bc³

BASQUE CENTRE
FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

ACTIVITY REPORT 2014

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1. INTRODUCTION

The evidence of climate change on global sustainability has led governments around the world to adopt political, economic and social measures aimed at preventing and mitigating threats, as well as at establishing actions for protection and recovery. Climate change is currently at the top of political agendas and it is a fundamental part of our work at the Basque Centre for Climate Change, BC3, to contribute to these policies through science. We also aim to facilitate their subsequent application in a regulatory framework consistent with the protection of the planet.

In such context, over the last 6 years our organization has become a major international player in the climate change research and policy arena. Our leading position on the ranking of ICCG (International Center for Climate Change Governance) in 2014, which acknowledged us as the world's second most influential Think Tank in the field of climate change economics and policy, was a clear recognition of our excellent results. In 2013, we had already been awarded with the prize for the Best Think Tank on Climate Change in Europe, referred to its performance in 2012.

At BC3, we work to fill the gap between research and policy. We understand that fundamental research is critical to underpin analyses of costs of inaction and benefits of different policies. Taking account of the economic impacts and costs makes a better case for action, and shows that investing in climate mitigation and adaptation is worthwhile. This Activity Report compiles numerous contributions that illustrate the wide impact of our work in global leading institutions.

We were first established in 2008 to study the causes and consequences of climate change and the best ways of addressing it. Given the vast range of the topic, we focused on the socio-economic aspects of climate change, within an interdisciplinary framework that includes the natural as well as social sciences, and we are nowadays one of the few centres in Europe with this specialization.

Since its inception, the centre has grown rapidly and we are now a team of 42. Our areas of work cover; Low Carbon, Climate and Natural Environment, Health and Climate and Climate Policy. In terms of funding, we have been increasingly successful in obtaining funds from different calls and agreement in Spain, the European Union and even more widely, and in 2014 nearly %53 of our funding came from such sources.

As for our network, at BC3 we believe that we can only be successful if we are fully integrated into the network of research centres working on the same topic. To this end, we have developed collaborative agreements with institutions all over the world.

A centre of excellence is evaluated primarily in terms of its scientific output and in this regard, BC3 is making a name for itself. As the staff has increased, so has the volume of publications, principally in scientific journals, but also in books and monographs. In 2014, we produced 63 articles as well as 2 books and 22 chapters. At the same time, we are 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. Hence, we have participated in major fora where this subject is discussed, including the annual Conference of Parties to the Framework Convention on Climate Change. We are likewise contributing to the important Intergovernmental Panel for Climate Change (IPCC), and IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) which brings together the state of knowledge on research on climate and makes it accessible to policymakers. Finally, yet importantly, we have prepared policy briefs and technical reports for various governments.

BC3 is already an established part of the international network of centres on climate change and we look forward to keep on playing an important role in this area.

In June 2014, was announced that **BC3** had been recognized as the world's second most influential Think Tank in the field of climate change economics and policy by the ICCG (International Center for Climate Change Governance) referred to its performance in 2013.

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.

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.

The centre also highlights the importance that the Basque Government, through both the Basque Environmental Strategy for Sustainable Development 2002-2020, and Environmental Framework Programme 2020 of the Basque Country, gives to the creation of knowledge and strategies to reconcile the improvement of the population's quality of life with the preservation of the environment and its resources.

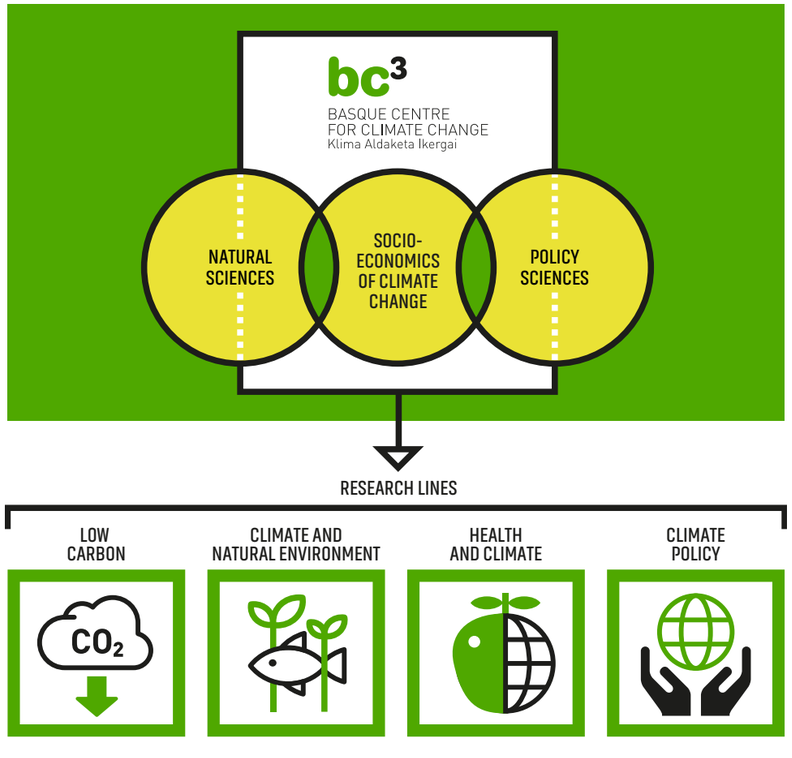
Our research lines fall broadly into the following groups:

- **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

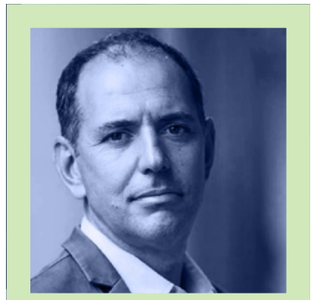
The International Scientific Advisory Committee (ISAC) is a consultative body of independent experts created to provide advisory opinions and analysis on science to our centre. Its remit includes matters concerning research program and general strategy.

Members are appointed for four years, as independent scientific experts on the basis of their specific skills, abilities, experience and knowledge.

In 2014, our International Scientific Advisory Board was updated, and five of its six members were newly appointed. The following members compose the current committee:

ISAC MEMBERS:

Neil Adger
PROFESSOR OF HUMAN GEOGRAPHY
—
University of Exeter

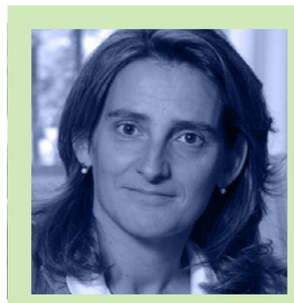


Xavier Labandeira
PROFESSOR OF APPLIED ECONOMICS
—
University of Vigo

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

Pete Smith
PROFESSOR OF SOILS & GLOBAL CHANGE
—
University of Aberdeen

Valentina Bosetti
ASSOCIATE PROFESSOR OF ECONOMICS
—
Bocconi University



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

2.5 BC3 TEAM | 2.5.1 Statistics

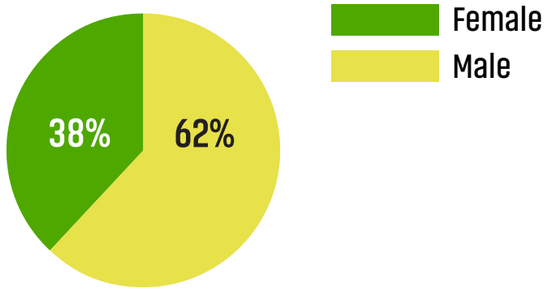
BC3 TEAM DISTRIBUTION BY POSITION

TOTAL BC3 TEAM	**42**
SCIENTIFIC DIRECTOR	1
RESEARCHERS	37
Research Professors	10
Research Fellows	3
Post Doc Researchers	13
PhD Student	7
Research Assistant	4
ADMINISTRATION TEAM	4
Operation Manager	1
Project Manager Outreach	1
Project Officer	1
Management Assistant	1

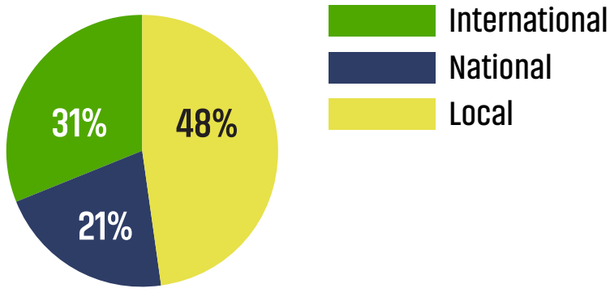
* BC3 team members at 31st of December 2014.
* 6 of the BC3 researchers are IKERBASQUE researchers (5 Ikerbasque Prof. and 1 Ikerbasque Research Fellow).

BC3 TEAM DISTRIBUTION BY GENDER AND NATIONALITY

Distribution by gender



Distribution by nationality



During 2014, 14 researchers were hired, both to fill vacancies of researchers who moved to other centres and to meet new needs related to specific research projects. During the selection processes of the new body of researchers, we received 240 applications from researchers from all over the world.

The distribution by position of the new staff was as follows: 1 Ikerbasque Research Fellow, 8 Post-Doctoral Researchers, 2 PhD Students and 3 Research Assistants. In addition, during 2014, we hosted 10 guest-researchers who stayed with us for a time frame inferior to 6 months.

As regards funding, during 2014 researchers' attraction was carried out through talent attraction programs such those of Ikerbasque (in its modality of Professorship (1) or Fellowship (1)), Bizkaia: Xede, national programs such as Ramón & Cajal (1) ,amongst others. Funding also came through the researchers' own participation in externally funded projects.

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

- **EFFECTIVE AND INNOVATIVE PROCESSES AND ORGANIZATION**
- **EXCELLENT INFRASTRUCTURE AND LOCATION**
- **LINKS TO LEADING CLIMATE CHANGE CENTERS WORLDWIDE**
- **TRAINING**
- **STAFF SATISFACTION PROGRAM**

During October 2014, we also launched the call to replace the Scientific Director's position, since Prof. Anil Markandya, Scientific Director at the time, was due to reach the end of his term in December 2015. This international call, which ended in February 2015, attracted 53 top-level international applications coming from a variety of leading institutions.

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

Anil Markandya
SCIENTIFIC DIRECTOR.
IKERBASQUE PROFESSOR

Ferdinando Villa
IKERBASQUE
RESEARCH PROFESSOR

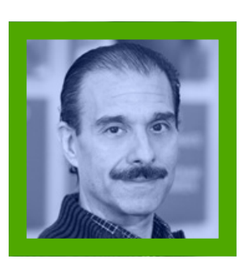
Unai Pascual
IKERBASQUE
RESEARCH PROFESSOR

Sérgio H. Faria
IKERBASQUE
RESEARCH PROFESSOR

Marc Neumann
IKERBASQUE
RESEARCH PROFESSOR

Aline Chiabai
RESEARCH
PROFESSOR

Ibon Galarraga
RESEARCH
PROFESSOR



Joseph Spadaro
RESEARCH
PROFESSOR

Mikel González-Eguino
RESEARCH
PROFESSOR

Luis Maria Abadie
RESEARCH
PROFESSOR

Agustin Del Prado
RESEARCH
PROFESSOR

David Moreno
IKERBASQUE
RESEARCH FELLOW

Elena Ojea
RESEARCH
FELLOW

Iñaki Arto
RESEARCH
FELLOW

Sebastien Foudi
POSTDOCTORAL
RESEARCHER

Eneko Garmendia
POSTDOCTORAL RESEARCHER
OF IKERBASQUE – DKR IN UK

RESEARCHERS - II

For more information, visit our website.

RESEARCH LINES:

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

Elena Perez Miñana
POSTDOCTORAL RESEARCHER

Marta Pascual
POST DOCTORAL RESEARCHER OF IKERBASQUE – DKR IN AUSTRALIA

Luis Rey
POST DOCTORAL RESEARCHER

Stefano Balbi
POST DOCTORAL RESEARCHER

Marta Olazabal
POSTDOCTORAL RESEARCHER

Kishore Dhavala
POST DOCTORAL RESEARCHER

Amaia de Ayala
POST DOCTORAL RESEARCHER

Josue Polanco
POST DOCTORAL RESEARCHER

Mary Thompson
POST DOCTORAL RESEARCHER

Maialen Garmendia
POST DOCTORAL RESEARCHER

Ignacio Palomo
POST DOCTORAL RESEARCHER

Federico Cardona
POST OCTORAL RESEARCHER

Ignacio Cazcarro
POST DOCTORAL RESEARCHER

Patricia Gallejones
JUNIOR RESEARCHER - PHD STUDENT

Elisa Sainz de Murieta
JUNIOR RESEARCHER - PHD STUDENT

Amaia Albizua
JUNIOR RESEARCHER - PHD STUDENT

RESEARCH LINES:

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

RESEARCHERS - III

For more information, visit our website.

Mª Victoria Román de Lara
JUNIOR RESEARCHER - PHD STUDENT

Guillermo Pardo
JUNIOR RESEARCHER - PHD STUDENT

Xoaquin Garcia
JUNIOR RESEARCHER - PHD STUDENT

Alina Tepes
JUNIOR RESEARCHER - PHD STUDENT

Josu Lucas
RESEARCH ASSISTANT

Laetitia Pettinotti
RESEARCH ASSISTANT

Pablo Martinez
RESEARCH ASSISTANT

Alex Azkargorta
RESEARCH ASSISTANT

ADMINISTRATION STAFF

For more information, visit our website.

