from ecology and biology (transects or inventories) with methodologies from social sciences (surveys involving citizens). The research is centred in cities of the Mediterranean region, specially in the municipality of Barcelona and its metropolitan region. Recently, this research area addresses the perceptions and uses of green urban spaces and their contribution to cultural environmental services from the scope of teleworking under COVID-19 scenario.



Biodiversity as quality indicator in metropolitan areas (BIOMA)

AIM: This research area pursues highlighting **the role of habitats and biodiversity in urban and peri-urban areas** and consequently to have an impact on **territorial planning and urban greening management**.

Hence, **biodiversity** in these areas **is assessed as a quality indicator** for metropolitan habitats valorisation and conservation.

RESEARCH TOPICS: Urban and peri-urban biodiversity, metropolitan areas, open spaces, urban greening, habitat quality bioindicators.

PROJECTS AND STUDY AREA: The study of **urban biodiversity** focuses on the analysis of urban green components with positive functional influences on biodiversity in Mediterranean cities, such as trophotop, genotop, low maintenance management and climate change adaptation. The quality of **open spaces in peri-urban areas** are addressed by the ecological analysis of butterflies as bioindicators.

The research is focused on the cities of the Mediterranean region, specially in the municipality and metropolitan area of Barcelona, and other municipalities and medium-sized towns in Catalonia.



Local assessment of global change effects (LAGCE)

AIM: To analyse the **complexity of global change processes** at a regional and local scale under an **interdisciplinary and a socioecological scope**. The assessment of these changes, both socio-economic and biophysical, is focused on the recent historical transformation of the territory.

RESEARCH TOPICS: Land use and land cover change, landscapes, socio-economic sectors.

PROJECTS AND STUDY AREA: The group background has broadly studied global change processes in the Mediterranean area, specially in the Catalan mid-mountain ranges. And currently, the research is being conducted in the region of the Low Casamance (Senegal).



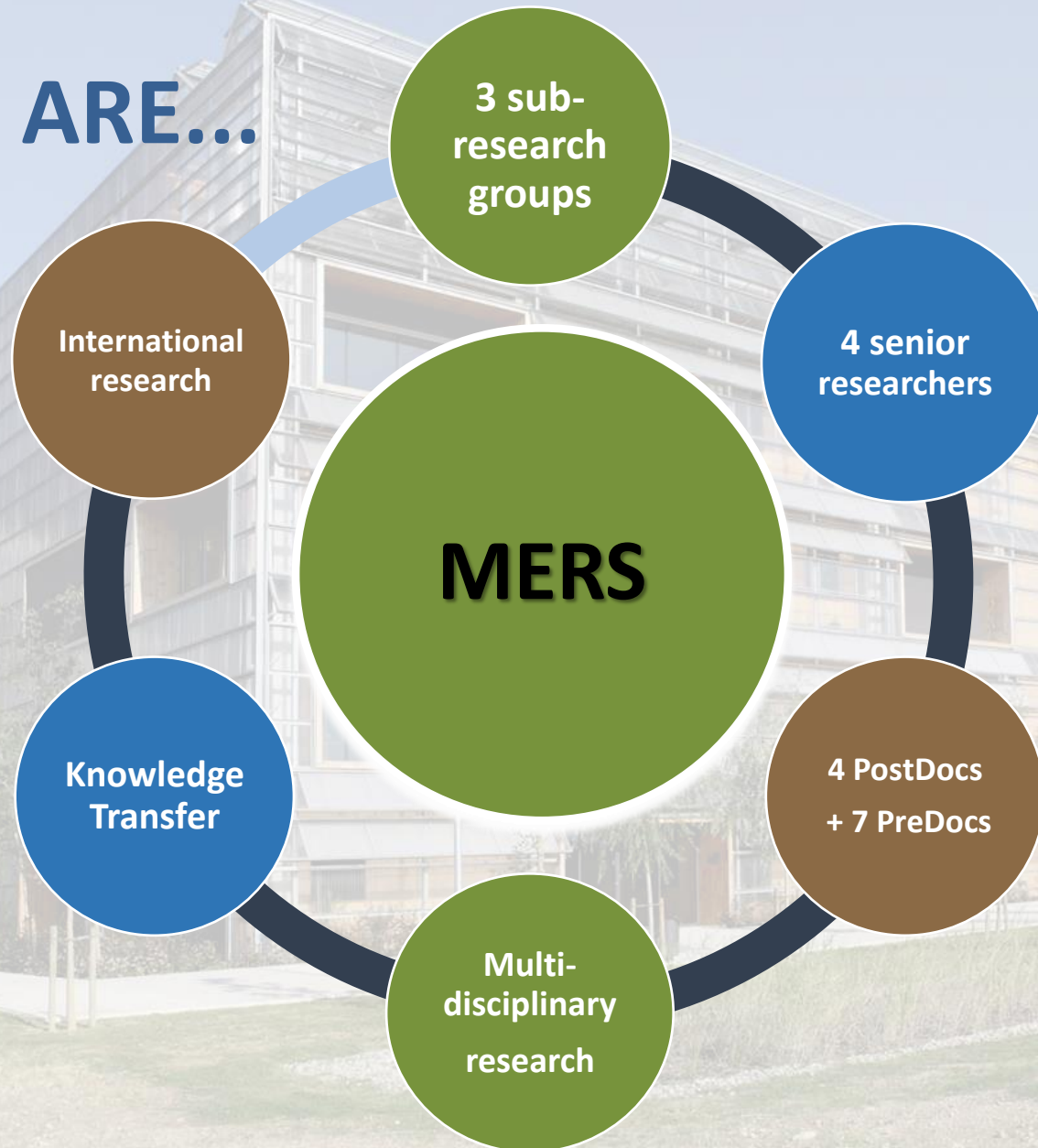
SGR – MARINE AND ENVIRONMENTAL BIOGEOSCIENCES (MERS)

Led by Patrizia Ziveri





WHO WE ARE...





MISSION

Promote and carry out research, and to train researchers who can contribute to our understanding of the environment and meet the challenges posed by the interaction between human and the environment.

GOALS

Study key environmental biogeochemical processes that regulates marine and freshwater realms and also the human-induced global and climate change that affects society, natural resources and economy around the world.





MERS TEAM

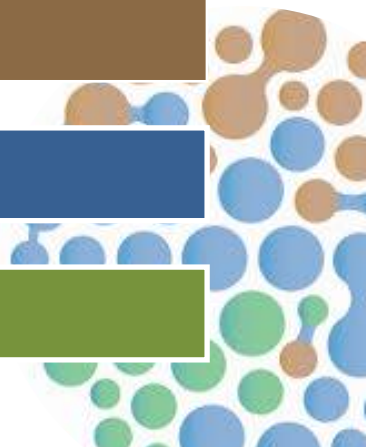
- IP:** **Patrizia Ziveri**
- Senior researchers:** Jordi Garcia Orellana
Pere Masqué (in Australia)
Sergio Rossi (in Italia)
- PostDocs:** Michael Grelaud
Valentí Rodellas
Carolina Olid
Ariane Arias
- Technician:** Joan Manuel Bruach
- Pre-Docs:** Laura Simón
Marc Diego
Miki Mallo
Sarah Paradis
Aaron Alorda
Roberta Johnson
Sven Pallacks





MERS Research lines

1. Climate and human impact on the aquatic environment
2. The ocean in a high CO₂ world
3. Use of natural and anthropogenic tracers
4. Ocean carbon cycle
5. Plastic debris in oceans
6. Artificial and natural radioactivity in oceans
7. Land-Ocean interaction





SGR – SUSTAINABILITY AND ENVIRONMENTAL PROTECTION (SOSTENIPRA)

Led by Dr. Xavier Gabarrell Durany
(2017SGR 1683)



sostenipra

Sostenibilitat i Prevenció Ambiental

www.sostenipra.cat

RESEARCHERS

PhD. Xavier Gabarrell Durany

- PhD Gara Villalba
- PhD M. Rosa Rovira
- PhD Laura Talens



sostenipra

Sostenibilitat i Prevenció Ambiental

The **OBJECTIVES** of the research group **SosteniPrA** (2017SGR 1683, Sustainability and Environmental Protection) are to develop and apply tools for the sustainability and environmental protection. These tools within the **Industrial Ecology** framework are **Life Cycle Analysis (LCA)**, **ecodesign**, **ecoefficiency**, **material and energy flow analysis** applied to different scales such as a process or a product, regional, national or global.

Team

- 4 researchers
- 1 postdocs
- 11 PhD students
- 3 collaborators

CO₂ZW 

Plugrisost 

edTOOL 
ecodesign tool

LCADB.sudoe 

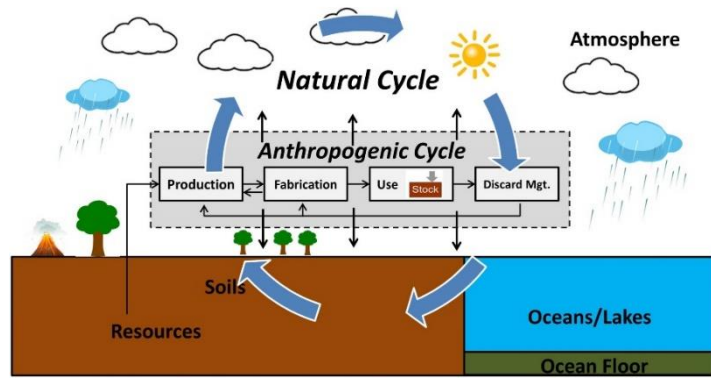
Tools: Industrial Ecology, flow analysis, LCA and ecodesign

**Raw material management for a
Circular economy**

Water-energy-food nexus

Vertical urban agriculture

Knowledge transfer between universities and business and NGO



Resource management for a circular economy

- **Material systems:** studies of the anthropogenic sources of raw materials (i.e. metals and critical raw materials)
- **Process chains:** efficiency and process optimisation
- Technical, Economic and Environmental analysis of material recovery



