bc³

BASQUE CENTRE
FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

**Sustainability, that's it!**

# ACTIVITY REPORT 2017

# Ø. CONTENTS

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# 1. INTRODUCTION

As recognized globally by the 2015 Agreement of the UNFCCC, known as the Paris Agreement, climate change represents one of the greatest environmental, social and economic threats humanity has ever faced. Its long-term nature, the uncertainty about future impacts, and the ethical responsibilities associated with the unequal distribution of its causes and consequences, as well as the different capacities to address it across societies, will make decisions by policy makers very challenging in the coming years. Private and public sectors, including governments, corporations and civil society, will have to choose between many, intertwined but often conflicting, priorities and objectives (economic, social, cultural, security,etc.) to which climate change adds even more complexity and uncertainty.

So far, research has played an important role showing the current and future implications of global warming due to greenhouse gas (GHG), emissions and other interrelated global environmental problems (e.g., deforestation, biodiversity loss, ocean acidification, water and air pollution, etc.). Now, following the Paris Agreement, the challenge for organisations like BC3 is not only to raise awareness of the dire consequences of climate change, but also to contribute with science to find suitable solutions, as well as to help with the design and implementation of policies that can lead to sustainability.

In such context, despite continuing to increase our knowledge of the climate system and its responses to Anthropogenic changes and natural variability, the key issue is to create innovative approaches to help decision makers, by proposing and supporting the testing and demonstration of scalable solutions, and providing the basis for evaluating the impact and effectiveness of different policy measures.

So far, our experience on the ground clearly indicates that local values and contexts matter, and that potential top-down solutions need to be matched with a diversity of bottom-up approaches across sectors to achieve cost-effective and fair solutions. This implies that all levels of governance (local, regional national and international) need to be closely involved in acting in the face of climate change, while better integrating the efforts by public and private sectors as well as by civil society in general.

Since our inception in 2008, in BC3 we have  worked for achieving excellence in research on core aspects of climate change, related to its physical, ecological to the socio-economic aspects. With this aim, we have focused ourselves throughout the years  on addressing the climate change milestones that have defined the last decade of climate change multilateral negotiations: 2008-2012 first strategy after the Bali Action Plan (COP13, 2007); 2013-2017 strategic framework after UNFCCC in Durban (COP17, 2011), where a universal legal agreement was sought by 2015; and finally, 2018-2021 strategy that responds to the challenges after the Paris Agreement (COP21, 2015).

During  2017, our focus  has been on the development of BC3's new strategy for the 2018-2021 period, based on a participatory process.

With a growing team, 51 people in 2017, we were also increasingly successful in obtaining funds from competitive calls in Spain, the European Union and even more widely, and nearly 64% of our funding came from such sources. This is a key indicator for us, as it represents our capacity to compete in the Science Environment, but there are many others as this Activity Report compiles. Thus, in 2017 we took into account numerous contributions that illustrate the wide impact of our work principally in scientific journals. We produced 73 articles, as well as 2 books and 15 chapters.

At the same time, mindful of the fact that a research centre working in the socio-economic domain of a problem such as climate change, has a responsibility to be relevant, we participated in major fora, including the annual Conference of Parties to the Framework Convention on Climate Change. We also contributed to the important Intergovernmental Panel for Climate Change (IPCC), and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which brings together the state of knowledge on research on climate and makes it accessible to policymakers. Last but not least, we prepared policy briefs and presentations for various governments.

Such work may only be done successful if fully integrated into the network of research centres working on the same topic, and to this end, in 2017 we continued developing collaborative agreements with institutions all over the world, and engaged with highly recognized scientific multidisciplinary teams and institutions. There is strength in numbers.

As for the future, we will develop our mission further, emphasizing the bridging of scales and scientific languages to support policy- and decision-making in economically efficient and socially equitable ways. And we will do it with the passion and commitment that characterizes us.

# 2. THE CENTRE

## 2.1 PRESENTATION OF THE CENTRE

BC3 (Basque Centre for Climate Change) is an excellence research centre that contributes to long-term research on the causes and consequences of climate change. Our main goal is to foster the creation of knowledge in this multidisciplinary science, as well as to engage a highly-qualified team of researchers with the primary objective of achieving excellence in research, training and dissemination.

Our Centre was created in 2008 jointly by the Basque Government and the Basque University, under the so-called BERC programme (Basque Excellence Research Centres), with the aim of focusing on the socio-economic aspects of climate change, within an interdisciplinary framework that includes both natural and social sciences.

At BC3, we are currently among the few centres in Europe specialized in this field, where we already count with a strong reputation. Therefore, as a world-class climate change research centre, we address the socio-economic implications of global climate change, contributing to decision-making at Basque, Spanish, and International level from an integrated perspective.

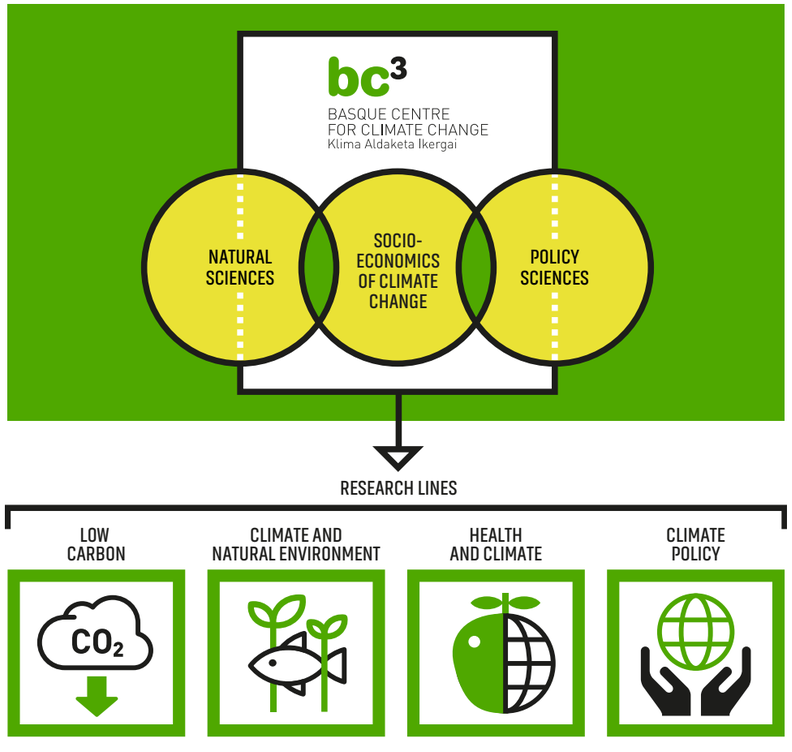
Our research lines fall broadly into the following groups:

- **LOW CARBON**
- **CLIMATE AND NATURAL ENVIRONMENT**
- **HEALTH AND CLIMATE**
- **CLIMATE POLICY**

The Strategic objectives that underlie the BC3 strategic plan, support the centre's vision and focus on its aspiration: To be a world-class climate change research centre aimed at informing decision-making at the Basque, Spanish, and international level by integrating natural and social sciences to address the socio-economic implications of global climate change.

### BC3 STRATEGIC OBJETIVES:

- **SO1.** To develop an excellence–based, innovative and multidisciplinary Climate Change research programme.
- **SO2.** To participate and develop high-level training programmes on Climate Change.
- **SO3.** To contribute to increase local/national/international development and citizens standard of living by Climate Change knowledge transfer to society.
- **SO4.** To promote collaboration and cooperation with Governments, universities, research centres, technology centres, social agents and companies at local, national and international level.
- **SO5.** To implement an excellence-based Financial and People Management in order to attract funding and top-ranking talents.



# 2.2 PARTNERS

We are a non-profit association formed by the following associate members:

ikerbasque
Basque Foundation for Science

eman ta zabal zazu
Universidad del País Vasco
Euskal Herriko Unibertsitatea

ihobe

# 2.3 MISSION - VISION

## MISSION

The BC3 is a Research Centre based in the Basque Country, which aims to contribute to long-term research on the causes and consequences of climate change, in order to foster the creation of knowledge in this multidisciplinary science.

We seek to prepare a highly qualified team of researchers with the primary objective of achieving excellence in research, training and dissemination.

It is our goal that our methods and analytical tools allow to widen the frontiers of human scientific knowledge, making our organisation a worldwide benchmark on climate change research.

## VISION

To be a world-class climate change research centre aimed at informing decision-making at the Basque, Spanish, and international level by integrating natural and social sciences to address the socio-economic implications of global climate change.

This synergy is realized through our research on low carbon transitions, natural environment and ecosystem services, health, economics and policy.

# 2.4 INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE

The International Scientific Advisory Committee (ISAC) is a consultative body of independent experts created to provide advisory opinions and analysis on science to our centre. Its remit includes matters concerning research program and general strategy. Members are appointed for four years, as independent scientific experts on the basis of their specific skills, abilities, experience and knowledge.

The ISAC met on the 1st of June 2017 at BC3 premises to asess the institution's 2017 performance.

The following members compose the current committee:

## ISAC MEMBERS:

### Neil Adger
PROFESSOR OF HUMAN GEOGRAPHY
—
University of Exeter (UK)

### Valentina Bosetti
ASSOCIATE PROFESSOR OF ECONOMICS
—
Bocconi University (Italy)

### Teresa Ribera
DIRECTOR
—
Institute for Sustainable Development and International Relations - IDDRI (France)

### Pete Smith
PROFESSOR OF SOILS & GLOBAL CHANGE
—
University of Aberdeen (UK)

### Reinhard Mechler
DEPUTY DIRECTOR OF "RISK, POLICY, VULNERABILITY"
—
International Institute for Applied Systems Analysis - IIASA (Austria)

### Iñigo Losada
DIRECTOR OF RESEARCH
—
Environmental Hydraulics Institute – IHCantabria (Spain)

# 2.5 BC3 TEAM | 2.5.1 Statistics

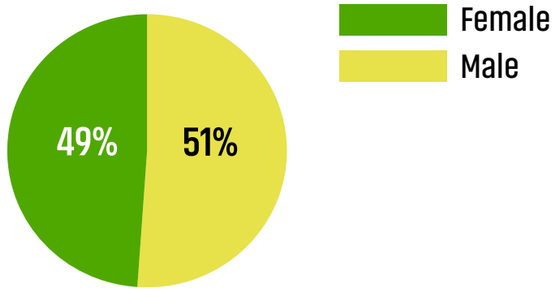
## BC3 TEAM DISTRIBUTION BY POSITION

| | |
|---|---|
| **TOTAL BC3 TEAM** | **51** |
| **SCIENTIFIC DIRECTOR** | **1** |
| **RESEARCHERS** | **45** |
| Research Professors | 12 |
| Research Fellows | 2 |
| Post Doc Researchers | 17 |
| PhD Students | 14 |
| **ADMINISTRATION TEAM** | **5** |
| Operation Manager | 1 |
| Project Manager Outreach | 1 |
| Project Officer | 2 |
| Management Assistant | 1 |

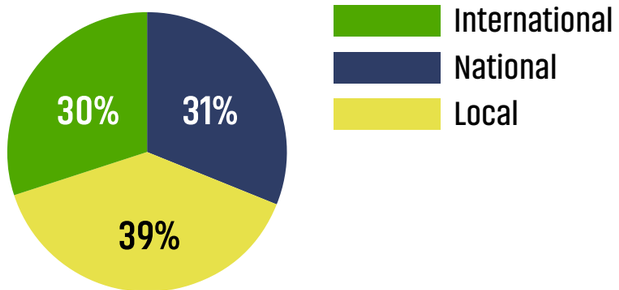
* BC3 team members at 31st of December 2017.
** 8 of the BC3 researchers were IKERBASQUE researchers (7 Ikerbasque Prof and 1 Ikerbasque Research Fellow)
*** 2 of the Ikerbasque Researchers were also *Ramon y Cajal* researchers.

## BC3 TEAM DISTRIBUTION BY GENDER AND NATIONALITY

### Distribution by gender




### Distribution by nationality




As mentioned before, another key aspect for our consolidation as a research center of international relevance is the talent retention based on the HR Excellence principles. Such process pivots on the following axes of action:

- **EFFECTIVE AND INNOVATIVE PROCESSES AND ORGANIZATION**
- **EXCELLENT INFRASTRUCTURE AND LOCATION**
- **CONNECTIONS TO LEADING CLIMATE CHANGE CENTRES WORLDWIDE**
- **TRAINING**
- **EMPLOYEE SATISFACTION PROGRAM**

Moreover, 4 calls linked to research projects were published in 2017 for the recruitment of staff in open calls. In total, 132 applications were received and 3 Juan de la Cierva and 2 Basque Government Post Doctoral Fellows were finally granted.

In addition, all throughout 2017, we had 19 guest researchers on short or medium-term internships.

# 2.5 BC3 TEAM | 2.5.2 BC3 Team

## RESEARCHERS - I

For more information, visit our website.

**RESEARCH LINES:**

LOW CARBON · NATURAL ENVIRONMENT · HEALTH AND CLIMATE · CLIMATE POLICY

### María José Sanz
SCIENTIFIC DIRECTOR.
IKERBASQUE PROFESSOR

### Anil Markandya
IKERBASQUE DISTINGUISHED PROFESSOR AND FORMER SCIENTIFIC DIRECTOR

### Ferdinando Villa
IKERBASQUE
RESEARCH PROFESSOR

### Unai Pascual
IKERBASQUE
RESEARCH PROFESSOR

### Sérgio H. Faria
IKERBASQUE
RESEARCH PROFESSOR

### Marc Neumann
IKERBASQUE
RESEARCH PROFESSOR

### Jorge Curiel
RESEARCH
PROFESSOR

### Aline Chiabai
RESEARCH
PROFESSOR

### Ibon Galarraga
RESEARCH
PROFESSOR

### Mikel González-Eguino
RESEARCH
PROFESSOR

### Luis María Abadie
RESEARCH
PROFESSOR

### Agustín Del Prado
RESEARCH
PROFESSOR

### Iñaki Arto
RESEARCH
PROFESSOR

### David Moreno
IKERBASQUE
RESEARCH FELLOW

### Stefano Balbi
RESEARCH
FELLOW

### Sebastien Foudi
POSTDOCTORAL
RESEARCHER

**RESEARCH LINES:**

LOW CARBON | NATURAL ENVIRONMENT | HEALTH AND CLIMATE | CLIMATE POLICY

# RESEARCHERS - II

For more information, visit our website.

## Marta Olazabal
POSTDOCTORAL RESEARCHER

## Amaia de Ayala
POST DOCTORAL RESEARCHER

## Josue Polanco
POST DOCTORAL RESEARCHER

## Ignacio Palomo
POST DOCTORAL RESEARCHER

## Ignacio Cazcarro
POST DOCTORAL RESEARCHER

## Elena Galán
POST DOCTORAL RESEARCHER

## Javier Martínez
POST DOCTORAL RESEARCHER

## Elisa Sainz de Murieta
POST DOCTORAL RESEARCHER

## Guillermo Pardo
POST DOCTORAL RESEARCHER

## Silvestre García
POST DOCTORAL RESEARCHER

## Alevgul Sorman
POST DOCTORAL RESEARCHER

## Noelia Zafra
POST DOCTORAL RESEARCHER

## Xoaquin García
POST DOCTORAL RESEARCHER

## María Almagro
POST DOCTORAL RESEARCHER

## Ainhoa Magrach
POST DOCTORAL RESEARCHER

## Amaia Albizua
POST DOCTORAL RESEARCHER

**RESEARCH LINES:** LOW CARBON · NATURAL ENVIRONMENT · HEALTH AND CLIMATE · CLIMATE POLICY

# RESEARCHERS - III

For more information, visit our website.

## Alina Tepes
JUNIOR RESEARCHER - PHD STUDENT

## Laetitia Pettinotti
JUNIOR RESEARCHER - PHD STUDENT

## Jon Sampedro
JUNIOR RESEARCHER - PHD STUDENT

## Dirk Jan Van de Ven
JUNIOR RESEARCHER - PHD STUDENT

## Ambika Markanday
JUNIOR RESEARCHER - PHD STUDENT

## Bosco Lliso
JUNIOR RESEARCHER - PHD STUDENT

## Asun Rodríguez
JUNIOR RESEARCHER - PHD STUDENT

## Iratxe Rubio
JUNIOR RESEARCHER - PHD STUDENT

## Asma Jebari
JUNIOR RESEARCHER - PHD STUDENT

## Elena López
JUNIOR RESEARCHER - PHD STUDENT

## Alessandro Silvestri
JUNIOR RESEARCHER - PHD STUDENT

## María del Mar Solá
JUNIOR RESEARCHER - PHD STUDENT

## Itxaso Ruiz
JUNIOR RESEARCHER - Research Assistant

## June Hidalgo
JUNIOR RESEARCHER - Research Assistant

# ADMINISTRATION STAFF

For more information, visit our website.

**Nerea Ortiz**
OPERATION MANAGER

**Susana Pérez**
MANAGEMENT ASSISTANT

**Ainhoa Azkarate**
OUTREACH MANAGER

**Silvia de Luis**
PROJECT OFFICER

**Irune Vegas**
PROJECT OFFICER

# 2.5 BC3 TEAM | 2.5.3 HR Excellence in Research

HR EXCELLENCE IN RESEARCH

In April 2015, after a thorough analysis of our human resources policies, the European Commission awarded BC3 with the HR EXCELLENCE IN RESEARCH, in recognition to our commitment with the 40 principles defined in the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

More specifically, the "European Charter for Researchers" outlines the roles, responsibilities and rights of researchers and their employers. The aim is to ensure that the relationship between these parties contributes to the successful achievement of the generation, dissemination and exchange of knowledge, as well as to the professional development of researchers from the early stages of their careers.

The implementation of the Charter & Code was meant to improve our performance in talent attraction, making of us an even more attractive destination for researchers in the coming years, as it ensures, among others, that our selection procedures are fair and transparent. The Charter & Code also provides information about our working environment and development possibilities, as we not only evaluate researcher's performance based on publication production criteria but also based on other evaluation criteria such as education and training, supervision, teamwork, knowledge transfer and public awareness and management activities.

The European Commission adopted the European Charter for Researchers and the Code for their Recruitment, drafting two documents directed to researchers, employers and providers of public and private sector funding. Both documents have become key elements of the European Union's policy, making research an attractive career and stimulating economic growth and employment in the continent.

In early 2017, BC3 underwent the self assessment process for reviewing and improving the previous Action Plan, and actually the centre continues working on the principles and maintains its commitment with the Charter and Code and the HRS4R, as part of our strategy for the upcoming years. Thus, recently BC3 started a new Strategy period of four years (2018 – 2021) and the New Action Plan (2017) is included in this challenge.

As member of the 6th cohort of organisations involved in the development of HRS4R, BC3 also analysed, assessed and integrated the recommendations and principles of OTM-R into the internal recruitment policies. The result is the current BC3´s Otm-r Policy dated in November 2017.

# 3. RESEARCH

## 3.1 RESEARCH LINES | 3.1.1 Low Carbon

### OBJECTIVES OF THE RESEARCH LINE

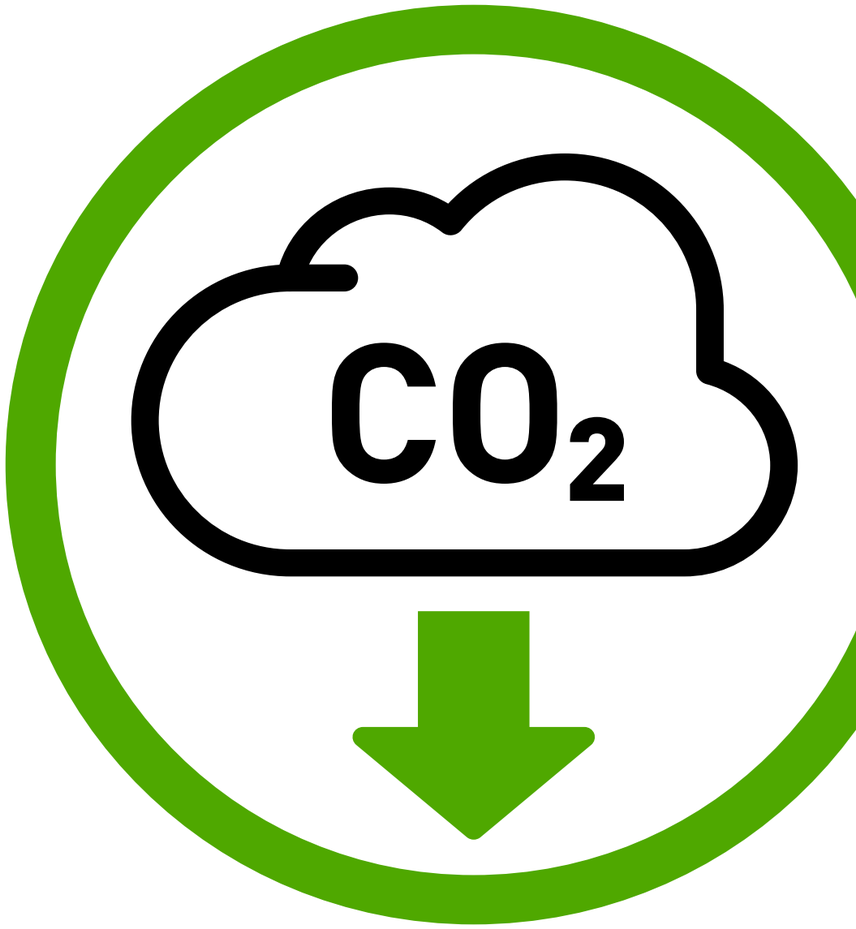
The "Low Carbon" (LC) research line deals with the implications of the transition to a low carbon economy. The major source of carbon emissions is the production and consumption of energy and a great deal of our effort at BC3 is devoted to understand how to reduce emissions without unduly affecting economic and social wellbeing, especially among the most vulnerable people.

This line has been very active over the last years, contributing to many different areas. As an overview, our research covers the transition to a low carbon economy from the micro level (for example, the decision of a firm or consumer to invest in energy efficiency or not) to the global level (such as the implications of different climate agreements). We analyse the economic implications of climate policies (including distributional impacts) and their impact on households, economic sectors and regions. The interrelations and interactions of climate policies with energy, economy, the environment, land use, trade and health policies are also explored, building strong links between our work and our other research lines.

The methodologies applied are very diverse:

- Real option theory and models: used to analyse optimal investments by considering the existing uncertainty in the price of commodities.
- Energy-system models: used to understand in a better way the implications of the transition to a low-carbon economy in some key sectors, such as power.
- Input-Output and CGE models: used to analyse the energy-economy-environment (E3) implications of policies that have economy-wide effects at regional, national and global levels.

Finally, we also explore the interrelations between the economy and the climate system, using Integrated Assessment models (DICER and GCAM-BC3) to analyse different issues related to climate policy, such as the implications of different climate agreements for the energy system and the optimal climate policy considering different estimations for damage functions. Other applications include the consequences of climate policies and scenarios in terms of costs, global temperature change and sea level rise. All these tools are in constant development, enabling us to quantitatively explore the full implications of a low-carbon transition and effectively support decision-making processes.



# 3.1 RESEARCH LINES | 3.1.1 Low Carbon

## 2017 RESEARCH IN ACTION: TOPICS

Co-benefits of low carbon transitions: looks at the health and other co-benefits of transition to low carbon in selected cities in Europe, India and China.

The economics of fuel industries in a carbon constrained world: deepens in energy economics and climate change research to help deliver a low carbon future.

Forward-looking methodologies to analyse societal challenges in the area of energy: reviews the performance of forward-looking models to assess grand societal challenges related to energy and develop methods to improve their applicability.

New modelling tools for managing step-change dynamics by working across a wide range of spatio-temporal scales, and integrating the knowledge of many stakeholder communities: develops complex systems in which causal relations are variant over time (as opposed to simple systems where causality is fixed). The approach is used to create tools that are more applicable to decision-making the changing social and technological structures that emerge as we move to a different economic structure.

The role of Migration as an Adaptation and its policy implications: the purpose of the research is to assess the economic impacts of climate change in Delta areas. Impacts of flexibility on biofuels policy: assess the impacts of giving more flexibility to EU´S biofuels policy.

Impacts of flexibility on biofuels policy: assess the impacts of giving more flexibility to EU's biofuels policy.

## SOME ACCOMPLISHMENTS

We supported decision making in the transition to a low carbon society trough the engagement with stakeholders in the design, communication, implementation and evaluation of specific actions and solutions.

We helped to strengthen the interdisciplinary character of policy assessments with a multidisciplinary approach to asses mitigation polices taking into account not only the technological, economic and financial dimensions, but also other relevant social and environmental aspects.

We assessed the co-benefits and risks of low carbon transitions, such as those related health, job creation or land-use changes.

We developed methodologies to analyse societal implications of policies and its distributional implications, in order to improve their acceptability and applicability.

We developed new modelling tools for managing step-change dynamics by working across a wide range of spatio-temporal scales, and integrating the knowledge of many stakeholder communities different economic structure.

We improved the capacities in quantitative and qualitative tools and models for carrying out state-of-the-art research on the implications (climatic, macroeconomic, distributive and microeconomic) of different policies (energy, climate, soil, health) at different levels (global, regional, national and sub-national).