Nerea Ortiz
OPERATION MANAGER

Susana Pérez
MANAGEMENT ASSISTANT

Ainhoa Azkarate
PROJECT MANAGER

Julen Ugalde
PROJECT OFFICER

2.5 BC3 TEAM | 2.5.3 HR Excellence in Research

HR EXCELLENCE IN RESEARCH

In November 2013, we endorsed the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (C&C) principles.

Since then, we have been working on our European Human Resources Strategy for Researchers (HRS4R) approach, a mechanism that aims to support the implementation of the C&C.

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.

Specifically, the European Charter for Researchers outlines the functions, responsibilities and rights of investigators and their employers, in order to ensure that the relation between these parties contributes to successful performance in the generation, transfer and shared use of knowledge, as well as to the professional development of researchers from an early stage.

Moreover, the Code of Conduct was drawn up to improve enrolment, and to guaranty fairness and transparency on researchers' selection procedures. Hence, their merit should be measured not only by their number of publications, but also by a wider range of evaluation criteria such as education and teaching, supervision, teamwork, knowledge transfer, management and public awareness-raising activities.

To help accommodate the research institutions to the Charter and Code principles, the Commission set out a procedure through interested institutions could design their own Human Resources Strategy. This procedure consists of five steps:

- **Preparation of a rigorous Internal Analysis.**
- **Publication of the Institution's Strategy in the corporate website to maintain and improve the Charter and Code.**
- **Evaluation and approval of the Strategy by the Commission.**
- **Application and continuous self-assessment of the process by the institution.**
- **Finally, external evaluation by the Commission every four years after initiating the process.**

Therefore, the initiative of defining and deploying this strategy is carried out in direct collaboration with the Commission, together with some other institutions that already have the acknowledgement or are in the process to do so. All together, they form the best forum for exchanging and sharing best practice.

3. RESEARCH

3.1 RESEARCH LINES

EVOLUTION OF STRUCTURE: RESEARCH LINES:

The Basque Centre for Climate Change belongs to an exclusive class of research institutions that defies standard classification. Our unique, organic approach to multidisciplinarity makes us stand out as an institutional instance of emergence, in which the whole is more than the mere sum of its parts. Despite our small size and the fact that we were only established in 2008, we have already achieved major international recognition and influence within the Climate Change community.

The key of our success lies in our innovative "paradigm", which combines the flexibility of a small centre with the versatility of an outstanding multidisciplinary team. Evidently, consolidating these two contrasting features (viz. small size and comprehensive multidisciplinarity) is no trivial task. On the contrary, it requires an organic approach in which all BC3 researchers are permanently committed to perform collective scientific-strategy planning, in order to optimize the use and integration of available skills and resources.

A better understanding of our organic approach may be obtained by looking back on our brief history and evolution, as we were originally created as a research centre in the field of environmental economics. During our first five years of existence, research was broadly organized along the following four lines: **Adaptation - Mitigation - International Agreements - Basque Climate Policy** ***(Fig-1)***.

While the first three research lines (Adaptation, Mitigation, and International Agreements) constituted a typical and comprehensive environmental-economics approach to climate change, the fourth (Basque Climate Policy) represented a distinctive focus on regional climate programmes. Since their inception, these four research lines displayed an overlap (e.g., research in climate policy and international agreements would draw on work done in adaptation and mitigation, and vice versa).

The excellence and breadth of research performed at BC3 soon started to attract a wide variety of scientists, including ecologists, environmental scientists, biologists, Earth scientists, engineers, and physicists. By its fifth anniversary, we were already regarded as an attractive destination centre for world-class climate-change researchers looking for a vibrant environment to pursue innovative interdisciplinary research. An evidence of this outstanding reputation is the recognition given in 2013 (based on 2012 centre performance) and in 2014 (based on 2013 centre performance) by the International Centre for Climate Governance (ICCG), which issued its ICCG Climate Think Tank Ranking in the field of climate change economics and policy, and named BC3 the Top European Climate Think Tank podium.

With the growth and expansion of the centre, the need for revising our scientific structure came naturally, and we eventually became organized as follows: ***(Fig-2)***.

The links between the two research-line structures (viz. *First* and *Second* Cycles) are relatively straightforward.

- The Low Carbon Line deals mainly with mitigation, but also addresses some adaptation issues (e.g. impacts of biofuels on land use and agriculture).
- The Natural Environment Line deals with adaptation and mitigation, mainly the former, from the perspective of natural resources and ecosystems.
- The Health Line looks primarily at adaptation to climate change, but also at the health benefits of mitigation policies and measures.
- The Climate Policy Line covers the previous International Agreements Line, and includes other policy areas as well, such as issues relating to the adoption of mitigation and adaptation measures.

Finally, all four second-cycle research lines encompass the older, first-cycle research line focused on policy issues relevant to the Basque Country. ***(Fig-3)***.

FIG 1. BC3 research lines and their objectives, First Cycle (2008–2013).

ADAPTATION	Design of measures to adapt to the impacts of climate change.
MITIGATION	Measures to reduce greenhouse gases (GHGs) so that the planet can stabilize concentrations at an acceptable level.
INTERNATIONAL AGREEMENTS	Understanding how international climate agreements need to be structured, as well as the obstacles in getting agreements that have broad support.
BASQUE CLIMATE POLICY	Developing and supporting research that informs climate policy in the Basque Country.

FIG 2. BC3 research lines and their objectives, Second Cycle (2014–2017).

LOW CARBON	Investigates strategies to mitigate the emissions of greenhouse gases (GHGs) in order to promote an efficient transition to a low carbon economy.
NATURAL ENVIRONMENT	Addresses the interlinkages between climate change, natural capital (natural resources and ecosystems), and the benefits that derive from them in terms of human well-being.
HEALTH AND CLIMATE	Analyses the social, economic, and behavioural factors that influence vulnerability of people, communities, and social systems to climate change.
CLIMATE POLICY	Aims to contribute, from the scientific standpoint, to enrich climate policies and to enable their implementation within a policy framework that is coherent with the protection of the planet.

FIG 3. Research lines focused on policy issues.

	FOCAL AREAS	
	MITIGATION	ADAPTATION
LOW CARBON	◆ ◆	◆
NATURAL ENVIROMENT	◆ ◆	◆ ◆
HEALTH AND CLIMATE	◆	◆ ◆
CLIMATE POLICY	◆ ◆	◆ ◆

3.1 RESEARCH LINES | 3.1.1 Low Carbon

OBJECTIVES OF THE RESEARCH LINE

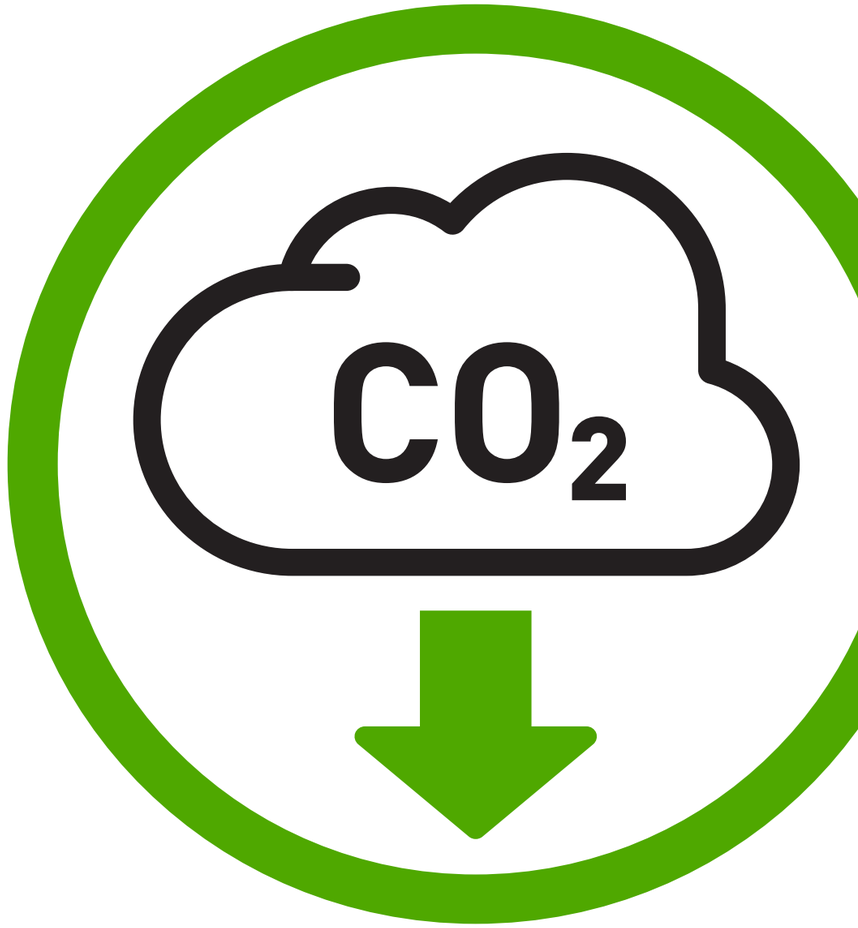
The "Low Carbon" (LC) research line deals with the implications of the transition to a low carbon economy. The major source of carbon emissions is the production and consumption of energy and a great deal of our effort at BC3 is devoted to understand how to reduce emissions without unduly affecting economic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

2014 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.

MAIN COLLABORATORS

- RISO-DTU
- UNIVERSITY OF OLDENBURG
- ECONOMICS FOR ENERGY
- UNIVERSITY OF SOUTHAMPTON
- INSTITUTE FOR PROSPECTIVE AND TECHNOLOGICAL STUDIES (IPTS)
- CEEW
- UPV/EHU
- UPN
- UNIVERSIDAD DE VALLADOLID
- UNIVERSIDAD DE ALCALÁ
- UNIVERSIDAD JUAN CARLOS I

MAIN RESEARCH PROJECTS

- CECILIA 2050 (FP7)
- FLAGSHIP (FP7)
- COMPLEX (FP7)
- DECCMA (CARIAA-IDRC)
- LOW CARBON PROGRAMME (FUNDACIÓN REPSOL)
- PURGE (FP7)

SOME HIGHLIGHTED OUTPUTS

- Economic-financial theory instruments have been used to analyze energy and climate resources of different investment projects such as wind energy projects or carbon storage and capture.
- The implications of public policies such as, rates on carbon and other polluting gases or on energy efficiency policies such as the Renove Plan have been assessed.

Publications:

1. Arto, I., Dietzenbacher, E. 2014. **Drivers of the growth in global greenhouse gas emissions. Environmental Science & Technology**. 48. (10) 5388–5394. DOI (10.1021/es5005347).
2. Arto, I., Roca, J., Serrano, M. 2014. **Measuring emissions avoided by international trade: Accounting for price differences. Ecological Economics**. 97. 93 - 100. DOI (10.1016/j.ecolecon.2013.11.005).
3. Arto, I., Rueda-Cantuche, J.M., Andreoni, V., Mongelli, I., Genty, A. 2014. **The game of trading jobs for emissions. Energy Policy**. 66. 517-525. DOI (10.1016/j.enpol.2013.11.046).
4. Arto, I., Rueda-Cantuche, J.M., Peters, G.P. 2014. **Comparing the GTAP-MRIO and WIOD databases for carbon footprint analysis. Economic Systems Research**. 26. (3) 327-353. DOI (10.1080/09535314.2014.939949).
5. Cazcarro, I.; Duarte, R., Sánchez Chóliz, J., Sarasa, C. and Serrano, A.2014 (Forthcoming). **Environmental footprints and scenario analysis for assessing the impacts of the agri-food industry on a regional economy. A case study in Spain. Journal of Industrial Ecology**. DOI (10.1111/jiec.12209).
6. De Neufville, R., Abadie, L.M., Chamorro, J.M. 2014. **Measuring performance of long-term power generating portfolios. Green Energy and Efficiency: An Economic Perspective**. 1st ed. London. Springer. ISBN 978-3-319-03631-1.

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).

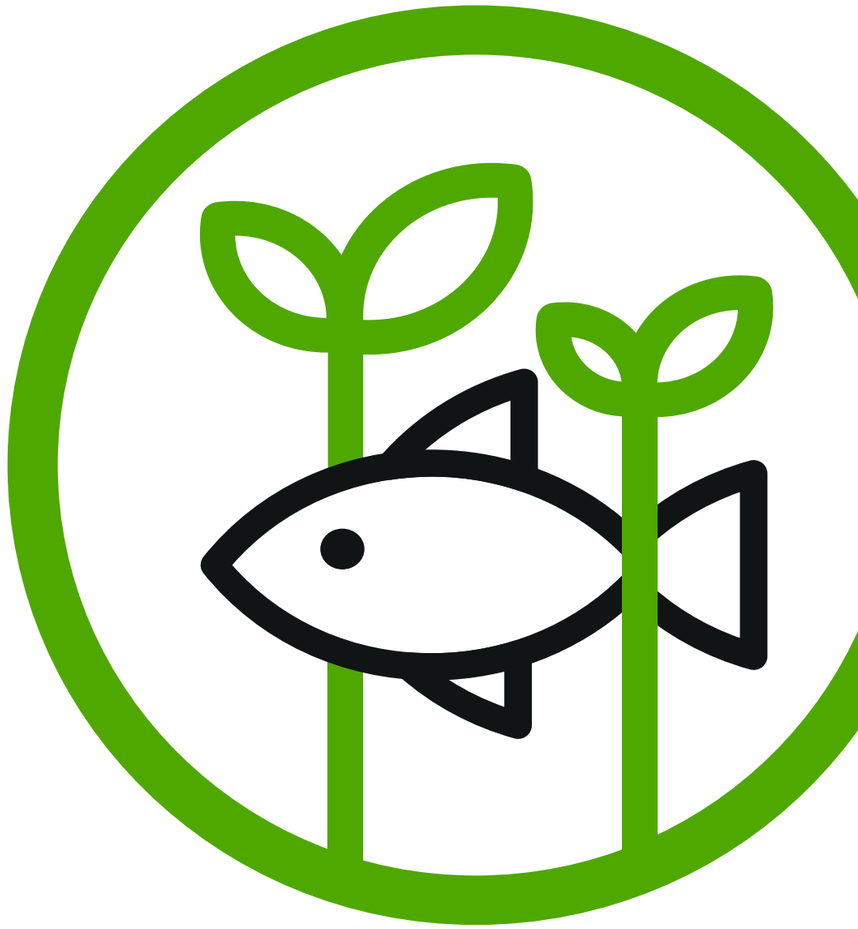
The general objective of Natural Resources (NR) is to investigate the links between climate change and the formation, depletion and exploitation of natural systems and reserves of biotic and abiotic resources. Physical, ecological, social, and economic aspects are considered, all of which are of great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

2014 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.