View semiconductor and other components

Name	CAS Number	Name	Quantity
IC 256 SDA	60676-86-0	Silica fused	954.4000 mg
Declared mass 2872.7000 mg	7439-92-1	Lead	204.8000 mg
Dimensions 27 x 27 x 1.2	7440-02-0	Nickel	20.9000 mg
Manufacturer Xilinx	7440-21-3	Silicon	73.5000 mg
Manufacturer 80A256 - PK144 Au wire	7440-22-4	Silver	5.7000 mg
Description code	7440-31-5	Tin	348.8000 mg
Component finishing None	7440-50-8	Copper	466.2000 mg
Fabrication year 2007	7440-57-5	Gold	4.1000 mg
Website url 2 https://www.xilinx.com/support/documentation/package_specs/gp256.pdf	7440-57-5	Gold	13.4000 mg
Picture	proprietary	Resin	1.6000 mg
	proprietary	Resin	130.2000 mg
	proprietary	Laminata	561.3000 mg
	proprietary	Solder mask	87.8000 mg
Database file smm3	Calculated mass		2872.7000 mg
Material declaration file SIM_256SDCA_Xilinx_2007.pdf			
Dimensions file SIM_256SDCA_Xilinx_2007.pdf			

Current projects

- ✓ **Integrated greenhouses on rooftops: symbiosis of energy, water and CO₂ emissions with the building - Towards urban food security in a circular economy.** CTM2016-75772-C3-1-R, 2017-2019. Research Agency, AI / UE-Feder and MINECO
- ✓ **Greenhouses to Reduce CO₂ on Roofs (GROOF).** UE. Interreg NWE 474. 20/09/2017 -- 19/09/2021
- ✓ **URBAG. Integrated System Analysis of Urban Vegetation and Agriculture.** URBAG.ERC Consolidator. H2020. UE. 2019-2024
- ✓ **Barriers and opportunities for mosaic roofing projects in Barcelona.** City Hall of Barcelona. Urban Ecology. Projects under the Commitment of Barcelona for Climate 2018. 2018-2019



Sostenipra Vertical Urban Agriculture



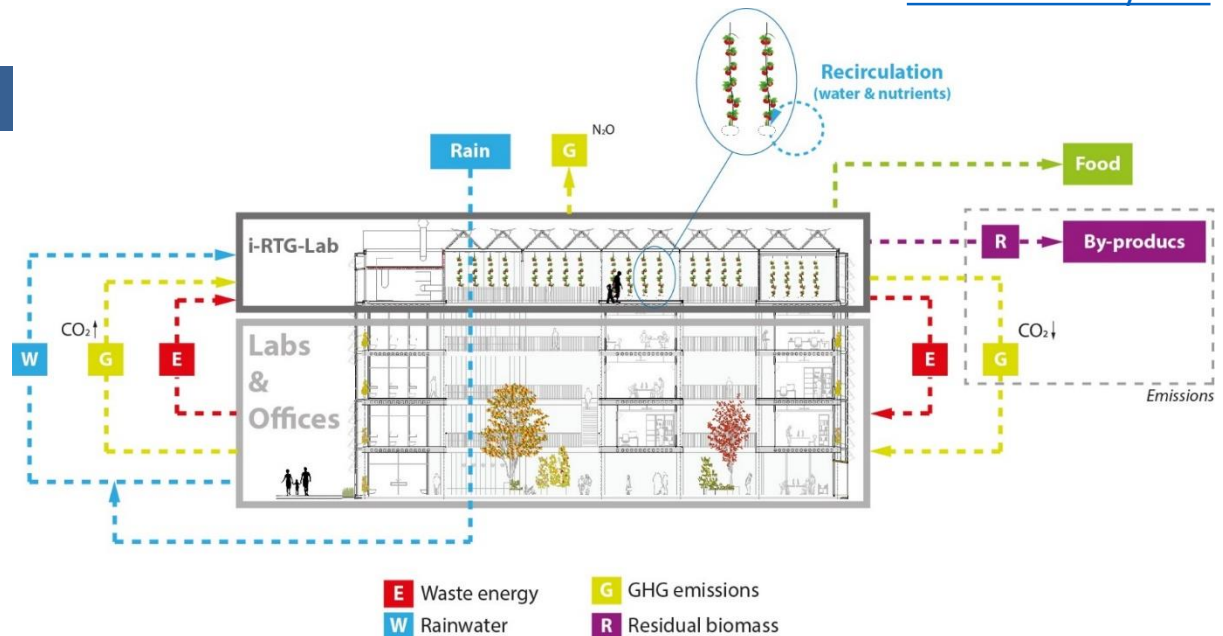
FertileCity



www.fertilecity.com

FertileCity II Project

Integrated rooftop greenhouses: symbiosis of energy, water and CO2 emissions with the building – Towards urban food security in a circular economy

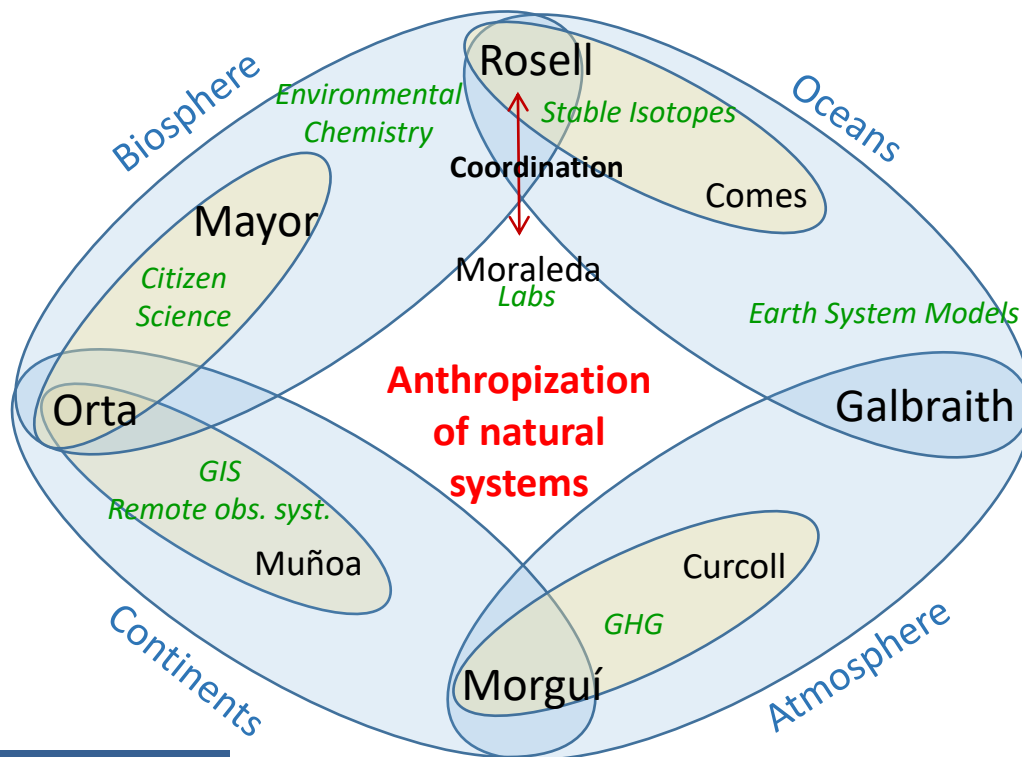




SGR – DYNAMICS OF NATURAL SYSTEMS AND THE ANTHROPIC IMPACTS (ImpactANT)

Led by Dr. Antoni Rosell- Melé
(2017SGR-1320)

Study of the anthropogenic impacts on the
natural dynamics of the Earth's systems



Two complementary strategies

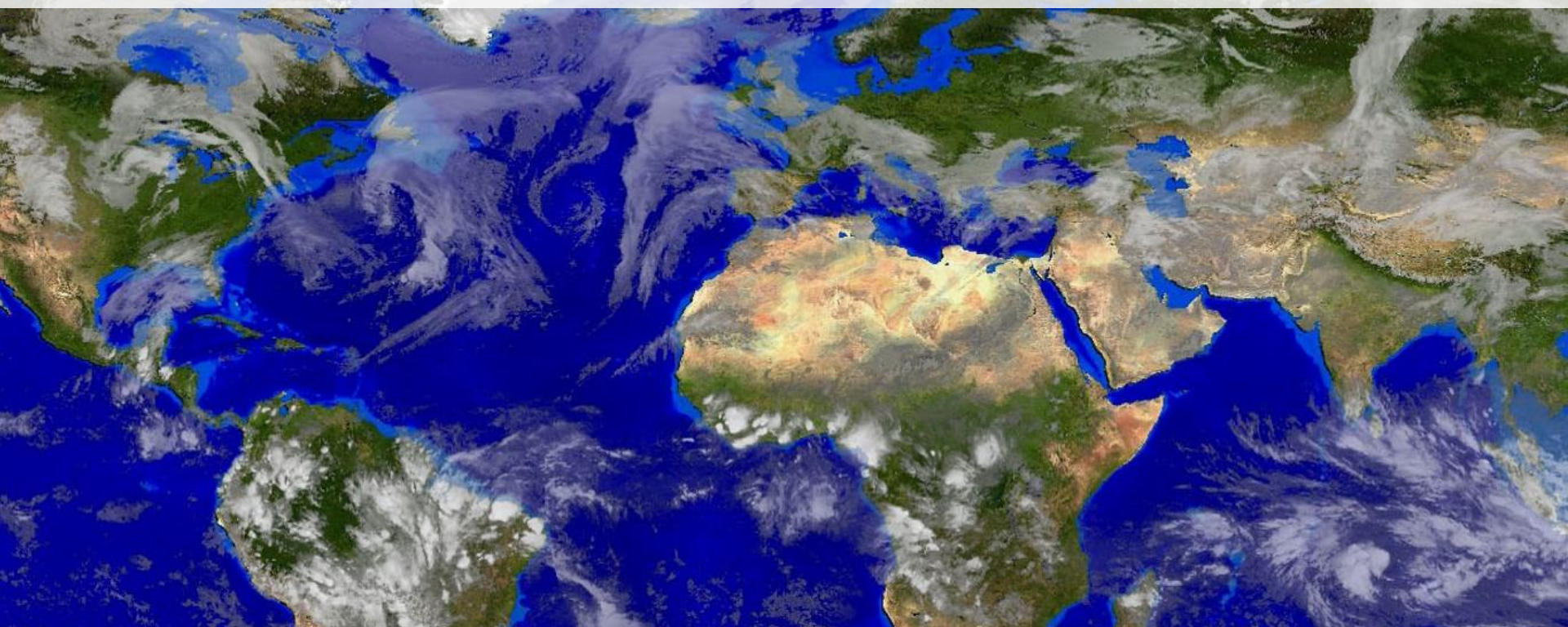
- characterize the natural dynamics of the **Earth system components** and their interactions
- find out how these dynamics, and the associated processes, are transformed in response to **human activities**.