## SOME HIGHLIGHTED OUTPUTS


- González-Eguino, M., M. B. Neumann, I. Arto, I. Capellán-Pérez, and S. H. Faria, (2017), **Mitigation implications of an ice-free summer in the Arctic Ocean, Earth's Future, 5: 59–66** (Environmental Science Q1, IF2016=4.938) doi:10.1002/2016EF000429
- García-Muros, X.; Markandya, A; Romero-Jordán, D. and González-Eguino, M. (2017) **The distributional effects of carbon-based food taxes, Journal of Cleaner Production** 140, 2, 1 996–1006
- González-Eguino, M., Capellán-Pérez, I., Arto, I., Ansuategi, A., Markandya, A. (2017): **Industrial and terrestrial carbon leakage under climate policy fragmentation, Climate Policy**
- Van de Ven, D. J., & Fouquet, R. (2017). **Historical energy price shocks and their changing effects on the economy**. Energy Economics, 62, 204-216.
- Böhringer, C., García-Muros, X., Cazcarro, I. and Arto, I. (2017): **The Efficiency Cost of Protective Measures in Climate Policy**. Energy Policy 104. 446-454. DOI (10.1016/j.enpol.2017.01.007)
- Kovacic, Z., Spanò, M., Piano, S.L. and Sorman, A.H., 2017. **Finance, energy and the decoupling: an empirical study**. Journal of Evolutionary Economics, pp.1-26.


## MAIN COLLABORATORS

- UPV/EHU
- IPTS (Spain)
- KTH Royal Institute of Technology, Environmental Humanities Lab (Sweden)
- ISPRA (Italy)
- University of Oldenburg (Germany)

## MAIN RESEARCH PROJECTS

- TRANSRISK (EU H2020)
- CONSEED (EU H2020)
- TALES (IPTS Project)
- ENABLE (EU H2020)
- DECCMA (CARIAA)

## RESEARCH APPLICATION IN THE BASQUE COUNTRY

BC3 often uses the Basque Country as a case study to offer Basque policy-makers state-of-the-art knowledge in its progress towards a low carbon economy. In this vein, we work in different areas such as the improvement of the design of the market-based instruments for energy efficiency promotion, comparisons of different schemes of taxes and subsidies or combinations of both, and evaluation of policies with standard economic tools, as well as with new approaches from behavioural and experimental economics.

# 3.1 RESEARCH LINES | 3.1.2 Climate and Natural Environment

## OBJECTIVES OF THE RESEARCH LINE

Climate change has complex impacts on human well-being. In this research line BC3 is concerned with the scientific study of the interplay between climate change and the environment. We address the interlinkages between climate change, natural capital (natural resources and ecosystems), and the benefits that derive from them in terms of human well-being. The Natural Environment Research Line focuses on both, the role of natural capital assets (stocks of natural resources) and the flows of the benefits that derive through their management (ecosystem services), and the ways they interact with climate change. It therefore includes two related areas of research:

- **Natural Resources** (NR)
- **Ecosystem Services** (ES).

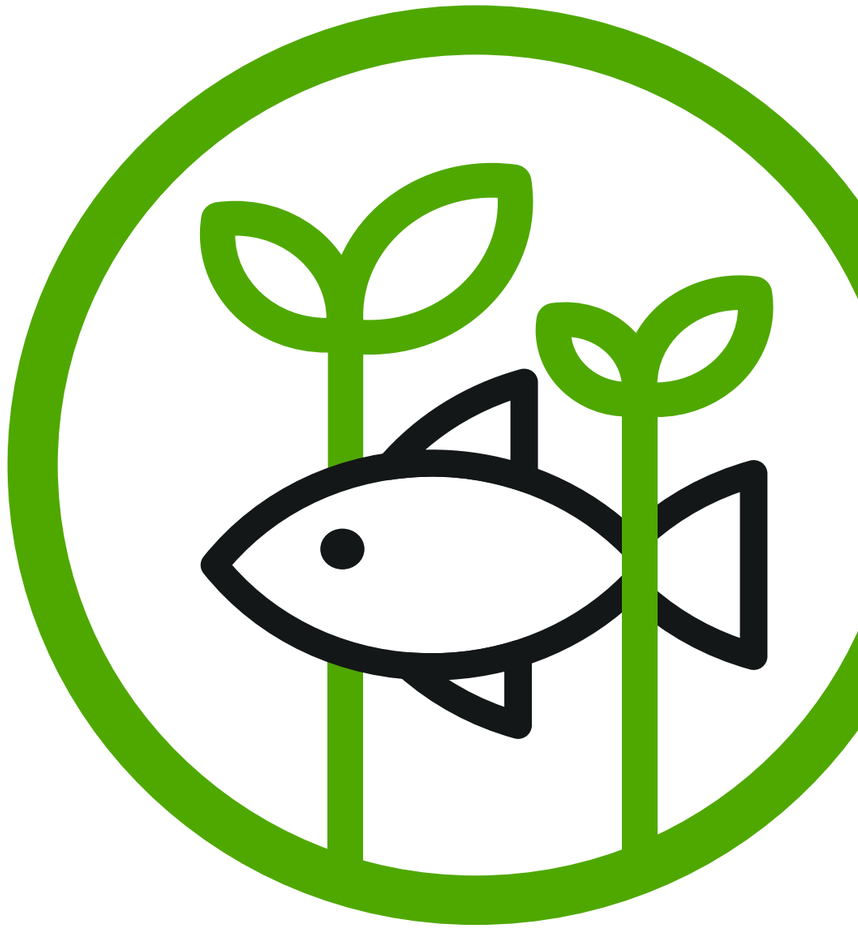
The general objective of Natural Resources (NR) is to investigate the links between climate change and the formation, depletion and exploitation of natural systems and reserves of biotic and abiotic resources. Physical, ecological, social, and economic aspects are considered, all of which are of great relevance for local, national, and international decision-making.

Ecosystem Services (ES) are the benefits that societies obtain from NR. These include the direct provision of material goods, such as food, fuel and fibre, as well as the regulation of undesired events, such as climate change and flooding. Many non-material benefits, such as spiritual or aesthetic enjoyment, are also obtained from nature.

Our scientific work at BC3 on NR can be best communicated by mastering the discourse on ecosystem services. This is a key mission of the Natural Environment (NE) Research Line. NE uses the ES as a language that has gained momentum in science and policy after the publication of the Millennium Ecosystem Assessment. As a science-policy interface, using an ecosystem services framework, allows NE to focus on connecting climate change with human well-being through the management of NR and ecosystems. The language of ES is unique for being both rooted in science and understood by policy makers. By focusing directly on benefits to humans through ES, form BC3 we can bridge climate change science and decision-making, allowing the consequences of action to be understood by all actors.

The physical, biological, economic and political ecology strands of the NE Research Line necessitate integrative research methodologies. Further, research in NE inherently requires an effort to gather and organize field data for detailed multi-scale analyses and modelling applications. It should be emphasized that our studies are not constrained by the use of existing models and tools. Rather, we also develop our own new mathematical, empirical, and computational models and tools, which are best suited to investigate particular issues out of the many dimensions of Climate Change (spatial, temporal, social, cultural, economic, etc.).

To this aim, we use a variety of methods, ranging from multiscale modelling and renormalization to artificial intelligence and network flow analysis. For example, the NE Research Line is at the forefront of this innovation through the development of novel physical models (e.g. continuous diversity) and methodologies such as ARIES (www.ariesonline.org), one of a few methodologies to quantify physical flows of benefits and model the way they translate into economic value and well-being. Other research methods at the core of NE are based on the use of spatially explicit databases, life-cycle analysis, inventories and socio-economic approaches (e.g. cost benefit analysis, multicriteria analysis, behavioural economics, bio-economic modelling), hydro-economic modelling, and stakeholder participatory analyses. The range of methods and focus on integrating them is one of the core scientific values of the NE.



# 3.1 RESEARCH LINES | 3.1.2 Climate and Natural Environment

## 2017 RESEARCH IN ACTION: TOPICS

Development and testing of integrated models to assess the potential of green/natural infrastructure to build climate resilient sustainable development policies: Test and demonstrate approaches to using portfolios of built and natural water infrastructure development to achieve more optimal outcomes for the multiple goals of poverty reduction, water-food-energy security, biodiversity conservation and climate resilience.

Systems-based approaches for integrated mitigation and adaptation strategies in agriculture at different spatial and temporal scales: Modelling the effect of new low-protein cow diets on overall GHG emissions; Review of grassland-based EU farm-level modelling approaches for research on integration of GHG mitigation and adaptation strategies; Modelling N2O emissions from most common cropping systems in Spain using the DNDC model; Modelling GHG emissions from bioenergy cropping systems in the Basque Country; Simulating the effect of climatic and management conditions on the main interactions between carbon and nitrogen and sustainability of dairy farms in the Basque Country; Simulation of livestock housing climate for region-specific barn concepts and climate boundary conditions; Strategies for adapting ruminant livestock systems to climate change in different regions of Europe Potential EU network on mitigation of GHG emissions from agricultural systems; Risk analysis and natural resources to identify optimal adaptation strategies to climate change: Adaptation strategies to environmental risks (drought) in agriculture.

Developing theoretical frameworks, and methods to assess the role of biodiversity for ES delivery and its impact on the adaptive capacity of the poor to climate change stressors.

Development of scientific research on ES that supports climate policy in the Basque Country: specific sectorial levels addressed (e.g. agriculture, forest, water and natural protected areas). This includes integrated strategies on: (i) drought and flooding, (ii) forest and agricultural management, (iii) soil management, (iv) sea level rise, (v) freshwater provision and (vi) biodiversity conservation.

Integrating bioeconomic models across temporal and spatial scales that link biodiversity, ecological processes, ecosystem services and social well-being: Connecting biodiversity to ecosystem services with regard to the role of soil biodiversity in agricultural soils.

Marine ecosystem services and adaptation strategies.

Sea-level rise scenarios for the Basque coast and related economic impacts.

Climate Change in Extreme Environments: The Cryosphere: We investigate how the cryosphere (ice sheets, glaciers, sea ice, icebergs, snow, and permafrost) records, affects, and responds to climate change on diverse size and time scales.

Climate Change in Extreme Environments: Natural Hazards.

Ecosystem Dynamics in a Changing Climate: Biodiversity Change.

Ecosystem Dynamics in a Changing Climate: Populations with Continuous Diversity.

## SOME ACCOMPLISHMENTS

- During 2017, the CNE line has been very active in international science and policy, particularly through the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES). Unai Pascual provided a leadership role within the Intergovernmental Platform on Biodiversity and Ecosystem Services through his work in the Multidisciplinary Expert Panel, Management Committee of the Global Assessment. In addition, Ignacio Palomo acted as young fellow of the IPBES Global Assessment Fellow. Ignacio Palomo and David Moreno also participated as experts in the Global Assessment and Land Degradation assessment, respectively.
- The CNE RL surpassed expectations in terms of its achievements as regards scientific publications derived from the projects its members were working on. The high record of scientific publications in high impact scientific journals was noteworthy. High caliber journals in which the outputs of the CNE research line appear include, inter alia, Nature Communications, Nature Ecology & Evolution, Environmental Research Letters, Global Environmetnal Change, Current Opinion in Environmental Sustainability, Ecosystem Services, Land Use Policy, PLoS ONE, and World Development.
- ARIES team, leaded by Prof. Ferdinando Villa, launched the Integrated Modelling (IM) Partnership, with the aim of enabling easier, more widespread and more efficient use of data and models among public and private sector decision-makers, whose actions affect large swaths of land and the future of many people.
- The senior researcher, Dr. David Moreno continued his research, funded by MINECO “Retos Programme”, on how the effects of anthropogenic alterations on ecosystems evolve over centuries-old time scales and how biodiversity and ecosystem functionalities are compromised in long periods of time.
- Within this multidisciplinary line, conceptual models for adapting to climate change were also studied, incorporating and improving the capacity to capture inter sectoral perspectives through cognitive maps that allow, for example, to understand how heat waves affect different sectors and how these impacts Interact with each other. This analysis, conducted by Dr. Marta Olazabal, resulted in a study that addresses complexity and unintended consequences.
- The role of thresholds and non-linearity in the delivery of ecosystem services by green infrastructures, was investigated, as well as the economic analysis of adaptation strategies with variable time thresholds.
- Prof. Agustín del Prado’s group focused its research on the development and use of scenarios in mitigation and adaptation models for different agricultural systems (greenhouse gas emissions, pollution, carbon sequestration in the agricultural and livestock industry, and climate-smart solutions to relieve heat stress in European dairies).

# 3.1 RESEARCH LINES | 3.1.2 Climate and Natural Environment

## MAIN COLLABORATORS

- UPV/EHU
- BCAM
- NEIKER
- CIEMAT
- Miguel Hernández University of Elche
- CSIC
- Greenwich University
- McGill University
- ETH Zurich
- University of Bordeaux,
- Stockholm Resilience Centre
- University of Leicester
- Osnabrueck University
- ICIMOD
- CIFOR
- Laval University
- Colorado State University
- Federal University of Rio Grande do Sul
- NIPR
- Nagaoka University of Technology
- University of Massachusetts
- Central University of Ecuador
- Alfred Wegener Institute for Polar and Marine Research (AWI)
- The Autonomous University of Mexico

among others.

## MAIN RESEARCH PROJECTS

- CLOCK (ERC Starting Grant)
- AQUACROSS (EU H2020)
- ISAGE (EU H2020)
- ALICE (INTERREG ATLANTIC AREA)
- EQUIVAL (FUTURE EARTH)
- OPTIBARN (ERA-NET)
- ESPERA (MINECO RETOS)
- REBECOM (MINECO RETOS)
- SEES (E)/GV – Research Projects)
- DEFRA AC-0122
- ATLANTIC ACTION PLAN (EU DG-MARE Contract)

among others.

## SOME HIGHLIGHTED OUTPUTS


1. Magrach, A., González-Varo, J.P, Boiffier, M., Vilà, M., Bartomeus, I. **Honeybee spillover reshuffles pollinator diets and affects plant reproductive success**. Nature Ecology and Evolution 1: 1299-1307.

2. Moreno-Mateos D, Barbier EB, Jones PC, Jones HP, Aronson J, López-López JA, McKrackin ML, Meli P, Montoya D, and Rey Benayas JM. 2017. **Anthropogenic ecosystem degradation and the recovery debt**. Nature Communications 8:14163.

3. Dobbie, S., Schreckenberg, K., Dyke, J., Schaafsma, M. and Balbi, S., 2018. **Agent-based modelling to assess community food security and sustainable livelihoods**. Journal of Artificial Societies and Social Simulation, 21(1), pp.1-23.

4. F. Villa in, Balvanera, Patricia, et al. "Ecosystem services." **The GEO Handbook on Biodiversity Observation Networks**. Springer, Cham, 2017. 39-78.


## RESEARCH APPLICATION IN THE BASQUE COUNTRY

The Basque Country is an ideal region to analyse the interlinkage between climate change and human well-being through the impacts on the natural environment. The multi-tiered institutional structure of the Basque Country creates a fertile ground for applying the research conducted under the CNE research line in order to understand how its institutional structures can be optimized in the face of climate change through an integrated management of natural capital assets and the flow of ecosystem services at multiple social and ecological scales.

At BC3, through the CNE Research Line, we are committed to developing new tools to support policy in the Basque Country with an ecosystem services-centric decision making prism to achieve environmentally sustainable, economically efficient and socially acceptable management of natural habitats, as well as the definition of new incentives and mechanisms for an integrated management of ecosystems services.

# 3.1 RESEARCH LINES | 3.1.3 Health and Climate

## OBJECTIVES OF THE RESEARCH LINE

Climate change addresses not only environmental and development issues, but it also represents a big threat to human health, and in the public mind, this impact gives rise to great concern. Health assessment in BC3 focuses on these threats, and analyses in this context the social, economic and behavioural factors that influence vulnerability of people, communities and social systems. This social dimension is however not fully integrated in the decision policy yet, and BC3 research line on health attempts to contribute in filling this gap.

Climate affects health through direct and indirect pathways. The expected increase in temperature will have a direct impact on both the incidence and the geographic distribution of climate-sensitive health outcomes, such as those related to heat waves, floods and infectious diseases. Human health will also be indirectly impacted by increased pressure via other pathways affecting natural and socio-economic systems, such as air pollution, ecosystem services, water, agriculture and food. On all these pathways, there are still considerable uncertainties. Yet the need for policy action is strong, in the form of capacity building, drawing up appropriate adaptation plans, and ensuring that health is appropriately considered in decision making related to other sectors, such as energy, transportation and agriculture.

In addition to the above, another important link between climate policy and health is in the area of co-benefits. Measures taken to reduce emissions of GHGs (e.g. sustainable policies on household energy, agriculture, transport) can often also reduce local pollutants such as particulate matter that have a detrimental effect on the health of the population. This means that the cost of a shift to sources of energy that have low GHG emissions is lower than would be the case of such benefits were not taken into account. At the same time, these benefits can provide strong political motivation.

The Health Research Line can be seen as a seed area that is developing along with all the other related research lines (Low Carbon, Natural Environment and Climate Policy). We are working with some of the leading research groups in the world on these issues in well-defined areas that address some important questions. The methodologies employed are diverse, including epidemiological and socio-economic models in the frames of health economics, environmental economics, health impact assessment, environmental impact assessment, environmental fate analysis, and uncertainty analysis.

# 3.1 RESEARCH LINES | 3.1.3 Health and Climate

## 2017 RESEARCH IN ACTION: TOPICS

Health impacts and costs/benefits of adaptation strategies (vector-borne, water-borne, heat). Bottom-up approaches and upscaling methods.

Specific focus on heatwaves impacts and adaptation.

Human health and exposure to green spaces.

Application to national and local contexts.

## SOME ACCOMPLISHMENTS

A project called OSATU, funded by IHOBE, ended in 2017 and enabled the development of a new project, OASIS, that was once more funded by IHOBE under the KLIMATEK progamme. The added value of OASIS arises from its close collaboration with local agents (IHOBE, Basque Department of Health, Basque Emergency Services and the UPV/EHU).

The research work developed on modelling health benefits of green spaces and associated changes in lifestyle, in addition to analysing concepts on environmental sustainability and equality in health, enabled us to consolidate the collaboration with the University of Exeter and the Centre for Environment and Health in the United Kingdom, the ECEHH, and the University of Alcalá. This collaboration has facilitated the development of a series of ideas that were framed in an H2020 programme proposal and currently under other H2020 ongoing proposals.

## MAIN COLLABORATORS

- UPV/EHU
- Basque Department of Health, IHOBE
- Academy of Medical Sciences
- University of Navarra
- University of Alcalá (Spain)
- University of Leicester (UK)
- University of Exeter (UK)
- CEHH-Centre on Environment and Human Health (UK)
- University of Montreal's Public Health Research Institute, (Canada)
- University of Pretoria (South Africa)
- Makerere University (Uganda)

## MAIN RESEARCH PROJECTS

- INHERIT (EU H2020)
- GLANCE (EU MARIE CURIE)
- COACCH (EU H2020)
- OASIS (IHOBE KLIMATEK)

## SOME HIGHLIGHTED OUTPUTS


- A. Markandya, I. Galarraga, L.M. Abadie, J.Lucas-Rueda and J. Spadaro. 2016. **What Role Can Taxes and Subsidies Play in Changing Diets? An Application from Spain.**, FinanzArchiv/Public Finance Analysis, 72, 1, 175-201.

- Bouwer, L; Capriolo, A; Chiabai, A; Foudi, S; Garrote, L; Harmáčková, ZV; Iglesias, A; Jeuken, A; Olazabal, M; Spadaro, JV; Taylor, T; Zandersen, M (2017). **Upscaling the impacts of climate change in different sectors**. In Sanderson H, Hildén M, Russel D, Penha-Lopes G, Capriolo A (Eds). Adapting to Climate Change in Europe 1st Edition. **Exploring Sustainable Pathways - From Local Measures to Wider Policies**. Elsevier. ISBN 9780128498873.

- Chiabai, A., Spadaro, J.V., Neumann, M.B. (2017). **Valuing deaths or years of life lost? Economic benefits of avoided mortality from early heat warning systems**. Mitigation and Adaptation Strategies for Global Change. https://doi.org/10.1007/s11027-017-9778-4.

- Foudi, S., Spadaro, J.V., Chiabai, A., Polanco-Martínez, J.M., Neumann, M.B. (2017). **The climatic dependencies of urban ecosystem services from green roofs: Threshold effects and non-linearity**. Ecosystem Services. 24. 223-233. DOI (10.1016/j.ecoser.2017.03.004).

# 3.1 RESEARCH LINES | 3.1.4 Climate Policy

## OBJECTIVES OF THE RESEARCH LINE

The research line "Regional, National and International Climate Policy" focuses, as the title suggests, on the policy-side of climate research. Sound policy of course is based on the results of work done under the other research lines (Low Carbon, Natural Environment, and Health), but it also involves some further lines of investigation. This research line therefore involves drawing out the policy implications of the research undertaken under the other lines as well as undertaking research on issues directly related to the formulation of policy.

The methodologies employed are diverse and include – amongst others – micro-simulation models, CGE-modelling, multi-criteria analysis, cost-benefit analysis, game theory, and integrated assessment modelling.

Both adaptation and mitigation policies are topics of the research in this research line and much of it is aligned with energy aspects (e.g., using economic instruments to influence energy use in a sustainable way, vulnerability of the electricity sector). With respect to international policy, thematic foci of the mid-term research strategy are international environmental agreements and international climate finance. These involve aspects such as ancillary benefits, green bonds and private financing, instruments to ensure fairness and sustainable development while pursuing climate goals. Concerning national policy, the mid-term strategy is concerned with market-based instruments (e.g. environmental tax reform), technology and innovation policy and adaptation to climate change.

The role of regional and local governments in climate protection plays also an important role in the research line with special emphasis in supporting the Basque Climate Policy.

One of the most relevant activities of this group is related to the participation of BC3 researchers as scientific experts in the most important international scientific organization that deals with climate change: the IPCC (Intergovernmental Panel of Climate Change) of the United Nations. We have actively contributed to its 5th Assessment Report (AR5), released in 2014 and we are also contributing to the next (6th) Assessment Report. This is the main report that this organization produces every 6 years and has deep global policy implications.

At BC3 we also help to define with the policy makers the strategic positioning of regional and national bodies in climate negotiations (such as the Conference of the Parties or COP or the EU). We closely follows and attend all COP meetings and have actively participated in the drafting of the Climate Change Plan for the Basque Government.

See Section POLICY ORIENTED KNOWLEDGE TRANSFER.

# 3.1 RESEARCH LINES | 3.1.4 Climate Policy

## 2017 RESEARCH IN ACTION: TOPICS

Economic valuation of climate risks and adaptation in coastal cities worldwide.

Tracking progress in adaptation planning.

Design and evaluation of energy efficiency programmes in Europe.

Evaluating the role of climate finance.

Understanding behavioral implications of risk framing.

Supporting the elaboration of plans and programs linked with climate change.

## SOME ACCOMPLISHMENTS

- During the year 2017 stochastic modeling was further developed to analyse the economics of risks management and adaptation to climate change.
- With regard to the investigation of national policies, the medium-term strategy was oriented towards the study of economic instruments, and policies for innovation and adaptation to climate change.
- The role of local and regional governments in protecting the environment also played an important role in the strategic research objectives of this line during the year.
- Important research were was undertaken to better track progress in adaptation policies with special attention to understanding what is "successful adaptation" and how to align these policies to climate risks. Meaningful conclusions with policy implications were achieved as a result of a long-term collaboration where more than 30 researchers (including BC3 members) have tracked progress on local climate policies in Europe. Also, innovative participatory systems approaches have been used to generate new knowledge useful for adaptation policy making and planning.
- It is worth highlighting the active participation of BC3 in the COP 23 climate change summit, held in Bonn in November 2017.
- During 2017, this research line significantly supported the setting up and identification of collaborations for the "INCCCETT 4CB - International Climate Change Centers of Excellence and Think Tanks for Capacity Building" launched at the COP 22 summit, of which we are founder member. BC3 also participated in two side events organized at UNFCCC in Bonn.
- And finally, as it is traditionally done, BC3 supported local, regional and national policy makers to better understand climate negotiations and enhance climate and energy policies. The BC3 team closely followed and attended all COP meetings, produced documents with the main outcomes of the summits and offered support to local and national media to understand climate negotiations.