MAIN COLLABORATORS

- UNIVERSITY OF THE BASQUE COUNTRY UPV/EHU
- NEIKER
- CIEMAT
- INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT (IIED)
- NORTHERN ILLINOIS UNIVERSITY
- UNIVERSITY OF WYOMING
- UNIVERSIDAD DE ALCALÁ
- UNIVERSITY OF CALIFORNIA AT SANTA CRUZ
- UNIVERSITY OF BRISTOL
- CENTRE D'ECOLOGIE FONCTIONNELLE ET EVOLUTIVE – CNRS
- CENTER FOR INTERNATIONAL FORESTRY RESEARCH (CIFOR)
- UNIVERSITY OF MONTPELLIER
- UNIVERSITY OF OSNABRÜCK
- UNIVERSITY OF ABERDEEN
- ROTHAMSTED RESEARCH INSTITUTION
- ATB
- PIK
- INRA
- PBL
- CSIC
- BANGOR UNIVERSITY
- WAGENINGEN UR
- AARHUS UNIVERSITY
- IRSTEA
- UNIVERSITY OF READING
- UPM
- UPNA
- IBERS
- UMH
- CIFA
- BCAM
- NIPR
- NAGAOKA UNIVERSITY OF TECHNOLOGY
- COLORADO STATE UNIVERSITY
- NEW YORK UNIVERSITY
- UNIVERSITY OF LEICESTER
- UNIVERSITY OF HEIDELBERG
- AWI BREMERHAVEN
- UNIVERSITY TUEBINGEN
- THE DEPARTMENT OF GEOGRAPHY AND THE CONSERVATION RESEARCH INSTITUTE (UNIV.OF CAMBRIDGE)
- JRC
- UNIVERSIDAD AUTÓNOMA DE MADRID
- ICRA - CATALAN INSTITUTE FOR WATER RESEARCH
- UNIVERSITY OF PALERMO
- UNIVERSITÉ LAVAL
- EAWAG AND ETH ZURICH

3.1 RESEARCH LINES | 3.1.2 Climate and Natural Environment

MAIN RESEARCH PROJECTS

- ECOFINDERS (EU FP7)
- ENERKROP (SAIOTEK)
- PERSEUS(EU FP7)
- CAMPIC and PAMPIC (Bizkaia Xede)
- OPTIBARN
  (ERA-NET, MINECO – Spanish Ministry for Economy and Competitiveness)
- NEREA5 (Plan Nacional)
- DEFRA (UK Department for Environment, Food & Rural Affairs)
- DG-MARE (EU Contract)
- TObeWELL (Cost Action)
- BASE (EU FP7)
- ECONADAPT(EU FP7)

SOME HIGHLIGHTED OUTPUTS

One of the most important aspects of the CNE line is the diversity of aspects it investigates. This is due to the variety of impacts of climate change on society due to changes in the state of natural capital (terrestrial, marine ecosystems, agriculture, etc.) and affecting food and water security, Measures to defend against floods and also by altering the inter-linkage and preferences that individual or social will suffer under the different scenarios of climate change. These scenarios manage variables such as social conflicts due to scarcity of resources (water, food, migratory movements ...) or distribution in the control and access to natural resources and ecosystem services. These are the main two topics assessed under the CNE line.

Some of the highlighted outputs during 2014 include among others:

Publications.

1. Villa F., Bagstad K.J., Voigt B., Johnson G.W., Portela R., Honzák M., Batker D. 2014. **A methodology for adaptable and robust ecosystem services assessment. PLoS ONE: 10.1371/journal.pone.0091001)**. This paper presents the methodology of the ARIES (Artificial Intelligence for Ecosystem Services) project. ARIES is a highly recognized, pioneering example of an e-science collaboratory, i.e. a virtual space on a semantic web where independent actors can ¬develop and share interoperable data and models. In BC3-led research, this paradigm has focused on the modelling of ecosystem services (ES), providing a view of coupled human-natural systems that has been widely recognized in science, management and governance.

2. Pascual, U., Phelps, J., Garmendia, E., Brown, K., Corbera, E., Martin, A., Gomez-Baggethun, E., Muradian, R. 2014. **Social Equity matters in Payments for Ecosystem Services. Bioscience 64(11): 1027-1036.)** On policy design, a novel framework that is widely being used by interdisciplinary scholars to assess trade-offs and synergies between economic efficiency and social equity of Payments for Ecosystem Services programs. This framework is being applied by many UN agencies and think tanks, such as UNEP to assess the effectiveness of PES around the world.

3. Faria S.H., Weikusat I., Azuma N. 2014. **The microstructure of polar ice. Part I: Highlights from ice core research. Journal of Structural Geology 61:2-20**. The interactions of natural ice with the environment can have serious implications for life on the globe, as demonstrated by the role of the cryosphere in sea-level rise and Earth's albedo feedback. This is the first of two companion papers that examine the whole knowledge about natural ice physical properties acquired from more than 70 years of polar ice coring, and identify a fundamental paradigm shift that paves the way for new interpretations and research strategies in the years to come. In 2015, Thompson Reuters "InCites" rated this publication as one of the top 10% most influential works in its field. (second part paper, Faria S.H., Weikusat I., Azuma N. 2014. **The microstructure of polar ice. Part II: State of the art. Journal of Structural Geology 61:21-49.**)

MODEL DEVELOPMENTS

Development of ARIES (ARtificial Intelligence for Ecosystem Services) has continued. During 2014, applications have been made on food security, impoverishment and climate change, complementing the modeling approach of ecosystem services.

REMARKABLE COLLABORATIONS WITH UNITED NATIONS

The science-policy interface has been improved through collaboration with various United Nations' institutions such as UNEP, UN University, UN Food and Agricultural Organization (FAO) or the International Platform on Biodiversity and Ecosystem Services (Diaz et al, 2014).

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 NE 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

2014 RESEARCH IN ACTION: TOPICS

Health impacts and costs/benefits of adaptation and mitigation strategies

Health vulnerability indicators

Human health and ecosystems

Application to national and local contexts

MAIN COLLABORATORS

- UNIVERSITY OF THE BASQUE COUNTRY UPV/EHU
- VICOMTECH, INSTITUTO CARLOS III
- UNIVERSIDAD OF ALCALÁ
- UNIVERSIDAD DE VALENCIA
- UPM
- AARHUS UNIVERSITY (DENMARK)
- CENTRO EURO-MEDITERRÁNEO PER I CAMBIAMENTI CLIMATICI
- LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE
- CHARLES UNIVERSITY
- TERI

MAIN RESEARCH PROJECTS

- BASE (EU FP7)
- PURGE (EU FP7)
- TOBEWELL (COST ACTION)
- ECOHEALTH (F. BIODIVERSIDAD)

SOME HIGHLIGHTED OUTPUTS

1. Chiabai, A. and Spadaro, J.V. 2014. **Climate Change Adaptation and Human Health. Routledge Handbook of the Economics of Climate Change Adaptation**. Routledge. Routledge. ISBN 978-0415633116.

2. Fantke, P., Jolliet, O., Apte, J.S., Cohen, A.J., Evans, J.S., Hänninen, O.O., Hurley, F., Jantunen, M.J., Jerrett, M., Levy, J.I., Loh, M.M., Marshall, J.D., Miller, B.G., Preiss, P., Spadaro, J.V., Tainio, M., Tuomisto, J.T., Weschler, C.J., McKone, T.E. 2014. **Health effects of fine particulate matter in life cycle impact assessment: Conclusions from the Basel guidance workshop. International Journal of Life Cycle Assessment**. 1-13. DOI (10.1007/s11367-014-0822-2).

3. Green, R., Milner, J., Dangour, A.D., Haines, A., Chalabi, Z., Markandya, A., Spadaro, J.V. and P. Wilkinson. 2014. **Health Implications of Adopting Nutritious, Low-Carbon Diets in the U.K. FASEB Journal**. 28. (1 Supplement) 255.3. DOI (0.1096/fj.1530-6860).

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 follow and attend all COP meetings and have actively participated in the drafting of the Climate Change Plan for the Basque Government.

See Section POLICY RELEVANT KNOWLEDGE TRANSFER.

3.1 RESEARCH LINES | 3.1.4 Climate Policy

2014 RESEARCH IN ACTION: TOPICS

Exploiting the full potential of economic instruments to contribute to achieving the EU's greenhouse gas emissions reduction objectives for 2050

Economic valuation of climate change adaptation in Spain: the case of water

Design and evaluation of Energy Efficiency Programmes.

Exploring the potential for Environmental Fiscal Reform in Spain.

Better measurement of emissions from land use and policies to improve IPCC/ GHG inventories for agriculture and land use methodologies.

Support in the elaboration of plans and programs linked with climate change.

- Collaboration Agreement with Bilbao City Council
- Climate Change Plan/ Strategy for the Basque Government. 2013-2014

MAIN COLLABORATORS

- UPV/EHU
- IHOBE
- CITY OF BILBAO
- CENTRO DE INVESTIGACIONES ENERGÉTICAS, MEDIOAMBIENTALES Y TECNOLÓGICAS (CIEMAT)
- CICERO
- IFO, INSTITUTE FOR ECONOMIC RESEARCH
- ECOLOGIC INSTITUTE
- INSTITUTE FOR EUROPEAN ENVIRONMENTAL POLICY
- FONDAZIONE ENI ENRICO MATTEI
- DANISH BOARD OF TECHNOLOGY

MAIN RESEARCH PROJECTS

- ECONADAPT (EU FP7)
- CICEP (Collaboration Agreement)
- BRODISE (EU H2020)
- LOW CARBON PROGRAMME (Repsol Foundation Collaboration Agreement)

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 framework 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 best policies 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.

SOME HIGHLIGHTED OUTPUTS

Contributions

The researchers of this line took active part as expert observers in the most relevant international climate change summit annually organized by the United Nations Framework Convention on Climate Change, COP20.

At BC3 we also contributed to the 5th report of the IPCCC, published in 2014. This report, edited by IPCC, the most authoritative organization dealing with climate change worldwide, is published every 6 years and is of great political relevance at international scale.

Besides, we helped to define jointly with policy-makers the strategic positioning of regional and national players in the face of future negotiations at both the COP and the European level. BC3 actively participates in the meetings of the COP and is also one of the expert agents that has participated in the Plan against Climate Change of the Basque Government.

See Section POLICY RELEVANT KNOWLEDGE TRANSFER.

Publications

1. Abadie, Luis M.; Ibon Galarraga and Dirk Rübbelke. 2014. **Evaluation of Two Alternative Carbon Capture and Storage Technologies: A Stochastic Model**. Environmental Modelling & Software. 54. 182 - 195. DOI (10.1016/j.envsoft.2014.01.002).
2. Ansuategi, A., Escapa, M., Galarraga, I. and González-Eguino, M. 2014. **Impacto económico de la eco-innovación en Euskadi: una aproximación quantitativa**. Ekonomiaz: Revista Vasca de Economía. 86. (02) 246-273
3. Galarraga, I., Ramos, A., Lucas, J. and Labandeira X. 2014. **The Price of Energy Efficiency in the Spanish Car Market. Transport Policy**. 36. 272-282. DOI (10.1016/j.tranpol.2014.09.003).
4. Lucas, J. and Galarraga, I. 2014. Green Energy Labelling. **Green Energy and Efficiency: An Economic Perspective**. 1st ed. Switzerland. Springer International Publishing. ISBN 978-3-319-03631-1.
5. Bagstad, K., Semmens, D., Villa, F., Johnson, G. 2014. **Quantifying and Valuing Ecosystem Services: An Application of ARIES to the San Pedro River Basin, USA**. In Handbook on The Economics of Ecosystem Services and Biodiversity. Northampton, MA. Edward Elgar Publishers. ISBN 978 1 78195 150.
6. Mukherjee, Vivekananda; Dirk Rübbelke and Tilak Sanyal. 2014. **Technology Transfer as a Means to Combat Global Warming. In Emerging Issues in Economic Development - A Contemporary Theoretical Perspective**. Oxford. Oxford University Press. ISBN 978-0-19-809906-2.