Different spatial and temporal scales (e.g. remote areas, past climate changes)

Interdisciplinarity: range of **techniques** from the natural and social sciences in order to study the Earth system from an integrated perspective.



Example 1: New geochemical approach to reconstruct tropical palaeo-atmospheric dynamics



PALADYN – ERC AdvGr 2019

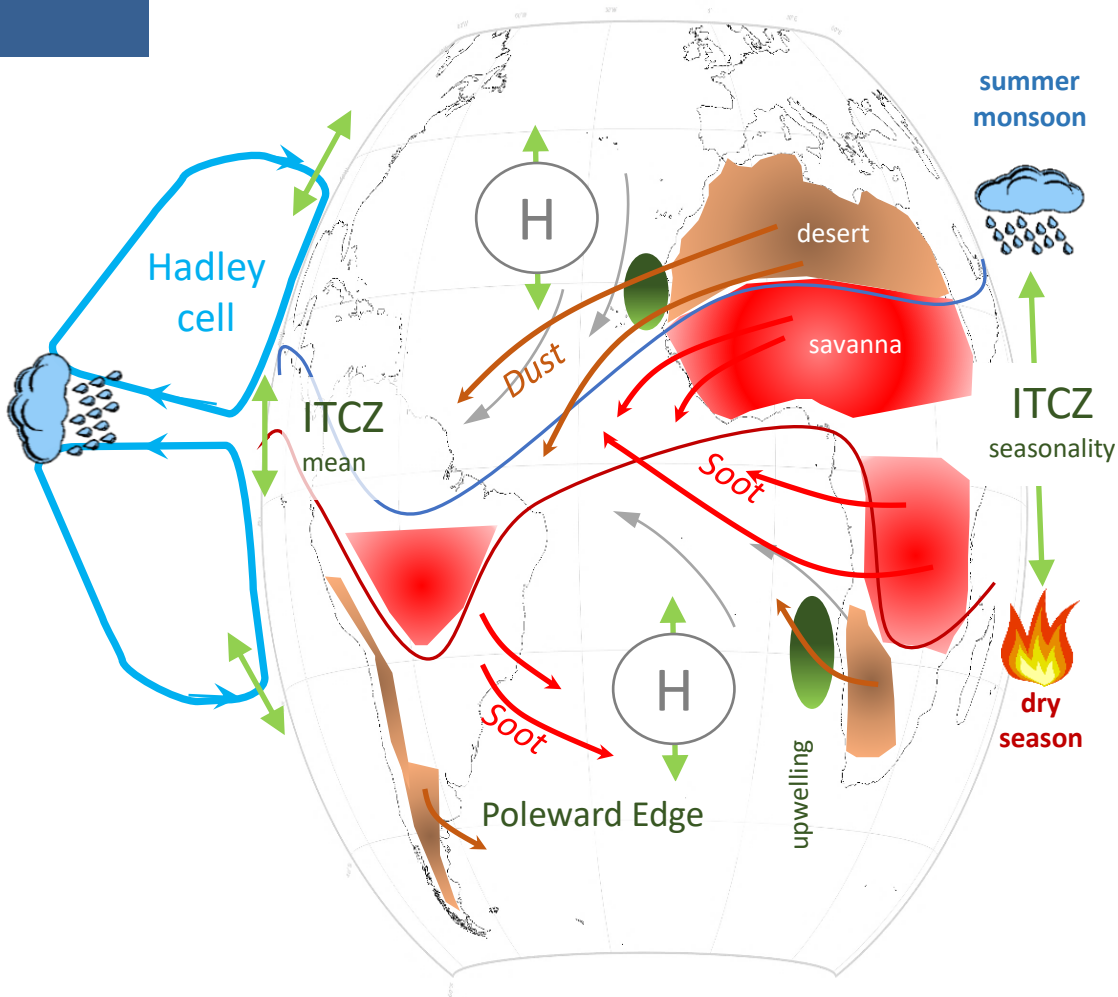
PI: A. Rosell-Melé





Objectives

- Develop an **innovative paleo-proxy approach** to reconstruct the past dynamic of the tropical atm. circulation (rainfall and winds patterns) based on the **molecular and isotopic composition of soot**.
- Apply it to investigate **the natural range of variability of this tropical atm. dynamic** during **past episodes of extreme warmth and cold**





Example 2: Long-term coastal adaptation, food security and poverty alleviation in Latin America



TRADITION – ERC AdvGr 2019
PI: A. Carlo Colonese

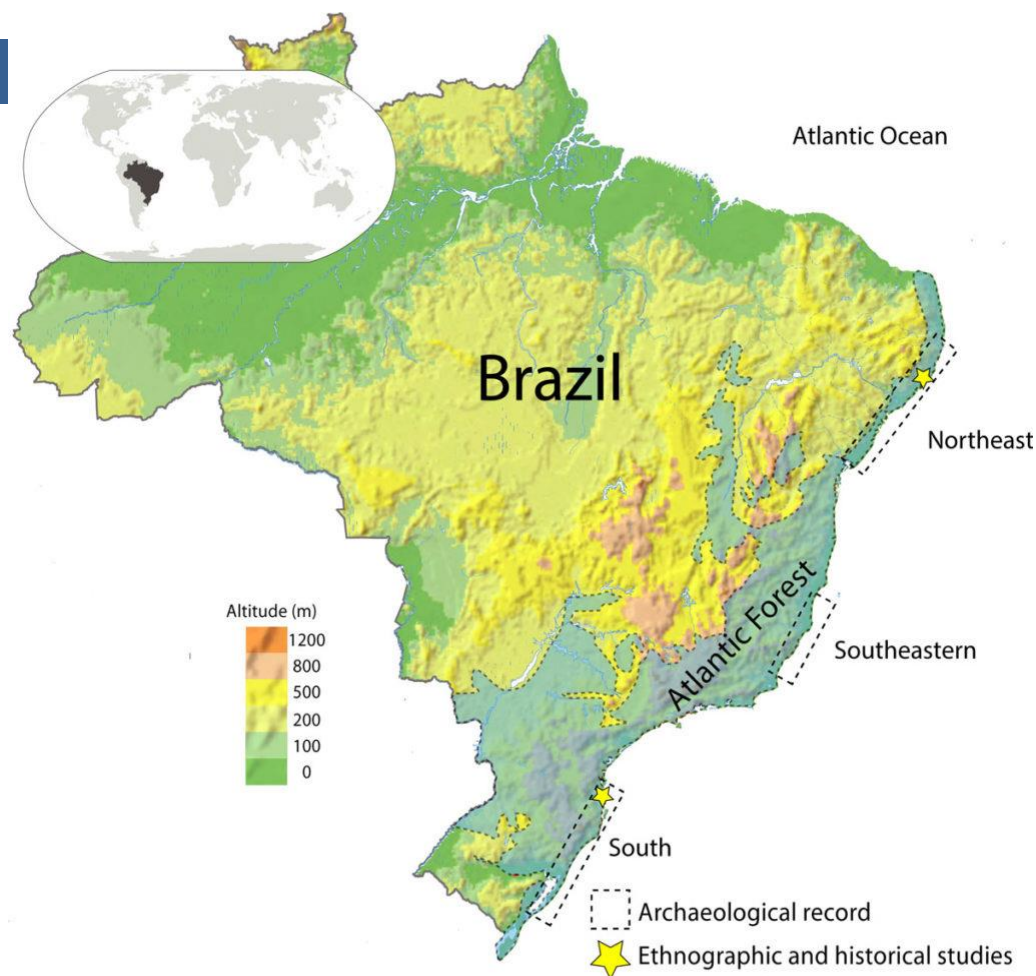


European
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Objectives

- Investigate the importance of **coastal resources** to **pre-Columbian populations** with the **introduction of ceramics and agriculture**
- Assess the impact of **climate and environmental change** on **coastal populations**
- Assess the **socio-economic development of small-scale fisheries** in the context of **colonisation and urbanization of the Atlantic Forest coast of Brazil**
- Investigate how **historical practices and events** have shaped **current small-scale coastal communities**, and whether this knowledge may benefit **current management strategies**





Example 3: Impacts of ice melting on marine ecosystems, ocean circulation and climate using a new molecular paleo-approach



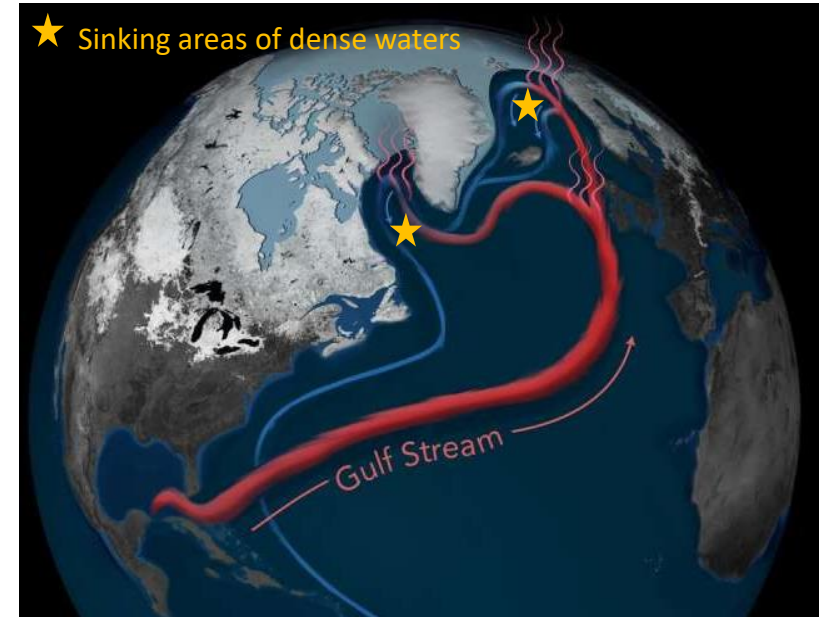
M. Wary's postdoc fellowship
ICTA-UAB Maria de Maeztu Unit of Excellence