## MAIN COLLABORATORS

- UPV/EHU
- CICERO (Norway)
- Danish Board of Technology (Denmark)
- Economics for Energy (Vigo, Spain)
- World Bank (International)
- IHOBE
- Fondazione Eni Enrico Mattei (Italy)
- University of Bath (United Kingdom)
- McGill University (Canada)
- UNEP (International)
- Centre for Energy, Environmental and Technological Research (CIEMAT)
- Grantham Research Institute for Climate Change and the Environment (UK)
- European Environmental Agency (Europe)
- Nagaoka University of Technology (Japan)
- UNDP (International)

## MAIN RESEARCH PROJECTS

- RESIN (EU H2020)
- CONSEED (EU H2020)
- WISE-UP (BMU)
- CICEP (Collaboration Agreement)
- ENABLE (EU H2020)
- COACCH (H2020)
- REMEDISOST (IHOBE)

## SOME HIGHLIGHTED OUTPUTS


- Abadie, L.M., Galarraga, I., Sainz de Murieta, E. 2017. **Understanding risks in the light of uncertainty: low-probability, high-impact coastal events in cities**. Environmental Research Letters. 12. (1) 014017. DOI (10.1088/1748-9326/aa5254).
- Abadie, L.M., Goicoechea, N. and Galarraga, I. 2017. **Carbon risk and optimal retrofitting in cement plants: An application of stochastic modelling, Monte Carlo simulation and Real Options Analysis**. Journal of Cleaner Production. 142 (Part 4). 3117-3130. DOI (10.1016/j.jclepro.2016.10.155).
- Foudi, S. Oses, N. and Galarraga, I. 2017. **The effect of flooding on mental health: lessons learned for building resilience**. Water Resources Research 53: 5831–5844
- Markandya. 2017. **State of Knowledge on Climate Change, Water and Economics. Water Global Practice Discussion Paper**. World Bank: Washington DC. 33pp. https://openknowledge.worldbank.org/handle/10986/26491


## RESEARCH APPLICATION IN THE BASQUE COUNTRY

The Basque Country counts on with a high level of self-government, including taxation. In terms of specific policies, the region has been recognized by EU institutions and the United Nations as one of the most active regions in climate change policy during the last years. Hence, it can be stated that the Basque Country has not only the capacity and the legal power to deal with climate change policy, but also the willingness to do so. Specifically, the research activities applicable to the context of the area are the following:

- Mitigation Policy related issues: Design of instruments to reduce greenhouse gases at regional, national and global levels; Policies to promote low-carbon economies; Uncertainty and climate policy: diverse tools to design bestpolicies to address climate change in the face of huge uncertainties and the long time periods involved.
- Adaptation Policy related issues: Biophysical and socioeconomic impact assessment: health, agroforestry, ecosystems, water and infrastructure related; Costs and benefits of adaptation measures; Design of optimal adaptation strategies.
- Support and dissemination.

See Section POLICY ORIENTED KNOWLEDGE TRANSFER

# 3.2 RESEARCH PROJECTS

## ONGOING RESEARCH PROJECTS

### European Commission or other international funding programs

| | |
|---|---|
| **CONSEEED -** CONsumer Energy Efficiency Decision Making | The European Union Horizon 2020 research and innovations programme |
| **ENABLE -** Enabling the Energy Union through understanding the drivers of individual and collective energy choices in Europe | The European Union Horizon 2020 research and innovations programme |
| **ALICE -** AcceLerate Innovation in urban wastewater management for Climate changE | The European Union Horizon 2020 research and innovations programme |
| **ISAGE -** Innovation for Sustainable Sheep and Goat Production in Europe | The European Union Horizon 2020 research and innovations programme |
| **INHERIT -** INter-sectoral Health Environment Research for InnovaTions | The European Union Horizon 2020 research and innovations programme |
| **CLOCK -** Climate Adaptation To Shifting Stocks | The European Union Horizon 2020 research and innovations programme |
| **TRANSRISK -** Transitions pathways and risk analysis for climate change mitigation and adaption strategies | The European Union Horizon 2020 research and innovations programme |
| **RESIN**_Climate Resilient Cities and Infrastructures | The European Union Horizon 2020 research and innovations programme |
| **AQUACROSS -** Knowledge, Assessment, and Management for AQUAtic Biodiversity and Ecosystem Services aCROSS EU policies | The European Union Horizon 2020 research and innovations programme |
| **GLANCE -** calculatinG heaLth impActs of atmospheric pollutioN in a Changing climatE | The European Union Horizon 2020 research and innovations programme |
| **COACCH -** CO-designing the Assessment of Climate Change costs | The European Union Horizon 2020 research and innovations programme |
| TALES -Tools and analyses of value chains, income and employment | JOINT RESEARCH CENTRE - JRC Tender |

| | |
|---|---|
| **ALICE -** Towards a better management of Atlantic Landscapes: developing tools to better characterise bIodiversity and eCosystem sErvices | INTERREG Atlantic Area |
| **"UK Department for Environment, Food and Rural Affairs (DEFRA):** Optimising the efficiency of dietary nitrogen use to reduce emissions and waste in dairy systems" | UK Department for Environment, Food and Rural Affairs (DEFRA) |
| **German Ministry for the environmnent, nature conservation and nuclear safety:** Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes (WISE-UP) | German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety |
| **DEltas,** vulnerability and Climate Change; Migration as an Adaptation | Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) |
| **EQUIVAL -** Nurturing a Shift towards EQUItable VALuation of Nature in the Anthropocene | Future Earth Program, Pegasus Grant by Colorado State University (USA) |

# 3.2 RESEARCH PROJECTS

## ONGOING RESEARCH PROJECTS

### MINECO or Spanish Institutions

| | | |
|---|---|---|
| | **REBECOM -** Estimación del tiempo de recuperación de bosques templados tras impactos antropogénicos históricos a lo largo de un gradiente de complejidad | MINECO – Spanish Ministry for Economy and Competitiveness |
| | **CLIMAECOM -** Políticas climáticas y transición a una economía baja en carbono | MINECO – Spanish Ministry for Economy and Competitiveness |
| | **ESPERA -** La Equidad Social en los Pagos por Servicios Ambientales (PSA): Una Perspectiva Socio- Ecológica. | MINECO – Spanish Ministry for Economy and Competitiveness |
| | **OPTIBARN -** Optimised animal specific barn climatisation facing temperature rise and increased climate variability | MINECO – National Institute for Agricultural and Food Research and Technology (INIA). |
| | **MANURE -** Gestión de deyecciones en sistemas productivos de vacuno de leche de la cornisa cantábrica. De la explotación al territorio: eficiencia del uso de nutrientes, mitigación de gases de efecto invernadero y reducción de la huella de carbono | MINECO – National Institute for Agricultural and Food Research and Technology (INIA). |

### Basque Government or Basque Institutions

| | | |
|---|---|---|
| | **SEES -** " El Papel de la Equidad Social en la Gobernanza de la Naturaleza desde una Perspectiva Socio-Ecológica" (The role of Social Equity in the Governance of Nature: A Social-Ecological approach) | Basque Government |
| | "La Protección de los Suelos en Euskadi y el Cambio Climático" (Land Protection and Climate Change at the Basque Country) | IHOBE |
| | **REMEDISOST -** "Diseño de una Metodología para la Evaluación de la Sostenibilidad De Planes de Remediación de Suelos Contaminados"" (Design of a Methodology for the Evaluation of the Sustainability of Contaminated Soil Remediation Plans) | IHOBE |
| | **OASIS** - "Olas de calor e impactos sobre la salud humana" " (Heatwaves and impacts of human health) | IHOBE |
| | La transición energética del País Vasco hacia un modelo más sostenible y bajo en carbono. "The energy transition of the Basque Country towards a low carbon and more sustainable model " | ARARTEKO |

### Other Funding Agencies

| | | |
|---|---|---|
| | **Research Agreement** | CICERO |
| | **Research Agreement** | Osnabruck University |
| | Analysis and Assessment On Determining Drivers of Global Land Use Change | The Food and Agriculture Organization of the United Nations |
| | The Potential of Sustainable Land Management Practices to Create Synergies Between Addressing Desertification, Land Degradation and Drought, and Climate Change Mitigation and Adaptation | UNCCD |
| | Forecasting Sustainability of Productive Landscapes Across Environmental, Social, Political, Climatic and Economic Dimensions in San Martín, Peru | CONSERVATION INTERNATIONAL |

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## H2020_CONSEED

| | |
|---|---|
| **GRANT AGREEMENT:** | GA 723741 |
| **NAME OF THE PROJECT:** | CONSEED - "CONsumer Energy Efficiency Decision Making" |
| **FUNDING AGENCY:** | The European Union Horizon 2020 research and innovations programme |
| **TYPE:** | H2020-EE-2016-RIA-IA |
| **TIME FRAME:** | 2016-2019 |
| **FUNDING:** | 359.635 € |
| **PARTNERS:** | **The Provost, Fellows, Foundation Scholars & The Other Members of Board of The College Of The Holy & Undivided Trinity Of Queen Elizabeth Near Dublin (Tcd) –** Coordinator<br>**Cicero Senter Klimaforskning Stiftelse (Cicero)**<br>**Asociacion Bc3 Basque Centre For Climate Change - Klima Aldaketa Ikergai (BcC3)**<br>**Univerza V Ljubljani (Ul)**<br>**Agricultural University of Athens (AUA)** |

## Project Description

Consumers do not minimize the total costs of their energy-consuming investments due to a range of market and non-market based failures. This is known as the 'Energy Efficiency Gap'. To reduce the gap and provide customers with energy consumption information, the EU has mandated that electrical appliances, cars and buildings carry information to indicate their energy consumption.There is a large knowledge gap in terms of understanding which factors are salient in consumers' decisions, the relative importance of these factors and how these factors change by consumer group and product type. The key idea behind CONSEED is to understand how consumers make decisions which involve an energy component, and to make (energy) operating costs more salient to consumers at the point of purchase to increase efficient behaviour.CONSEED will involve four key steps: Step **1)** Develop a theoretical framework to base our work on the best available knowledge in the field and Step **2)** Collect empirical data on consumer behaviour through a range of different methods. Our project will involve 27 focus groups, eleven large consumer surveys, three field experiments, and three discrete choice experiments, with tailored treatments to generate a novel database consisting of empirical evidence on the salient factors impacting on the consumer decision making process. Step **3)** will validate the theoretical models using our empirical data. Step **4)** will deliver evidence-based research on consumer decisions involving an energy component that will enable better, more efficient and effective energy policy. Many of the challenges relating to energy efficiency policy derive from the large number of factors which potentially play a role in influencing ultimate consumer decisions. CONSEED research will directly investigate the relative importance of these factors and isolate the aspects which are likely to provide the greatest impact in terms of future energy efficiency policy.

## Key BC3 researchers involved

Prof. Anil Markandya
Mari Mar Solá
Dr. Ibon Galarraga
Dr. Amaia de Ayala
Dr. Luis Mª Abadie

## Link with BC3 Research Line

Low Carbon
Climate Policy

## Acknowledgement

CONSEED has received funding from the European Union's Horizon 2020 Programme for Research, Technological Development and Demonstration under Grant Agreement no. 723741.

## URL Address

http://www.conseedproject.eu/

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## H2020_ENABLE

| | |
|---|---|
| **GRANT AGREEMENT:** | GA 727524 |
| **NAME OF THE PROJECT:** | ENABLE "Enabling the Energy Union through understanding the drivers of individual and collective energy choices in Europe" |
| **FUNDING AGENCY:** | The European Union Horizon 2020 research and innovations programme |
| **TYPE:** | H2020-LCE-2016-2017 submitted for H2020-LCE-2016-RES-CCS-RIA |
| **TIME FRAME:** | 2016-2019 |
| **FUNDING:** | 344.563 € |
| **PARTNERS:** | **Istituto Di Studi Per L'integrazione Dei Sistemi Sc (Isinnova)** – Coordinator<br>**Notre Europe - Institut Jacques Delors Association (JDI)**<br>**Center for The Study Of Democracy (CSD)**<br>**Cicero Senter Klimaforskning Stiftelse (Cicero)**<br>**BC3 Basque Centre For Climate Change - Klima Aldaketa Ikergai**<br>**Cambridge Econometrics Limited (CE)**<br>**Rekk Energiapiaci Tanacsado Kft (Rekk)**<br>**Ekonomski Institut Ad Beograd (EI)**<br>**Westfaelische Wilhelms-Universitaet Muenster (WWU)**<br>**Centre For Global Studies Strategy Xxi (Cgs21)**<br>**Polski Instytut Spraw Miedzynarodowych (PISM)**<br>**London School Of Economics And Political Science (Gri-Lse)** |

## Project Description

The Energy Union Framework Strategy laid out on 25 February 2015 has embraced a citizens-oriented energy transition based on a low-carbon transformation of the energy system. The success of the energy transition pillar in the Energy Union will hinge upon the social acceptability of the necessary reforms and on the public engagement in conceptualizing, planning, and implementing low carbon energy transitions. The ENABLE.EU project will aim to define the key determinants of individual and collective energy choices in three key consumption areas - transportation, heating & cooling, and electricity – and in the shift to presumption (users-led initiatives of decentralised energy production and trade). The project will also investigate the interrelations between individual and collective energy choices and their impact on regulatory, technological and investment decisions. The analysis will be based on national household and business surveys in 11 countries, as well as research-area-based comparative case studies. ENABLE.EU aims to also strengthen the knowledge base for energy transition patterns by analysing existing public participation mechanisms, energy cultures, social mobilisation, scientists' engagement with citizens. Gender issues and concerns regarding energy vulnerability and affluence will be given particular attention. The project will also develop participatory-driven scenarios for the development of energy choices until 2050 by including the findings from the comparative sociological research in the E3ME model created by Cambridge Econometrics and used extensively by DG Energy. The findings from the modelling exercise will feed into the formulation of strategic and policy recommendations for overcoming the gaps in the social acceptability of the energy transition and the Energy Union plan. Results will be disseminated to relevant national and EU-level actors as well as to the general public.

## Key BC3 researchers involved

Prof. Anil Markandya
Alessandro Silvestri
Dr. Ibon Galarraga
Dr. Amaia de Ayala
Dr. Luis Mª Abadie

## Link with BC3 Research Line

Low Carbon
Climate Policy

## Acknowledgement

ENABLE.EU has received funding from the European Union's Horizon 2020 Programme for Research, Technological Development and Demonstration under Grant Agreement no. 727524.

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## H2020_ALICE

| | |
|---|---|
| **GRANT AGREEMENT:** | **GA 734560** |
| **NAME OF THE PROJECT:** | **ALICE "AcceLerate Innovation in urban wastewater management for Climate changE"** |
| **FUNDING AGENCY:** | **The European Union Horizon 2020 research and innovations programme** |
| **TYPE:** | **HORIZON 2020-MSCA-RISE-2016** |
| **TIME FRAME:** | **2016-2020** |
| **FUNDING:** | **36.000 €** |
| **PARTNERS:** | **University of Ulster** – Coordinator<br>**Northern Ireland Water Ltd**<br>**The Queen's University of Belfast**<br>**Dublin City University**<br>**Dionergy Ltd**<br>**BC3 Basque Centre For Climate Change - Klima Aldaketa Ikergai**<br>**Centro De Investigaciones Energeticas, Medioambientales Y Tecnologicas-CIEMAT**<br>**Región De Murcia**<br>**Universita Degli Studi Di Macerata**<br>**Redinn Srl**<br>**Aset**<br>**University of Cyprus**<br>**Militos Symvouleutiki A.E.** |

## Project Description

The challenges facing society in urban wastewater management cannot be solved by any one sector alone. ALICE (AcceLerate Innovation in urban wastewater management for Climate changE) will accelerate innovation by bringing together and exchanging knowledge between the key players who can, together, address the future techno-economic, governance and societal challenges arising from climate change. It will boost international and interdisciplinary skills, as well as careers perspective of Experienced Researchers, Early Stage Researchers, and the workforce of industry, water utilities and public organizations. The results will **1)** benefit water utilities, **2)** support political and managerial decisions in wastewater, **3)** benefit wastewater equipment manufacturers, identifying new market opportunities in the EU, **4)** benefit EU citizens from the improved wastewater infrastructure, the environment and job creations. Higher precipitation and more frequent storms will require change in sewer water management. Moreover, higher risks of water scarcity and droughts require increased wastewater reuse, currently at 20% of its potential in the EU. These changes will lead to increased energy demand in a sector that is already a major contributor of carbon emissions. ALICE will promote effective solutions based on innovative technologies, green infrastructures, climate vulnerability assessments, governance and economic models, embracing stakeholders' and citizens' views to overcome barriers to the acceptance and uptake of new technologies. The excellence of the project lies in the joined-up thinking of different perspectives and disciplines. Academic and non-academic partners along the wastewater value-chain will exchange knowledge, develop training, research and innovation activities. ALICE will build lasting knowledge and cooperation networks and will provide the non-academic sector with practical solutions to respond in innovative ways to the challenges posed by climate change.

## BC3's contribution to the project

Develop a general framework for the vulnerability assessment which includes **(I)** compiling of climate and socioeconomic information; **(II)** evaluating the climate sensitivity and **(III)** determining the adaptive capacity. The framework will be applied to Belfast and Murcia.

## Key BC3 researchers involved

Dr. Marc Neumann
Dr. Sebastien Foudi
Dr. Elisa Sainz de Murieta
Dr. Josue Polanco
Dr. Marta Olazabal
Alina Tepes

## Link with BC3 Research Line

Climate and Natural Environment

## Acknowledgement

ALICE has received funding from the European Union's Horizon 2020 Programme for Research, Technological Development and Demonstration under the Marie Sklodowska-Curie Grant Agreement no. 734560

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## H2020_ISAGE

| | |
|---|---|
| **GRANT AGREEMENT:** | GA 679302 |
| **NAME OF THE PROJECT:** | ISAGE "Innovation for Sustainable Sheep and Goat Production in Europe" |
| **FUNDING AGENCY:** | The European Union Horizon 2020 research and innovations programme |
| **TYPE:** | H2020-SFS-2015-2 |
| **TIME FRAME:** | 2016-2020 |
| **FUNDING:** | 474.259 € |
| **PARTNERS:** | Aristotle University of Thessaloniki - Coordinator ● Kentro Genetikis Beltiosis Zoon Neas Mesimvrias ● LEVER S.A. Development Consultants LEVER ● Agricultural Cooperative of Pieria Sheep and Goat Farmers ● Agricultural Livestock Cooperative of Western Greece ● Luke- National Resource Institute Finland ● ProAgria Association of Rural Advisory Centers ● Institut National de la Recherche Agronomique L'Institut de l'Elevage ● Capgenes ● Comite National Brebis Laitieres ● European Federation of Animal Science ● Universita Politecnica delle MarcheIstituto per la Certificazione Etica ed Ambientale ● Mediterranean Agronomic Institute of Zaragoza /International Centre for Advanced Mediterranean Agronomic ● Instituto Nacional de Investigacion y Tecnologia Agraria y Alimentaria Agencia Estatal Consejo Superior de Investigaciones Científicas ● BC3 Basque Centre for Climate Change – Klima ● Carnes Oviarogon SCL ● CABRANDALUCIA Federacion Andaluza de Asociaciones de Ganado Caprino de Raza Pura ● ASSAFE (ES); ARDIEKIN SL ● Asociación Nacional de Criadores de Ganado Ovino Selecto de Raza Manchega ● Asociacion Espanola de Criadores de Ovino Selecto de Raza Lacaune ● Nigde University ● Ataturk University ● Pan Hayvancilik Gida Sanayi Tic LTD ● Red Rock Agricultural Pastoral Tarim Limited Sirketi ● Gaziantep Ili Damizlik Koyun Keçi Yetistiricileri Birligi ● Scotland's Rural College ● Organic Research Centre ● National Sheep Association ● The Agriculture and Horticulture Development Board ● Yorkshire Dairy Goats |

## Project Description

iSAGE will enhance the sustainability, competitiveness and resilience of the European Sheep and Goat sectors through collaboration between industry and research. iSAGE have a powerful consortium with 18 industry representatives from various EU production systems and socio-economic contexts. The sheep and goat sector will be investigated because it is sensitive to general socio-economic, demographic, and ecological and market challenges; nevertheless, the project's approach and results will be made available and disseminated to other EU livestock industries. Therefore, at the core of iSAGE is a participatory approach centered on a multi-actor internal and external communication (WP) to build the project from the farmer level. This approach will ensure relevant issues are addressed and the project outcomes are applicable in practice and create a farm-level observatory and knowledge exchange network on the sustainability of livestock. This WP will also assist three assessment work packages that will deal with the sustainability assessment of sheep and goat farm systems and related supply chains, with socio-economic demographic and consumer trend analyses, and with the impacts of climate change. Assessment WPs will inform action WPs that will: (1) redesign holistic farming systems to best reconcile the various demands concerning productivity, sustainability and societal values. (2) identify industry solutions that aim to improve sustainability and productivity of sheep and goat systems through breeding, including new phenotypes linked to sustainable animal productivity. iSAGE, together with stakeholders and end-users, will draft a roadmap for further research and policy making. The stakeholder groups will be the key players in disseminating project outputs through case studies and demonstrations to act as a blueprint to other producers across Europe and create networks to assist wider implementation of iSAGE outputs.

iSAGE will enhance the sustainability, competitiveness and resilience of the European Sheep and Goat sectors through collaboration between industry and research. iSAGE have a powerful consortium with 18 industry representatives from various EU production systems and socio-economic contexts. The sheep and goat sector will be investigated because it is sensitive to general socio-economic, demographic, and ecological and market challenges; nevertheless, the project's approach and results will be made available and disseminated to other EU livestock industries. Therefore, at the core of iSAGE is a participatory approach centered on a multi-actor internal and external communication (WP) to build the project from the farmer level. This approach will ensure relevant issues are addressed and the project outcomes are applicable in practice and create a farm-level observatory and knowledge exchange network on the sustainability of livestock. This WP will also assist three assessment work packages that will deal with the sustainability assessment of sheep and goat farm systems and related supply chains, with socio-economic demographic and consumer trend analyses, and with the impacts of climate change. Assessment WPs will inform action WPs that will: (1) redesign holistic farming systems to best reconcile the various demands concerning productivity, sustainability and societal values. (2) identify industry solutions that aim to improve sustainability and productivity of sheep and goat systems through breeding, including new phenotypes linked to sustainable animal productivity. iSAGE, together with stakeholders and end-users, will draft a roadmap for further research and policy making. The stakeholder groups will be the key players in disseminating project outputs through case studies and demonstrations to act as a blueprint to other producers across Europe and create networks to assist wider implementation of iSAGE outputs.

## BC3's contribution to the project

BC3 is partner of a consortium led by Aristotle University of Thessaloniki with 33 partners. "Innovation for Sustainable Sheep and Goat Production in Europe". Pl_ Agustin Del Prado

## Key BC3 researchers involved

Dr. Agustín del Prado (PI)
Dr. Guillermo Pardo

## Link with BC3 Research Line

Climate and Natural Environment

## Acknowledgement

This project has received funding from the European Union Horizon 2020 research and innovations programme under grant agreement Nº 679302

## URL Address

www.isage.eu

# 3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## H2020_INHERIT

| | |
|---|---|
| **GRANT AGREEMENT:** | GA 667364 |
| **NAME OF THE PROJECT:** | INHERIT "INter-sectoral Health Environment Research for InnovaTions" |
| **FUNDING AGENCY:** | The European Union Horizon 2020 research and innovations programme |
| **TYPE:** | Horizon 2020-H2020-PHC-4-2015 |
| **TIME FRAME:** | 2016-2018 |
| **FUNDING:** | 288.175 € |
| **PARTNERS:** | EuroHealthNet – European Partnership for Improving Health, Equity and Wellbeing (EHNet) - Coordinator<br>National Institute for Public Health and the Environment (RIVM)<br>University College London (UCL) Health Equity Institute<br>Institute of Preventive Medicine Environmental and Occupational Health (Prolepsis)<br>University of Exeter Medical School, European Centre for Environment and Human Health (UNEXE)<br>Norwegian University of Science and Technology, Faculty of Social Sciences and Technology Management (NTNU)<br>Riga City Council, Housing, Environment and Welfare Department (RIGA)<br>Collaborating Centre on Sustainable Consumption and Production (CSCP)<br>Swedish Public Health Agency (FoHM)<br>National Institute of Public Health (IJZRM)<br>Basque Research Centre for Climate Change (BC3)<br>Lisbon University Institute (ISCTE-IUL)<br>Univerzita Karlova v Praze (CUNI), Environment<br>University of Alcala (UAH)<br>Revolve Media (REVOLVE)<br>Philips Electronics Nederland (PHILIPS)<br>Flemish Institute for Health Promotion and Disease Prevention (VIGeZ)<br>Federal Centre for Health Education (BZgA) |

## Project Description

The overarching aim of INHERIT is to define effective inter-sectoral policies and interventions that promote health and well-being across the social gradient by tackling key environmental stressors and related inequalities in the areas of living, consuming and moving. INHERIT will bring together relevant stakeholders from different sectors, including the private sector.

It will support inter-sectoral cooperation between environment, climate and health by: **a)** Analysing existing scientific knowledge on key environmental stressors to health and approaches to address these; **b)** Identifying existing promising inter-sector policies and interventions that enable conditions for more healthy and environmentally sustainable behaviours, in three main areas: living, consuming and moving; **c)** Developing a Common Analytical Framework using impact assessment tools and quantitative and qualitative indicators to assess the social, environmental and health benefits and the economic value in promising inter-sectoral interventions; **d)** Developing targets and future visions while considering overall economic and politics contexts and global trends (i.e. participatory back-casting, stakeholder and citizen consultations and household surveys); **e)** Implementing, testing and evaluating pilot interventions in different European contexts; **f)** Enhancing the leadership skills of public health professionals in inter-sectoral work to address key environmental stressors to health and promote healthy and environmentally sustainable lifestyles; **g)** Translating evaluation findings into models of good practice for effective inter-sectoral work and evidence based tools for policy development to contribute to the global and European environment, health and sustainable development policy agenda. The novelty of INHERIT lies in its support for health, environment and climate sectors to jointly pursue the inter-related goals of improving health and well-being of the population while preserving the environment.

## BC3's contribution to the project

BC3 is co-leader of WP5 for the quantitative evaluation of the identified best practices and is leading the cost-benefit analysis for 3 case studies (living environment, moving and nutrition). BC3 is also contributing to the literature review and to the scenario building.