3.2 RESEARCH PROJECTS

ONGOING RESEARCH PROJECTS

European Commission or other international funding programs

SEVENTH FRAMEWORK PROGRAMME	**PURGE** "Public health impacts in Urban environments of Greenhouse gas Emissions reduction strategies"	7th Framework Programme
	PERSEUS "Policy-oriented marine Environmental Research in the Southern European Seas"	7th Framework Programme
	COCONET "Towards COast to COast NETworks"	7th Framework Programme
	BASE "Bottom-up Climate Adaptation Strategies towards a Sustainable Europe"	7th Framework Programme
	COMPLEX "Knowledge Based Climate Mitigation Systems for a Low Carbon Economy"	7th Framework Programme
	ECOFINDERS "Ecological Function and Biodiversity Indicators in European Soils"	7th Framework Programme
	CECILIA 2050 "Choosing Efficient Combinations of Policy Instruments for Low-carbon development and Innovation to Achieve Europe's 2050 climate targets"	7th Framework Programme
	FLAGSHIP "Forward Looking Analysis of Grand Societal cHallenges and Innovative Policies"	7th Framework Programme
	ECONADAPT "Economics of climate change adaptation in Europe"	7th Framework Programme
NATURAL ENVIRONMENT RESEARCH COUNCIL	**ASSETS** "Attaining Sustainable Services from Ecosystems"	NERC-ESPA Programme (Ecosystem Services for Poverty Alleviation)
	WISER "Which Ecosystem Service Models Best Capture the Needs of the Rural Poor?"	NERC-ESPA Programme (Ecosystem Services for Poverty Alleviation)
Department for Environment Food & Rural Affairs	"Optimising the efficiency of dietary nitrogen use to reduce emissions and waste in dairy systems"	UK Department for Environment, Food and Rural Affairs (DEFRA)
Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit	**WISE-UP** "Water Infrastructure Solutions from Ecosystem Services Underpinning Climate Resilient Policies and Programmes"	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
CARIAA Collaborative Adaptation Research Initiative in Africa and Asia	**DECCMA** "DEltas, vulnerability and Climate Change; Migration as an Adaptation"	Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA)

MINECO or Spanish Institutions

GOBIERNO DE ESPAÑA MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD / FACCEJPI Agriculture, Food Security and Climate Change	"New approaches to efficient use of N for sustainable agriculture"	MINECO – Spanish Ministry for Economy and Competitiveness
	CAUSE "Comparative Assessment and Valuation of Ecosystem Services in Agro-Forest systems: a methodology for Land Use Policy prioritization"	MINECO – Spanish Ministry for Economy and Competitiveness
	OPTIBARN "Optimised animal specific barn climatisation facing temperature rise and increased climate variability"	MINECO – Spanish Ministry for Economy and Competitiveness
GOBIERNO DE ESPAÑA MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE / Fundación Biodiversidad	**ECOHEALTH** "Analysing co-benefits among ECOsystems and HEALTH to cope with climate change risks"	Fundación Biodiversidad, Spanish Ministry of Agriculture, Food and Environment

Basque Government or Basque Institutions

EUSKO JAURLARITZA GOBIERNO VASCO	**ENERKROP** "Desarrollo y aplicación de modelos agronómicos para la evaluación ambiental y energética de la producción de biocombustibles en la CAPV"	Basque Government
bizkaia ::: xede / BFA DFB Bizkaiko Foru Aldundia Diputación Foral de Bizkaia	**CAMPIC** - Chemical Analysis of Microinclusions in Polar Ice Cores	Bizkaia Xede
	PAMPIC - Physical Analysis of Microinclusions in Polar Ice Cores	Bizkaia Xede
	Climate and Trade Policies for a Global Agreement	Bizkaia Xede

Other Funding Agencies

Danmarks Meteorologiske Institut	CRES "Centre for Regional change in Earth System"	Danish Meteorological Institute (DMI)
°CICERO Center for International Climate Research	**CICERO** - BC3 agreement	Centre for International Climate and Energy Policy (CICEP)
Bioversity International 1974 - 2014	**Bioversity-CCAFS** "Agrobiodiversity as an Instrument for Climate Change Adaptation"	Bioversity International
Fundación REPSOL	Low Carbon Programme	Repsol Foundation

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

FP7_PURGE

GRANT AGREEMENT:	GA 265325
NAME OF THE PROJECT:	PURGE "Public health impacts in Urban environments of Greenhouse gas Emissions reduction strategies"
FUNDING AGENCY:	7th FRAMEWORK PROGRAMME
TYPE:	FP7-ENV-2010
TIME FRAME:	2011-2014
FUNDING:	634.554 €
PARTNERS:	**London School of Hygiene and Tropical Medicine** (United Kingdom) - Coordinator **Arup International Consultants** (China) **BC3 Basque Centre for Climate Change** (Spain) **Univerzita Karlova V Praze** (Czech Republic) **Fondazione Eni Enrico Mattei** (Italy) **Foundation for Innovation and Technology Transfer** (India) **Peking University** (China) **Institut Nuklearne Nauke Vinca** (Serbia) **University College London** (United Kingdom)

Project Description

The project examines the health impacts of greenhouse gas (GHG) reduction policies in urban settings in Europe, China and India, using case studies of 3-4 large urban centres and three smaller urban centres. Sets of realistic interventions are proposed, tailored to local needs, to meet published abatement goals for GHG Emissions for 2020, 2030 and 2050. Mitigation actions are being defined in four main sectors: power generation/ industry, household energy, transport and food and agriculture. The chief pathways by which such measures influence health is being described, and models developed to quantify changes in health-related 'exposures' and health behaviours. Models include, ones relating to outdoor air pollution, indoor air quality and temperature, physical activity, dietary intake, road injury risks and selected other exposures.

Integrated quantitative models of health impacts are based on life table methods encompassing both mortality and morbidity outcomes modelled over 20 year time horizons. Where possible, exposure-response relationships will be based on review evidence published by the Comparative Risk Assessment initiative or systematic reviews. Uncertainties in model estimates are characterized using a mathematical framework to quantify the influence of uncertainties in both model structure and parameter estimates. Particular attention is given to economic assessments, both in terms of behavioural choices/uptake of various forms of mitigation measure (with new surveys to address evidence gaps), and in terms of health benefits and costs calculated from societal, health service and household perspectives. A decision analysis framework is being developed to compare different mitigation options.

BC3's contribution to the project

BC3 is 1 of the 9 partners, and coordinates the economic elements of the project, together with FEEM and CUNI, leads the tasks related to modelling of trends/changes in electricity generation, drawing on its experience with research done for the Lancet.

Key BC3 researchers involved

Prof. Anil Markandya
Dr. Joseph Spadaro
Dr. Aline Chiabai
Dr. Ibon Galarraga

Link with BC3 Research Line

Low Carbon
Health and Climate
Climate and Natural Environment
Climate Policy

URL Address

http://purge.lshtm.ac.uk/

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

FP7_PERSEUS

GRANT AGREEMENT:	GA 287600
NAME OF THE PROJECT:	PERSEUS "Policy-oriented marine Environmental Research in the Southern European Seas"
FUNDING AGENCY:	7th FRAMEWORK PROGRAMME
TYPE:	FP7-OCEAN-2011
TIME FRAME:	2012-2015
FUNDING:	139.834 €
PARTNERS:	**NATO Science & Technology Organization - Centre for Maritime Research & Experimentation** (Italy); **Airbus Ds Sas** (France); **DCNS Sa** (France); **Engineering - Ingegneria Informatica Spa** (Italy); **Isdefe** (Spain); **Airbus Defence and Space** (Spain); **National Center For Scientific Research. Demokritos** (Greece); **Guardia Civil Española** (Spain); **Institutt for Fredsforskning Stiftelse** (Norway); **Saab Aktiebolag** (Sweden); **Ses Techcom Sa** (Luxembourg) **Ajeco Oy** (Finland); **Intuilab** (France); **Meteosim Sl** (Spain); **Luxspace Sarl** (Luxembourg); **Sofresud (France); Inov Inesc Inovacao - Instituto De Novas Tecnologias** (Portugal); **Skytek Ltd** (Ireland); **Laurea-Ammattikorkeakoulu Oy** (Finland); **Dfrc Ag** (Switzerland); **Boeing Research & Technology Europe S.L.U.** (Spain); **Ecorys Nederland B.V.** (Netherlands); **Cork Institute Of Technology** (Ireland); **Ministere De L'interieur, De L'outremer Et Des Collectivites Territoriales Direction De La Defense et de La Securite Civiles** (France); **Força Aérea Portuguesa** (Portugal); **Satways - Proionta Kai Ypiresies Tilematikis Diktyakon Kai Tilepikinoniakon Efarmogon Etairia Periorismenis Efthinis Epe** (Greece); **Ministry of National Defence, Greece** (Greece); **Nato Science and Technology Organisation** (Belgium); **Ministry of Citizens Protection** (Greece); **Ministerio Da Administracao Interna** (Portugal) **Kentro Meleton Asfaleias** (Greece); **Consorcio para el Diseno, Construcción, Equipamiento y Explotación de la Plataforma Oceanica de Canarias** (Spain)

Project Description

The overall scientific objectives of PERSEUS are to identify the interacting patterns of natural and human-derived pressures on the Mediterranean and Black Seas, assess their impact on marine ecosystems and, using the objectives and principles of the Marine Strategy Framework Directive as a vehicle, to design an effective and innovative research governance framework based on sound scientific knowledge. Well-coordinated scientific research and socio-economic analysis will be applied at a wide-ranging scale, from basin to coastal. The new knowledge will advance our understanding on the selection and application of the appropriate descriptors and indicators of the MSFD. New tools will be developed in order to evaluate the current environmental status, by way of combining monitoring and modelling capabilities and existing observational systems will be upgraded and extended. Moreover, PERSEUS will develop a concept of an innovative, small research vessel, aiming to serve as a scientific survey tool, in very shallow areas, where the currently available research vessels are inadequate. In view of reaching Good Environmental Status (GES), a scenario-based framework of adaptive policies and management schemes will be developed. Scenarios of a suitable time frame and spatial scope will be used to explore interactions between projected anthropogenic and natural pressures. A feasible and realistic adaptation policy framework will be defined and ranked in relation to vulnerable marine sectors/groups/regions in order to design management schemes for marine governance. Finally, the project will promote the principles and objectives outlined in the MSFD across the SES. Leading research Institutes and SMEs from EU Member States, Associated States, Associated Candidate countries, non-EU Mediterranean and Black Sea countries, will join forces in a coordinated manner, in order to address common environmental pressures, and ultimately, take action in the challenge of achieving GES.

BC3's contribution to the project

BC3 carries out the socio economic analysis of the project.

Key BC3 researchers involved

Prof. Anil Markandya
Dr. Aline Chiabai
Dr. Ibon Galarraga
Dr. Eneko Garmendia
Dr. Marta Pascual
Dr. Elena Ojea
Dr. Maialen Garmendia"

Link with BC3 Research Line

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Climate Policy

URL Address

http://www.perseus-net.eu/site/content.php

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

FP7_ECOFINDERS

GRANT AGREEMENT:	GA 264465
NAME OF THE PROJECT:	ECOFINDERS "Ecological Function and Biodiversity Indicators in European Soils"
FUNDING AGENCY:	7th FRAMEWORK PROGRAMME
TYPE:	FP7-ENV-2010 (European Commission)
TIME FRAME:	2011-2014
FUNDING:	231.376 €
PARTNERS:	**Institut National De La Recherche Agronomique** (France) - Coordinator **Natural Environment Research Council** (United Kingdom) **Aarhus Universitet** (Denmark) **ECT Oekotoxikologie** (Germany) **Universitaet Zu Koeln** (Germany) **Inra Transfert** (France) **Joint Research Centre- European Commission** (Belgium) **Lunds Universitet** (Sweden) **Koninklijke Nederlandse Akademie Van Wetenschappen** (Netherlands) **Rijksinstituut Voor Volksgezondheiden Milieu** (Netherlands) **Sveriges Lantbruksuniversitet** (Sweden) **Teagasc - Agriculture And Food Development Authority** (Ireland) **Instituto Do Mar** (Portugal) **Universita Degli Studi Di Torino** (Italy) **University College Dublin** (Ireland) **The University Court Of The University Of Aberdeen** (United Kingdom) **The Chancellor, Masters And Scholars Of The University Of Cambridge** (United Kingdom) **Lancaster University** (United Kingdom) **Wageningen Universiteit** (Netherlands) **Stichting Dienst Landbouwkundig Onderzoek** (Netherlands) **Prognosticky Ustav Slovenskej Akademie Vied** (Slovakia) **China Agricultural University** (China) **Univerza V Ljubljani** (Slovenia) **Universita Degli Studi Di Sassari** (Italy) **BC3 Basque Centre for Climate Change** (Spain)

Project Description

The strategic goal of EcoFINDERS is to provide the EC with tools to design and implement soil strategies aimed at ensuring sustainable use of soils, including: **I)** Characterisation of European soil biodiversity; **II)** Determination of relations between soil biodiversity, soil functions and ecosystem services; **III)** Design of policy-relevant and cost-effective indicators for monitoring soil biodiversity. The project will: **I)** Develop and standardise tools and procedures to measure microbial and faunal diversity; **II)** Describe the diversity of soil organisms (microbes and fauna), III) Decipher the interactions among soil organisms and with plants through foodwebs and **IV)** Determine the role played by soil organisms in soils ecosystem services (nutrient cycling, carbon storage, water retention, soil structure regulation, resistance to pests and diseases, and regulation of above-ground diversity); **III)** Establish cost-effective bioindicators for measuring sustainability of the microbial and faunal diversity and their associated functions (using a combination of metrics and meta-analysis); **IV)** Evaluate the economic value of ecosystem services, the added value of these bioindicators; **V)** Develop and implement effective communication strategies to engage the European public around issues associated with the sustainability of soil biodiversity. The overall concept of the project is to develop and integrate the following activities: **I)** Decipher the links between soil biodiversity, activities, functioning and ecosystem services; **II)** Combine three types of approach: observation, experimentation, and computation; **III)** Assess the impact of environmental conditions; **IV)** Integrate information on microbes, fauna and plant communities and analyse how these compartments interact. The general hypotheses are: changes in soil biodiversity indicate the direction and rate of changes in soil functions and associated ecosystem services; application of cost-effective bioindicators brings an economic added value to sustainable soil management.