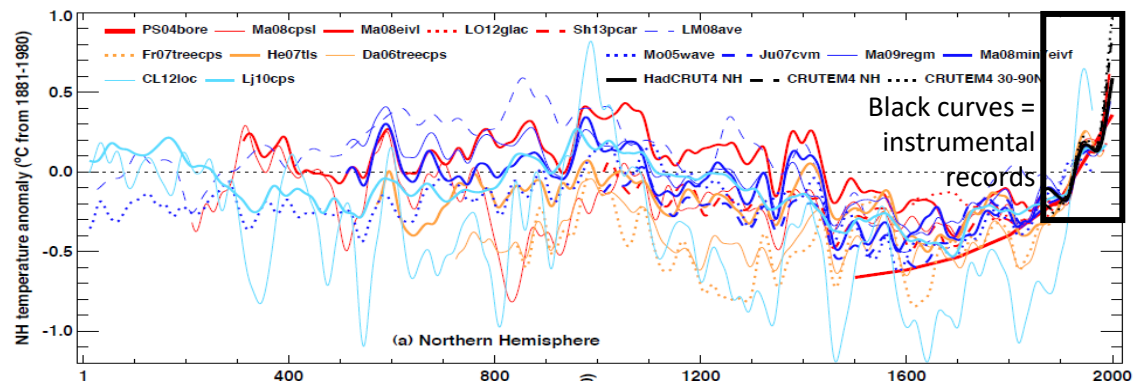


Objectives

- Develop a **new method based on biomarker stable isotopes** to track past episodes of ice melting
- Apply it in a multiproxy approach to **reconstruct the coupled variability of ocean-ice-marine ecosystems dynamics** in key subpolar areas, and assess their role on climate **during past episodes that may shed light on the on-going global warming**
- Compare these paleo-records with historical ones to assess the **contribution of human activity** in driving the current changes



Credit: Natalie Renier/Woods Hole Oceanographic Institution





Example 4: Impacts of produced waters from oil extraction on wildlife in the Amazon tropical rainforest



M. Cartro's PhD

Supervisors: A. Rosell, M. Orta, P. Mayor



Objective

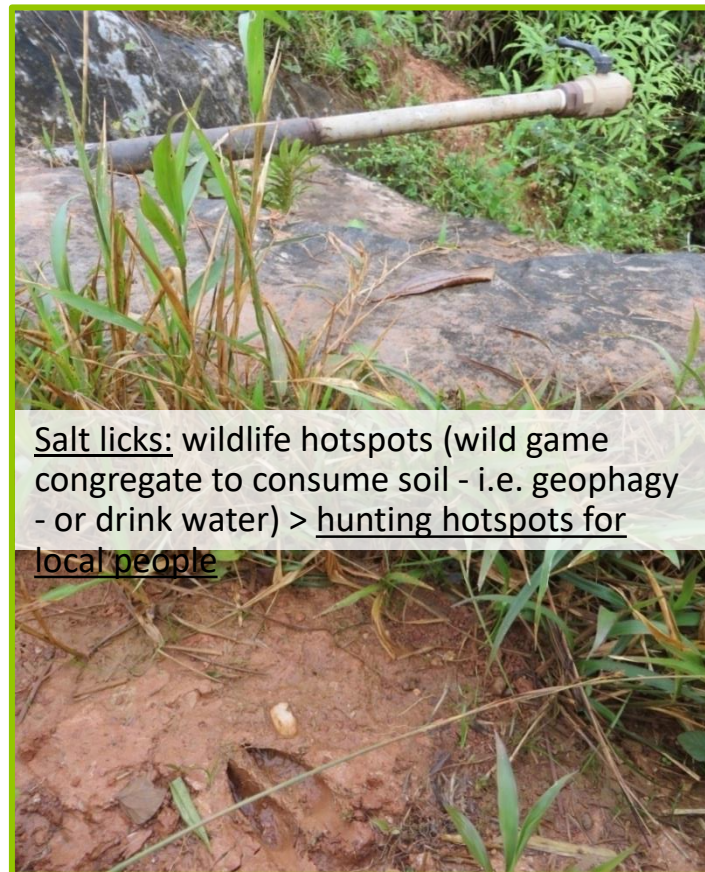
Characterize the **levels and sources of lead contamination in wild game hunted** for food by indigenous populations >> hunting hotspots = both anthropogenic and natural salt licks

.... Using **citizen science** (in study design, data collection and analysis...) and **environmental forensics** approaches

Conclusion (Cartró et al., under review at Nature Sustainability): hunting ammunition = likely main source of lead in wildlife, BUT oil-related pollution through salt licks resulting from the dumping of produced waters is also a major source



Citizen science



Salt licks: wildlife hotspots (wild game congregate to consume soil - i.e. geophagy - or drink water) > hunting hotspots for local people



Example 5: Forest damages caused by oil exploration and extraction in the Northern Peruvian Amazon



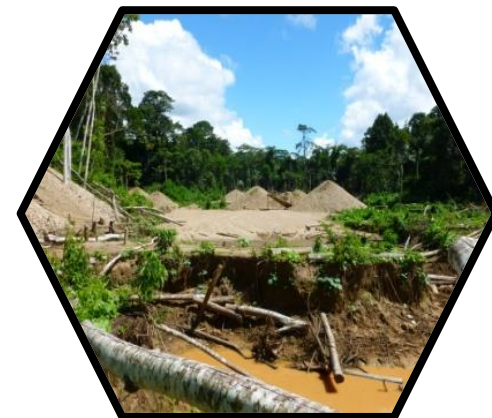
G. Muñoa's PhD (ICTA MdM program)
Supervisors: A. Rosell, M. Orta, P. Mayor



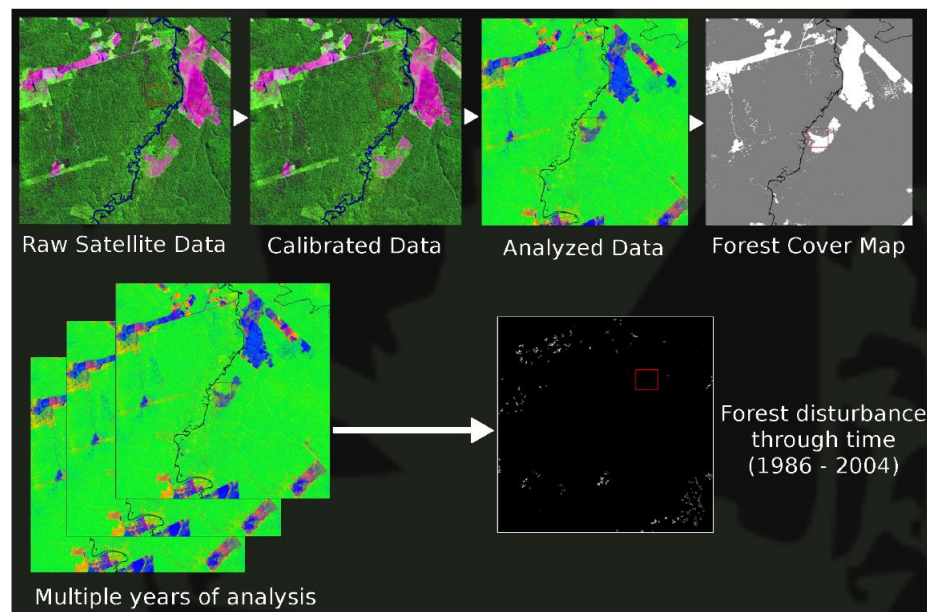
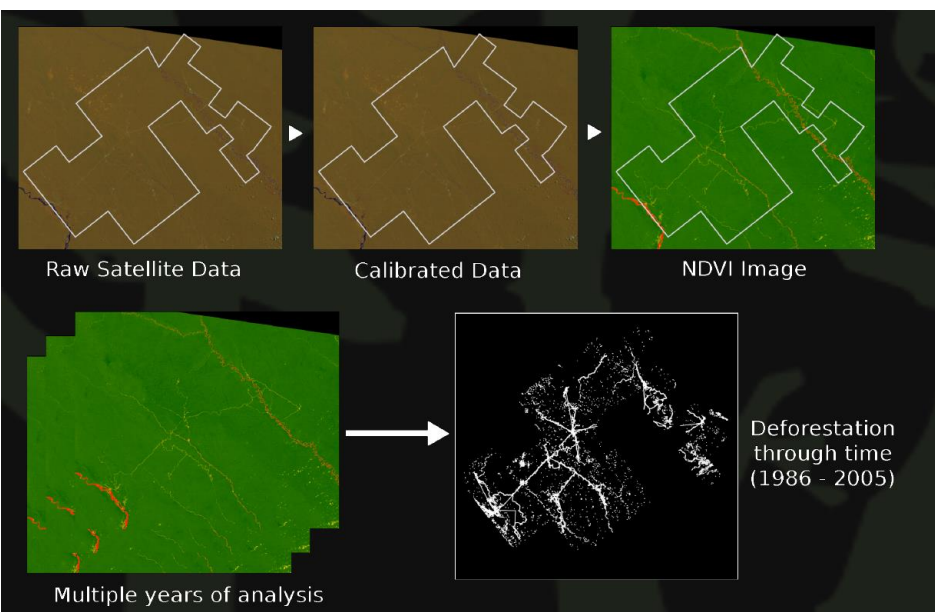