## Key BC3 researchers involved

Prof. Anil Markandya
Dr. Amaia de Ayala
Dr. Aline Chiabai (PI)

## Link with BC3 Research Line

Health and Climate

## Acknowledgement

The INHERIT project (www.inherit.eu), coordinated by EuroHealthNet, has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 667364.

## URL Address

http://inherit.eu/

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## H2020_COACCH

| | |
|---|---|
| **GRANT AGREEMENT:** | GA 776479 |
| **NAME OF THE PROJECT:** | COACCH - CO-designing the Assessment of Climate Change costs |
| **FUNDING AGENCY:** | The European Union Horizon 2020 research and innovations programme |
| **TYPE:** | Horizon 2020-H2020-SC5-2016-2017 |
| **TIME FRAME:** | 2017-2021 |
| **FUNDING:** | 251.318 € |
| **PARTNERS:** | Fondazione Eni Enrico Mattei - Coordinator<br>Paul Watkiss Associates Ltd<br>Internationales Institut Fuer Angewandte Systemanalyse<br>Universitaet Graz<br>Stichting VU<br>Ecologic Institut Gemeinnützige Gmbh<br>Univerzita Karlova<br>Fondazione Centro Euro-Mediterraneo Sui Cambiamenti Climatici<br>Ministerie Can Infraestructuur en Milieu<br>BC3 Basque Centre for Climate Change<br>Climate Analytics Gmbh<br>Stiching Deltares<br>GCF - Global Climate Forum EV<br>Postdam Institut Fuer Klimafolgenforschung |

## Project Description

COACCH will develop an innovative science-practice and integrated approach to co-design and co-deliver an improved downscaled assessment of the risks and costs of climate change in Europe, working with end users from research, business, investment, and policy making communities throughout the project. COACCH will advance the evidence base on complex climate change impact chains, assessing their market, non-market, macroeconomic and social consequences in the EU.

The final objective of COACCH is to produce an improved downscaled assessment of the risks and costs of climate change in Europe that can be of direct usability and respond to the different needs of end users from the research, business, investment, and the policy making community. This overall objective is substantiated into five specific goals:

1. To develop technically excellent and innovative research on complex climate change impact chains, using downscaled climate information and advancing integrated assessment methods and models developed under early RTD research calls.
2. To develop a challenge-driven and solutions orientated research and innovation approach, involving proactively business, industrial, public decision makers and research stakeholders in the co-design, co-production and co-dissemination of policy driven research.
3. To significantly advance the knowledge and the evidence base not only on climate tipping elements and tipping points but also on socio-economic tipping points.
4. To advance the economic valuation of climate action (mitigation and adaptation) in the EU at various scales over short to longer-term timeframes to support a more informed policy process in the achievement of intended nationally determined contributions (INDCs) for the EU.
5. To enhance innovation capacity and integration of this new knowledge using co-dissemination of results.

## Key BC3 researchers involved

Dr. Ibon Galarraga (PI)
Prof. Anil Markandya
Dr. Aline Chiabai
Dr. Elisa Sainz de Murieta
Ambika Markanday

## Link with BC3 Research Line

Climate Policy

## Acknowledgement

COACCH project, coordinated by Fondazione Eni Enrico Mattei, has recevied funding from the European Union´s Horizon 2020 research and innovation programme under the Gran Agreement Nº 776479

## URL Address

https://www.coacch.eu/

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## INTERREG_ALICE

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|---|---|
| **GRANT AGREEMENT:** | **Ref # EAPA_261/2016** |
| **NAME OF THE PROJECT:** | **ALICE - Towards a better management of Atlantic Landscapes: developing tools to better characterise blodiversity and eCosystem sErvices** |
| **FUNDING AGENCY:** | **Interreg Atlantic Area** |
| **TYPE:** | **Interreg Atlantic Area 2016** |
| **TIME FRAME:** | **2017-2020** |
| **FUNDING:** | **285.178 €** |
| **PARTNERS:** | **Universidad de Cantabria - leading partner**<br>**Consejería de Medio Rural, Pesca y Alimentación del Gobierno de Cantabria**<br>**Universidade de Tras-Os-Montes e Alto Douro**<br>**Agri Food and Biosciences Institute**<br>**BC3**<br>**Université de Bretagne Occidentale**<br>**Gistree**<br>**Quercus**<br>**Université de Rennes**<br>**Le Centre National de la Recherche Scientifique**<br>**National University of Ireland, SEMRU** |

## Project Description

Eleven European institutions from 5 countries (France, Ireland, United Kingdom, Portugal and Spain) joined to develop an innovative approach to assess how Blue and Green Infrastructures can contribute to meeting the EU 2020 targets for biodiversity in Atlantic coastal and terrestrial landscapes. The team includes scientists, universities, research institutes, local and national governments, NGOs and SMEs, who have the appropriate environmental, social and economic experience. Fishing, tourism, agriculture and forestry provide essential economic assets (Ecosystem Services) to the development of many coastal and rural areas of the Atlantic region. All these activities have been identified as important within the Research and Innovation Strategies for Smart Specialization for many EU regions of the Atlantic region (ie RIS3 objectives). However, the Ecosystem Service provision from Atlantic landscapes could be seriously compromised by losses on biodiversity because of changes on land uses and climate change.

Aquatic ecosystems such as rivers and estuaries are especially vulnerable to the impacts of human activities in the watershed such as urbanization, pollution of rivers, application of fertilizers and bad land management.

Based in four Case Studies, the aim of ALICE is to develop a common methodology that recognizes the socioeconomic differences between the “Case Studies” to help transform the way, regional and local actors manage natural resources in the Atlantic region. This will assist on a more sustainable management of these landscapes by ensuring the conservation of biodiversity and ecosystem services provisioning.

## Key BC3 researchers involved

Dr. Ferdinando Villa (PI)
Dr. Stefano Balbi
Dr. Javier Martinez
Dr. Ainhoa Magrach

## Link with BC3 Research Line

Climate and Natural Environment

## Acknowledgement

ALICE project, whose leading partner is Universidad de Cantabria, has received funding from the European Union’s Interreg Atlantic Area programme. Ref number:EAPA_261/2016

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

Bundesministerium
für Umwelt, Naturschutz,
Bau und Reaktorsicherheit

## BMU_WISEUP

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|---|---|
| **NAME OF THE PROJECT:** | **German Ministry for the environmnent, nature conservation and nuclear safety: Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes (WISE-UP)** |
| **FUNDING AGENCY:** | **German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety** |
| **TYPE:** | **International Climate Initiative 2012 (German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)** |
| **TIME FRAME:** | **2013–2018** |
| **FUNDING:** | **478.276 €** |
| **PARTNERS:** | **The International Union for Conservation of Nature (UICN) - Coordinator**<br>**BC3 Basque Centre for Climate Change**<br>**Council for Scientific and Industrial Research, University of Nairobi**<br>**International Water Management Institute**<br>**University College London, Overseas Development Institute** |

## Project Description

Major new climate financing for adaptation is coming on stream with water infrastructure as a priority. Ecosystem services need to be linked more directly and clearly into water infrastructure development, for climate change adaptation and integration into water, food and energy security. If river basins themselves are treated as natural infrastructure, based on the ecosystems services they provide, then infrastructure planning and investment can consider alternate 'portfolios' of built and natural infrastructure. This project will develop, test and demonstrate approaches to using portfolios of built and natural water infrastructure development to achieve more optimal outcomes for the multiple goals of poverty reduction, water-food-energy security, biodiversity conservation and climate resil-ience. WISE-UP will demonstrate the application of natural infrastructure as a 'nature-based solution' for climate change adaptation and more sustainable development in the Volta and Tana river basins of West and East Africa respectively.

The project will increase adaptive capacity for climate change in the Volta and Tana basins through identification of optimised portfolios of built and natural water infrastructure in decision making and consensus building. The project will collect and synthesise hydrological, ecological and economic data, enabling development and testing of innovative applications of cutting edge optimisation of multiple objectives for basin infrastructure. New evidence and tools will be tailored through participatory learning to end user needs, supported by analysis of political, institutional and stakeholder dynamics in decision making. Capacity building and communications will disseminate results, lessons, skills and rec-ommendations from the project regionally and globally.

The project will contribute directly to realising the 'nexus opportunities' identified at the Bonn 2011 Conference on water, food and energy security, while facilitating action on the Aichi targets for biodiversity. An open-source platform will make evidence and tools from the project available to national experts and consultants to support development of new national and regional knowledge-based business.

## BC3's contribution to the project

BC3 is a partner of a consortium to provide Economic valuation and benefits of Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes.

## Key BC3 researchers involved

Prof. Anil Markandya
Dr. Marc Neumann
Dr. Amaia de Ayala
Laetitia Pettinotti

## Link with BC3 Research Line

Climate Policy

# 3.2 RESEARCH PROJECTS

## RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

## DECCMA

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|---|---|
| **NAME OF THE PROJECT:** | **DEltas, vulnerability and Climate Change; Migration as an Adaptation** |
| **FUNDING AGENCY:** | **Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA)** |
| **TYPE:** | **Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA)** |
| **TIME FRAME:** | **2014-2018** |
| **FUNDING:** | **£229.484** |
| **PARTNERS:** | **University of Southampton - Coordinator**<br>**BC3 Basque Centre for Climate Change**<br>**University of Dundee**<br>**University of Exeter**<br>**International Water Management Institute**<br>**Met Office Hadley Centre**<br>**Plymouth Marine Labs**<br>**UN Food and Agriculture Organisation (FAO)"** |

## Project Description

With their large and often poor populations in low-lying areas, deltas have long been seen as highly vulnerable to climate change and non-climate drivers with, in the most extreme, large-scale displacement of people being the result. Migration is a complex process which is already occurring in all deltas, largely independent of climate change. Most research on deltas and migration tends to focus on individual system elements and issues rather than taking a systems-level perspective. This fails to consider the wider consequences of climate change and the interdependence between these phenomena and people's behaviour. In contrast to previous research, this programme of research will take a systemic and multi-scale analytical perspective to understand gendered vulnerability and adaptation in deltas under a changing climate by analysing four contrasting populous delta systems in South Asia and Africa where there is significant potential for migration.

The dual research aims are:

1. To assess migration as an adaptation in deltaic environments with a changing climate.
1. To deliver policy support to create the conditions for sustainable gender-sensitive adaptation.

## BC3's contribution to the project

BC3 partner of a consortium for the project DECMA, assess how people adapt to climate change in deltas; case studies in Asia and Africa.

## Key BC3 researchers involved

Prof. Anil Markandya
Dr. Iñaki Arto
Dr. Mikel Gonzalez
Dr. Ignacio Cazcarro

## Link with BC3 Research Line

Low Carbon

## URL Address

http://www.bc3research.org/projects/deccma.html

# 3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

MINECO or Spanish Institutions



## MINECO_RETOS 15_REBECOM

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| **REFERENCE NUMBER:** | **CGL2015-70452-R** |
| **NAME OF THE PROJECT:** | **REBECOM "Estimation of the recovery time of temperate forests after historical anthropogenic impacts along a complexity gradient"** |
| **FUNDING AGENCY:** | **MINECO – Spanish Ministry for Economy and Competitiveness** |
| **TYPE:** | **Programa Estatal de I+D+i Orientada a los Retos de la Sociedad 2015** |
| **TIME FRAME:** | **2016-2018** |
| **FUNDING:** | **141.000 €** |
| **PARTNERS:** | **University of the Basque Country (UPV-EHU)** |

## Project Description

In order to reduce the accelerated loss of ecosystem diversity, functions and services, a multitude of restoration strategies and programs have been launched around the world driven by the initiatives of the Convention on Biological Diversity or the European Commission. However, it has been found in wetlands, rivers and other habitats that restored ecosystems are less functional and less diverse than those preserved (relatively undisturbed) for long periods of time (> 100 years). This may be due to many factors, but it is related to the time it takes ecosystems to fully recover and the parameters used to measure the success of the restoration. In this project, we measure the evolution of some interactions along a chronosequence of 500 years to understand the process of recovery of the deep structure of ecosystems. In this study we consider a recovered ecosystem as one that reaches stability from a multidimensional perspective, including biogeochemical means (carbon and nitrogen in the soil), community structure (fungivorous insects and ectomycorrhizas) and architecture of interaction networks (Among ectomycorrhizae, trees and insects) all related to essential functions of the ecosystem, such as the production and cycling of nutrients in the system. To know these recovery times, we will measure these parameters in a chronosequence in two mining areas of the massif of Peña del Aia and surroundings in the provinces of Navarra and Guipuzcoa. This will also allow us to study the temporal evolution of interactions in the ecological networks studied and to identify possible groups of species with a key role in the recovery and functioning of the system. This will have applications in the regulation of the restoration of ecosystems, within the mitigation policies, as it will allow to know the true magnitude of the degradation that must be compensated and will also have application for the practice of the restoration and the forest management for Conservation, since it will guide efforts towards key elements that regulate the recovery and functionality of temperate forests after cessation of human impacts.

## BC3's contribution to the project

This research project is led by Dr. David Moreno.

## Key BC3 researchers involved

Dr. David Moreno
Asun Rodríguez
June Hidalgo

## Link with BC3 Research Line

Climate and Natural Environment

# 3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

MINECO or Spanish Institutions

## MINECO_RETOS 15_CLIMAECOM

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| **REFERENCE NUMBER:** | **ECO2015-68023-C2-1-R** |
| **NAME OF THE PROJECT:** | **CLIMAECOM "Climate policies and transition to a low carbon economy"** |
| **FUNDING AGENCY:** | **MINECO – Spanish Ministry for Economy and Competitiveness** |
| **TYPE:** | **Programa Estatal de I+D+i Orientada a los Retos de la Sociedad 2015** |
| **TIME FRAME:** | **2016-2018** |
| **FUNDING:** | **6.700 €** |
| **PARTNERS:** | **University of the Basque Country (UPV-EHU)** |

## Project Description

The main objective of this research project is to contribute to the advancement of scientific knowledge to promote the reduction of carbon emissions and to promote the transition to a low carbon economy. This project is specifically aimed at acquiring new knowledge to advance the resolution of Challenge 5 ("Action on climate change and efficiency in the use of resources and raw materials") identified in the Spanish Strategy for Science and Technology and Innovation. There is a growing scientific consensus that, if we are to avoid the potential adverse effects of climate change, carbon emission levels should be reduced globally by 50% by 2050. Achieving this objective without the economic and social well-being of each country, especially for the most vulnerable, is disadvantaged is not an easy task. In fact, this international and intergenerational dimension of climate change explains the difficulties encountered in the negotiations in the context of the United Nations. Framework Convention on Climate Change. There is, therefore, a need to investigate different national and / or international strategies for reducing CO2 emissions. In this project we will analyze different key dimensions related to the design of climate policies to favor the transition towards a low carbon economy. For example, the importance of financial mechanisms for climate policy, the interaction between climate policy and international trade, or how to design climate policies that incorporate the risk and uncertainty inherent in climate change will be analyzed. We will also explore alternative ways to achieve mitigation objectives through changes at the macroeconomic level, technological changes and changes in consumption patterns, to foster the decoupling of economic growth and CO2 emissions. In addition, the economic impact (in terms of efficiency and equity) of different policies and instruments such as different types of fiscal reform, as well as the additional benefits in terms of local pollution and public health associated with some climate policies will be studied.

## BC3's contribution to the project

This project is led by Dr. Mikel González-Eguino.

## Key BC3 researchers involved

Prof. Anil Markandya
Dr. Iñaki Arto
Dr. Mikel González-Eguino
Dr. Luis Mª Abadie
Dr. Ignacio Cazcarro

## Link with BC3 Research Line

Low Carbon

# 3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

MINECO or Spanish Institutions

## MINECO_RETOS 15_ESPERA

| | |
|---|---|
| **REFERENCE NUMBER:** | **CSO2015-71243-R** |
| **NAME OF THE PROJECT:** | **ESPERA "Social Equity in Payments for Environmental Services: A Socio-Ecological Perspective"** |
| **FUNDING AGENCY:** | **MINECO – Spanish Ministry for Economy and Competitiveness** |
| **TYPE:** | **Programa Estatal de I+D+i Orientada a los Retos de la Sociedad 2015 MINECO** |
| **TIME FRAME:** | **2016-2018** |
| **FUNDING:** | **15.000 €** |

## Project Description

The main objective of ESPERA is to contribute to the knowledge of the impact of PESs (Payment for Ecosystem Services) on social equity and its trade-offs with environmental effectiveness and economic efficiency, from the socio-ecological perspective of Ecosystem services. ESPERA will advance in the development of a conceptual framework by introducing power relations among PES actors, a variable usually overlooked in the literature on PES. The governance of nature conservation is evolving towards the use of voluntary economic incentives, and within these, towards the so-called Payments for Environmental or Ecosystem Services (PES). The PES are now at the center of the international conservation agenda promoted by various actors such as intergovernmental institutions (eg World Bank, UNEP, etc.), national governments (eg, Costa Rica, Colombia, Mexico, etc.) and the private sector (eg Vitell-Danone). PSAs are justified for reasons of economic efficiency and for the ability to achieve public-private financing. However, there is a weak integration of aspects of social equity in the PES. Social equity is understood in a multidimensional manner including aspects of **(I)** distribution of the benefits of payments and conservation responsibilities among stakeholders; **(II)** recognition of values from the ethical point of view on the relationship between society and nature; And **(III)** participation in the design and implementation of PES by the main actors. The main objective of ESPERA is to contribute to the knowledge of the impact of PES on social equity and its trade-offs with environmental effectiveness and economic efficiency from the socio-ecological perspective of ecosystem services. To study empirically the social equity in PES already established PES programs, through meta-analysis and two case studies in depth in Latin America; One in Costa Rica, a pioneer country in the implementation of PES programs, and another in Colombia.

## BC3's contribution to the project

This research project is led by Dr. Unai Pascual.

## Key BC3 researchers involved

Prof. María José Sanz (PI)
Dr. Unai Pascual Ikerbasque Professor (PI)
Dr. Sebastien Foudi
Dr. Ignacio Palomo
Dr. Eneko Garmendia

## Link with BC3 Research Line

Climate and Natural Environment

# 3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

Basque Government and Basque Institutions

## IHOBE_OASIS

| | |
|---|---|
| **NAME OF THE PROJECT:** | **(OASIS) "Olas de calor e impactos sobre la salud humana" (Heatwaves and impacts of human health)** |
| **FUNDING AGENCY:** | **IHOBE** |
| **TYPE:** | **KLIMATEK : Proyectos de Innovación y Demostración en Adaptación al Cambio Climático en Euskadi 2017-2018. IHOBE** |
| **TIME FRAME:** | **01/07/2017 - 30/10/2018** |
| **FUNDING:** | **78.650 €** |
| **PARTNERS:** | **BC3 Basque centre for Climate Change<br>Euskoiker - Grupo de Investigación Atmosférica de la Universidad del País Vasco/ Euskal Herriko Unibertsitatea (UPV/EHU).<br>Environment and Systems** |

## Project Description

The main objectives of the OSATU project are:

**1** The development of a dynamic methodological framework to characterise heatwaves, based on the impacts on human health and other relevant local environment parameters, including recommendation on possible indicators.

**2** The evaluation of the additional economic costs at short-medium term for the public health system due to the heatwaves compared with the long-term cost (OSATU Project)

## Key BC3 researchers involved

Dr. María José Sanz
Dr. Aline Chiabai
Dr. Silvestre García de Jalón

## Link with BC3 Research Line

Health and Climate

## URL Address

https://www.bc3research.org/projects/oasis.html

# 3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

Basque Government and Basque Institutions

## IHOBE_REMEDISOST

| | |
|---|---|
| **NAME OF THE PROJECT:** | **REMEDISOST "Design of a Methodology for the Evaluation of the Sustainability of Contaminated Soil Remediation Plans"** |
| **FUNDING AGENCY:** | **IHOBE** |
| **TYPE:** | **Proyectos de Ecoinnovación durante el ejercicio 2016. IHOBE** |
| **TIME FRAME:** | **11/07/2016-26/05/2017** |
| **FUNDING:** | **23.209 €** |
| **PARTNERS:** | **Gaiker IK4** - Coordinator<br>**Neiker Tecnalia**<br>**AFESA Medioambiente S.A.**<br>**BC3 Basque Centre for Climate Change** |

## Project Description

The REMEDISOST project aims to develop a rigorous, reliable and robust methodology that can carry out an analysis and evaluation of the sustainability of the different remediation plans of contaminated soils that, from the technical point of view, allow to recover a soil from an initial contamination situation to a final situation according to the intended use of the soil.

## Key BC3 researchers involved

Dr. Ibon Galarraga
Dr. Ignacio Palomo
Dr. Elisa Sainz de Murieta

## Link with BC3 Research Line

Climate Policy

## URL Address

http://www.bc3research.org/research_projects/climate_policy_completed_projects/remedisost_2.html

# 3.3 Collaborators

In BC3, we operate under the philosophy that effective research can only be conducted in collaboration with other research groups. As a result, BC3 researchers were directly involved in collaborative research projects, dissemination and training activities both locally and worldwide. Besides, our international collaboration programs have enabled us to establish collaborations and own networks that span five continents.

This networking involves:

- THE DEVELOPMENT OF SHARED RESEARCH PROJECTS.
- THE EXCHANGE OF RESEARCHERS.
- THE EXCHANGE OF PHD STUDENTS.
- THE TRANSFER OF BEST PRACTICES.
- THE COOPERATION AND PARTICIPATION IN DISSEMINATION AND TRAINING ACTIVITIES.

At BC3 we were actively involved in attracting external funds from international funding bodies, with a special focus on the European Union Research projects (H2020), which also were an interesting way of creating scientific networks, collaboratively with the consortium partners.

On top of that, the research lines maintained their collaboration with the most prestigious universities and research centers at international level among which we stand out the following during 2017: Grantham Research Institute for Climate Change and the Environment (UK), ECEHH Centre on Environment and Health (UK), McGill University (Canada), KTH Royal Institute of Technology, Environmental Humanities Lab (Sweden), Alfred Wegener Institute for Polar and Marine Research (Germany), among others.

Several contracts and agreements were also obtained with scientific prestigious institutions at local and international level allowing us to widen our collaborators' net.

- **Basque Government** – Design of the Training program on climate change for Basque Government or Basque Public Agencies' employees.
- **IHOBE** – Preparation of the report on "Land Protection and Climate Change at the Basque Country".
- **Fundación BBK** – Financial support for master students on "Green growth in Bizkaia".
- **Private consultancy Donna Lee Consulting LLC –** Preparation of the report on "GhG Atmospheric fluxes of forests".
- **JRC Joint Research Centre** – Generating a user-friendly code and graphical user interface (GUI) allowing the user to calculate and represent in the desired aggregation levels the domestic and foreign embodied employment and value added in bilateral gross exports using the WIOD (2016) database and other related labour statistics. Production of a pocketbook.

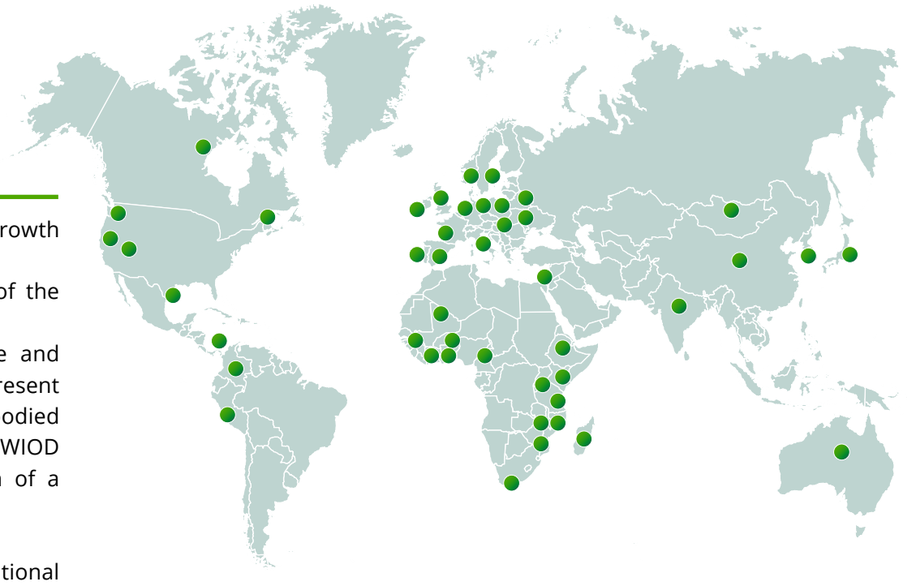
Our **visiting programme** was another important way to attract international and national climate change experts to the Basque Country, as well as to begin new relationships with other institutions.

Besides, BC3 was dynamic and active part of the Basque Science, Technology and Innovation Network, promoting and collaborating in Research projects with the different members of the network.

The University of the Basque Country (UPV / EHU) is our academic partner and therefore the joint work carried out covers different areas such as research, training and scientific dissemination. Since our centre was created in 2008, we have kept a close relationship with UPV/EHU and, over the years, we have consolidated different programs: joint seminars, the Klimagune Workshop, our participation in the "EUSKAMPUS" initiative, collaboration in various proposals and research projects or in masters and doctoral programs, among others.