BC3's contribution to the project

BC3 is carrying out the development of cost-analysis indicators, modelling soil biodiversity and soil ecosystem services for human well-being, doing the institutional and policy evaluation for soil conservation.

Key BC3 researchers involved

Dr. Unai Pascual
Dr. Estelle Midler
Dr. Sebastien Foudi
Dr. Ignacio Palomo
Amaia Albizua

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Climate and Natural Environment

URL Address

http://projects.au.dk/ecofinders/

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

FP7_CECILIA 2050

GRANT AGREEMENT:	GA 308680
NAME OF THE PROJECT:	CECILIA 2050 "Choosing Efficient Combinations of Policy Instruments for Low-carbon development and Innovation to Achieve Europe's 2050 climate targets"
FUNDING AGENCY:	7th FRAMEWORK PROGRAMME
TYPE:	FP7-ENV-2012-one-stage (European Commission)
TIME FRAME:	2012-2015
FUNDING:	228.782 €
PARTNERS:	**Ecologic Institut** (Germany) - Coordinator **UCL Energy Institute, University College London** (United Kingdom) **LU-CML, Leiden University** (Netherlands) **Charles University Environment Centre** (Czech Republic) **GWS Institute for Economic Structures Research** (Germany) **Institute for Environmental Studies, VU University Amsterdam** (Netherlands) **Centre International de Recherche sur l'Environnement et le Développement** (France) **Warsaw Ecological Economics Centre, University of Warsaw** (Poland) **BC3 Basque Centre for Climate Change (Spain)** **Università di Ferrara** (Italy)

Project Description

The EU wants to transform itself to a low-carbon economy by mid-century. This transformation process will require an overhaul of the European economy, affecting a range of sectors – not only power generation, industry and transport, but also agriculture, construction or finance. Governing this transformation process is a huge challenge – stimulating the necessary innovations, ensuring public support, encouraging the needed investments, creating the right infrastructure, and avoiding lock-in into old, carbon-intensive technologies. To manage this transformation, a range of policy instruments are required. The existing mix of climate policy instruments needs to be scaled up drastically to initiate the necessary changes. But as the scale and scope of instruments increases, it becomes more important to understand and to manage their interaction, as do constraints on the political, legal and administrative feasibility. Policy solutions that have worked well in an economic niche are not necessarily suited to guide economic development on a broad scale; instruments that have co-existed well on a small scale may conflict when scaled up to an economy wide level. To evaluate their efficiency and effectiveness, policy instruments cannot be viewed in isolation; understanding and managing their interaction becomes key.

The CECILIA2050 project address this challenge: to understand how policy instruments work in interaction, what factors determine their performance, and how the European climate policy instrument mix should evolve to guide the transformation to a low-carbon economy. The project will describe ways to improve the economic efficiency and environmental effectiveness of the instrument mix, and to address constraints that limit their performance or feasibility. These include public acceptance, availability of finance and the physical infrastructure, but also the administrative and legal framework.

BC3's contribution to the project

BC3 takes the lead of the socio economic modelling of choosing efficient combinations of policy instruments for low-carbon development and innovation to achieve Europe's 2050 climate targets.

Key BC3 researchers involved

Prof. Anil Markandya
Dr. Mikel González
Dr. Luis Rey
Dr. Iñaki Arto

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http://cecilia2050.eu/

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

FP7_FLAGSHIP

GRANT AGREEMENT:	GA 320330
NAME OF THE PROJECT:	FLAGSHIP "Forward Looking Analysis of Grand Societal cHallenges and Innovative Policies"
FUNDING AGENCY:	7th FRAMEWORK PROGRAMME
TYPE:	FP7-SSH-2012-2 (European Commission)
TIME FRAME:	2012-2015
FUNDING:	144.757,65 €
PARTNERS:	**ISIS** (Italy) - Coordinator **OEAW-VID** (Austria) **BC3 Basque Centre for Climate Change** (Spain) **SIGMA** (France) **CEPS** (Belgium) **HiiL** (The Netherlands) **CDS** (Bulgaria) **ICS-UL** (Portugal) **KNAW-NIDI** (The Netherlands) **MCRIT** (Spain) **OME** (France) **S4S** (Luxembourg) **SEIT** (Estonia) **SEURECO** (France) **SWSPiZ** (Poland) **TNO** (The Netherlands)

Project Description

The FLAGSHIP project aims at driving change, supporting the policy shift from adapting to changes through short-term policy responses, towards anticipating, welcoming and managing changes properly. The FLAGSHIP project brings together a multidisciplinary team with recognised records of excellence in qualitative, as well as in quantitative forward-looking analysis.

FLAGSHIP partners have substantially contributed, individually and collectively, to previous advancements in the field of forward looking analysis and are therefore fully committed to "put FLA knowledge to work", applying it to the formulation of policies that effectively address main challenges faced by the EU, and the world as a whole. The objectives of FLAGSHIP are: **I)** Understanding and assessing the state of the art of forward looking methodologies in relation to Grand Societal Challenges (GSC) and developing tools and modelling frameworks beyond state of the art; **II)** Applying an enhanced set of forward looking methods and tools to support EU policies, by analysing reference and alternative scenarios of long-term demographic, legal, economic, social and political evolutions of Europe, in a world context, and assessing potential progress in technological and social innovation; **III)** Driving change, producing a set of EU-relevant policy recommendations on the potential of the EU for transition and change. In relation to these objectives the project will: **I)** take stock of the existing forward looking studies: a review will be done of the central questions, key trends, critical uncertainties and scenario frameworks; **II)** proceed to apply and combine enhanced qualitative and quantitative methods mastered by the project partners in a coherent framework, producing a combination of GSC-driven qualitative and quantitative scenarios - coping with a range of possible global paradigm shifts and geo-political changes - and engaging a community of experts and stakeholders in a scenario thinking and assessment exercise; **III)** focus further on EU policy responses to emerging transition challenges, and the potential role of EU in shaping global governance as well as new territorial dynamics within the continent, aiming to deliver policy recommendations to support the formulation of strategic EU policy agendas.

BC3's contribution to the project

BC3 evaluates the environmental trends and challenges, identifying and further understanding the driving forces and critical uncertainties specific to environmental challenges.

Key BC3 researchers involved

Prof. Anil Markandya
Dr. Mikel González
Dr. Iñaki Arto
Dr. Kishore Dhavala

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Climate Policy

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http://www.flagship-project.eu

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

FP7_ECONADAPT

GRANT AGREEMENT:	**PID 603906**
NAME OF THE PROJECT:	**ECONADAPT "Economics of climate change adaptation in Europe"**
FUNDING AGENCY:	**7th FRAMEWORK PROGRAMME**
TYPE:	**FP7-ENV.2013.6.1-6**
TIME FRAME:	**2013-2015**
FUNDING:	**182.640 €**
PARTNERS:	**University of Bath** (United Kingdom) - Coordinator **Ecologic Institut** (Germany) **BC3 Basque Centre for Climate Change** (Spain) **Internationales Institu Für Angewandte Systemanalyse** (Austria) **Sveriges Lantbruksuniversitet** (Austria) **Stichting VU-VUMC** (Netherlands) **Potsdam Institu Für Klimafolgenforschung** (Germany) **Centro Euro-Mediterraneo sui cambiamenti climatici** (Italy) **Wageningen University** (Netherlands) **University of East Anglia** (United Kingdom) **Paul Watkiss Associates** (United Kingdom) **Univerzita Karlova V Praze** (Czech Republic) **JRC - Joint Research Centre** (Belgium)

Project Description

The aim of the ECONADAPT project is to provide user-orientated methodologies and evidence relating to economic appraisal criteria to inform the choice of adaptation actions using analysis that incorporates cross-scale governance under conditions of uncertainty. A critical theme of the project is therefore to support the application of adaptation economics in the period following the publication of the EU's 2013 Adaptation Strategy, focusing on key decision areas that need enhanced economic information, and on the key users of such information.

Key decision areas include:management of extreme weather events modified by climate change that have high impact costs in the short term;appraisal of projects where the costs of climate risks are borne over long time periods;appraisal of flows of large-scale EU funds where the case for climate resilience needs to be made; macro-economic effects of climate change risks and adaptation strategies at Member State and EU levels, and; appraisal of overseas development assistance aimed at reducing the damage costs of climate risks in less developed countries. The project will work intensively with stakeholders from e.g. relevant DGs, Member States, Regional or local policy makers, and seek to learn from, and inform, experience.

The methods and approaches are co-developed with the diverse user groups engaged in using economic data within adaptation decision making. A two-tier approach is proposed to provide detailed guidance and empirical data: first, to other economists or private sector organisations with adaptation needs, and second, to other users who may want to use 'light-touch' methods, with the empirical data to help in scoping decision making outcomes. A strong link is being made with the European Climate Adaptation Platform (Climate-ADAPT), with the guidance and economic information designed for a wide range of users.

BC3's contribution to the project

BC3 has a main focus on Treatment of Uncertainty in Economic Assessment of Adaptation and on the development of protocols for transferring data from the micro scale to the macro and vice-versa and also to address systemic change and evaluate the right adaptation policies and measures for dealing with it.

Key BC3 researchers involved

Prof. Anil Markandya
Dr. Ibon Galarraga
Dr. Aline Chiabai
Elisa Sainz de Murieta
Alina Tepes

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3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

NERC ESPA_ASSETS

GRANT AGREEMENT:	NE/J002267-1
NAME OF THE PROJECT:	ASSETS "Attaining Sustainable Services from Ecosystems"
FUNDING AGENCY:	UK NATURAL ENVIRONMENT RESEARCH COUNCIL
TYPE:	NERC-ESPA Programme (Ecosystem Services for Poverty Alleviation)
TIME FRAME:	2012-2015
FUNDING:	180.693 €
PARTNERS:	**University of Southampton** (United Kingdom) - Coordinator **University of Dundee** (United Kingdom) **Conservation International** (USA) **BC3 Basque Centre for Climate Change** (Spain) **International Centre for Tropical Agriculture** (Colombia) **Chancellor College** (Malawi)

Project Description

The ASSETS project aims to explicitly quantify the linkages between ecosystem services that affect – and are affected by – food security and nutritional health for the rural poor at the forest-agricultural interface. The project proposes to integrate a suite of complexity tools and cutting edge models with more traditional participatory assessments in the field within a modified version of the Drivers-Pressures-States-Impacts-Response methodological framework to:

- Identify how dynamic stocks and flows of ecosystem services at the landscape scale translate to local-level nutritional diets and health.
- Inform policy makers on how future land use and climate change will affect both food security and the ecosystem services associated with it.

BC3's contribution to the project

BC3 is a partner of ESPA research Consortium, and does scenario-building assessment using the ARIES ecosystem Service mapping.

Key BC3 researchers involved

Dr. Ferdinando Villa
Dr. Stefano Balbi
Dr. Elena Pérez Miñana

Link with BC3 Research Line

Climate and Natural Environment

URL Address

http://espa-assets.org/

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

NERC ESPA_WISER

GRANT AGREEMENT:	NE/L001322/1
NAME OF THE PROJECT:	WISER "Which Ecosystem Service Models Best Capture the Needs of the Rural Poor?"
FUNDING AGENCY:	UK NATURAL ENVIRONMENT RESEARCH COUNCIL
TYPE:	**NERC-ESPA Programme** (Ecosystem Services for Poverty Alleviation)
TIME FRAME:	2014- 2015
FUNDING:	86.826 €
PARTNERS:	**NERC Centre for Ecology and Hydrology** (United Kingdom) - Coordinator **University of Southampton** (United Kingdom) **Council for Scientific and Industrial Research** (South Africa) **BC3 Basque Centre for Climate Change** (Spain)

Project Description

It is widely acknowledged that poor rural communities are often highly dependent on ecosystem services (ES) for their livelihoods, especially as a safety net in times of hardship or crisis. However, a major challenge to the understanding and management of these benefit flows to the poor is a lack of data on the supply, demand and use of ecosystem services by the poor, particularly in the developing world where dependence on ES is often highest. This project will evaluate the effectiveness of a range of modelling approaches for mapping at least six ecosystem services - crop production, stored carbon, water availability, non-timber forest products (NTFPs), grazing resources, and pollination - at multiple spatial scales across sub-Saharan Africa.