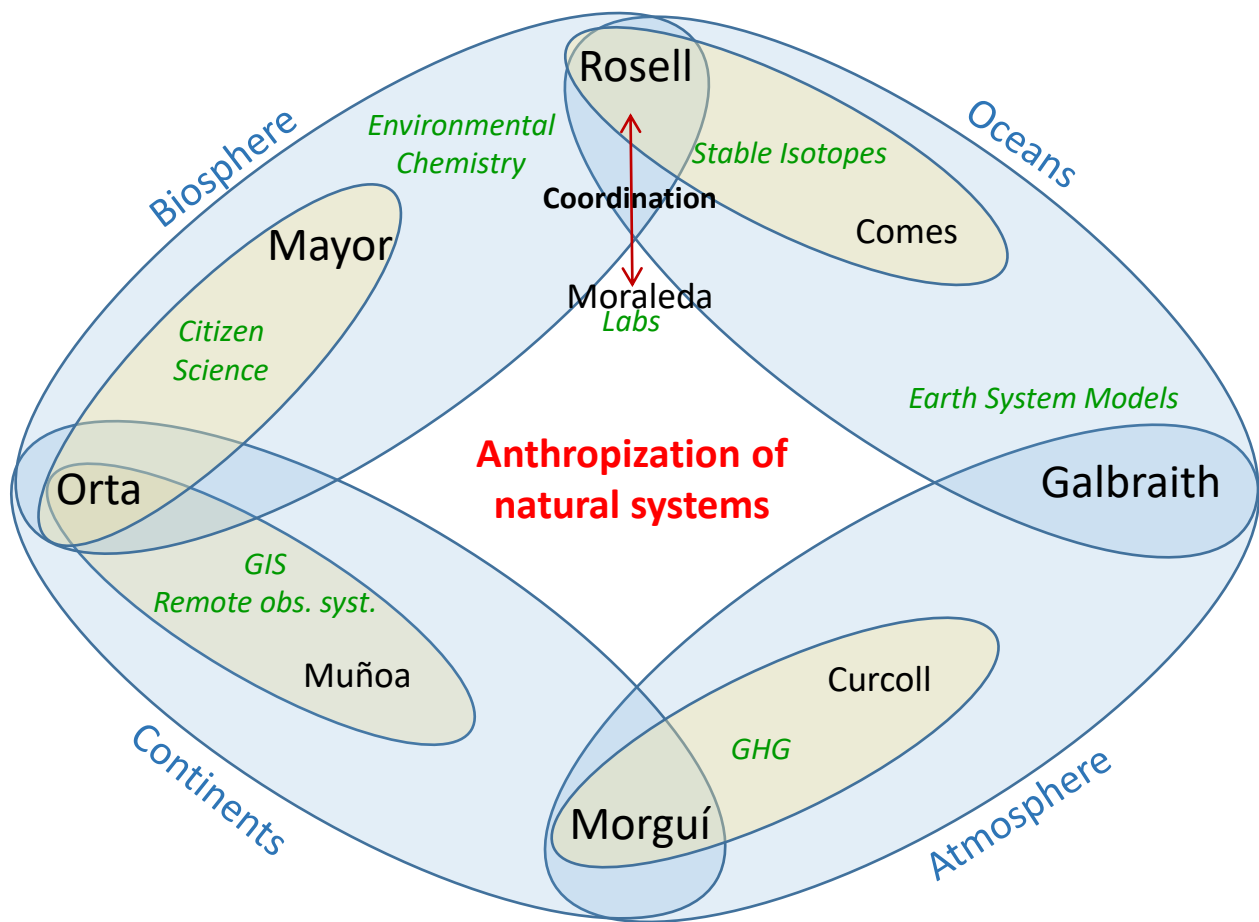
Objectives:

- Measure **deforestation** directly caused by oil extractive activity
- Identify the **forest disturbance** associated to the **edge effect** of linear structures (oil roads, pipelines, seismic lines)



... using **remote sensing**





ImpactANT

Natural dynamics of the Earth system components

Impacts of human activities in the context of the global change

Different spatial and temporal scales

Wide range of interdisciplinary techniques

URBAG Integrated System Analysis of Urban Vegetation and Agriculture

A Horizon 2020 and European Research Council funded project, hosted by ICTA-UAB, to determine to what degree green infrastructures can be a source of sustainable food, reduce environmental impacts, and promote a more efficient use of resources in urban regions.

gara.villalba@uab.cat

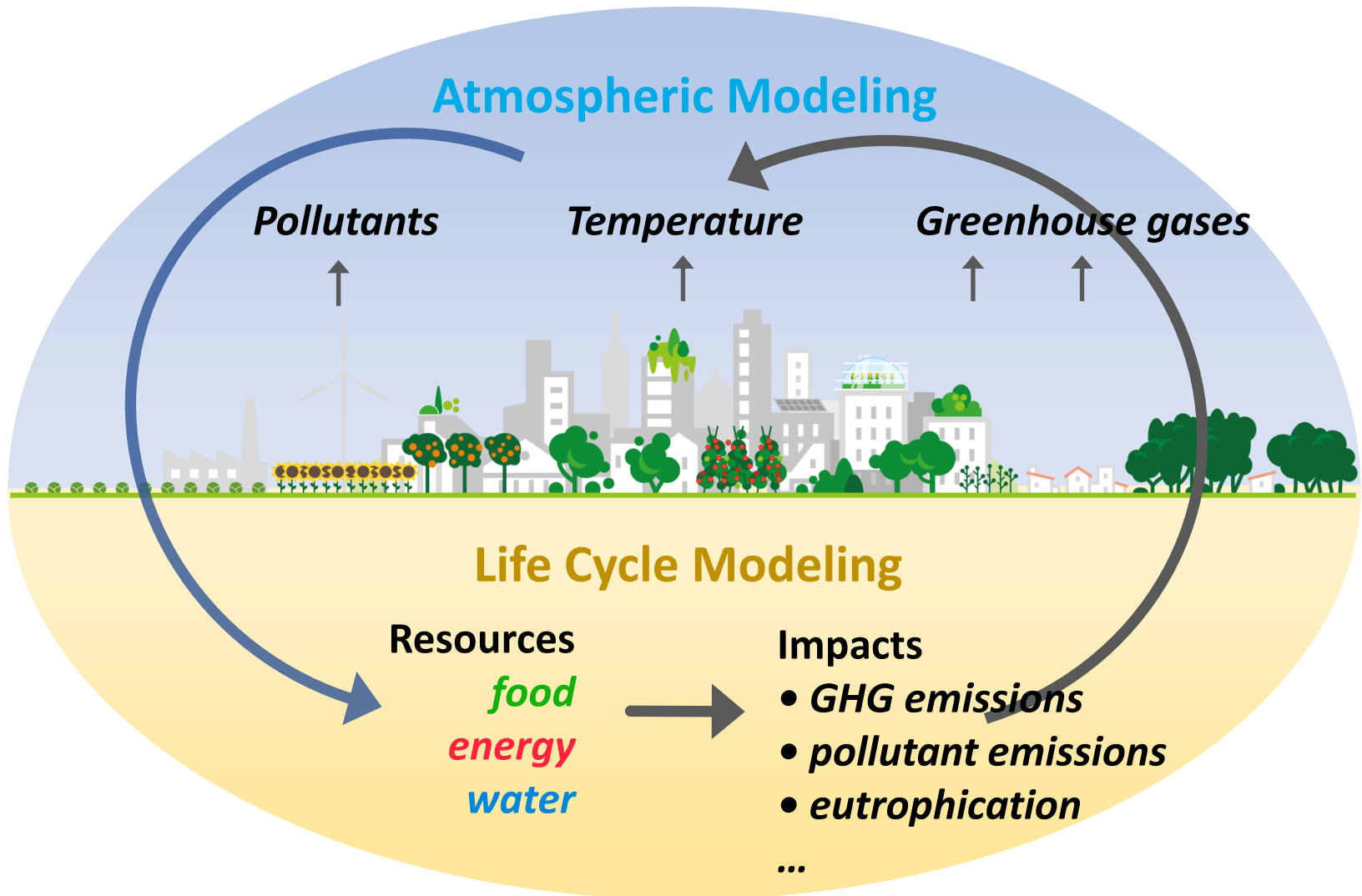
November 2019- November 2024



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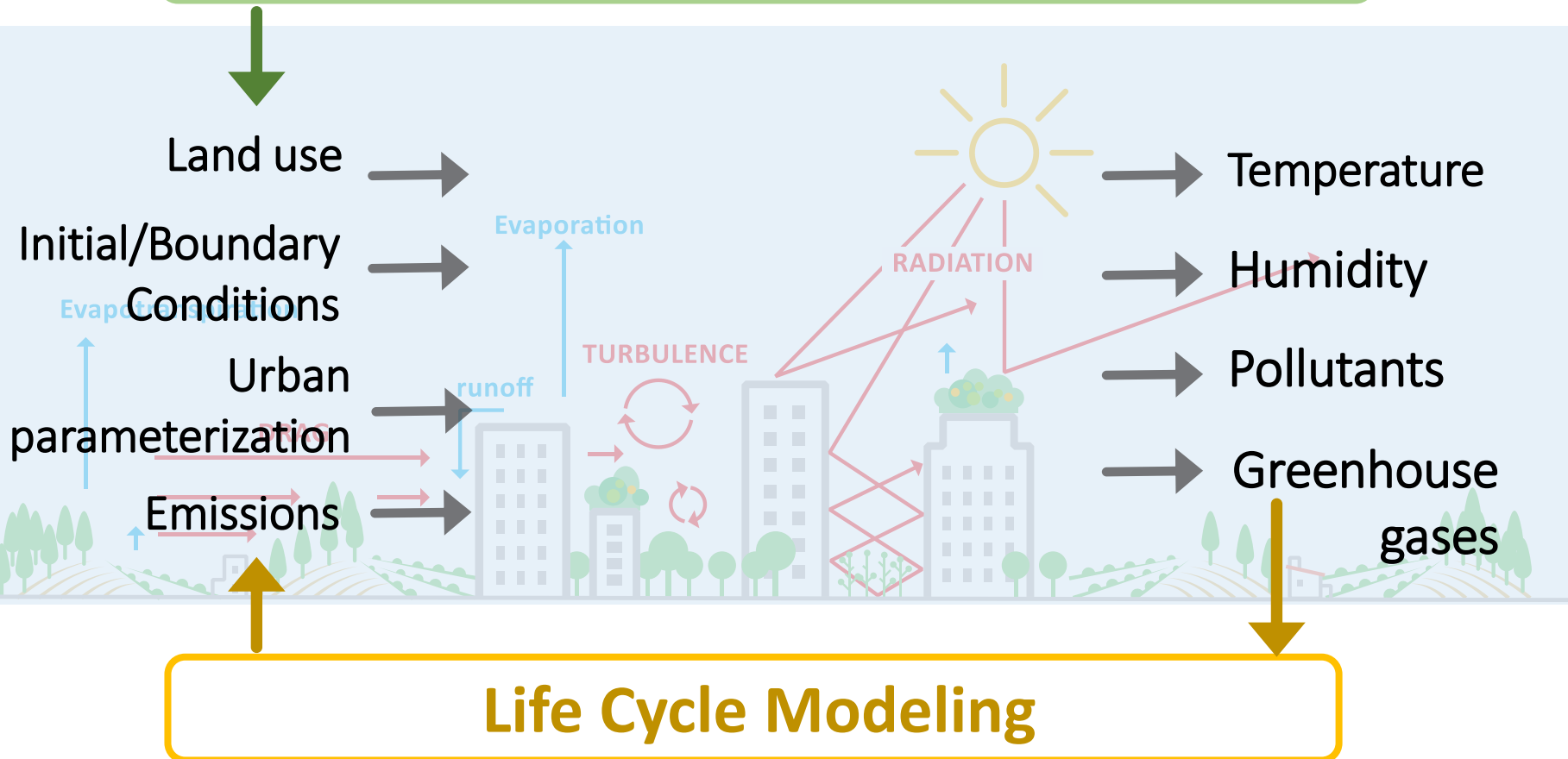