## REINFORCING COLLABORATIONS THROUGH REMEDIA NETWORK

In 2011, we fostered the establishment of REMEDIA network (Scientific Network on the Mitigation of GHG Emissions from Agroforestry Activities) to promote exchanges among the researches working the mitigation of GHG emissions from agriculture and forestry sectors, as well as to exchange dissemination of scientific and strategic information with both public institutions and private sector in Spain. At an international level, this network fosters a closer research collaboration with other international networks. Spanish Ministry of



Agriculture and Fisheries, Food and Environment (MAPAMA), acknowledged the importance of this initiative –nowadays made of around a hundred and fifty of researchers, spread through very diverse geographic regions and academic fields- for its contributions to the improvement of the scientific basis of the estimated GHG inventory for the Spanish agroforestry industry. More info: https://www.redremedia.org.

## NUT_GLOBAL UNIVERSITY NETWORK

BC3 is coordinating at European level the innovative project for a worldwide campus of excellence, led by the Nagaoka Technological University of Japan, which in 10 years will make possible the creation of a "Global University" that will facilitate the international mobility of students and researchers, and will strengthen the international presence of SMEs in the field of sustainable technologies.

This exchange model is a strategic initiative of the Japanese government to generate a global campus of excellence, with permanent connections in countries such as Germany, South Africa, Vietnam and Mexico. According to their estimates, the project will be fully deployed in a decade, and will count on with an average of 900 participants annually. The program is entirely financed by the Japanese government, through endowments intended for this purpose. During 2017, NUT and BC3 signed an agreement to set a coordination office at BC3 premises with the aim of:

# 3.3 Collaborators

- Managing and supporting the GIGAKU Education and Research Network, and GIGAKU Techno Park Network in Europe.
- Collecting and providing information on scholarships and exchange of students within the frame of GIGAKU.
- Promoting Industry-Academia activities and exploring the companies which could be potentially interested in GIGAKU Techno Park activities.

The agreement was made possible by the work done by the BC3 team, led by Professor Ikerbasque and researcher Ramón y Cajal, Sérgio Henrique Faria, with the collaboration of Bizkaia Talent, the association promoted by the Provincial Council of Bizkaia to attract, retain and link highly qualified people to Bizkaia (Basque Country), in the scientific, technological and business fields.

### INTERNATIONAL NETWORK OF CENTERS OF EXCELLENCE AND CLIMATE CHANGE THINK-TANKS FOR CAPACITY DEVELOPMENT (INCCCETT 4CB)

BC3, jointly with other 11 international reference research centers, announced on the 14 November at the COP 22 its participation in the creation of a pioneering network of research centers of excellence (INCCCETT 4CB) “International Network on Climate Change Centres of Excellence and Think Tanks”.

This network, whose technical secretary is in charge of the recently created Center of Compétences Changement Climatique du Maroc (4C Maroc), is participated by first level centers such as the International Institute for Climate and Society of Columbia (IRI), the Stockholm Environment Institute (SEI), the International Institute for Global Change Research (IAI) and the International Institute for Climate Change For Sustainable Development (IISD), and its purpose is:

- To achieve climate action in the climate contributions of all countries through better South-South-North collaboration between Think-Tanks and centers of excellence, thus responding to the needs of policy makers at all levels of government (local, regional, national).
- To increase the impact of capacity development by improving outreach and focusing on practices that have a sustainable impact.

INCCCETT 4CB
INTERNATIONAL CLIMATE CHANGE CENTERS
OF EXCELLENCE AND THINK THANKS FOR CAPACITY BUILDING

# 3.3 Collaborators

## Some of our collaborators in 2017

Center for International Forestry Research - CIFOR (Indonesia)

Central University of Ecuador (Ecuador)

Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas – CIEMAT (Spain)

Centro Euro-Mediterraneo per i Cambiamenti Climatici - CMCC ( Italy)

Charles University Environment Centre (Czech Republic)

CICERO (Norway)

Colorado State University (USA)

Conservation International (USA)

CSIC (Spain)

Danish Board of Technology (Denmark)

ECEHH Centre on Environment and Health (UK)

Economics for Energy - University of Vigo (Spain)

ETH Zurich (Switzerland)

European Environmental Agency (Europe)

Food and Agriculture Organization of the United Nations - FAO (International)

Federal University of Rio Grande do Sul (Brasil)

Fondazione Eni Enrico Mattei (FEEM) (Italy)

Grantham Research Institute for Climate Change and the Environment (UK)

Greenwich University (UK)

Catalan Institute for Water Research - ICRA (Spain)

IH Cantabria (Spain)

IHOBE (Spain)

Instituto Carlos III (Spain)

International Centre for Integrated Mountain Development - ICIMOD (Nepal)

IPTS (Spain)

ISPRA (Italy)

KTH Royal Institute of Technology, Environmental Humanities Lab (Sweden)

Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) (Germany)

London School of Economics and Political Science (Gri-Lse)

London School of Hygiene and Tropical Medicine (UK)

Makerere University (Uganda)

McGill University (Canada)

National Taiwan University (Taiwan)

Neiker Tecnalia (Spain)

National Institute of Polar Research - NIPR (Japan)

Nagaoka University of Technology -NUT (Japan)

Osnabrueck University (Germany)

Queen's University Belfast (UK)

Rothamsted Research Centre (UK)

Stockholm Resilience Centre (Sweden)

Technical University of Berlin (Alemania)

The International Renewable Energy Agency (Irena)(Germany)

Universidad Autónoma de México (Mexico)

Universidad de Alcalá (Spain)

Universidad de Cádiz (Spain)

Universidad de Castilla la Mancha (Spain)

Universidad de las Palmas de Gran Canaria (Spain)

Universidad de Navarra (Spain)

Universidad de Valencia (Spain)

Universidad Miguel Hernández de Elche (Spain)

Universidad Miguel Hernández de Elche (UMH) (Spain)

Universidad of Alcalá (España)

Université de Bordeaux (France)

Université Laval (Canada)

University of Alcala (UAH) (Spain)

University of Bath (UK)

University of Exeter (UK)

University of Leicester (UK)

University of Massachusetts (USA)

University of Montreal - Public Health Research Institute (Canada)

University of Oldenburg (Germany)

University of Oulu (Finland)

University of Pretoria (South Africa)

University of Rome – Roma Tre (Italy),

University of Southampton (UK)

University of Texas(USA)

University of the Basque Country (UPV/EHU) (Spain)

University of Vigo (Spain)

UPM (Spain)

Wageningen University (Netherlands)

World Bank (International)

# 3.4 Publications

Since our creation in 2008, we have been aimed at publishing in the first-class international peer-reviewed journals and with the world-class most influential leading academic publishers. As a result, our volume of publications has increased, and so has their quality and impact.

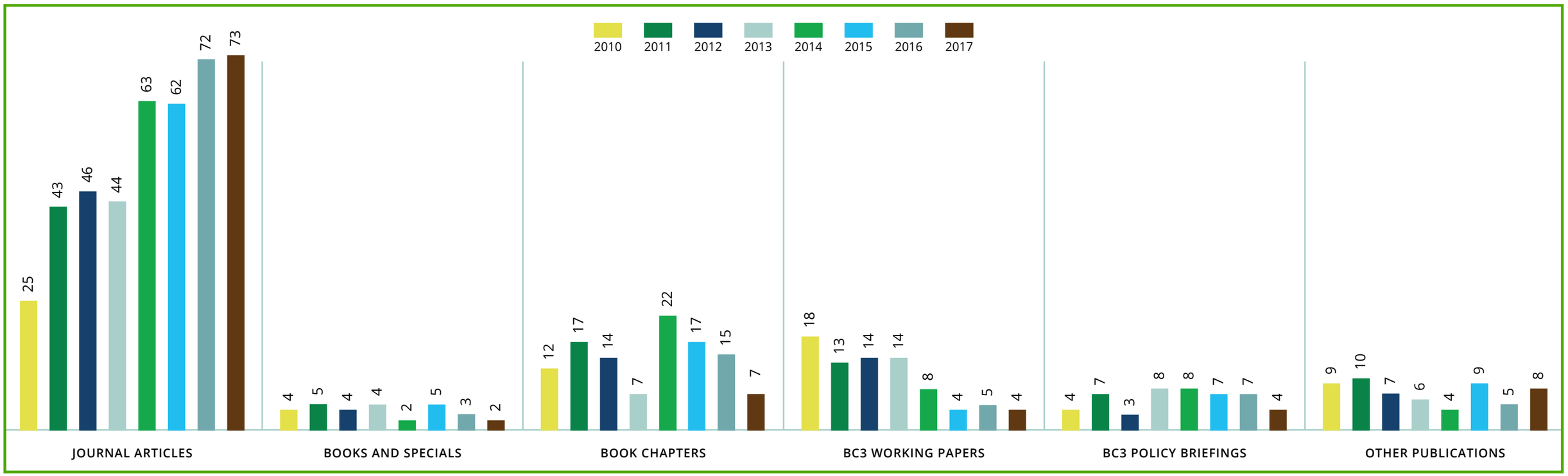
Prove of this, is that during 2017, the 79 % of the 73 peer-reviewed articles produced by BC3 and indexed in Scopus were published in first quartile (Q1) journals. These outstanding metrics, have taken BC3 to be ranked among the top ten climate change research institutions worldwide (based on standardized ranking of ICCG (International Centre for Climate Governance) in the latest 4 years. All the research lines of the centre contributed to these results through inter and multidisciplinary work in the area of climate and global change. Many of the publications demonstrate the multidisciplinary nature of the centre.

Following BC3´s classification system, the scientific production of the centre in 2017 was as follows:

During 2017, we published:

**73** JOURNAL ARTICLES*
**2** BOOKS
**15** BOOK CHAPTERS
**4** BC3 WORKING PAPERS
**4** BC3 POLICY BRIEFING
**8** TECHNICAL REPORTS

* *The journal articles production of 2016 has been corrected as two of the publications were finally published in 2017.*



# 3.4 Publications | 3.4.1 List of Publications

## Journal Articles (published on-line in 2017)


1. Abadie, L.M., Chamorro, J.M. 2017. **Valuation of Real Options in Crude Oil Production**. Energies. 10. (8) 1218. DOI (10.3390/en10081218).
2. Abadie, L.M., Galarraga, I., Sainz de Murieta, E. 2017. **Understanding risks in the light of uncertainty: low-probability, high-impact coastal events in cities**. Environmental Research Letters. 12. (1) 014017. DOI (10.1088/1748-9326/aa5254).
3. Abadie, L.M., Goicoechea, N. and Galarraga, I. 2017. **Carbon risk and optimal retrofitting in cement plants: An application of stochastic modelling, MonteCarlo simulation and Real Options Analysis**. Journal of Cleaner Production. 142 (Part 4). 3117-3130. DOI (10.1016/j.jclepro.2016.10.155).
4. Abadie, L.M., Goicoechea, N. and Galarraga, I. 2017. **Adapting the shipping sector to stricter emissions regulations: Fuel switching or installing a scrubber?** Transportation Research Part D: Transport and Environment. 57. 237-250. DOI (10.1016/j.trd.2017.09.017).
5. Abadie, L.M., Sainz de Murieta, E.,Galarraga, I. 2017. **Investing in adaptation: flood risk and real option application to Bilbao.** Environmental Modelling & Software. 95. 76-89. DOI (10.1016/j.envsoft.2017.03.038).
6. Aline Chiabai, Joseph V. Spadaro, Marc B. Neumann. 2017.**Valuing deaths or years of life lost? An economic assessment of the mortality benefits of an early heat warning system.** Mitigation and Adaptation Strategies for Global Change. DOI (10.1007/s11027-017-9778-4).
7. Antimiani, A., Costantini, Valeria., Markandya, A., Paglialunga, E., Sforna, G. 2017. **The Green Climate Fund as an effective compensatory mechanism in global climate negotiations.** Environmental Science & Policy. 77. 49-68. DOI (10.1016/j.envsci.2017.07.015).
8. Balvanera, P., Pascual, U., Díaz, S., Dziba, L., Prieur-Richaard, A-H, Subramanian, S.M. . 2017. **Urgent need to strengthen the international commitment to IPBES.** Nature Ecology & Evolution. 1. 197. DOI (10.1038/s41559-017-0197).
9. Barton et al. 2017. **(Dis) integrated valuation – Assessing the information gaps in ecosystem service appraisals for governance support.** Ecosystem Services. DOI (10.1016/j.ecoser.2017.10.021).
10. Boeri, M., Longo, A. 2017. **The importance of regret minimization in the choice for renewable energy programmes: Evidence from a discrete choice experiment.** Energy Economics. 63. 253-260. DOI (10.1016/j.eneco.2017.03.005).
11. Böhringer C., Garcia-Muros X., Cazcarro I., Arto I. 2017. **The efficiency cost of protective measures in climate policy.** ENERGY POLICY. 104. 446-454. DOI (10.1016/j.enpol.2017.01.007).
12. Böhringer C., Garcia-Muros X., González-Eguino, M., and Rey, L. 2017. **US Climate Policy: A Critical Assessment of Intensity Standards.** Energy Economics. DOI (10.1016/j.eneco.2017.10.021).
13. Capellán-Pérez, I., de Castro, C., Arto, I. 2017. **Assessing vulnerabilities and limits in the transition to renewable energies: land requirements under 100% solar energy scenarios.** Renewable & Sustainable Energy Reviews . 77. 760-782. DOI (10.1016/j.rser.2017.03.137).
14. Ciarreta A., Espinosa M.P., Pizarro-Irizar C. 2017. **Optimal regulation of renewable energy: A comparison of Feed-in Tariffs and Tradable Green Certificates in the Spanish electricity system.** Energy Economics. 67. (387) 399. DOI (10.1016/j.eneco.2017.08.028).
15. Ciarreta, A., Espinosa, M.P, Pizarro-Irizar, C. 2017. **Has renewable energy induced competitive behavior in the Spanish electricity market?**. Energy Policy. 104. 171–182. DOI (10.1016/j.enpol.2017.01.044).
16. Curiel Yuste, J.C., Heres, A.M., Ojeda, G., Paz, A.,Pizano, C., Pizano, D., García-Angulo, D., Lasso, E. 2017. **Soil heterotrophic CO 2 emissions from tropical high-elevation ecosystems (Páramos) and their sensitivity to temperature and moisture fluctuations.** Soil Biology and Biochemistry. 110. 8-11. DOI (10.1016/j.soilbio.2017.02.016).
17. Díaz-Balteiro L., de Jalón S.G. 2017. **Certifying forests to achieve sustainability in industrial plantations: Opinions of stakeholders in Spain.** Forests. 8. (12) 502. DOI (10.3390/f8120502).
18. Dick J., Turkelboom F., Woods H., Iniesta-Arandia I., Primmer E., Saarela S.-R., Bezák P., Mederly P., Leone M., Verheyden W., Kelemen E., Hauck J., Andrews C., Antunes P., Aszalós R., Baró F., Barton D.N., Berry P., Bugter R., Carvalho L., Czúcz B., Dunf. 2017. **Stakeholders' perspectives on the operationalisation of the ecosystem service concept: Results from 27 case studies.** Ecosystem Services. DOI (10.1016/j.ecoser.2017.09.015).
19. Dunford, R. et al. 2017. **Integrating methods for ecosystem service assessment: Experiences from real world situations.** Ecosystem Services. DOI (10.1016/j.ecoser.2017.10.014).
20. Farinós-Celdrán, P., Robledano-Aymerich,F., Carreño, M.F.,Martínez-López,J. 2017. **Spatiotemporal Assessment of Littoral Waterbirds for Establishing Ecological Indicators of Mediterranean Coastal Lagoons.** ISPRS International Journal of Geo-Information. 6. (8) 256. DOI (10.3390/ijgi6080256).
21. Fernández, M.P, Basauri, J.,Madariaga, C.,Menéndez-Miguélez, M., Olea, R., Zubizarreta-Gerendiain, A. 2017. **Effects of thinning and pruning on stem and crown characteristics of radiata pine (Pinus radiata D. Don).** iForest-Biogeosciences and Forestry. 10. (2) 383-390. DOI (10.3832/ifor2037-009).
22. Floress K, García de Jalón S., Church SP, Babin N, Ulrich-Schad JD, Prokopy LS. 2017. **Toward a theory of farmer conservation attitudes: Dual interests and willingness to take action to protect water quality.** Journal of Environmental Psychology. 53. 73–80. DOI (10.1016/j.jenvp.2017.06.009).
23. Foudi, S., Osés-Eraso,N., Galarraga, I. 2017. **The effect of flooding on mental health: Lessons learned for building resilience.** Water Resources Research. 53. (7) 5831–5844. DOI (10.1002/2017WR020435).
24. Foudi,S., Spadaro, J.V.,Chiabai,A., Polanco-Martínez, J.M., Neumann, M.B. 2017. **The climatic dependencies of urban ecosystem services from green roofs: Threshold effects and non-linearity.** Ecosystem Services. 24. 223-233. DOI (10.1016/j.ecoser.2017.03.004).
25. Frugone-Álvarez, M.; Latorre, C.; Giralt, S.; Polanco-Martínez, J.M.; Bernárdez, P.; Oliva-Urcia, P.; Maldonado, A.; Carrevedo, M.L.; Moreno, A.; Delgado Huertas, A.; Prego, R.; Barreiro-Lostres, F.;Valero-Garcés, B. 2017. **A 7,000 yr high-resolution lake sediment record from coastal central Chile (Lago Vichuquén, 34°S): implications for past sea level and environmental variability.** Journal of Quaternary Science . 32. (6) 830-844. DOI (10.1002/jqs.2936).
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27. Galán, E. 2017. **Feeding soils: Nutrient balance in the northeast of the Iberian Peninsula c. 1920.** Historia Agraria. 72. 107-134.
28. García-Muros X. and González-Eguino, . 2017. **Análisis de una reforma fiscal ambiental para España con devoluciones para todos los hogares.** Papeles de Economía Española (N154) 216-231.
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41. Longo A., Campbell D. 2017. **The Determinants of Brownfields Redevelopment in England.** Environmental and Resource Economics. 67. (2) 261-283. DOI (10.1007/s10640-015-9985-y).
42. Magrach A., González-Varo J.P., Boiffier M., Vilà M., Bartomeus I. 2017. **Honeybee spillover reshuffles pollinator diets and affects plant reproductive success.** Nature Ecology and Evolution. 1. (9) 1299-1307. DOI (10.1038/s41559-017-0249-9).
43. Medina-Elizalde M., Burns S.J., Polanco-Martínez J., Lases-Hernández F., Bradley R., Wang H.-C., Shen C.-C. 2017. **Synchronous precipitation reduction in the American Tropics associated with Heinrich.** Scientific Reports. 7. (1) 11216. DOI (10.1038/s41598-017-11742-8).
44. Meli P., Holl K.D., Benayas J.M.R., Jones H.P., Jones P.C., Montoya D., Mateos D.M. 2017. **A global review of past land use, climate, and active vs. passive restoration effects on forest recovery.** PLoS One. e0171368. DOI (10.1371/journal.pone.0171368).
45. Mohan G., Longo A., Kee F. 2017. **Evaluation of the health impact of an urban regeneration policy: Neighbourhood Renewal in Northern Ireland.** DOI (10.1136/jech-2017-209087).

# 3.4 Publications | 3.4.1 List of Publications

## Journal Articles (published on-line in 2017)


**46.** Moreno-Mateos D., Barbier, E.B., Jones, P.B, Jones, H.P., Aronson, J., López-López, J.A., McCrackin, M.L., Meli, P., Montoya, D., Benayas, J.M.R. 2017. **Anthropogenic ecosystem disturbance and the recovery debt.** Nature Communications. 8. 14163. DOI (10.1038/ncomms14163).

**47.** Nordhagen, S. Pascual, U., Drucker, A. 2017. **Feeding the Household, Growing the Business, or Just Showing Off? Farmers' Motivations for Crop Diversity Choices in Papua New Guinea.** ECOLOGICAL ECONOMICS. 137. 99-109. DOI (10.1016/j.ecolecon.2017.02.025).

**48.** Ojea, E., Pearlman, L., Gaines,S.D., Lester, S.E. 2017. **Fisheries regulatory regimes and resilience to climate change.** AMBIO. 46. (4) 399-412. DOI (10.1007/s13280-016-0850-1).

**49.** Oliveira, D., Sánchez Goñi, M.F., Naughton,F., Polanco-Martínez, J.M., Jiménez-Espejo, F., Grimalt,F., Martrat, B., Voelker, A.H.L., Trigo, R., Hodell, D., Abrantes, F., Desprat,S. 2017. **Unexpected weak seasonal climate in the western Mediterranean region during MIS 31, a high-insolation forced interglacial.** QUATERNARY SCIENCE REVIEWS. 161. 1-17. DOI (10.1016/j.quascirev.2017.02.013).

**50.** Palma JHN, Crous-Duran J, Graves AR, García de Jalón S., Upson M, Oliveira TS, Paulo JA, Ferreiro-Domínguez N, Moreno G., Burgess PJ. 2017. **Integrating belowground carbon dynamics into Yield-SAFE, a parameter sparse agroforestry model.** AGROFORESTRY SYSTEMS. DOI (10.1007/s10457-017-0123-4.)

**51.** Palomo I., Múgica M., Piñeiro C., Martín-López B., Atauri J., Montes C. 2017. **Envisioning protected areas through participatory scenario planning: Navigating coverage and effectiveness challenges ahead.** PARKS. 23. (1) 29-44. DOI (10.2305/IUCN.CH.2017.PARKS-23-1IP.en).

**52.** Palomo, I. 2017. **Climate Change Impacts on Ecosystem Services in High Mountain Areas: A Literature Review.** Mountain Research and Development. 37. 179-187. DOI (10.1659/MRD-JOURNAL-D-16-00110.1).

**53.** Pardo, G., del Prado, A., Martínez-Mena, M., Bustamante, M. A., Martín, J. R., Álvaro-Fuentes, J., & Moral, R. 2017. **Orchard and horticulture systems in Spanish Mediterranean coastal areas: Is there a real possibility to contribute to C sequestration?** Agriculture, Ecosystems & Environment. DOI (10.1016/j.agee.2016.09.034).

**54.** Pardo. G., Moral. R., and del Prado, A. 2017. **SIMSWASTE-AD - A modelling framework for the environmental assessment of agricultural waste management strategies: Anaerobic digestion.** SCIENCE OF THE TOTAL ENVIRONMENT. 574. 806-817. DOI (10.1016/j.scitotenv.2016.09.096).

**55.** Pascual, U., Balvanera, P., Díaz, S., et al. . 2017. **Valuing nature's contributions to people: the IPBES approach.** Current Opinion in Environmental Sustainability. 26-27. 7-16. DOI (10.1016/j.cosust.2016.12.006).

**56.** Pascual, U., Palomo, I., Adams, W., Chan, K., Daw, T., Garmendia, E., Gómez-Baggethun, E., de Groot, R., Mace, G., Martín-López, B., Phelps, J. 2017. **Off-stage ecosystem service burdens: A blind spot for global sustainability.** Environmental Research Letters. DOI (10.1088/1748-9326/aa7392).

**57.** Phelps, J., Dermawan, A., Garmendia, E. 2017. **Institutionalizing environmental valuation into policy: Lessons from 7 Indonesian agencies.** GLOBAL ENVIRONMENTAL CHANGE-HUMAN AND POLICY DIMENSIONS. 43. 15-25. DOI (10.1016/j.gloenvcha.2017.01.004).

**58.** Ricaurte,L. F., Olaya-Rodríguez, M., Cepeda-Valencia, J., Lara, D., Arroyave-Suárez, J., Max Finlayson, C., Palomo, I. 2017. **Future impacts of drivers of change on wetland ecosystem services in Colombia.** Global Environmental Change. 44. 158-169. DOI (10.1016/j.gloenvcha.2017.04.001).

**59.** Román de Lara, M.V., Sanz Sanchez, M.J. y Galarraga Gallastegui, I. 2017. **La COP22 de Marrakech confirma el compromiso mundial con la lucha contra el cambio climático.** Dyna. 92. (2) 133-135 . DOI (10.6036/8273).

**60.** Román, M.V., Arto. I., Ansuategi, A. 2017. **Why do some economies benefit more from climate finance than others? A case study on North-to-South financial flows.** Economic Systems Research. 1-24. DOI (/10.1080/09535314.2017.1334629).

**61.** Saarikoski H., Primmer E., Saarela S.-R., Antunes P., Aszalós R., Baró F., Berry P., Blanko G.G., Goméz-Baggethun E., Carvalho L., Dick J., Dunford R., Hanzu M., Harrison P.A., Izakovicova Z., Kertész M., Kopperoinen L., Köhler B., Langemeyer J., Lapola D. 2017. **Institutional challenges in putting ecosystem service knowledge in practice.** Ecosystem Services. DOI (10.1016/j.ecoser.2017.07.019).

**62.** Sánchez Goñi M.F., Desprat S., Daniau A.-L., Bassinot F.C., Polanco-Martínez J.M., Harrison S.P., Allen J.R.M., Scott Anderson R., Behling H., Bonnefille R., Burjachs F., Carrión J.S., Cheddadi R., Clark J.S., Combourieu-Nebout N., Mustaphi C.J.C., Debusk. 2017. **The ACER pollen and charcoal database: A global resource to document vegetation and fire response to abrupt climate changes during the last glacial period.** Earth System Science Data. 9. (2) 679-695. DOI (10.5194/essd-9-679-2017).

**63.** Sanz-Cobena, A. , Lassaletta, L., Aguilera, E., del Prado, A. , Garniere, J., Billen, G., Iglesias, A., Sánchez, B., Guardia, G., Abalos, D., Plaza-Bonilla, D., Puigdueta-Bartolomé, I., Moral, R., Galán, E., Arriaga, H., Merino, P., Infante-Amate, J. 2017. **Strategies for greenhouse gas emissions mitigation in Mediterranean agriculture: A review.** AGRICULTURE ECOSYSTEMS & ENVIRONMENT. 238. 5-24. DOI (10.1016/j.agee.2016.09.038).