It will assess model performance based on two broad metrics - model data requirements and the usefulness to decision-making - to ascertain the degree of complexity of modelling that needs to be applied to map ES in a way useful for poverty alleviation. WISER hopes to help improve the lives of the approximately 400 million people living in poverty in sub-Saharan Africa by ensuring policy makers in the region use the right tools.

Our goal in this project is to ascertain the degree of complexity of modelling that needs to be applied to map ES at resolutions that are useful for poverty alleviation. The findings of this project will enable decision makers to: **1)** best use existing ES models to inform national and regional land use/ cover change policies supporting ES management and promoting equality and justice amongst the beneficiaries of these services; and **2)** set priorities determining where scarce resources should be invested to improve effective management of ES. Thus, WISER may help improve the lives of the approximately 400 million people living in poverty in sub-Saharan Africa by evaluating the tools available to policy makers in this region.

BC3's contribution to the project

BC3 is a partner of ESPA research Consortium, and does scenario-building assessment using the ARIES ecosystem Service mapping.

Key BC3 researchers involved

Dr. Ferdinando Villa
Dr. Stefano Balbi
Dr. Elena Pérez Miñana

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http://www.espa.ac.uk/projects/ne-l001322-1

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

European Commission or other international funding programs

CARIAA_DECCMA

GRANT AGREEMENT:	RIS Ref: - 12666/04
NAME OF THE PROJECT:	DECCMA "DEltas, vulnerability and Climate Change; Migration as an Adaptation"
FUNDING AGENCY:	International Development Research Centre (IDRC).
TYPE:	CARIAA of Canada - Collaborative Adaptation Research Initiative in Africa and Asia of IDRC (The International Development Research Centre)
TIME FRAME:	2014-2018
FUNDING:	£229.484
PARTNERS:	**University of Southampton** - Coordinator (United Kingdom) **BC3 Basque Centre for Climate Change** **University of Dundee** (United Kingdom) **University of Exeter** (United Kingdom) **International Water Management Institute** (Sri Lanka) **Met Office Hadley Centre** (United Kingdom) **Plymouth Marine Labs** (United Kingdom) **UN Food and Agriculture Organisation (FAO)** (Italy)

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:

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

BC3's contribution to the project

BC3 assess how people adapt to climate change in deltas; case studies in Asia and Africa.

Key BC3 researchers involved

Dr. Anil Markandya
Dr. Iñaki Arto
Dr. Mikel Gonzalez
Dr. Ignacio Cazcarro
Dr. Kishore Dhavala

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3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

MINECO or Spanish Institutions

MINECO Plan Nac_NEREA 5

GRANT AGREEMENT:	**AGL2012-37815-C05-04**
NAME OF THE PROJECT:	**"New approaches to efficient use of N for sustainable agriculture"**
FUNDING AGENCY:	**MINECO –** Spanish Ministry for Economy and Competitiveness
TYPE:	**Ministerio de Economía y Competitividad -** Plan Nacional de Proyectos de investigación fundamental no orientada 2012
TIME FRAME:	**2013-2015**
FUNDING:	**16.000 €**
PARTNERS:	**UPM** (Spain)-Coordinator **UPV/EHU** **CIEMAT** **BC3, Basque Centre for Climate Change**

Project Description

Development of techniques to mitigate N oxide emissions through agricultural practices whilst maintaining crop production. According to the Commission on Sustainable Agriculture and Climate Change (2011), one of the main priorities for future agriculture is to promote the intensification of agricultural production by reducing environmental impacts such as gaseous emissions (N2O, CO2, CH4, NOx and NH3) . In order to be able to act in this line through agricultural practices it is necessary to understand well the dynamics of the N and its relation with the cycle of C and water in agrarian systems.

However, given the scarce information for our cropping systems, objective 1 of this coordinated project is to study how agricultural practices can contribute to the mitigation of N oxides emissions while maintaining production. This will analyze the effect of tillage (direct tillage, minimum tillage, traditional tillage) combined or not with crop rotation (cereal-legume), the use of organic fertilizers compared to minerals, irrigation-fertilization interaction and employment Of nitrification inhibitors. In order to achieve this, we will obtain information from field trials, some of them of long duration, and from complementary laboratory experiments. In order to obtain conclusions in new scenarios, the DNDC model will be parameterized and validated based on the information generated in this and previous projects.

BC3's contribution to the project

"Plan Nacional" leaded by Dr. Agustin del Prado - Modelling gaseous N and C emissions using DNDC model.

Key BC3 researchers involved

Dr. Agustin del Prado - Principal Researcher at BC3
Patricia Gallejones

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http://www.bc3research.org/projects/nerea5.html

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

MINECO or Spanish Institutions

MINECO Plan Nac_CAUSE

GRANT AGREEMENT:	**CTM2012-39500**
NAME OF THE PROJECT:	**CAUSE "Comparative Assessment and Valuation of Ecosystem Services in Agro-Forest systems: a methodology for Land Use Policy prioritization"**
FUNDING AGENCY:	**MINECO –** Spanish Ministry for Economy and Competitiveness
TYPE:	**Ministerio de Economía y Competitividad -** Plan Nacional de Proyectos de investigación fundamental no orientada 2012
TIME FRAME:	**2013-2015**
FUNDING:	**38.000 €**
PARTNERS:	**BC3 Basque Centre for Climate Change** - Coordinator **UPV/EHU"**

Project Description

CAUSE aims to creating a solid base and practical applications of ecologically sound Ecosystem Services science to actual policy makers. The objective of CAUSE is to analyze the biophysical mechanisms of the provision of ecosystem services (ES) as well as the economic implications that these may have, allowing our society to balance both sides of the equation "Economy", resulting in better management and governance. So far, approaches to quantification of ES have ignored its complex dynamics and multidimensional ecological structure, resulting in estimates of ES provision, uses and flows, which do not provide the spatial accuracy or precision needed to efficiently report Decision-making. These approaches also do not allow a scenario-based analysis of a quantitatively and explicitly spatially. This project aims to create a solid basis for the ecological study of ESs and their practical applications that serves to inform decision making. The following main activities are proposed:

- Develop and apply the latest methodologies available to combine the dimensions of provision, use and flows of SE in the analysis of three case studies located in the administrative boundaries of the Basque Country, and compare these with other realities in the world.
- Use economic valuation methods to translate current flows of ecosystem goods and services into economic estimates as long as the transformation is justified by scientific and political ends.
- Combine biophysical and economic assessments in a multi-criteria analysis that prioritizes current demand in policy-making, structured on the principles of productivity, efficiency and sustainability.
- Generalization of the prioritization method developed in the form of a series of guidelines and methods that are affordable and valid for an independent application to different realities.

BC3's contribution to the project

"Plan Nacional" leaded by Prof. Ferdinando Villa.

Key BC3 researchers involved

Dr. Ferdinando Villa (PI)
Dr. Aline Chiabai
Dr. Elena Ojea
Dr. Eneko Garmendia
Dr. Stefano Balbi
Dr. Elena Perez Miñana
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http://www.bc3research.org/research_projects/climate_and_natural_environment_completed_projects/cause.html

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

MINECO or Spanish Institutions

F Bio_EcoHealth

GRANT AGREEMENT:	**CA2013**
NAME OF THE PROJECT:	**ECOHEALTH "Analysing co-benefits among ECOsystems and HEALTH to cope with climate change risks"**
FUNDING AGENCY:	**Fundación Biodiversidad, Spanish Ministry of Agriculture, Food and Environment**
TYPE:	**Convocatoria de Ayudas de la Fundación Biodiversidad, en Régimen de Concurrencia Competitiva, para la Realización de Actividades en el Ámbito de la biodiversidad Terrestre, Biodiversidad Marina y Litoral, el Cambio Climático y la Calidad Ambiental 2013 (Fundación Biodiversidad)**
TIME FRAME:	**2014-2015**
FUNDING:	**31.500 €**
PARTNERS:	**BC3 Basque Centre for Climate Change** - Coordinator **Universidad de Alcalá**

Project Description

In the setting of the 2nd PNACC work programme, ECOHEALTH addresses the need to identify measures which could bring multiple co- benefits in health and ecosystems protection, in a context of adaptation to climate change. Within this context, we aim to link research on wellbeing provided by ecosystems and the implications on human health. The idea is to explore how and in what way it is possible to improve human health and wellbeing, by using in a sustainable way natural resources and ecosystem services, while addressing adaptation to climate change. The objective is to contribute to the PNACC through the identification and evaluation of measures which can bring multiple co-benefits in health and ecosystem protection, in a context of changing climate. Specific attention will be given to best practices and interventions which can improve human health and wellbeing through the link with a sustainable use of ecosystems and natural resources. A set of beneficial health effects related to access to green areas will be explored and analyzed through the literature, such as the reduction of health inequalities (access to green areas promoting good health contributes to the reduction of socio-economic health inequalities), the promotion of active lifestyle (contributing to decrease obesity and survival of senior citizens), promotion of better community cohesion, improvement of mental health (calming and restorative effects), as well as the cost-effectiveness of programs. Quantitative and qualitative indicators on the health benefits from exposure to green areas will be gathered in a database.

BC3's contribution to the project

BC3 was coordinating the project and contributed to the literature review on the health benefits produced by an increased exposure to green areas; creation of a database with qualitative and quantitative indicators; development of econometric modeling related to exposure; organization of stakeholder workshop to analyze best practices; cost-benefit analysis applied to the case study.

Key BC3 researchers involved

Prof. Anil Markandya
Dr. Aline Chiabai
Dr. Ibon Galarraga

Link with BC3 Research Line

Health
Climate Policy

3.2 RESEARCH PROJECTS

RESEARCH PROJECTS: HIGHLIGHTS

Basque Government and Basque Institutions

EJ_Saiotek_Enerkrop

NAME OF THE PROJECT:	**ENERKROP "Development and application of agronomic models for the environmental and energy assessment of the production of biofuels in the Basque Autonomous Community"**
FUNDING AGENCY:	**Basque Government**
TYPE:	**Programa SAIOTEK (Industria, Innovación, Comercio y Turismo; Gobierno Vasco: 2013-2014)**
TIME FRAME:	**2014**
FUNDING:	**50.000 €**

Project Description

Agricultural production and products are being recently used as raw materials for obtaining an energy (energy crops or agro-fuels) presumably with less impact on gas energy than conventional greenhouse. The project aims to contribute ENERKROP scientific evidence to the debate on the potential role of energy production from resources that may be in competition and conflict with the food industry. The main question we tried to answer in the ENERKROP project is: under what conditions management, meteorology, climate and soil in the field are biofuels produced entirely in the Basque sustainable? To do this, from the BC3 we have developed an innovative methodology that integrates different agronomic and soil models with a study of life cycle analysis. This methodology has been applied for a selection of energy crops (wheat, beet and rapeseed) and its subsequent production of biofuel (bioethanol and biodiesel) in a specific area of Araba.

Key BC3 researchers involved

Dr. Agustín del Prado (PI)
Dr. Stefano Balbi
Dr. Eneko Garmendia
Patricia Gallejones
Guillermo Pardo

Link with BC3 Research Line

Climate and Natural Environment

3.3 Collaborators

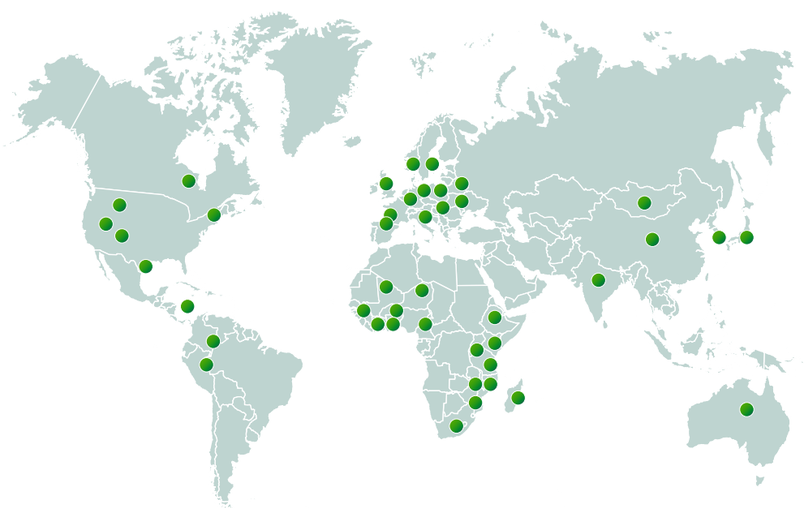
In BC3, we operate under the philosophy that effective research can only be conducted in collaboration with other research groups. As a result, BC3 researchers were directly involved in collaborative research projects, dissemination and training activities both locally and worldwide. Besides, our international 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 Commission research programmes (FP7), which also were an interesting way of creating scientific networks, collaboratively with the consortium partners.