Integrate life cycle modeling with atmospheric modeling



Develop a spatially-temporally resolved framework for quantitative analysis and simulation of green infrastructures

Land use map



Integrated assessment of green infrastructure analysis

Urban planners
Policy makers
Public administration...



Policy and planning opportunities and constraints

Communication and research transfer strategy

Stakeholder workshops



Social benefits for surrounding communities

End-users, SMEs, Associations
Agency of Urban Services...



Life Cycle/Atmospheric Assessment

Agencies of climate change, biodiversity, waste management...

SGR - INTEGRATED EARTH SYSTEM DYNAMICS (IMPACTANT)

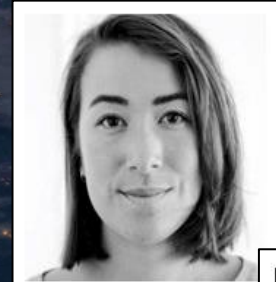
Coordinated by Dr. Eric Galbraith
eric.galbraith@uab.cat



Ian Hatton



Dan Zhu



Kim Scherrer



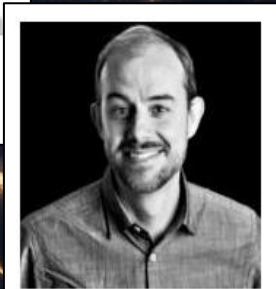
Sara Minarro



Priscilla LeMézo



Ryan Heneghan



Eric Galbraith

Interactions of climate, ocean biogeochemistry and marine animals

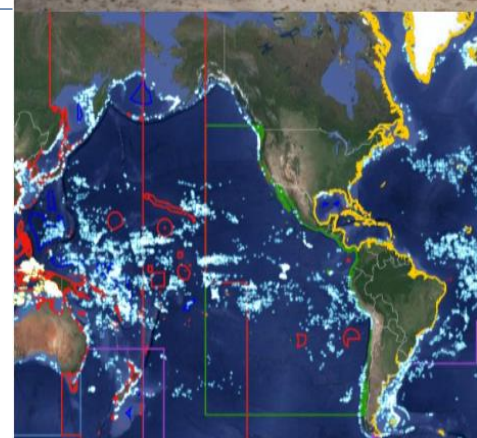
Marine heterotroph sizes range over many orders of magnitude, and most of the large sizes have been traditionally ignored by biogeochemists. We are developing simple theory, based on macroecological concepts, to build new quantitative estimates of how large animals may play an important role.

General framework for dynamic simulation of fishing effort, fishing fleets and management

The global wild capture fishery is a major source of food and employment for hundreds of millions of people. We are developing novel methods to simulate global fishing effort as an interactive component of Earth System models.

Environmental influences on observed changes in global fishing dynamics

Global datasets, including the Global Fishing Watch, RAM Legacy and Sea Around Us Project, provide unprecedented perspectives on global fishing and an opportunity to identify direct interactions with the ecosystem.



Predictability of subjective well-being

Many people would argue that human well-being should be our top concern. Can we predict this from simple principles, or from proxy variables, in a way that can be used for future projections? How can we quantify the differences in subjective well-being between non-industrialized and industrialized societies?

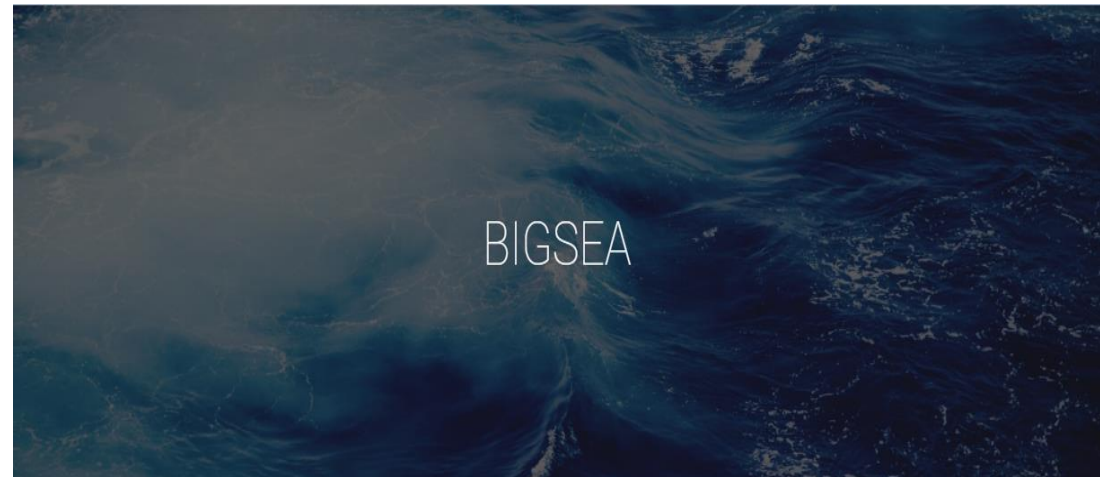
Whole ecosystem metabolism.

Ecosystems can be conceptualized as continuous size ranges of organisms, spanning from single cells to elephants or whales. This simplification turns out to provide very strong general predictions for energy consumption and temperature dependences, useful for global-scale models.



1. ERC- BIGSEA Project

BioGeochemistry and ecosystem interactions with Socio-Economic Activity in the global ocean





2. Land Atmosphere Oceans Lab - LAO

Led by JosepAnton Morguí

ClimaDat

Researchers



JosepAnton.Morgui@uab.cat



Roger.Curcoll@uab.cat



Carme.Estruch@uab.cat





climaDAT

A climate network of measuring stations from "la Caixa"

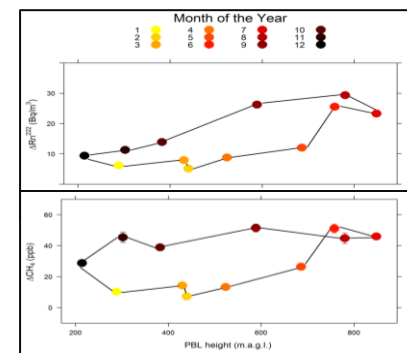
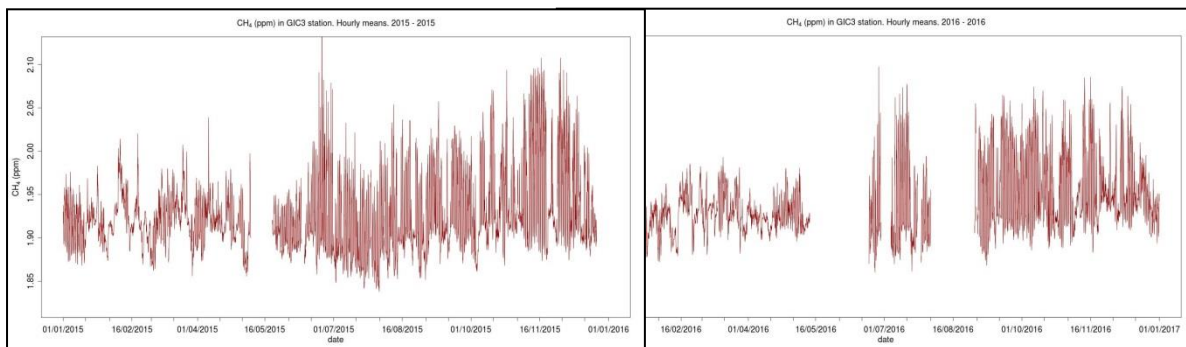
ClimaDat is a project devoted to obtain **CONTINUOUS** data of the main Greenhouse Gases (**CO₂**, **CH₄** and **N₂O**) with Universal **OPEN DATA ACCESS**, and its challenge is to obtain **NEAR REAL TIME** data in remote areas.

The ClimaDat stations are strategically placed over coastal and elevated sites across the Iberian peninsula allowing for the detection of atmospheric CO₂ and CH₄ anomalies

coming from **Subtropical, Mediterranean, Atlantic and Northern European regions**, as well as local sources.