**64.** Sharifi, A., Chelleri,L., Fox-Lent, C., Grafakos, S., Pathak,M., Olazabal, M., Moloney,S., Yumagulova,L., Yamagata, Y. 2017. **Conceptualizing Dimensions and Characteristics of Urban Resilience: Insights from a Co-design Process.** Sustainability. 9. (6) 1032. DOI (10.3390/su9061032).

**65.** Turkelboom et al. 2017. **When we cannot have it all: Ecosystem services trade-offs in the context of spatial planning.** Ecosystem Services. DOI (10.1016/j.ecoser.2017.10.011).

**66.** Ulrich-Schad J.D., García de Jalón S., Babin N., Pape A., Prokopy L.S. 2017. **Measuring and understanding agricultural producers' adoption of nutrient best management practices.** Journal of Soil and Water Conservation. 72. (5) 506-518. DOI (10.2489/jswc.72.5.506).

**67.** Valatin G., Abildtrup J., Accastello C., Al-Tawaha A., Andreucci M., Atanasova S., AvdibegoviM., Baksic N., Banasik K., Barquin J., Barstad J., Bastakova V., Becirovic D., Begueria S., Bethers U., Bihunova M., Blagojevic B., Bösch M., Bournaris T., Cao Y., Carvalho-Santos. 2017. **PESFOR-W: Improving the design and environmental effectiveness of woodlands for water Payments for Ecosystem Services.** Research Ideas and Outcomes. 3. e13828. DOI (10.3897/rio.3.e13828).

**68.** Van de Ven, D.J., Fouquet, R. 2017. **Historical Energy Price Shocks and their Changing Effects on the Economy.** ENERGY ECONOMICS. DOI (10.1016/j.eneco.2016.12.009).

**69.** Van de Ven, DJ., González-Eguino, M. & Arto, I. 2017. **The potential of behavioural change for climate change mitigation: a case study for the European Union.** Mitigation and Adaptation Strategies for Global Change. DOI (10.1007/s11027-017-9763-y).

**70.** Villa, F., Balbi, S., Athanasiadis, I.N., Caracciolo, C. 2017. **Semantics for interoperability of distributed data and models: Foundations for better-connected information.** F1000Research. 6. 686. DOI (10.12688/f1000research.11638.1).

**71.** Zabala, A., Pascual, U., García-Barrios, L. 2017. **Payments for Pioneers? Revisiting the Role of External Rewards for Sustainable Innovation under Heterogeneous Motivations.** ECOLOGICAL ECONOMICS. 135. 234-245. DOI (10.1016/j.ecolecon.2017.01.011).

**72.** Zafra-Calvo N., Pascual U., Brockington D., Coolsaet B., Cortes-Vázquez J.A., Gross-Camp N., Palomo I., Burgess N.D. 2017. **Towards an indicator system to assess equitable management in protected areas.** BIOLOGICAL CONSERVATION. 211. 134-141. DOI (10.1016/j.biocon.2017.05.014).

**73.** Zubizarreta-Gerendiain A., Pukkala T., Peltola H. 2017. **Effects of wind damage on the optimal management of boreal forests under current and changing climatic conditions.** CANADIAN JOURNAL OF FOREST RESEARCH-REVUE CANADIENNE DE RECHERCHE FORESTIERE. 47. (2) 246-256. DOI (10.1139/cjfr-2016-0226).


## Books


**1.** M.J. Sanz, J. De Vente, J.-L. Chotte, M. Bernoux, G. Kust, I. Ruiz, M. Almagro, J.-A. Alloza, R. Vallejo, V. Castillo, A. Hebel, and M. Akhtar-Schuster. 2017. **Sustainable Land Management contribution to successful land-based climate change adaptation and mitigation. A Report of the Science-Policy Interface.** Bonn, Germany. United Nations Convention to Combat Desertification (UNCCD). 178. ISBN 978-92-95110-96-0 . (http://www2.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change).

**2.** Nunes, P., Markandya, A., Svensson, L. 2017. **Handbook on the Economics and Management of Sustainable Oceans.** Edward Elgar Publishing. ISBN 9781786430717. (http://econpapers.repec.org/bookchap/elgeebook/17310.htm).



# 3.4 Publications | 3.4.1 List of Publications

## Book Chapters


1. Abadie, L.M., Sainz de Murieta, E., Galarraga, I., Markandya, A. 2017. **Progressive adaptation strategies in European coastal cities: a response to flood-risk under uncertainty. Handbook on the Economics of Climate Change.** Edward Elgar Press.
2. Anil Markandya, Valeria Costantini, Giorgia Sforna, Elena Paglialunga. 2017. **Global and Regional Economic Damages from Climate Change.** Oxford Encyclopedia of Environmental Science. Oxford University Press. (10.1093/acrefore/9780199389414.013.409 ).
3. Bosello, Francesco; Iglesias, Ana; Termansen, M; Jeuken, Ad; De Cian, Enrica; Chiabai, Aline; Garrote, Luis.2017. **Economy wide impacts of climate mitigation and adaptation strategies across European regions. Adapting to Climate Change in Europe: Exploring Sustainable Pathways - From Local Measures to Wider Policies**. Elsevier.
4. Bouwer, Laurens; Capriolo, Alessio; Chiabai, Aline; Foudi, Sebastien; Garrote, Luis; Harmáková, Zuzana Veronika; Iglesias, Ana; Jeuken, Ad; Olazabal, Marta; Spadaro, Joseph V.; Taylor, Tim; Zandersen, Marianne. 2017. **Upscaling the impacts of climate change in different sectors. Adapting to Climate Change in Europe: Exploring Sustainable Pathways - From Local Measures to Wider Policies.** Elsevier.
5. Drakou, E., Willemen,L., Crossman,N.D., Burkhard,B., Palomo,I., Maes,J., Conti, M. 2017. **The ecosystem services partnership visualisation tool. Mapping Ecosystem Services.** Pensoft Publishers. 376. ISBN 9789546428295. (http://books.pensoft.net/book/13161/mapping-ecosystem-services).
6. Fagerholm, Nora; Palomo, Ignacio. 2017. **Participatory GIS Approaches For Mapping Ecosystem Services. Mapping Ecosystem Services.** Pensoft Publishers. ISBN 978-9546428523.
7. Galarraga, I., Sainz de Murieta, E. and França, J. 2017. **Climate Policy at the sub-national level. Trends in Climate Change Legislation**. Edward Elgar.
8. Markandya, A. 2017. **Energy Policies in China and the EU. Energy Governance, Institutions and Policies in China and the EU: A Comparative Assessment.** Milan. FEEM Press. ISBN 9788894170146.
9. Ojea, E., Pascual, M., March, D., Bitetto, I., Meli, P., Breil, M., Claudet, J.,Markandya, A. 2017. **Socioeconomic Impacts of Networks of Marine Protected Areas. Management of Marine Protected Areas.** Chichester, UK. John Wiley & Sons, Ltd. 103-124. ISBN 978-1-119-07580-6 978-1-119-07577-6. (http://onlinelibrary.wiley.com/doi/10.1002/9781119075806.ch6/summary;jsessionid=8B9B03D80BE6F9577A5310FECFAB0F3C.f03t04).
10. Olazabal, M. 2017. **Resilience, Sustainability and Transformability of Cities as Complex Adaptive Systems. Urban Regions Now & Tomorrow.** 1st ed. Wiesbaden, Germany. Springer. 73-97. ISBN 978-3-658-16758-5. (http://link.springer.com/chapter/10.1007/978-3-658-16759-2_4).
11. Palomo, Ignacio; Bagstad, Kenneth; Nedkov, Stoyan; Klug, Hermann; Adamescu, Mihai; Cazacu, Constantin. 2017. **Tools for mapping ecosystem services. Mapping Ecosystem Services.** Pensoft Publishers. Pensoft. ISBN 9789546428523.
12. Román, M.V., A. Ansuategi and A. Markandya. 2017. **Climate finance and the global climate policy. Climate Finance: Theory and Practice.** World Scientific Publishing. ISBN 978-981-4641-82-1. (http://www.worldscientific.com/worldscibooks/10.1142/9433#t=aboutBook).
13. S. Dobbie and S. Balbi. 2017. **Design of an Empirical Agent-Based Model to Explore Rural Household Food Security Within a Developing Country Context. Simulating Social Complexity: A Handbook.** Heidelberg. Springer. 978-3-540-93813-2. ISBN 978-3-540-93812-5.
14. Santos Martín, Fernando; Kelemen, Eszter; García Llorente, Marina; Jacobs, Sander; Oteros Rozas, Elisa; Barton, David; Palomo, Ignacio; Hevia, Violeta; Martín López, Berta. 2017. **Socio-cultural valuation approaches. Mapping Ecosystem Services.** Pensoft.
15. Tello, Enric; Marco, Inés; Padró, Roc; Caravaca, Jonathan; Gómez, Laura; Cattaneo, Claudio; Marull, Joan; Coll, Francesc; Garrabou, Ramon; Cussó, Xavier; Sacristán, Vera; Font, Carme; Galán del Castillo, Elena; Olarieta, José Ramon. 2017. **Sinèrgies ente fluxos d'energia i de materials agràris, i l'estat ecològic del territori: l'exemple del Vallès (1860-1999). Recursos i territori: perspectiva històrica i nous equilibris. Valls.** Coordinadora de Centres d'Estudi de Parla Catalana-Institut RamonMuntaner/Centre d'Estudis del Bages/Cossetània Edicions. 13-37. ISBN 978-84-9034-670-9. (http://www.cossetania.com/recursos-i-territori-perspectiva-histrica-i-nous-equilibris-2108).


## Other Publications

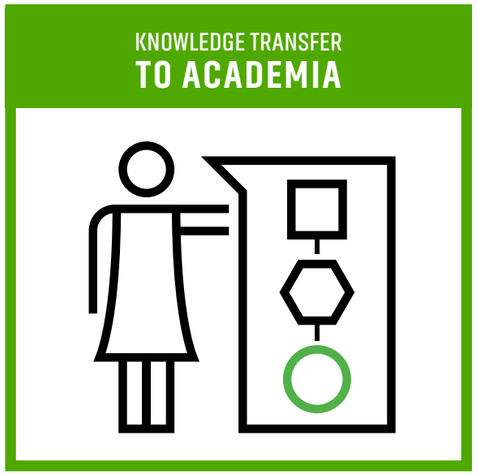

1. Federici, S., Grassi, G., Harris, N., Lee, D., Neeff, T., Penman, J., Sanz, M.J., and Wolosin, M. 2017. **GHG Fluxes from Forests: An assessment of national GHG estimates and independent research in the context of the Paris Agreement.** Climate and Land Use Alliance.
2. A. Markandya. 2017. **State of Knowledge on Climate Change, Water and Economics.** Water Global Practice Discussion Paper, World Bank. 1. 33. DOI (https://openknowledge.worldbank.org/handle/10986/26491).
3. Antxon Olabe, Mikel González-Eguino, Teresa Ribera. 2017. **Hacia un nuevo orden de la energía.**
4. Jon Sampedro, Cristina Pizarro, Mikel González-Eguino e Iñaki Arto. 2017. **Health co-benefits associated with different transition pathways.**
5. Lee, D. & Sanz, M.J. 2017. **UNFCCC Accounting for Forests: What's in and what's out of NDCs and REDD+.**
6. Markandya, A. 2017. **Improving Irrigation Water Use Efficiency Holds the Key to Tackling Water Scarcity in South Asia: Technical, Potential and Financing Options.** 39. 11.
7. Sanz Sanchez, M.J. et all. 2017. **Good Practice Guidance,SDG Indicator 15.3.1, Proportion of land that is degraded over total land area.** Edited from a report prepared by Commonwealth Scientific and Industrial Research Organisation (CSIRO) for the United Nations Convention to Combat Desertification (UNCCD).

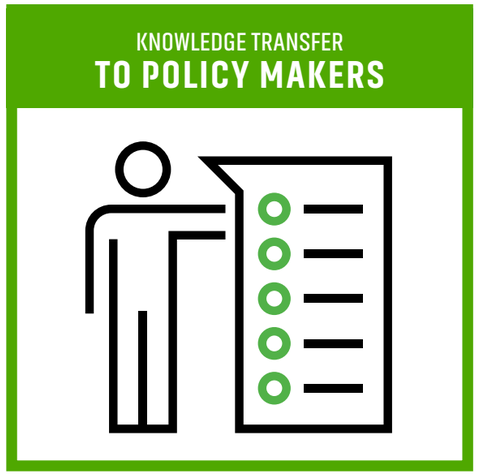
# 4. KNOWLEDGE TRANSFER

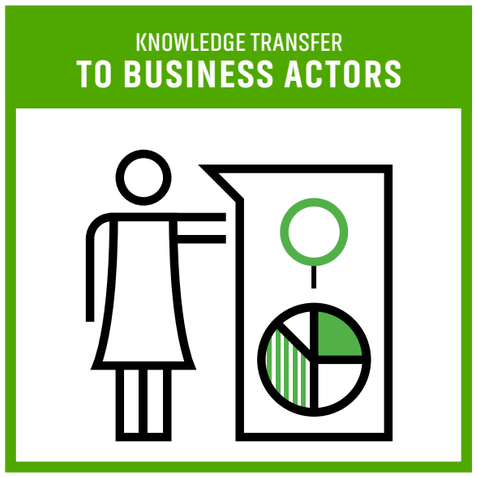
The role of science in shaping climate policies, building capabilities and raising awareness has become increasingly important, since climate change is nowadays at the top of political agendas. In fact, it is a fundamental part of our work is to contribute, through science, to the climate policy making process.

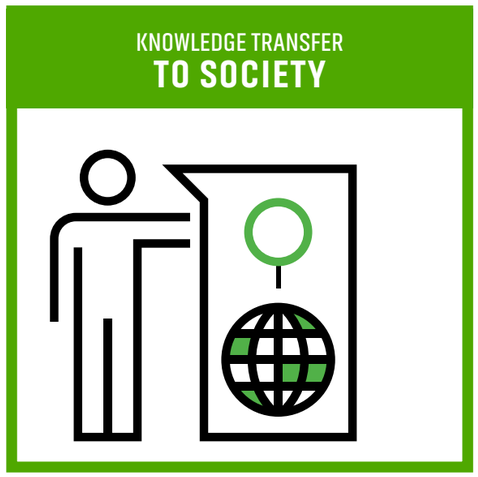
The BC3 Knowledge Transfer deployment is brought into action through the centre´s Dissemination and Strategic Communication Plan (SCP) 2014-2017, which was designed in 2013 and it is being implemented since then. This plan pursues excellence in research, training and dissemination making the knowledge generated in our centre broadly available to the following target audiences:

- SCIENTIFIC COMMUNITY (ACADEMIA)
- POLICY MAKERS
- BUSINESS ACTORS
- SOCIETY



# BC3's Dissemination, Training & Capacity Building and Science Outreach permanent initiatives





## DRIVING ACTIONS

designed to disseminate and disclose rigorous information on climate change.

**Dissemination:**
of research findings in Key Scientific Meetings.

**Dissemination:**
BC3 Seminar Programme.

**Dissemination:**
BC3 Visiting Programme.

**Dissemination:**
BC3 Working Papers Serie.

## TRAINING AND CAPACITY BUILDING

activities to "bridge knowledge" in terms of scientific advancements.

**Training:**
Supervised Phd and Master Students.

**Training:**
Classes given in Post graduate Courses.

**Capacity building:**
Workshops: Klimagune and ad-hoc organized events

**Training & Capacity Building:**
BC3 - UPV/EHU Summer School.

**Training & Capacity Building:**
Spring University on Ecosystem Services Modeling.

**Capacity building:**
Policy Briefing Series.

**Capacity building:**
Contribution to UNFCCC COPs.

## SCIENCE EDUCATION AND PUBLIC AWARENESS

Raising awareness of Climate Change at Basque Country Scale

**Science Education:**
Training Caravan (Researchers at Classroom).

**Public awareness in the media.**

# 4.1 TO ACADEMIA | 4.1.1 Dissemination in Scientific Meetings

During 2017, BC3 researchers participated in major science conferences and congresses related to their specialties all around the world. Following a selected contributions are listed.

| NAME OF THE CONFERENCE/CONGRESS | CITY | HOST INSTITUTION | TITLE OF THE CONTRIBUTION |
|---|---|---|---|
| 1st International Conference on Energy Research and Social Science | Sitges | Elsevier | The role of behavioural changes in the climate change mitigation portfolio |
| YOUMARES 8 Conference, Oceans across boundaries: Learning from each other | Kiel | University of Kiel and the GEOMAR Helmholtz Centre for Ocean Research | Catch distribution shifts in tropical tuna fisheries |
| JGCRI Annual Integrated Assessment Workshop GCAM Community Modeling Meeting | College Park, Maryland | Joint Global Change Research Institute | Health co-benefits associated with different mitigation pathways |
| IAEE Conference | Viena | IAEE | The role of energy efficiency and label information on consumer's purchasing preferences towards appliances: Results from a focus group in Bilbao (Spain) |
| Adaptation capacity-building initiatives for the implementation of NDCs | Bonn | INCCCETT 4CB | Science based decision making for adaptation: Adaptation tracking and definition of acceptable level of risks |
| Conference of the Spanish Association for Energy Economics | Salamanca | University of Salamanca & AEEE | Consumer purchases of energy efficient cars: behavioural implications for policy |
| EAERE Conference | Athens | European Association of Environmental Economics | Economic viability of the national-scale forestation program: The case of success in the Republic of Korea |
| Primer Foro Regional de Incentivos a la Conservación | Florencia-Caquetá | Gobernación de Caquetá, Patrimonio Natural, Fundación Picachos | Equidad social en pagos por servicios ambientales (PSA) |
| ICMaSS2017 International Conference on Materials and Systems for Sustainability | Nagoya | Nagoya University | Modelling beneficiaries in dynamic Ecosystem Services assessments |
| Global Forest Observation Initiative Plenary (GFOI, under the Global Earth Observation Group) | Ho Chi Minh City | Global Forest Observation Initiative | REDD+ progress: Forest towards solving Climate Change |
| 6th International Symposium on Soil Organic Matter Healthy soils for sustainable agriculture: the role of SOM | Harpenden | Rothamsted Research | Stoichiometric and litter quality effects on microbial communities along the decay continuum of perennial energy crops |
| Symposium Filling current knowledge gaps: understanding the role of plant-soil interactions in the MTEs | Seville | XIV MEDECOS & XIII AEET meeting | Soil respiration in drylands: controlling factors and thresholds |
| 68th Annual Meeting of the European Federation of Animal Science | Tallin | EAAP | Modelling the effects of heat stress of dairy cattle at farm scale |
| 10th European Public Health Conference Sustaining resilient and healthy communities | Stockholm | European Public Health Conference Foundation, the European Public Health Association (EUPHA) and Swedish Association of Social Medicine | Cost-benefit evaluations –approaches and effects |
| IAEE 2017 | Viena | IAEE European Conference | Implications of different mitigation portfolios based on stakeholder preferences |
| Biodiversity and Health in the face of Climate Change. Challenges, opportunities and evidence gaps | Bonn | German Federal Agency for Nature Conservation (BfN) and the European Network of Heads of Nature Conservation Agencies (ENCA) | Exposure to green areas: Modeling health benefits in a context of study heterogeneity |

# 4.1 TO ACADEMIA | 4.1.1 Dissemination in Scientific Meetings

| NAME OF THE CONFERENCE/CONGRESS | CITY | HOST INSTITUTION | TITLE OF THE CONTRIBUTION |
|---|---|---|---|
| 14th International Conference on Urban Health. Health Equity: The New Urban Agenda and Sustainable Development Goals | Coimbra | Convent São Francisco Convention Centre | Natural environment and urban green areas: effects on human health and equity |
| 3rd European Adaptation Conference | Glasgow | Three EU-funded projects (IMRESSIONS, Helix and RISES-AM) | Linking soil degradation control to climate change adaptation: a cost and benefit inventory of soil protection techniques in Europe |
| VII World Conference on Ecological Restoration | Iguaçu | Society for Ecological Restoration | Anthropogenic ecosystem disturbance and the recovery debt |
| Symposium for European Freshwater Sciences (SEFS) 10 | Olomouc | European Federation for Freshwater Sciences (EFFS) | Jointly accounting for biodiversity and ecosystem services for optimizing freshwater management: a projection and optimization framework |
| 5th Advances in Marine Ecosystem Modelling Research Symposium (AMEMR 2017) | Plymouth | Plymouth Marine Laboratory | An example of end-to-end model coupling for marine ecosystem services using ARtificial Intelligence for Ecosystem Services |
| International Conference on Materials and Systems for Sustainability 2017 (ICMaSS2017) | Nagoya | Nagoya University | Modeling the Effect of Solar UV Radiation on Plant Litter Decomposition |
| European Society for Ecological Economics (ESEE) 2017 Conference | Budapest | Corvinus University of Budapest | Biophysical and socioeconomic of deltaic areas vulnerable to Climate Change: gender and spatial relations |
| Economies in an age of limits: time for (R)evolution | Montreal | Société Canadienne en Économié Écologique | Modern irrigation double edge: Farmers' vulnerability through the lens of legitimacy and equity |

# 4.1 TO ACADEMIA | 4.1.2 Supervised post-graduate students

As one of the BC3 training key activities, during 2017 the following PhD and Master students were supervised by BC3 Knowledge body.

## PhD Students

| TITLE | PhD STUDENT | SUPERVISOR |
|---|---|---|
| Distributional implications of environmental policies. | Xaquín García | Mikel Gonzaález |
| Economics of Climate Finance | Mavi Román | Iñaki Arto |
| Use of multi-criteria analysis in the prioritization of policy options for the improvement of urban air quality in a Latin American setting: the case of Lima, Peru | Gerardo Sánchez | Aline Chiabai |
| Statistical analysis of climate and paleoclimate records | Gonzalo Morcillo | Sérgio H. Faria |
| Modelling of public opinion and awareness of climate change | Itxaso Ruiz | Sérgio H. Faria |
| Implications of uncertainties for adaptation decision making in the agriculture sector | Alina Tepes | Ibon Galarraga |
| On economics of adaptation | Ambika Markanday | Ibon Galarraga |
| Integrated Assessment and behavioural options for mitigation | Dirk Jan Van de Ven | Mikel González |
| Integrated Assessment and the co-benefits of mitigation | Jon Sampedro | Mikel González |
| Economics of ecosystem services | Laetitia Pettinotti | Anil Markandya |
| Recuperación de la estabilidad de las redes de interacción en bosques templados tras impactos causados por la minería durante la Edad Media | Asunción Rodriguez | David Moreno |
| Análisis y evaluación integral de sistemas de pastoreo de ovejas lecheras: propuesta de escenarios y herramientas de gestión | Aitor Andonegi | Agustín del Prado & Eneko Garmendia |
| Tesis sobre Eficiencia energética (Titulo sin definir) | Alessandro Silvestri | Sebastien Foudi |
| Tesis sobre Eficiencia energética (Titulo sin definir) | Elena Lopez | Ibon Galarraga |
| Tesis sobre Eficiencia energética (Titulo sin definir) | Maria del Mar Solá | Ibon Galarraga |
| Territorialidad, resiliencia tradicional/ancestral y cambio climático: pueblos y nacionalidades indígenas de la Amazonía ecuatoriana del Cantón Mera de la Provincia de Pastaza 2016-2018 | Freddy Eliseo Michel Portugal | Sergio H. Faria |
| Desarrollo de herramientas para evaluar los efectos de las medidas de adaptación al cambio climático | Pablo Martinez | Aline Chiabai |
| Assessing the sustainability of dairy cattle production systems in Karrantza region (aproximate title, PhD in progress) | Karlos Mas | Agustin del Prado Santeodoro |

## PhD Students

| TITLE | PhD STUDENT | SUPERVISOR |
|---|---|---|
| Social and Biophysical Dimensions of Clean Electricity Production | Sofia Ávila | Alev Sorman |
| Incorporating the social-ecological approach to landscape planning in Colombia | Juanita Aldana | Ignacio Palomo |
| Incorporating complexity into ecosystem services governance | Javier Moreno | Ignacio Palomo |
| Modelling soil C stocks in grazed grasslands in northern Spain | Asma Jebari | Agustín del Prado Santeodoro |
| Tradeoffs between effectiveness and equity in Payments for Ecosystem Services | Bosco Lliso | Unai Pascual |
| A socio-institutional analysis of wildlife conservation in Africa | Giulia Wegner | Unai Pascual |
| Development of agent-based approaches to integrate supply and demand of selected ecosystem services, within the Local Action Group Alto Bellunese, Eastern Alps | Michele Zen | Stefano Balbi |
| Influence of habitat uniqueness on species assemblage and potential implications for biodiversity conservation | Roxanne Leberger | Javier Martínez |

## Master Students

| TITLE | MASTER STUDENT | SUPERVISOR |
|---|---|---|
| Adaptation to climate change in coastal cities in China | Wu Quan | Elisa Sainz de Murieta |
| Impactos de los cambios de usos del suelo en el suministro y demanda de servicios en Madrid | Alberto González | Ignacio Palomo |
| The effects of Medieval mining on mycorrhizal communities of a beech forest in Navarre | Pablo Rodhes Pérez | David Moreno |
| The (crop, pasture and forest) Land footprints and virtual trade across the World, with a particular focus on the case of Colombia | Mateo Felipe Ortiz Moreno | Iñaki Arto/ Ignacio Cazcarro |
| Monitoring, Evaluation and Reporting (MER) mechanisms for local climate change adaptation planning | Lies Huitema | Marta Olazabal |

# 4.1 TO ACADEMIA | 4.1.3 Courses given in post-graduate courses

Among our training activity drivers, we may also find the classes offered by our researchers in post-graduate and advanced courses in different universities during the year.

| TYPE OF COURSE | TITLE OF COURSE | UNIVERSITY |
|---|---|---|
| Advanced course | Principales retos del cambio climático. Una visión desde la adaptación | University of the Basque Country UPV/EHU |
| IV Curso de Economía Ecológica | Universidad del País Vasco/ Euskal Herriko Unibertsitatea (UPV/EHU) | University of the Basque Country UPV/EHU |
| Advanced course | Incidencia del cambio climático en las ciudades y regiones | IVAP-EVETU |
| Advanced course | 2017 ARIES Masterclass: a follow-up course on the ARIES ecosystem services model and integrated semantic modelling | BC3 |
| Advanced course | 3 days ARIES crash course | National Institute for Environmental Studies (Japan) |
| Master course | Economics for the Environment and Climate Change: basic concepts | University of the Basque Country UPV/EHU |
| Master course | Climate Change Challenges: Adaptation and Mitigation | University of the Basque Country UPV/EHU |
| Master course | Master on Environment and Sustainability | University of the Basque Country UPV/EHU |
| Master course | Understanding Protected Areas as Social-ecological Systems | Universidad Autónoma de Madrid |
| Master course | Course on environmental & economic top-down and bottom up link with GIS | Universidad de Zaragoza |

# 4.1 TO ACADEMIA | 4.1.4 Seminars given

From BC3 we organized in 2017 a series of interdisciplinary lectures that contributed to climate change knowledge transfer. Focused on key theoretical and methodological issues on climate change, these lectures brought together professors, researchers and PhD students. Some of these seminar series were jointly organized with the University of the Basque Country.