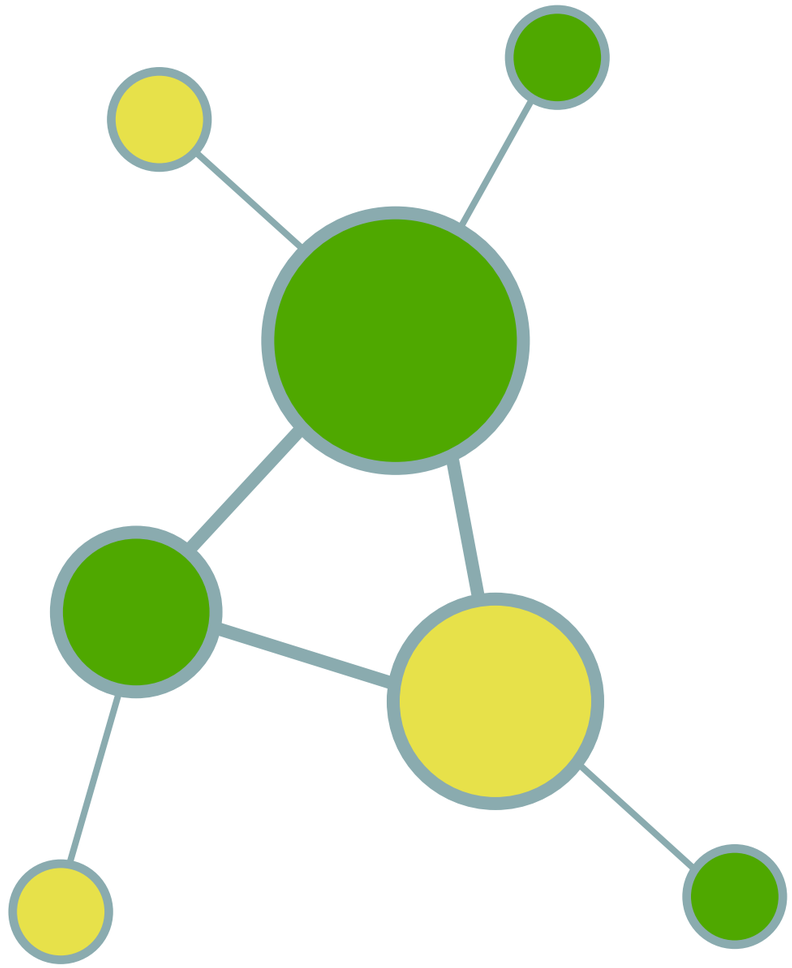
Our visiting programme was another important way to attract international and national climate change experts to the Basque Country, as well as to begin new relationships with other institutions.



Al local scope, we would like to remark that 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.

More specifically, we led the integration of agents that are currently active in the fields of climate change research in the Basque Country and made an important effort to place the Klimagune initiative as part of the annual agenda of the local research groups and institutions, as well as of the local policy makers. Furthermore, we were dynamic and active part of the Basque Science, Technology and Innovation Network, promoting and collaborating in research projects with the different components of the network. During 2014 we reinforced this network to guarantee the continuation of the collaborations set.

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. In 2014, the Spanish Ministry of Agriculture, Food Administration and Environmental Protection (MAGRAMA), acknowledged the importance of this initiative –nowadays made of around a hundred 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.



3.3 Collaborators

Some of our collaborators in 2014

Aarhus University (Denmark)

Aberystwyth University - IBERS International (UK)

AWI Bremerhaven (Germany)

Ayuntamiento de Bilbao (Spain)

Bangladesh University of Engineering and Technology (Bangladesh)

Bangor University (UK)

Basque Center for Applied Mathematics. BCAM (Spain)

CEEW (India)

Center for International Forestry Research. CIFOR (Indonesia)

Centre d'Ecologie Fonctionnelle et Evolutive – CNRS (France)

Centro de Investigación y Formación Agrarias de Cantabria. CIFA (Spain)

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

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

Charles University, Prague. CUNI (Czech Republic)

CICERO (Norway)

Colorado State University (USA)

CSIC (Spain)

Danish Board of Technology (Denmark)

Eawag (Switzerland)

Ecologic Institute International and European Environmental Policy (Germany)

Economics of Energy (Spain)

Environment and Water. CEEW (India)

ETH Zurich (Switzerland)

Fondazione Eni Enrico Mattei. FEEM (Italy)

FundaÇao da Faculdade de Ciencias da Universidade de Lisboa. FFCUL (Portugal)

ICRA - Catalan Institute for Water Research (Spain)

Ifo Munich (Germany)

IHOBE (Spain)

INRA (France)

Institute for Polar and Marine Research. AWI (Germany)

Institute for Prospective and Technological Studies. IPTS – Joint Research Centre (European Commission) (Spain)

Instituto Carlos III (Spain)

International Institute for Environment and Development. IIED (UK)

IRSTEA (Spain)

Jadavpur University (India)

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

London School of Hygiene and Tropical Medicine (UK)

National Authority for Remote Sensing and Space Sciences (Egypt)

NEIKER (Spain)

New York University (USA)

NIPR - National Institute of Polar Research (Japan)

Northern Illinois University (USA)

NUT – Nagaoka University of Technology (Japan)

PBL (Netherlands)

PIK, Potsdam Institu Für Klimafolgenforschung (Germany)

RISO-DTU (Denmark)

TERI institution (India)

The Department of Geography and the Conservation Research Institute (University of Cambridge) (UK)

Universidad Autónoma de Madrid (Spain)

Universidad de Alcalá (Spain)

Universidad de Valencia (Spain)

Universidad de Valladolid (Spain)

Universidad Juan Carlos (Spain)

Universidad Miguel Hernández de Elche. UMH (Spain)

Université Laval (Canada)

University Tuebingen (Germany)

University Barcelona (Spain)

University College of London. UCL (UK)

University of Aberdeen (UK)

University of Bristol (UK)

University of California at Santa Cruz (USA)

University of Exeter (UK)

University of Ghana (Ghana)

University of Leicester (UK)

University of Montpellier (France)

University of Oldenburg (Germany)

University of Osnabrück (Germany)

University of Palermo (Italy)

University of Southampton (UK)

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

University of Wyoming (USA)

University of Heidelberg (Germany)

UPM (Spain)

UPN (Peru)

Vicomtech-IK4 (Visual Interaction and Communication Technologies Centre) (Spain)

Wageningen University (Netherlands)

3.4 Publications

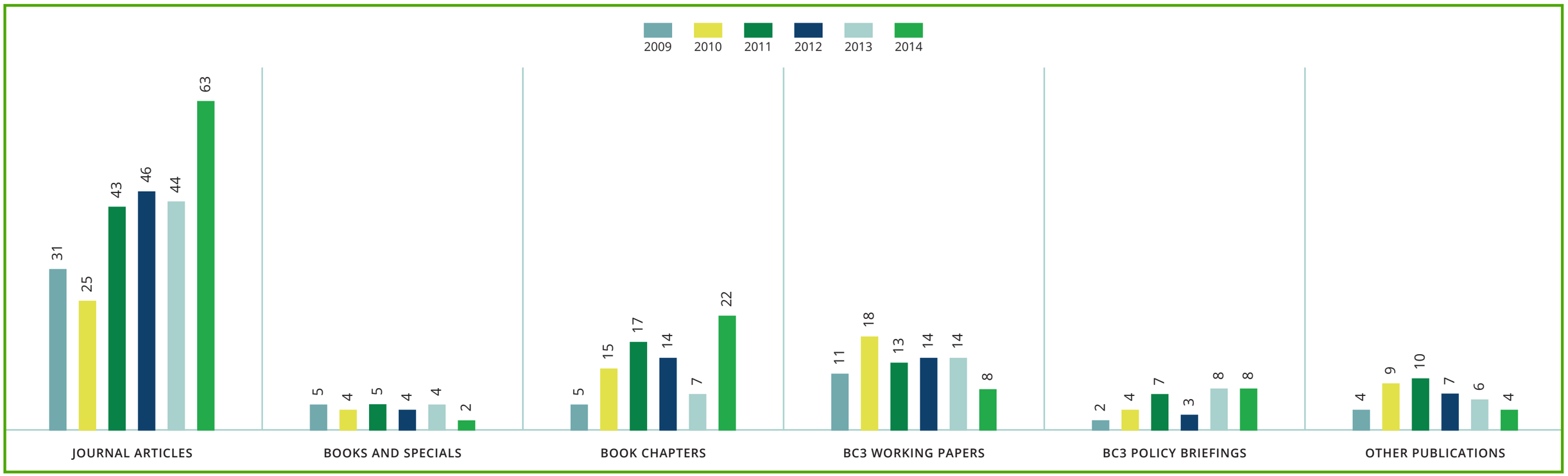
Since our creation in 2008, we have been aimed at publishing in the first-class international peer-reviewed journals and with the world-class most influential leading academic publishers. As a result, our volume of publications has increased, and so has their quality and impact.

Prove of this is that during 2014, 87% of the BC3 articles indexed in Scopus were published in first quartile (Q1) journals. These outstanding metrics, have taken us to be ranked among the top ten climate change research institutions worldwide (based on standardized ranking of ICCG (International Centre for Climate Governance). All the research lines of the centre contributed to these results through inter and multidisciplinary work in the area of climate and global change.

Following our classification system, the scientific production of the centre was as follows:

During 2014, we published:

63 JOURNAL ARTICLES
2 BOOKS
22 BOOK CHAPTERS
8 BC3 WORKING PAPERS
8 BC3 POLICY BRIEFING and
4 TECHNICAL REPORTS.



3.4 Publications | 3.4.1 List of Publications

Journal Articles (published on-line in 2014)