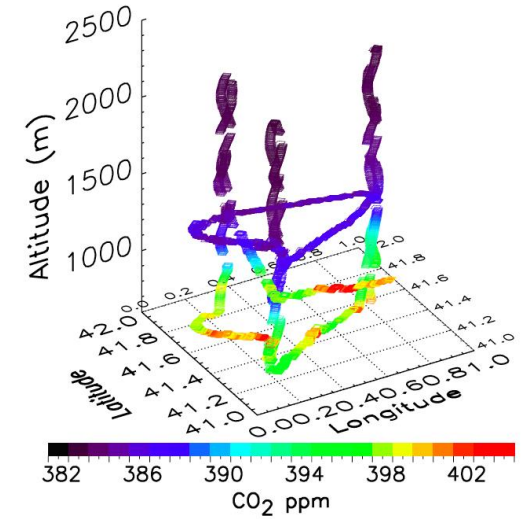
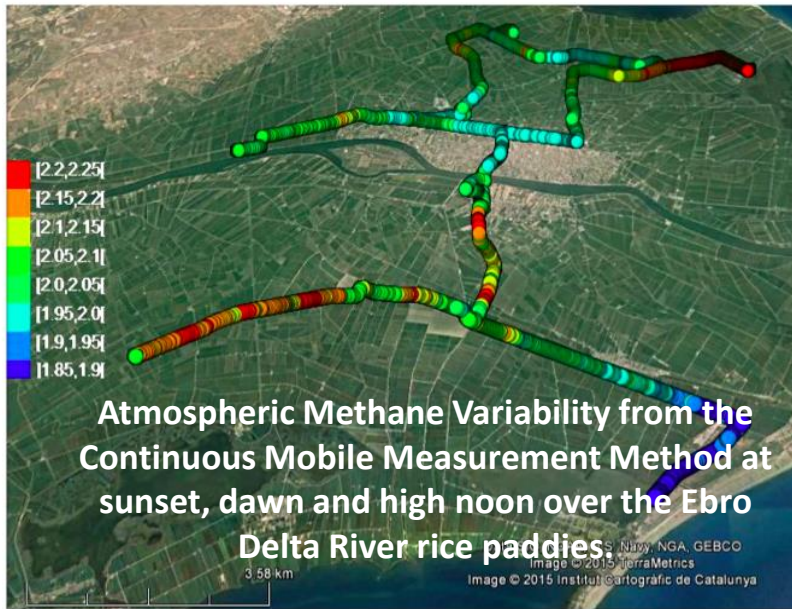
Atmospheric concentration measurements are based on both Cavity Ring-Down Spectroscopy and Gas Chromatography.

As the ClimaDat observations can be made available in near-real time, they can be used to support the evaluation of **the CO₂ and CH₄ forecasts of the Copernicus Atmosphere Monitoring System (CAM5) based on the ECMWF numerical weather forecast model.**

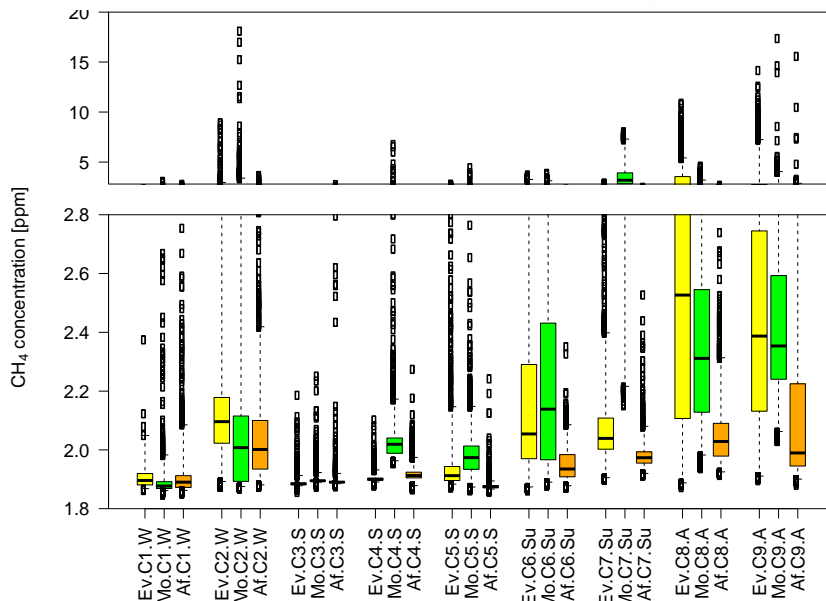


Working on emissions:

Use of ClimaDat data for understanding the effect of cow management (*Trashumancia*) over the seasonal cycle of Methane by the Atmospheric Radon Method at the Gredos ClimaDat station (Spain).



Multiple UAVs' flights design: Down-scaling the Crown Design





SGR – LABORATORY FOR THE ANALYSIS OF SOCIAL- ECOLOGICAL SYSTEMS IN A GLOBALIZED WORLD- (LASEG)



Group leaders

Victoria Reyes-García (Victoria.Reyes@uab.cat)

Esteve Corbera (Esteve.Corbera@uab.cat)

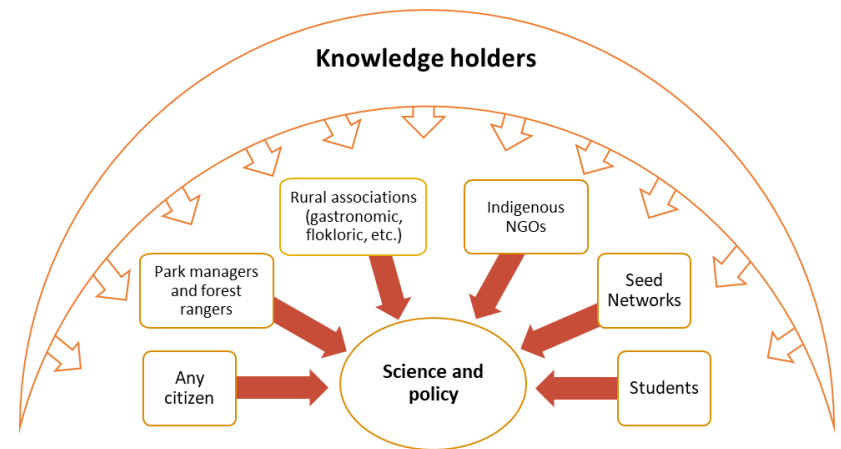




1. Indigenous and Local Knowledge

We investigate how Indigenous Peoples and local communities' knowledge is affected by environmental change and how such knowledge can contribute to understand environmental change impacts. Specifically, we:

- ✓ Examine the conditions under which traditional, local and indigenous knowledge systems can contribute to positive environmental outcomes;
- ✓ Show the potential of indigenous and local knowledge systems, as well as of citizen science, to improve our understanding of local climate change impacts on physical, biological, and socio-economic systems; how such impacts are locally perceived, and which strategies people adopt in their quest to adapt to real or perceived changes.



Illustrative projects: [LICCI](#), [CONNECT-e](#), [LEK](#)



2. Ecosystem Services

We study new policy and resource management approaches informed by the Ecosystem Services (ES) concept. These include payments and markets for ES, as well as the UN-REDD+ framework or “green infrastructure” in urban contexts. Specifically, we:

- ✓ Identify the human values attached to ES, the spatial and social distribution of their benefits, and assess trade-offs across ecosystem services and human well-being;
- ✓ Establish links between biocultural diversity and ES provision, with emphasis on peoples’ interactions with the urban and rural environment through the analysis of cultural ES;
- ✓ Assess the ecological effectiveness and social and environmental justice implications of policies and instruments, and management options informed by the ES framework in urban, peri-urban and rural areas.

Illustrative projects: [URBES](#); [OPENNESS](#); [ENABLE](#); [NATURVATION](#); [STACCATO](#); [ESPA-Poverty](#)





3. Environmental Governance & Conservation

We analyze environmental governance processes in the areas of climate change and the conservation of biodiversity, from international to national and local levels. Specifically, we:

- ✓ Identify the actors who -with varying degrees of power and access to institutions and resources- participate in environmental governance initiatives, and explore the potential for collective action, conflict or cooperation in such initiatives;
- ✓ Scrutinize the political, social, behavioral and ecological conditions that influence the success of climate change mitigation and adaptation, biodiversity conservation and sustainable land-use management initiatives, with special emphasis on justice, poverty and wellbeing considerations.

Illustrative projects: [INVALUABLE](#); [MPINGO-REDD](#); [COMBIOSERVE](#); [ESPA–Agriculture](#); [NSF–Habitat](#); [COCOOR](#); [HERICCA](#)

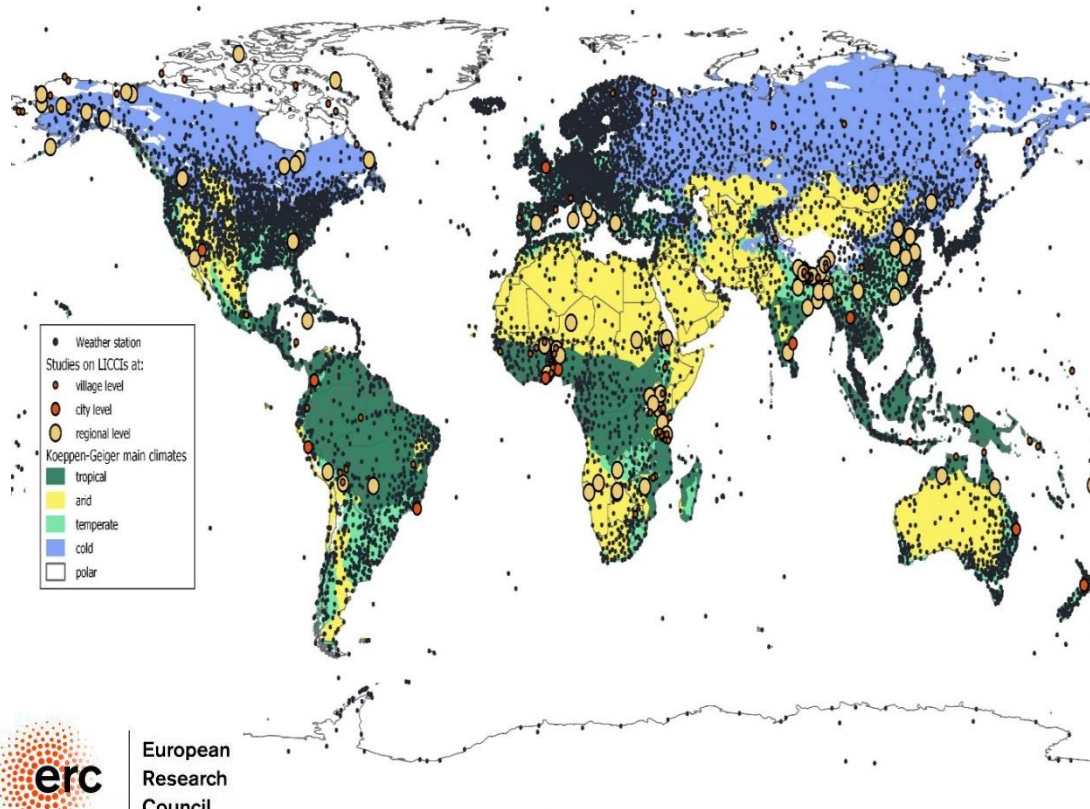




4. Local Indicators Of Climate Change Impacts - LICCI

ERC Consolidator Grant - Led by Victoria Reyes-García

Indigenous and local knowledge contribution to the understanding of climate change impacts



- Evidence from climate change impacts **mostly focuses on global models and big data analysis**, which are too coarse to capture the local specificities of climate change impacts.
- **Indigenous and local knowledge is an unexplored data source** with untapped potential to contribute to our understanding of local climate change impacts



LICCI project aims to:

- deepen our understandings of the spatial, socio-economic, and demographic patterns regarding locally observed climate change impacts
- bring insights of indigenous and local knowledge to international climate change negotiations
- create a wide network of researchers, practitioners, and general public interested in local knowledge and climate change.