## BC3 Seminars

| DATE | LECTURER | INSTITUTION | SEMINAR TITLE |
|---|---|---|---|
| 19/12/2017 | **Leandro Farina** | Universidade Federal do Rio Grande do Sul, Brasil | Dimensionality reduction for the ocean wave dynamics |
| 15/12/2017 | **Leslie W. Morland** | School of Mathematics, University of East Anglia Norwich | Role of Antarctic and Arctic Ice in Climate Change |
| 13/12/2017 | **Fernando Estelles** | Universitat Politècnica de València (UPV) | Un-Sustainable Intensification of Livestock Production |
| 11/12/2017 | **Teresa E. Gimeno** | UMR ISPA, INRA-Bordeaux (France) | Tracking water use and carbon uptake in a global change scenario: bridging scales and approaches |
| 29/11/2017 | **Guadalupe Arce** | University of Castilla – La Mancha | Carbon footprint of human settlements in Spain |
| 27/11/2017 | **Prof. Toshihiko Nakata** | Department of Management Science and Technology, Graduate School of Engineering, Tohoku University | “Integrated Design and Analysis for Sustainable Energy Systems” |
| 25/05/2017 | **Jean-Christophe Pereau** | University of Bordeaux | Groundwater Management in a Food Security Context |
| 01/06/2017 | **Unai Álvarez-Rodríguez** | Universidad del País Vasco/ Euskal Herriko Unibertsitatea (UPV/EHU) | Beyond Quantum Biomimetics |
| 27/10/2017 | **Peter Alexander** | School of Geosciences, University of Edinburgh | Losses and inefficiencies in the global food system |
| 24/05/2017 | **Sanjay Sharma** | Grossman School of Business, University of Vermont, USA | Building Organizational Capacity for Sustainable Innovation |

# 4.1 TO ACADEMIA | 4.1.5 Visiting Programme

The aim of our Visiting Programme is to promote research and dialogue between BC3 and other institutions by supporting and hosting local and international researchers wishing to establish a link with us. Additionally, this programme allows our institution to contribute to climate change knowledge at the Basque Country by inviting visitors to participate in the UPV/EHU – BC3 joint seminar programme. Our Visiting Programme may be considered therefore an additional source for talent attraction, as well as a chance to join international research initiatives.

## List of 2017 visitors

| VISIT DATE | VISITOR | INSTITUTION | POSITION | LINK WITH BC3 RESEARCH LINE |
|---|---|---|---|---|
| DIC. 17 | **Leandro Faria** | Universidade Federal do Rio Gabde do Sul, Brasil | Professor | Climate and Natural Environment, Low Carbon, Climate Change Policy |
| DIC. 17 | **Leslie Morland** | University of East Anglia (UEA, UK) | Prof.Emeritus | Climate and Natural Environment |
| DIC. 17 | **Fernando Estellés** | Universitat Politècnica de València (UPV) | Assistant Professor | Terrestrial Ecosystems, Adaptation Lab |
| DIC. 17 | **Teresa E. Gimeno** | INRA | IEF Marie Curie Fellow | Terrestrial Ecology |
| NOV. 17 | **Guadalupe Arce** | Universdad de Castilla-La Mancha | Researcher Global Energy and Environmental Economics Analysis Research Group | Low Carbon |
| NOV. 17 | **Toshihiko Nakata** | tohoku university | Professor | Integrated modelling |
| OCT. 17 | **Peter Alexander** | School of Geosciences, University of Edinburgh | Interactions within food systems and land use | Terrestial Ecosystems |
| JUN. 17 | **Unai Álvarez-Rodríguez** | Universidad del País Vasco / Euskal Herriko Unibertsitatea (UPV/EHU) | GV-EJ Postdoctoral researcher | Integrated modelling |
| MAY. 17 | **Jean-Christophe Pereau** | University of Bordeaux | Professor | Terrestial Ecosystems |
| MAY. 17 | **Sanjay Sharma** | Grossman School of Business, University of Vermont, USA | Dean and Professor of Management | Integrated modelling |

# 4.1 TO ACADEMIA & POLICY MAKERS | 4.1.6 Organization of Scientific Events

BC3 plays an active role organizing international Climate Change scientific events and workshops involving the most influential researchers in the field. During 2017, we organized with this objective a series of different dissemination activities, such as workshops, directed to nurture ongoing research, support decision-making processes and enhance the engagement of key players (stakeholders) by establishing a dialogue with them.

## SOME HIGHLIGHTED WORKSHOPS

### IPCC Meeting

**"FIRST LEAD AUTHOR MEETING (LAM1) FOR THE ELABORATION OF THE 2019 REFINEMENT TO THE 2006 IPCC GUIDELINES FOR NATIONAL GREENHOUSE GAS INVENTORIES"**
**7TH – 14TH SEPTEMBER, 2017. LEIOA.**

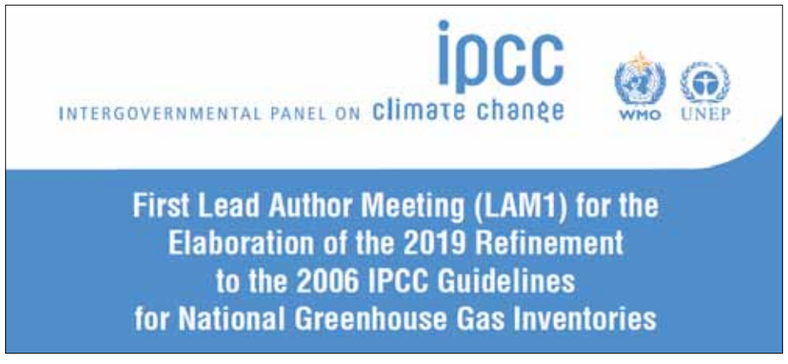
More than 190 experts met in Bilbao on June 7-14 to work on a new Methodology Report, which will update the guidelines that countries use for estimating greenhouse gas emissions and removals, bringing them into line with the new requirements of the 2015 Paris Agreement.

The meeting launched the preparation of the new Report 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2019 Refinement). In particular, the authors elaborated the chapter outlines, allocated tasks among Lead Authors, and decided milestones between this and the Second Lead Author Meeting. After another two meetings in 2018, the 2019 Refinement is planned to be finalized, and be adopted and accepted by the IPCC Plenary, in May 2019.

Bureau of the IPCC Task Force on National Greenhouse Gas Inventories concluded that the 2006 IPCC Guidelines still provide a technically sound methodological basis of national greenhouse gas inventories; however, in order to maintain their scientific validity, certain refinements are required, taking into account scientific and other technical advances that have matured sufficiently since 2006. Therefore the IPCC has decided to produce a new Methodology Report to refine the 2006 IPCC Guidelines, which is titled the "2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories" (2019 Refinement)," said Mr. Kiyoto Tanabe, Co-Chair of the IPCC's Task Force on National Greenhouse Gas Inventories.

The meeting was organized by BC3, with the collaboration of the Basque Government's Department of Environment, the University of the Basque Country and the Spanish Climate Change Office.

**+ Info:** http://unescows2016.bc3research.org/




# 4.1 TO ACADEMIA & POLICY MAKERS | 4.1.6 Organization of Scientific Events

## SOME HIGHLIGHTED WORKSHOPS

## Klimagune Workshop 2017

**CLIMATE CHANGE AND PUBLIC ENGAGEMENT.**
**31ST MAY, 2017. BILBAO.**

Since its first edition, 7 years ago, more than 500 people have participated in the Klimagune Workshop, a science-policy forum on Climate Change jointly organized by BC3 and the University of the Basque Country, open to all agents in the Basque Science and Technology Network, as well as to other social agents interested in climate change. It is its aim to share knowledge, new ideas and developments in terms of scientific and policy advancements on climate change."Climate Change and public engagement" was the title of this 7th edition, which took place in Bilbao.

The 21st Conference of the United Nations Framework Convention on Climate Change (COP21) held in Paris, and the agreement reached (Paris Agreement) prove that we are in a new stage of the fight against climate change. A stage where, once the scientific evidence on climate change is globally accepted, it is urgent and mandatory that institutions, production structures and all private and public social players play an active, coordinated role. However, social activation and scientific knowledge must go hand-in-hand. This requires new scientific tools to find environmentally sustainable solutions that are economically efficient and socially just. This is attained through the participation, not only of different institutions, but of all citizens in general.

Given that reporting, taking part or being a part is not the same thing, at Klimagune, we analysed the different methods and degrees of social participation for climate change. What perceptions do citizens have of climate change? What participation methods are there, and what purpose do they serve? What does science, and citizen science have to say about participating in climate change? To which extent can we be involved as citizens in this challenge, for which we are both responsible and victims at the same time?

Participation in sustainability issues is based on regulations and instruments to: (1) democratise decision-making, (2) empower participants and avoid conflicts, (3) integrate different kinds of knowledge, and (4) increase the effectiveness and fairness of the effects of both public and private projects and programmes. In a post-modern society undergoing constant change, participating against climate challenges is not an option; rather it is a citizen responsibility, related to the concepts of social perception, legitimacy, climate justice, corporate social responsibility, citizen science and trans-disciplinary science.

**KLIMAGUNE COUNTED, AMONG OTHER RELEVANT LECTURERS, WITH THE FOLLOWING KEYNOTE SPEAKERS:**

- **JAMIE CLARKE**, Executive Director of Climate Outreach, "Talking Climate - From Research to practice In Public Engagement"
- **FRANCISCO HERAS**, Department of Adaptation Strategies, Spanish Climate Change Office, Spanish Ministry of Agriculture and Fisheries, Food and Environment, "Social participation a tool for sustainability"


# 4.1 TO ACADEMIA & POLICY MAKERS | 4.1.6 Organization of Scientific Events

## SOME HIGHLIGHTED WORKSHOPS

### TRANSRISK Workshop

**ASSESSING UNCERTAINTIES AND RISKS IN THE TRANSITION TO LOW CARBON AND SUSTAINABLE SOCIETIES.**
**3RD - 4TH JULY, 2017. BILBAO.**

The main objective of the workshop was to coordinate the efforts and to use the different existing pathways through a risk and uncertainty lens and also for implementing these pathways and transferring this information into the cases studies. For this purpose, a selected list of contributions was presented and discussed. Contributions from partners who had the challenge of thinking on transition pathways for their case studies, as well as on the main risks (barriers, negative outcomes) and uncertainties associated with them. They also discussed and designed the different inter-model comparison exercises that will take place in TRANSrisk (in WP6 and WP7).

Finally, they also dedicated specific time to discuss three dissemination activities proposals: a book, a special issue for a scientific journal and a potential joint-paper (or comment/letter in a top journal) with TRANSrisk's partners.

TRANSrisk
TRANSITION PATHWAYS AND RISK ANALYSIS FOR CLIMATE CHANGE POLICIES

### REMEDISOST Workshop

**SUSTAINABILITY OF POLLUTED LAND REMEDIATION SOLUTIONS.**
**16TH MARCH, 2017, LEIOA.**

REMEDISOST workshop contributed to the design of sustainability criteria for the methodology that REMEDISOST project partners were elaborating to measure the sustainability of polluted land remediation solutions. The workshop brought the opportunity to meet different stakeholders that actively participated in this design.

PARTNERS IN REMEDISOST:

- **Gaiker IK4** - Coordinator
- **Neiker Tecnalia**
- **AFESA Medioambiente S.A.**
- **BC3 Basque Centre for Climate Change**
- **IHOBE -** Funding agency of REMEDISOST

# 4.1 TO ACADEMIA | 4.1.7 BC3 Working Papers — 4.1.8 Open Access

## 4.1.7 BC3 WORKING PAPERS

BC3 produces also its own Working Paper Series, which serves to illustrate and disseminate the scientific work developed by our researchers and collaborators, as well as triggers the scientific debate on hot topics. They are accessible via several media channels, including our website, Research Papers on Economics (RePEc) and the public repository of the University of the Basque Country (ADDI).

- [2017-04] **Cost-effectiveness and incidence of alternative mechanisms for financing renewables**. Xaquin Garcia-Muros, Christoph Böhringer and Mikel González-Eguino.
- [2017-03] **Traveling for happiness, moving to adapt: An agent-based perspective on population mobility**. Stefano Balbi.
- [2017-02] **Drivers of climate change opinion.** Itxaso Ruiz, Sérgio Henrique Faria and Marc B. Neumann.
- [2017-01] **Towards successful adaptation: a checklist for the development of climate change adaptation plans.** Marta Olazabal, Ibon Galarraga, James Ford, Alexandra Lesnikowski and Elisa Sainz de Murieta.

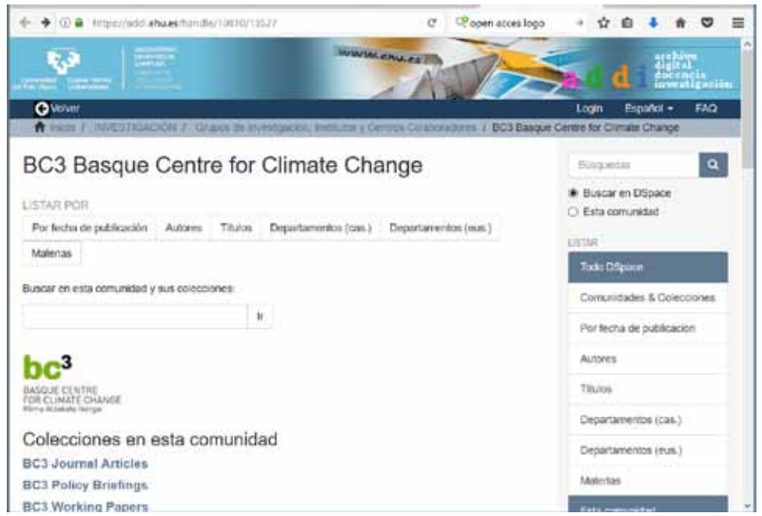
## 4.1.8 OPEN ACCESS

In 2014, we reached a collaboration agreement with the ADDI platform (public repository of publications of the University of the Basque Country) for the delegated archive of our Working Papers series of publications and Policy Briefings in a public repository. During 2017, we continued making available throug ADDI all its publications series at ADDI platform and scientific journal publications

ADDI public repository platform, is interconnected with OPENAIRE in a way that optimizes the visibility of open access BC3 publications series.

The publications are available at:

- **https://addi.ehu.es/handle/10810/13527**



# 4.2 TO POLICY-MAKERS | 4.2.1 Policy relevant contributions: Highlights

Climate change is nowadays at the top of political agendas and it is a fundamental part of our work to contribute to the design of related policies, as well as to facilitate, through science, their application in a regulatory framework, consistent with the protection of the planet.

Hence, our involvement in the most authoritative organizations, such as IPCC (Intergovernmental Panel on Climate Change), IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) and the UNFCCC (United Nations Framework Convention on Climate Change) is strategic for us, as it shows our ability to play an active role among the most authoritative actors in the field of climate change and climate policy. Such involvement is also a sign of international recognition, and a demonstration of our capacity to build relevant links and connections, addressing policy-makers at the highest levels.

One of our relevant contributions to the EU policy making process is taking part in the UNFCCC Side Events. These were established as a platform for observer organizations to highlight diverse climate change issues at UNFCCC conferences, and are a vital component of the UNFCCC sessions, as they provide opportunities for information dissemination, capacity building, policy discussion, as well as a way to legitimize global governance.

Recognized by the United Nations Framework Convention on Climate Change (UNFCCC) as a Non-Governmental Organization, we contributed to several side events at the Conferences of the Parties at COP23 in Bonn jointly with other leading Climate Change scientific and policy institutions. BC3's Scientific Director, María José Sanz, and BC3's researchers, Anil Markandya and Ibon Galarraga actively participated at the COP23 events.

## IPCC contributions

BC3 Increased its involvement in the scientific Special Reports (SRs) and the Assessment Reports (ARs) of the IPCC. From one Lead Author in the Fifth Assessment Report (A. Markandya 5AR, 2014) to the selection of four BC3 Researchers for the next cycle of IPCC documents:

- **SR on 1.5 °C Scenarios** (A. Markandya)
- **SR Refinement of the 2019 GHGs Inventory Guidelines** (M.J. Sanz and A. del Prado)
- **SR on Land and Climate Change** (M.J. Sanz)
- **and, 6th Assessment Report, Working Group I Chapter 1: Framing, context, methods** (Sérgio H Faria).

In this context BC3 hosted the First Lead Authors Meeting of the SR Refinement of the 2019 GHGs Inventory Guidelines with the support of the UPV-EHU Faculty of Science and Technology, IHOBE, and the Spanish Office of Climate Change in June 2017.

## Spanish Parliament Reporting

On November 22, the Scientific Director of BC3, María Jose Sanz attended as an expert the Spanish Congress of Deputies (Commission for the Study of Climate Change), to report on future legislative measures on climate change and energy transition.

## BC3, member of the Advisory Council for Foreign Affairs of the Basque Government

BC3 is member of Advisory Council for Foreign Affairs of the Basque Government since its creation in 2016 and has contributed to the update of the 2020 Internationalisation Framework Strategy of the Basque Country. During 2017, BC3 participated in the Advsisory committee celebrated at the Basque Government.

# 4.2 TO POLICY-MAKERS | 4.2.2 Policy making supporting methodology tools

## ECOSYSTEM SERVICES

BC3 has also developed decision making suporting tools in the context of ecosystem services, such as **ARIES** (Artificial Intelligence for Ecosystem Services), a web-based free modelling technology offered to users such as practitioners, scientists and decision-makers including members of NGOs, academic, or governmental institutions worldwide, to assist rapid ecosystem service assessment and valuation (ESAV).

BC3, with ARIES has developed some of the most advanced methodologies (assembling deterministic or probabilistic models) to quantify and value flows of ecosystem services at the appropriate spatial scale, ecological and socio-economic context. ARIES maps concrete, spatially explicit beneficiaries of ecosystem services, and quantifies their demand for each service. Conceptualizing ecosystem services as a concrete list of benefits for concrete beneficiary groups avoids the problem of “double counting” of benefits that has plagued past ecosystem service valuation efforts.

In this context, the Integrated Modelling Partnership was launched in late 2017. **The Integrated Modelling Partnership**, brings together institutions contributing to designing and building a fully integrated information landscape for the science of the future. The partnership develops and maintains the IM worldview, the k.IM language and the k.LAB software stack. It provides training in semantic modelling and supports partners and users in creating unprecedented model-data integration in projects such as ARIES.

## LOW CARBON TRANSITION PATHWAYS

Regarding low carbon transition pathways, BC3 has developed different tools and methodologies that can capture the interlinkages between the socio-economic, energy, environmental and the climate systems to better understand the measures to control GHG emissions at national and global level. These tool/models are very diverse and include different types of CGE/input-output models, integrated assessment models and micro-simulation models.

## DERIO

**(Dynamic Econometric input-output Model for the Basque Country)**

A team of researchers from the Basque Centre for Climate Change (BC3) led by Iñaki Arto, in collaboration with Professor Kurt Kratena (Center for Economic Scenario Analysis and Research, CESAR and Austrian Institute of Economic Research, WIFO) developed an economic- energy-environment model for the Basque Country oriented the analysis of scenarios and policies in different areas of decision. The model was successfully used for the analysis of the economic impact of the Basque Country’s 2050 Climate Change Strategy.

The DERIO (DERIO) model, developed under the Bizkaia: Talent program, follows the philosophy of the FIDELIO (Fully Interregional Dynamic Econometric Long-term Input- Output) created by Professor Kurt Kratena together with Iñaki Arto for the Joint Research Centre of the European Commission. This model has recently contributed to the analysis of the impact of the Clean Air Package of the European Union.

DERIO is characterized by a detailed description of the Basque economy in terms of sectors (88 sectors), products (105 products), consumers (5 groups of consumers differentiated by income level), categories of final consumption (16 categories), energy system (processing industry, exchanges, final consumption, etc.) and environmental extensions (energy, CO2 emissions and other pollutants). For the development of the model, different official statistical sources such as economic accounts (EUSTAT), family budget survey (INE), energy balances (EVE) or emission inventories (IHOBE) were been used.

One of the main characteristics of the model is that the user can adapt it according to his needs. This feature, together with its multi-dimensional character, makes it especially useful for the analysis of scenarios and policies in different areas of decision. In addition, its flexibility and versatility make it suitable for the analysis of specific policies such as the promotion of energy efficiency (households, industry or transport), Renove plans, tax reforms, etc.

# 4.2 TO POLICY-MAKERS | 4.2.3 Policy making supporting information: Policy Briefing Series

Policy Briefings

bc3 BASQUE CENTRE FOR CLIMATE CHANGE Klima Aldaketa Ikergai

PB 2017/ Special Issue-02/www.bc3research.org

COP23: TECHNICAL PROFILE WITH RELEVANT POLITICAL SUPPORT

*Authors: Elisa Sainz de Murieta[1,2], Ibon Galarraga[1], María Jose Sanz[1]*

The United Nations Framework Convention on Climate Change (UNFCCC) Conference, known as COP23, was held in Bonn (Germany) between the 7-18th of November 2017. Although the presidency of the COP, and therefore host, was the Republic of Fiji in Melanesia, the conference was held at the UNFCCC headquarters in Bonn, with the support of the German government as a co-host, due to a lack of the necessary infrastructure to accommodate the tenths of thousands delegates and observers attending the meeting in Fiji. The six bodies of the UNFCCC based on their respective agendas meet during two weeks. The Parties sent 11,300 delegates to Bonn, 25% less than in COP21 in Paris. More than 6,000 Representatives from US bodies, specialised agencies, intergovernmental organisation and NGOs were also present, together with more than 1,600 journalists. Altogether, more than 19,000 delegates travelled to Bonn, far from the number met in Paris in 2015.

While the Paris Agreement (PA)(*1*) adopted in 2015 aims at keeping global temperature increase well below 2°C (*2*), how this objective was to be achieved was left to be defined in what is known as the **PA Rulebook**, which should include the processes and rules and modalities necessary to guide and facilitate the implementation of the PA, guarantee increasing ambition and monitor and evaluate progress (*3*). The PA Rulebook should be adopted by the end of 2018, and that is why COP23 was expected to have a rather technical profile to develop the rules and modalities for the implementation of the PA after 2020.

The conference developed in a context of recent extreme events in many parts of the planet, an increasing rate of CO2 concentration, the 2017 spike on emissions worldwide (after several years stabilization) and the highest concentration of CO2 in the atmosphere for the last 2 million years. In the policy arena, the announcement of President of the USA Donald Trump of abandoning the PA, being the US the second largest emitter that had pledged to cut its emissions to 26-28% below 2005 levels by 2025, was indeed a severe drawback for the UNFCCC process. This had triggered the fear of other countries following example and also leaving the climate negotiations, paradoxically it may also boost the actions of the other countries. Today the fight against climate change is seen by the vast majority not only as a need, but also as an opportunity. The announcement made by Nicaragua earlier this year and Syria on November 13th of signing the PA left the US more isolated, being the only country that signed the PA that is indicating it will not ratify the Paris Agreement[1].