LICCI
Local Indicators of Climate Change Impacts

The Contribution of Local Knowledge to Climate Change Research
<https://licci.eu>

erc
European Research Council

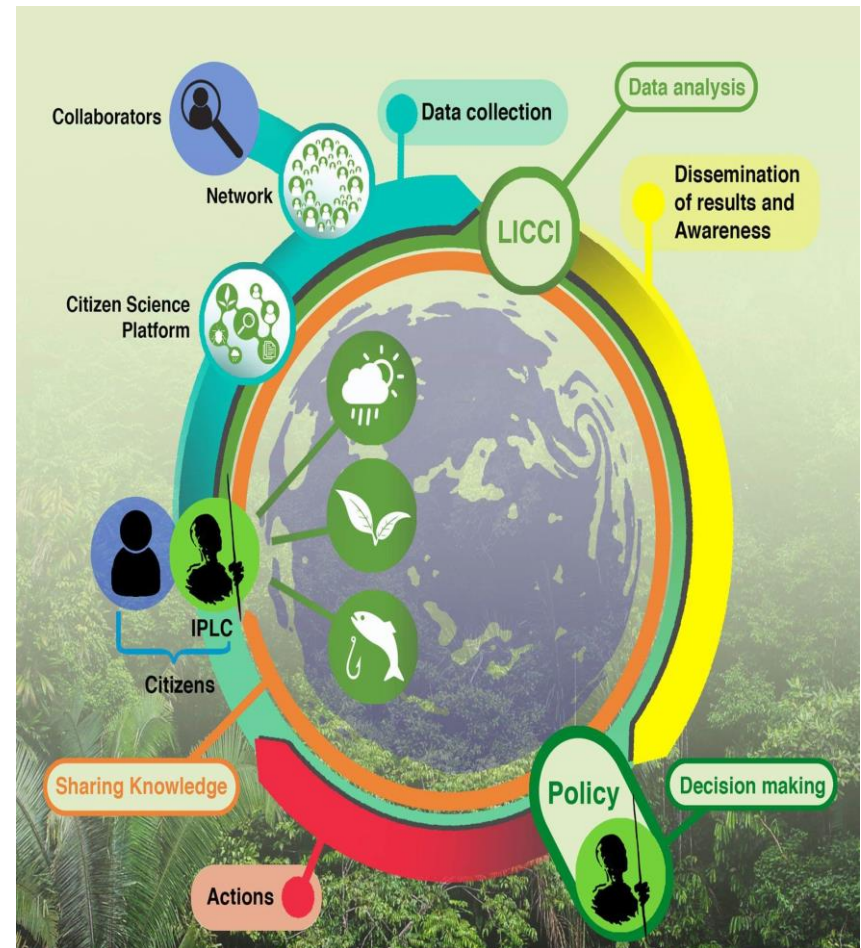
ICTA
Institut de Ciència i Tecnologia Ambiental
ICTA-UAB

UAB
Universitat Autònoma de Barcelona



The research strategy

- The LICCI team is creating an **inventory of local indicators of climate change impacts** based on Indigenous and local communities' knowledge
- We rely on the **collaboration of 40 researchers** who will collect data along the world's climatic regions
- Data will be collected in a **web-based citizen science platform**. Through this platform any interested citizen will be able to contribute information on local indicators of climate change impacts
- Local observations of climate change impacts will be brought to **climate change research and policy fora**





PhD Program in Environment Science & Technology

Coordinator

- **Adriana Artola**

adriana.artola@uab.cat

Academic Commission of the PhD Program

- Juan Antonio Baeza (Environmental Technology)
- Victoria Reyes (Global and Climate Change)
- Maria Rosa Rovira (Ecological Economics)
- Gara Villalba (Industrial Ecology)
- Antoni Rosell (Global and Climate Change)

Main objective

- To develop an original and innovative Research Project that will constitute your PhD Thesis.
- To achieve this goal, PhD student must be integrated in a research group or research line which make up the PhD program.





- There are not regulated courses during PhD program but student must follow training activities (mandatory & optional)

Features



- Verification according to RD 99/2011: favorable (AGAUR 2012)
- Mention to Excellence: favorable (ANECA_2011)



Strengths

- Entrance: **good** (25-30 new students/course)
- Research curriculum of the professors: **very good.**
- Relationship PhD students / professors: **very adequate.**
- Percentage of students funded: **very high.**
- Scientific yield of the Doctoral Theses: **very high.**
- Percentage of students with mobility: **high.**



Industrial and urban ecology

- Environmental sustainability and prevention applied to industrial, urban and rural systems.



Ecological economics

- Water management, territory and sustainability
- Integrated environmental assessment and social metabolism





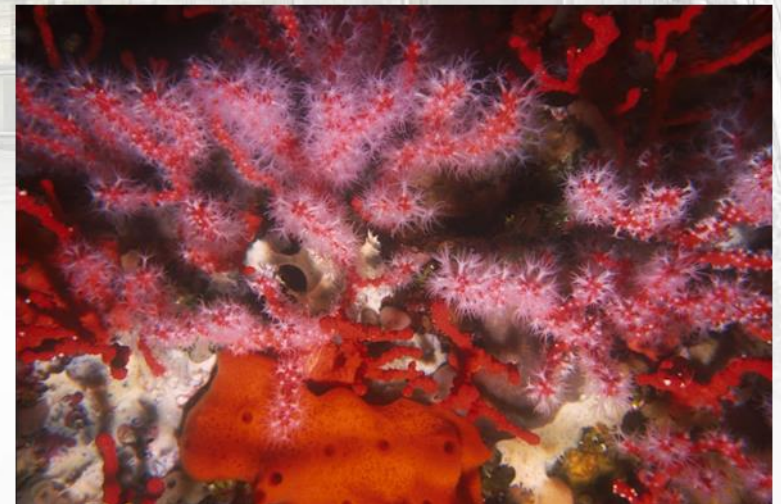
Technology

- Composting of solid organic waste
- Industrial pollutants' biodegradation and waste recovery
- Biological treatment of wastewater and gaseous waste



Climate Change

- Ocean and climate processes study
- Aerobiology and aeroallergens, atmospheric and temporal dynamics
- Ethnoecology and conservation of the biology



1 Edu-BioMed Project- Capacity Building for Education and Applied Research in Mediterranean Biosphere Reserves

Objective

Strengthen, ameliorate and upgrade the academic activity at four Moroccan and Lebanese Higher Education Institutions (HEIs) in the context of Mediterranean Biosphere Reserves (BRs), in collaboration and through networking with BRs' stakeholders (citizens, visitors, managers and technicians), public administrations and EU Partners.

6 Universities

2 NGOs

1 Association of Universities

3 Governmental Organizations

8 Biosphere Reserves

> 100 people involved



P1. UAB. Universitat Autònoma de Barcelona
 P2. AMU. Aix-Marseille University
 P3. AUB. American University of Beirut
 P4. USJ. Université Saint Joseph

P5. UCA. Université Cadi Ayyad
 P6. UM5. Université Mohammed V Rabat
 P7. MABFr. MAB France
 P8. APJM. Association for the Protection of Jabal Moussa
 P9. UNIMED. Mediterranean Universities Union



2. Master's Degree in Political Ecology, Degrowth and Environmental Justice

Objectives

Develop a critical thinking about the main drivers behind the political, economic and social processes:

- Acquire general and specific knowledge related to the main social and environmental challenges that our society is currently facing and of the alternative paths emerging from degrowth and environmental justice movements.
- Learn to analyze, confront and integrate the pieces of complex socioeconomic systems, such as the interrelated dimensions of scarcity of resources, economic stability, human well-being and social justice
- Integration of theoretical knowledge with practical skills in order to better bridge academic and activist knowledge on degrowth and environmental justice.
- Acquire the necessary professional skills to fully integrate into the academy or to become a professional prepared to work in the Social and Solidarity Economy, public administration, environmental justice organizations, think tanks and consultancies.

Places: 35
60 ECTS



3 Graduate Diploma in Promoting Agroecological Farming at the Local Level

Objectives

- Offer students a broad base (both theoretical and practical) about agroecology in general and its applications in rural, periurban and urban regions of contemporary societies.
- Understand the reality of Local Agroecological Boom in Catalonia and in Spain: from its history to challenges for the future and the current situation.
- Analyse the planning, development and management of Local Agroecological Revitalization in all its areas: political, strategic and organisational.
- Offer tools to participants to take Local Agroecological Revitalisation initiatives .
- Understand the public policies, emerging sectors and ways of facing future challenges in the sector (financing, forms of growth, innovation, participation, etc.) using real case studies.
- Prepare participants for producing studies and research on the rural and perirural environments.



Institut de Ciència i Tecnologia Ambientals (ICTA-UAB)

An interdisciplinary centre
that promotes academic
research and
postgraduate **education**
on environmental
sciences

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