**Key Points**

- *Considerable progress was needed at COP23 with regards to the Paris Agreement Rulebook, which must define the rules and modalities for the implementation of the PA and should enter into force in 2018.*
- *However, progress with this regard was limited, except for the Talanoa dialogue, a facilitative dialogue framework to be launched in 2018 which aims at accelerating action under the Paris Agreement.*
- *The need for more ambitious actions before 2020 and the relevance of the stock-taking process in 2018 were recognised during COP23.*
- *The Subsidiary Bodies made some progress on issues such as the climate Gender Action Plan or the Platform for Local Communities and Indigenous Peoples.*
- *A breakthrough was achieved with regards to agriculture as, for the first time, Parties have agreed to address central climate challenges related to this sector, mainly adaptation, emission reduction and food security issues.*
- *In parallel to the official agenda, strong political support to the PA was shown by non-state actors - cities, regions, businesses and NGOs-, who are taking important commitments and are gaining relevance within the climate negotiation process.*
- *The alternative US delegation, gathered under the motto "We are still in", gained a lot of public attention and showed their commitment with climate action.*

COP23 FIJI
UN CLIMATE CHANGE CONFERENCE
BONN 2017

This Policy Briefing was written by Sainz de Murieta, E.[1][2], Galarraga, I[1], and Sanz, M.J.[1],[1] Basque Centre for Climate Change (BC3), [2] Grantham Research Institute, London School of Economics and Political Science (LSE), London WC2A 2AZ (United Kingdom)

Cite as: Sainz de Murieta, E, Galarraga, I and Sanz, M.J. (2017) "COP23: Technical Profile With Relevant Political Support ", BC3 Policy Briefing Series, 02-2017, Basque Centre for Climate Change (BC3), 48940, Leioa , Spain.

[1]Currently, 195 out of 197 countries have signed the Paris Agreement and 170 have ratified it.

With the objective of being relevant to policy makers, BC3 continued to produce highly accessible Policy Briefings aimed to offer first-hand information to policy makers. During 2017, BC3 produced 4 Policy Briefings.

These documents provide policy recommendations based on our expertise and results from research carried at the centre. The briefings also offer information and training to policy makers and public interest organisations, in order to help them address and respond to the environmental policy related issues.

The documents are accessible through our website and through the public repository of the University of the Basque Country (ADDI), which is interconnected to the "Openaire" repository.

Only at our website, these publications received a large amount of hits in the reference period, and the Basque Parliament called BC3 researchers to present some of their key findings before the political representatives at the Commission for Environment of the Basque Government.

**List of 2017 BC3 Policy Briefings**

- [2017-04] **Mecanismos para financiar la promoción de energías renovables. Impactos en los hogares y las industrias.** Joaquín García-Muros y Mikel González-Eguino.
- [2017-03] **The potential of behavioural change for achieving climate change mitigation targets in the European Union.** Dirk-Jan van de Ven, Mikel Gonzalez-Eguino and Iñaki Arto.
- [PB 2017-02_Special Issue] **COP23: Technical profile with relevant political support.** Elisa Sainz de Murieta, Ibon Galarraga and María José Sanz.
- [2017-01] **How does modern irrigation influence farmers' vulnerability to external stressors? The case of Itoiz-Canal de Navarra.** Amaia Albizua and Esteve Cobera.

# 4.2 TO POLICY MAKERS & ACADEMIA | 4.2.4 Training & Capacity Building

## International Spring University on Ecosystem Services Modelling

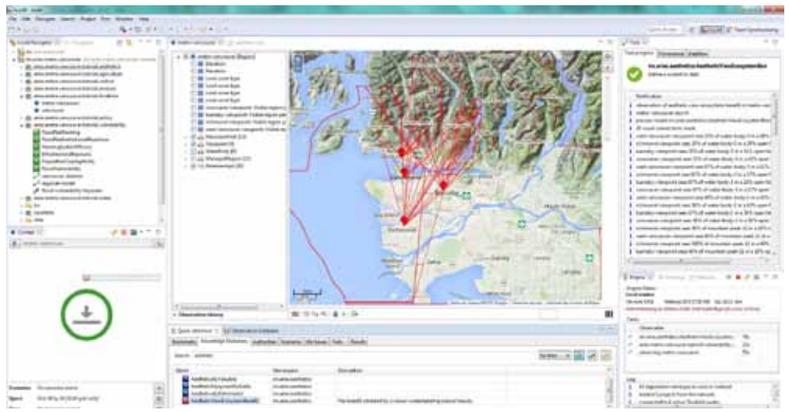
BC3 launched in 2013 a very successful training programme, "International Spring University on Ecosystem Services Modelling", in collaboration with Conservation International (USA) and the University of Vermont (USA).

The International Spring University (ISU) on Ecosystem Services Modelling has completed up to the moment four editions of an annual 2-week intensive course.

This initiative, an annual two week intensive advanced course, enables simple use of complex models through artificial intelligence. The course is meant to build a new generation of scientists and policy analysts, capable of using coupled human-environmental models in research, and policy, to address and solve complex sustainability problems.

The training plan covers the theory and practice of collaborative, integrated modelling on networked repositories, applied to concrete ecological and social issues of interest of the participants and of the larger community built around the ARIES project.

In 2017, instead of repeating the 2-week intensive course, the Ecosystem Services modelling team decided to launch in Leioa a Hackaton that took place from the 12th to the 25th of June and a Masterclass that took place from the 20th to the 24th of November in order to adapt to the new needs of the community.This Masterclass was conceived as a mastering course and update on the latest developments in k.LAB, targeted for previous editions' 25 selected participants.




## BC3- UPV/EHU Summer School 2017: "Climate Change in an Era of Uncertainty"

Another relevant course for BC3, is the annual Summer School on Climate Change, launched in 2010 with the collaboration of the University of the Basque Country. The objective of this 3-day school, is to offer an updated and recent view of the ongoing trends in climate change issues, gathering leading experts in the field and students from top universities and research centres worldwide.

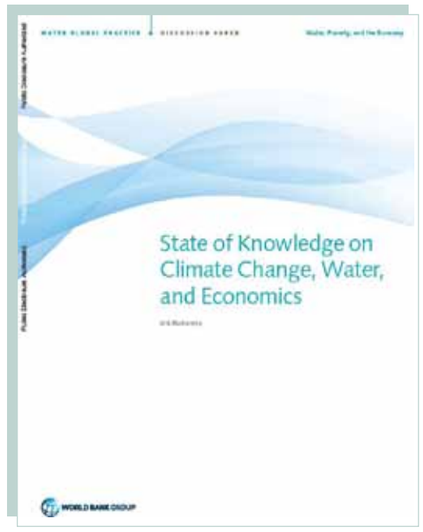
Its 8th edition took place in San Sebastian, from the 5th- 7th of July 2017. It was entitled "Climate Change in an Era of Uncertainty", and leaded by Dr. Alberto Ansuategi (UPV / EHU) and Dr. Mikel González-Eguino (BC3).


# 4.2 TO POLICY MAKERS & ACADEMIA | 4.2.5 Other highlighted contributions

## State of Knowledge on Climate Change, Water and Economics

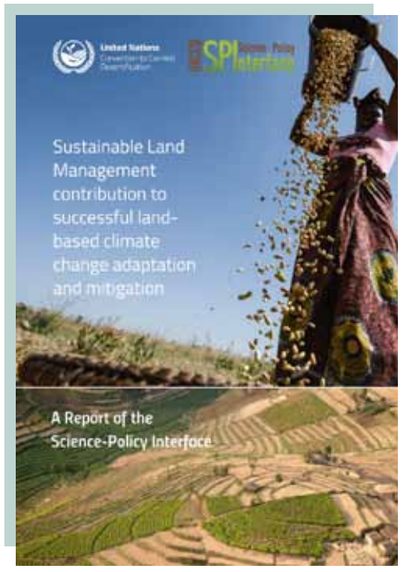
This book book edited in 2017 by BC3 researcher Anil Markandya reviews the current state of knowledge on climate change and water points to predominantly negative effects. Moreover, the publication reviews the literature on these effects by geographical region and notes the differences as well as the uncertainties. An important feature is the fact that the climate effects will occur on top of water scarcity that currently prevails in many parts of the world. The impact of climate change on scarcity is present but generally small compared to the impact of the socioeconomic factors. Changes in efficiency of water use could make a big contribution to water problems, including those caused by climate change.

In-depth estimates of damages from climate change related to water have been made to 2060 and, less accurately, to 2100. The 2060 estimates indicate that the impacts from water supply changes or changes in water-related extreme events and marine flows add up to about 1.5 of GDP in 2060 in the absence of mitigation or adaptation. This average figure, however, may be an underestimate of a number of reasons. Estimates to 2100 of potential damages in economic terms are even more uncertain but there are strong reasons to believe they will be greater as a percentage of GDP, perhaps around 10 globally and possibly even higher. Adaptation can make a major contribution to reducing damages from climate change for all mitigation scenarios, and more so when mitigation is absent or limited. Adaptation will require both private and public actions.




## Sustainable Land Management contribution to successful land-based climate change adaptation and mitigation

An assessment of the benefits and tradeoffs of Sustainable Land Management in the context of combating desertification/land degradation and climate change adaptation and mitigation was presented to the UNCCD Thirteen Conference of the Parties (September 2017) (M.J. Sanz, J. de Vente, J.-L. Chotte, M. Bernoux, G. Kust, I. Ruiz, M. Almagro, J.A. Alloza, R. Vallejo, V. Castillo, A. Hebel, and M. Akhtar-Schuster. 2017. Sustainable Land Management contribution to successful land-based climate change adaptation and mitigation. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany).



# 4.2 TO POLICY MAKERS & ACADEMIA | 4.2.5 Other highlighted contributions

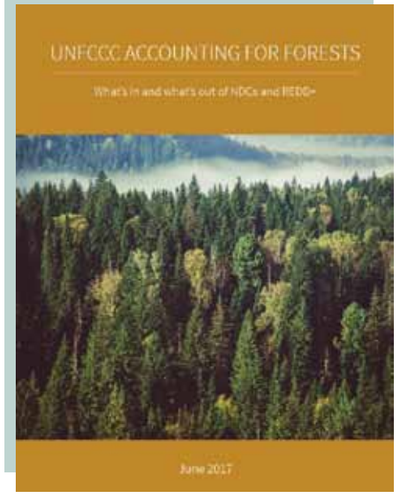
## GHG Fluxes from Forests: An assessment of national GHG estimates and independent research in the context of the Paris Agreement

A comprehensive assessment of the transparency and robustness of GHGs fluxes from forest, and the reasons of discrepancies from top down and bottom up scientific estimated fluxes was done to shape the near future support to research and action relevant for the multilateral debate on the Global Stocktake under the Paris Agreement (Federici, S., Grassi, G., Harris, N., Lee, D., Neeff, T., Penman, J., Sanz, M.J., and Wolosin, M. 2017. GHG Fluxes from Forests: An assessment of national GHG estimates and independent research in the context of the Paris Agreement.) Which conclusions are critical to move towards the reconciliation of conflicting GHGs estimates emerging for the latest top scientific papers on the issue and the national GHGs Inventories that follow the IPCC methodological guidance and Paris Agreement transparency discussions.


## UNFCCC Accounting for Forests: What's I and What's Out of NDCs and REDD+

This policy brief developed by BC3's Scientific Director, María José Sanz, together with Donna Lee seeks to explain how forests are represented in GHG inventories, Nationally Determined Contributions (NDCs) and REDD+ reference levels. It includes information on:

- The differences on how forests are reported in GHG inventories from how they are accounted in NDCs and REDD+.
- The way forests are accounted within NDCs including how comprehensive their coverage is and issues around transparency in counting mitigation performance.
- The way countries are measuring REDD+ performance, including a snapshot of the scope of forest fluxes in current REDD+ reference levels.



# 4.3 TO SOCIETY. Science Education and Public Awareness | 4.3.1 Outreach activities

## Pursuing Science Impact on Society

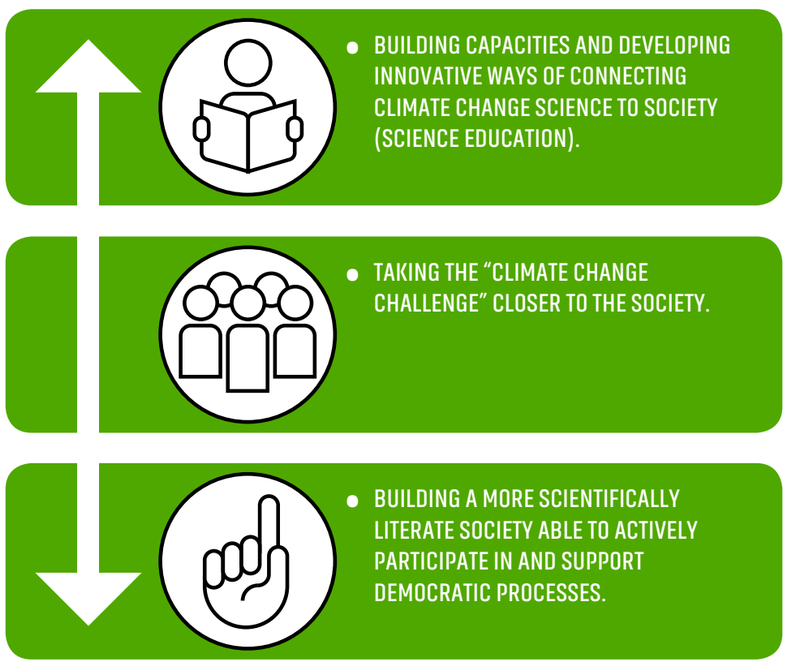
The role of science in shaping climate policies and raising awareness among the general public has become increasingly important. "Bridging knowledge" is a crucial issue, as we understand at BC3.

Thus, we organize events and activities, which enable us to reach and attract all the sectors of society, making the science produced at the institution available to a broad public. This way, we raise awareness on specific subjects and scientific advancements among the people who will eventually play an important role in demanding policy-makers to reshape their policy agendas or to plan concrete actions.

The central message of this first year of the post-Paris era was a unanimous call to action, both political and social. So far, science has played a decisive role of warning about climate change and issues related to global environmental issues. From now on, the issue is not to continue to alert, but to innovate, to seek and test urgent solutions, and to evaluate its impact and effectiveness.

Providing tools for training and developing innovative ways to connect climate change science with society will help make science more attractive to citizens and open up new research and innovation activities. In this sense, we promoted our communication activity to citizens and the implementation of different knowledge transfer actions, contributing to the awareness of society about what the European Commission describes as one of the of the greatest European social challenges. These actions included the Training Caravan program, the knowledge transfer program to the teachers of the Basque Country in joint collaboration with Ingurugela (Basque Government Environmental Science Education platform) and the knowledge transfer program target at general public through the media.

Our activities pursue an impact of the research findings on policy, managerial and professional practices, and social behavior, and they were directed to:



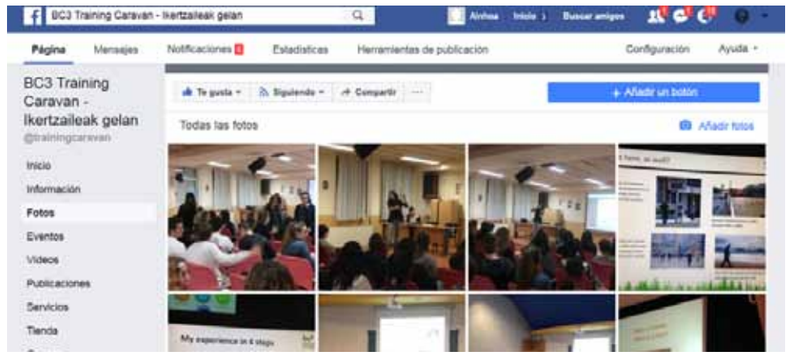
# 4.3 TO SOCIETY. Science Education and Public Awareness | 4.3.1 Outreach activities

## TRAINING CARAVAN.
## Climate Change Researchers at Classrooms


Under BC3's Responsible Research Programme Framework (Sub-area of Science Education), and together with the Basque Ministry of Education and the BERC (Basque Excellence Research Centre), we jointly organize the Training initiative since 2010.

The main objective of this activity targeted at Basque student's aged 16-17, is to provide science-based answers to some central questions about climate change, drawing on the best current scientific understanding and at the same time, making science education and careers attractive for young people. With this purpose, a selection of BC3 researchers feature the Climate Change Science at the classrooms and present the research career. Firmly committed with Climate Change Science Education, our philosophy tries to anticipate and assesses potential implications and societal expectations with regard to climate change research in order to foster the design of inclusive and sustainable research.

For the past years, we have reached over 6.000 students of the Basque Country Autonomous Community through 86 Training Caravan Speeches altogether. For more info, check our http://trainingcaravan.bc3research.org/ or their social network activity (#trainingcaravan).




### LIST OF TRAINING CARAVAN SPEECHES OFFERED DURING 2017

| DATE | HIGH SCHOOL | LOCATION | BC3 LECTURER |
|---|---|---|---|
| 26th April | **Zumaiako institutua** | Zumaia | Marta Pascual |
| 26th April | **Oteitza Lizeo Politeknikoa** | Zarautz | Marta Pascual |
| 27th April | **Goierri Eskola** | Ordizia | Marta Pascual |
| 27th April | **Haztegi Ikastola** | Legazpi | Marta Pascual |
| 4th May | **IES Fray Juan De Zumarraga Durango BHI** | Durango | Amaia de Ayala |
| 4th May | **Ibaizabal Ikastola** | Durango | Amaia de Ayala |
| 10th May | **Karmelo Ikastola IPI** | Bilbao | Stefano Balbi |
| 10th May | **Berrio-Otxoa Ikastetxea** | Bilbao | Stefano Balbi |
| 11th May | **El Carmelo** | Amorebieta | David Moreno |
| 11th May | **San Jose Maristak** | Durango | David Moreno |
| 12th May | **IES Beurko BHI** | Barakaldo | Bosco Lliso |
| 12th May | **IES Balmaseda BHI** | Balmaseda | Bosco Lliso |

## COLLABORATION WITH INGURUGELA
## Science Education initiative focus on High School Teachers and members of local municipalities

The objetive of this iniciative, is the Knowledge Transfer on Climate Change to the Basque teachers of the CAV. This collaboration emerged from the organization of the initiative Training Caravan (researchers at Classrooms) initiative. We found that high school teachers demanded a training in climate change that could be transferred to the classroom after having many of them participated in the TC initiative. Through a close collaboration with Ingurugela and having as its axis of action the School Agenda21, a selection of BC3 senior researchers developed training activities for the teaching and technical staff of different CAV local governments on climate change, for its later implementation in the classrooms and in the municipal organs.

# 4.3 TO SOCIETY. Science Education and Public Awareness | 4.3.2 BC3 in the media

Besides the publication of our research results in leading scientific journals, at BC3 we make a special effort to build an institutional reputation in order to be a benchmark at the local, national or international level. In 2013, we designed the Strategic Communication Plan with this aim, which settled the different channels and tools to be used in the 2014-2017 period. Thus, our outreach activities are based on a comprehensive stakeholder analysis.

In 2014, we added to our webpage and blog, our social media channels (Twitter, LinkedIn, Vimeo, Slideshare, Facebook, among others) with the objective of reaching targeted stakeholders. Furthermore, we worked on the reinforcement of relations with media, both at national and regional levels, and we agreed different permanent collaborations with the local television and with several radio programmes.
BC3 is regularly consulted by different media as an expert adviser in climate change. In this regards, we had significant presence in national and international communication media. Besides, we developed a permanent collaboration with two programas on the Basque TV channel, EITB, (Azpimarra and Ahoz aho) with the objective to transfer knowledge about climate change.

As regards to the impact obtained in different media channels during 2017, we launched 5 press releases, 4 interviews were done in TV programmes, 28 interviews were published in newspapers and magazines. We also recorded 11 appearences in digital media and 24 radio interviews were offered.. Besides, our web page and social platforms received more than 43.106 visits along the year.



## IMPACT IN MEDIA DURING 2017:

TV — 4
Magazines — 4
Press — 24
Digital media — 11
Radio — 24
Press Releases — 5

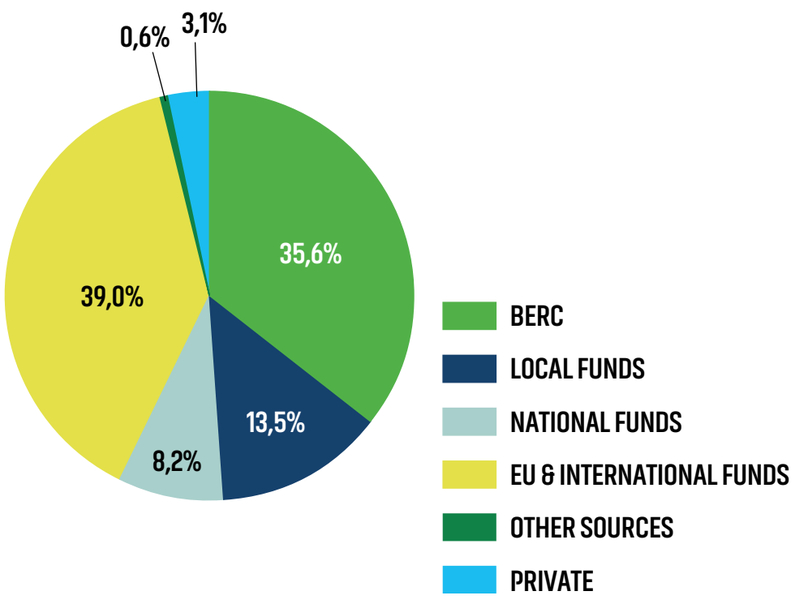
# 5. FUNDING

## 5.1 FUNDING SOURCES

The outstanding scientific records of BC3 since its inception have contributed to its remarkable success in attracting external funds during the period 2014–2017. As a BERC Centre it was a set goal to attract at least 34 % of annual funds from external sources for this period, and 2017 proved to be overwhelmingly successful, with external funding making up 64% of the year's budget.

The following chart shows the external financing structure of BC3 in 2017.

**DISTRIBUTION OF BC3 FUNDS**



# 6. SET OF INDICATORS

## PUBLICATIONS (Production)

| | |
|---|---|
| **Total number of publications published** in the given year (* Published on line) | 96 |
| **Number of articles published** in the given year (* Published on line) | 73 |
| **Number of Books and Chapters published** in the given year | 10 |
| **Other publications published** in the given year | 5 |
| **BC3 Policy Briefings published** in the given year | 4 |
| **BC3 Working papers published** in the given year | 4 |

## PUBLICATIONS (Impact Factor)

| | |
|---|---|
| % of Indexed articles in Quartile 1 | 79% |
| Citation number per year | 1858 |
| H index | 35 |

## TRAINING

| | |
|---|---|
| PhD - Defended thesis | 3 |
| PhD - Supervised students | 26 |
| Master - Supervised students | 5 |

## EXCELLENCE

| | |
|---|---|
| ERC (Requested) | 3 |
| Ikerbasque Researchers | 8 |

## FUNDING

| | |
|---|---|
| % of Funding (non BERC) | 64% |

## PEOPLE

| | |
|---|---|
| Total BC3 Team | 51 |
| Number of researchers | 46 |
| Number of administration staff | 5 |

* number of people at 31st of December of the given year.

**Fig. 1:** Quartile distribution of the articles indexed in SCOPUS:

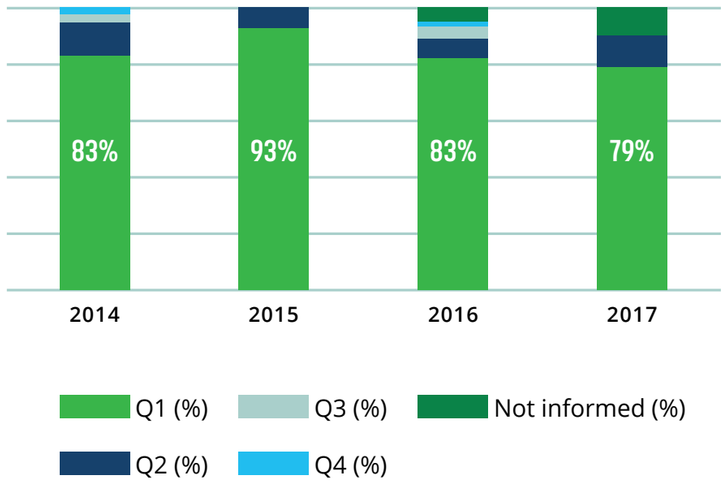
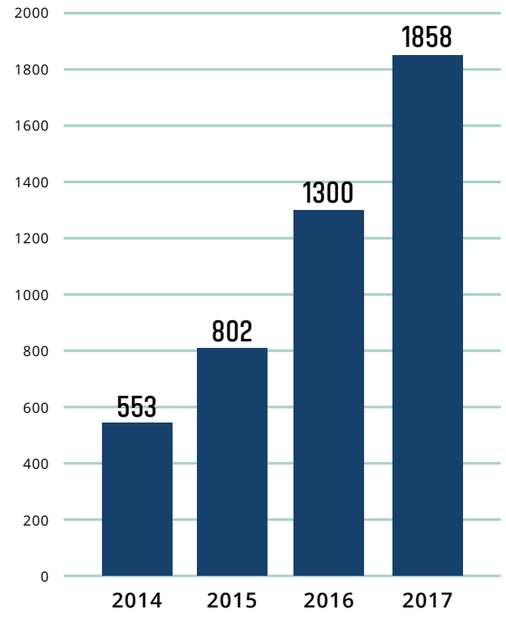



**Fig. 2:** Evolution of the Citation number per year:



bc³

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FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

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