1. Abadie, L.M., Chamorro, J.M. 2014. **Valuation of wind energy projects: A real options approach**. Energies. 7. (5) 3218-3255. DOI (10.3390/en7053218).
2. Abadie, Luis M.; Ibon Galarraga and Dirk Rübbelke. 2014. **Evaluation of Two Alternative Carbon Capture and Storage Technologies: A Stochastic Model**. Environmental Modelling & Software. 54. 182 - 195. DOI (10.1016/j.envsoft.2014.01.002).
3. Abson, D.J., Termansen, T. Pascual, U. Aslam, U., Fezzi, C., Bateman, I. 2014. **Valuing Climate Change Effects Upon UK Agricultural GHG Emissions: Spatial Analysis of a Regulating Ecosystem Service**. Environment and Resource Economics. 57. (2) 215 - 231. DOI (10.1007/s10640-013-9661-z).
4. Albizua, A. and Zografos, C. 2014. **A values-based approach to vulnerability and adaptation to climate change. Applying Q methodology in the Ebro Delta, Spain**. Environmental Policy and Governance. DOI (10.1002/eet.1658).
5. Altemeyer-Bartscher, Martin; Anil Markandya and Dirk Rübbelke. 2014. **International Side-Payments to Improve Global Public Good Provision when Transfers are Refinanced Through a Tax on Local and Global Externalities**. International Economic Journal. 28. (1) 71 - 93. DOI (10.1080/10168737.2012.759986).
6. Álvaro-Fuentes J. del Prado A. and Yáñez-Ruiz D. 2014. **Greenhouse gas mitigation in the agricultural sector in Spain**. Mitigation and Adaptation Strategies for Global Change. DOI (10.1007/s11027-014-9596-x).
7. Ansuategi, A., Escapa, M., Galarraga, I. and González-Eguino, M. 2014. **Impacto económico de la eco-innovación en Euskadi: una aproximación quantitativa**. Ekonomiaz: Revista Vasca de Economía. 86. (02) 246-273.
8. Aronson, J., Murcia, C., Kattan, G.H., Moreno-Mateos, D., Dixon, K., and Simberloff, D. 2014. **The road to confusion is paved with novel ecosystem labels: a reply to Hobbs et al**. Trends in Ecology & Evolution. 29. (12) 646-647. DOI (10.1016/j.tree.2014.09.011).
9. Arto, I., Dietzenbacher, E. 2014. **Drivers of the growth in global greenhouse gas emissions**. Environmental Science & Technology. 48. (10) 5388–5394. DOI (10.1021/es5005347).
10. Arto, I., Roca, J., Serrano, M. 2014. **Measuring emissions avoided by international trade: Accounting for price differences**. Ecological Economics. 97. 93 - 100. DOI (10.1016/j.ecolecon.2013.11.005).
11. Arto, I., Rueda-Cantuche, J.M., Andreoni, V., Mongelli, I., Genty, A. 2014. **The game of trading jobs for emissions**. Energy Policy. 66. 517-525. DOI (10.1016/j.enpol.2013.11.046).
12. Arto, I., Rueda-Cantuche, J.M., Peters, G.P. 2014. **Comparing the GTAP-MRIO and WIOD databases for carbon footprint analysis**. Economic Systems Research. 26. (3) 327-353. DOI (10.1080/09535314.2014.939949).
13. Bagstad, K., Villa, F., Batker, D., Harrison-Cox, J., Johnson, G.W., Voigt, B. 2014. **From theoretical to actual ecosystem services: Accounting for beneficiaries and spatial flows to map and quantify ecosystem services**. Ecology and Society. 19. (2) 64. DOI (10.5751/ES-06523-190264).
14. Banwart. S., Black, H., Cai, Z., Gicheru; P. Joosten, H., Reynaldo, V., Milne, E., Pascual, U.; Nziguheba; Vargas; Bationo; Buschiazzo;de-Brogniez;Melillo;Richter;Termansen;Van Noordwijk; Ballabio;Goverse; Bhattacharyya; Goldhaber; Nikolaidis; Zhao; Funk;. 2014. **Benefits of soil carbon: Report on the outcomes of an international Scientific Committee on Problems of the Environment Rapid Assessment Workshop**. Carbon Management. 5. (2) 185-192. DOI (10.1080/17583004.2014.913380).
15. Bateman, I.J., Harwood, A.R., Abson, D.J.,Andrews, B., A. Crowe, S. Dugdale, C. Fezzi, J. Foden, D. Hadley, R Haines-Young, M, Hulme, A Kontoleon, P. Munday, U Pascual, J Paterson, G Perino, A Sen, G.Siriwardena, M Termansen. 2014. **Economic Analysis for the UK National Ecosystem Assessment: Synthesis and Scenario Valuation of Changes in Ecosystem Services**. Environment and Resource Economics. 57. (2) 273 - 297. DOI (10.1007/s10640-013-9662-y).
16. Birgit Müller, Stefano Balbi, Carsten M. Buchmann, Luís de Sousa, Gunnar Dressler, JÃ¼rgen Groeneveld, Christian J. Klassert, Quang Bao Le, James D.A. Millington, Henning Nolzen, Dawn C. Parkeri, J. Gary Polhill, Maja Schlüter, Jule Schulze, et al. 2014. **Standardised and transparent model descriptions for agent-based models: Current status and prospects**. Environmental Modelling & Software. 55. 156 - 163. DOI (10.1016/j.envsoft.2014.01.029).
17. Boettcher, P. J., Hoffmann ,I., Baumung, R.,Drucker, A.G., McManus,G., Berg,B., Stella,A., Nilsen,L.B., Moran,D., Naves, M and Thompson,M.C. 2014. **Genetic resources and genomics for adaptation of livestock to climate change**. Frontiers in Genetics. 5. 461. DOI (10.3389/fgene.2014.00461).
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19. Buchholz, Wolfgang; Richard Cornes and Dirk Rübbelke. 2014. **Potentially Harmful Cooperation on Global Public Good Provision**. Economica. 81. (322) 205-223. DOI (10.1111/ecca.12074).
20. Cazcarro, I.; Duarte, R., Sánchez Chóliz, J., Sarasa, C. and Serrano, A. 2014. **Environmental footprints and scenario analysis for assessing the impacts of the agri-food industry on a regional economy. A case study in Spain**. Journal of Industrial Ecology. DOI (10.1111/jiec.12209).
21. Chiabai, A.; Platt, S.,and Strielkowski, W. 2014. **Eliciting users' preferences for cultural heritage and tourism**. Tourism Economics. 20. (2) 263-277. DOI (10.5367/te.2013.0290).
22. Corominas, Ll., Neumann, M.B. 2014. **Ecosystem-based management of a Mediterranean urban wastewater system: A sensitivity analysis of the operational degrees of freedom**. Journal of Environmental Management. 143C. 80-87. DOI (10.1016/j.jenvman.2014.04.021).
23. Cosenza, A., Mannina, G., Vanrolleghem, P.A., Neumann, M.B. 2014. **Variance-based sensitivity analysis for wastewater treatment plant modelling**. Science of the Total Environment. 470-471. 1068 - 1077. DOI (10.1016/j.scitotenv.2013.10.069).
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25. Del Prado A. Corré WJ, Gallejones. P., Pardo, G., Pinto M, del Hierro O. and Oenema O. 2014. (Forthcoming). **NUTGRANJA 2.0: a simple mass balance model to explore the effects of different management strategies on nitrogen and greenhouse gases losses and soil phosphorus changes in dairy farms. Mitigation and Adaptation Strategies for Global Change**. DOI (10.1007/s11027-014-9598-8).
26. Diana Reckien, Johannes Flacke, Richard Dawson, Oliver Heidrich, M. Olazabal, Aoife M. Foley, Joel J. P. Hamann, Hans Orru, Monica Salvia, Sonia De Gregorio Hurtado, Davide Geneletti, Filomena Pietrapertosa. 2014. **Climate change response in Europe: What's the reality? Analysis of adaptation and mitigation plans from 200 urban areas in 11 countries**. Climatic Change. 122. (31/12/1899) 331 - 340. DOI (10.1007/s10584-013-0989-8).
27. Edward R. Carr, Mary C. Thompson. 2014. **Gender and Climate Change Adaptation in Agrarian Settings: Current Thinking, New Directions, and Research Frontiers**. Geography Compass. 8. (3) 182-197. DOI (10.1111/gec3.12121).
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30. Fouquet, Roger. 2014. **Long-Run Demand for Energy Services: Income and Price Elasticities over Two Hundred Years**. Review of Environmental Economics and Policy. 8. (2) 186-207. DOI (10.1093/reep/reu002).
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34. Green, R., Milner, J., Dangour, A.D., Haines, A., Chalabi, Z., Markandya, A., Spadaro, J.V. and P. Wilkinson. 2014. **Health Implications of Adopting Nutritious, Low-Carbon Diets in the U.K**. FASEB Journal. 28. (1 Supplement) 255.3. DOI (0.1096/fj.1530-6860).
35. Jens Roessiger, Paul D. Bons, Sérgio H. Faria. 2014. **Influence of bubbles on grain growth in ice. Journal of Structural Geology**. 61. 123-132. DOI (10.1016/j.jsg.2012.11.003).
36. Josué M. Polanco Martínez. 2014. **Estimación espectral de datos ambientales no equiespaciados vía el periodograma suavizado de Lomb-Scargle. Una breve revisión**. Analítika: Revista de Análisis Estadístico. 8. (2) 7-23.
37. Lassaletta, L., Aguilera, E., Sanz-Cobena, A., Pardo, G., Billen, G., Garnier, J., and Grizzetti, B. 2014. **Leakage of nitrous oxide emissions within the Spanish agro-food system in 1961–2009. Mitigation and Adaptation Strategies for Global Change**. DOI (10.1007/s11027-014-9569-0).
38. Llistar, D., Garmendia, E., Urkidi, L. and Arto, I. 2014. **Responsabilidad global y extraterritorialidad en la pérdida de biodiversidad**. Ecología Política. 46. 36-47.
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40. Markandya, A., González-Eguino, M., Criqui, P., Mima. S. 2014. **Low climate stabilisation under diverse growth and convergence scenarios. Energy Policy**. DOI (10.1016/j.enpol.2013.07.046).
41. Markandya. A. 2014. **Environment and Development Economics: Past, Present and Future Challenges**. Environment and Development Economics. 19. (Special Issue 03) 328-329. DOI (10.1017/S1355770X14000333).
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43. Milne, E. Banwart, S.A., Noellemeyer, E. Pascual, U. et al. 2014. Soil Carbon, **Multiple Benefits. Environmental Development**. DOI (10.1016/j.envdev.2014.11.005).

3.4 Publications | 3.4.1 List of Publications

Journal Articles (published on-line in 2014)

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45. Moreno, J., Palomo, I., Escalera, J., Martín-López, B., Montes, C. 2014. **Incorporating ecosystem services into ecosystem-based management to deal with complexity: a participative mental model approach. Landscape Ecology**. 29. 1407-1421. DOI (.10.1007/s10980-014-0053-8).

46. Murcia, C., Aronson, J., Kattan, G.H., Moreno-Mateos, D., Dixon, K. and Simberloff, D. 2014. **A critique of the 'novel ecosystem' concept. Trends in Ecology & Evolution**. 29. (10) 548-553. DOI (10.1016/j.tree.2014.07.006).

47. Oene Oenema, Xiaotang Ju, Cecile de Klein, Marta Alfaro, Agustin del Prado, Jan Peter Lesschen, Xunhua Zheng, Gerard Velthof, Lin Ma, Bing Gao, Carolien Kroeze, Mark Sutton. 2014. **Reducing nitrous oxide emissions from the global food system. Current Opinion in Environmental Sustainability**. 9-10. 55-64. DOI (10.1016/j.cosust.2014.08.003).

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51. Pascual, U., Phelps, J., Garmendia, E., Brown, K., Corbera, E., Martin, A., Gomez-Baggethun, E., Muradian, R. 2014. **Social equity matters in conservation payments. Bioscience**. DOI (10.1093/biosci/biu146).

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54. Remais JV, Hess JJ, Ebi KL, Markandya A, Balbus JM, Wilkinson P, Haines A, Chalabi Z. 2014. **Estimating the health effects of greenhouse gas mitigation strategies: addressing parametric, model and valuation challenges. Environmental Health Perspectives**. 122. 447-455. DOI (10.1289/ehp.1306744).

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Book Chapters

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4. Abson, D. Pascual, U., Termansen, M. 2014. **Valuation approaches for soil carbon. Soil Carbon: Science, management and policy for multiple benefits**. Wallingford, United Kingdom. CAB International. 213-224. ISBN 9781780645322.

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6. Banwart, S.A., Black, H., Cai, Z., Gicheru, P.T., Joosten, H., Victoria, R.L., Milne, E., Noellemeyer, E., Pascual, U. 2014. **The Global Challenge for Soil Carbon. Soil Carbon: Science, Management and Policy for Multiple Benefits**. 1st ed. Wallingford, United Kingdom. CAB International. 1-9. ISBN 9781780645322.

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17. Markandya, A., Labandeira, X. and Ramos, A. 2014. **Policy Instruments to Foster Energy Efficiency. Green Energy and Efficiency - An Economic Perspective**. Springer, Heidelberg. Springer. 428. ISBN 978-3-319-03631-1.

18. Mukherjee, Vivekananda; Dirk Rübbelke and Tilak Sanyal. 2014. **Technology Transfer as a Means to Combat Global Warming. Emerging Issues in Economic Development - A Contemporary Theoretical Perspective**. Oxford. Oxford University Press. ISBN 978-0-19-809906-2.

19. Part A: **Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. 2014. 2014 Summary for Policy Makers. Climate Change 2014: Impacts, Adaptation and Vulnerability**. Cambridge University Press. (http://ipcc-wg2.gov/AR5/images/uploads/WG2AR5_SPM_FINAL.pdf).

20. Pascual, U., Termansen, M, Abson, D. 2014. **The economic value of soil carbon. Soil Carbon: Science, management and policy for multiple benefits**. Wallingford, United Kingdom. CAB International. 179-188. ISBN 9781780645322.

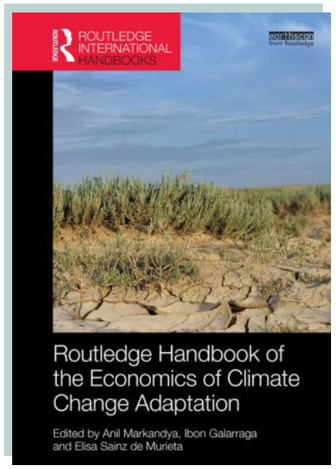
21. Pickering, Jonathan and Dirk Rübbelke. 2014. **International Cooperation on Adaptation to Climate Change. Routledge Handbook of the Economics of Climate Change Adaptation**. London and New York. Routledge. ISBN 978-0415633116.

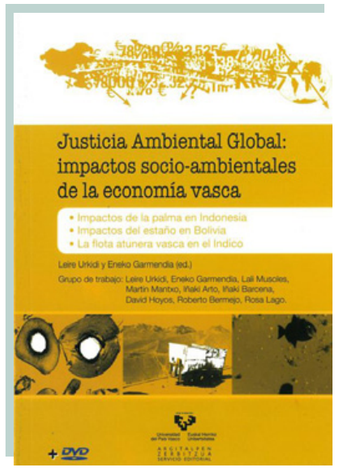
22. Sainz de Murieta, E., Galarraga, I. and Markandya, A. 2014. **Introduction to the Economics of Adaptation. Routledge Handbook of the Economics of Climate Change Adaptation**. 1st ed. London. Routledge. ISBN 978-0415633116.

3.4 Publications | 3.4.1 List of Publications

Books

1. Markandya, A., Galarraga, I and Sainz de Murieta, E. (eds). 2014. **Routledge Handbook on Economics of Adaptation to Climate Change**. 1st ed. London. Routledge. 464. ISBN 978-0-415-63311-6.
2. Urkidi, L., Garmendia,E., Mantxo,M., Musoles,L., Arto,I., Barcena,I., Hoyos,D., Bermerjo,R. y Lago,R. 2014. **Justicia Ambiental Global: Impactos Socio-Ambientales de la economía vasca en el Sur**. Bilbao. Euskal Herriko Unibertsitatea UPV/EHU. ISBN 978-84-9860-924-0.





Other Publications

1. Holland, M., Spadaro, J.V., Misra, A. and Pearson, B. 2014. **Costs of Air Pollution from European Industrial Facilities 2008-2012 (an updated assessment)**.
2. Markandya, A., Labandeira, X. and Ramos, A. 2014. **Policy Instruments to Foster Energy Efficiency**. Economics for Energy Working Papers. WP 01/2014. 1-23.
3. Midler, E., Pascual, U., Simonit, S. 2014. (Forthcoming). **Forest ecosystems in national economies and contribution of REDD+ in a green economy transformation: the case of Panama**.
4. Palomo, I. 2014. **Protección de la Montaña y la Carta Española de las Montañas.** 548. 100-101.

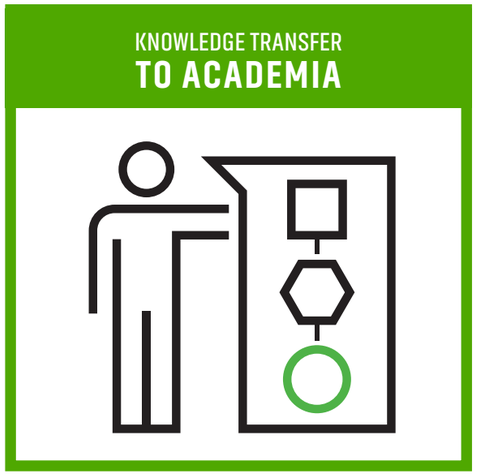
4. KNOWLEDGE TRANSFER

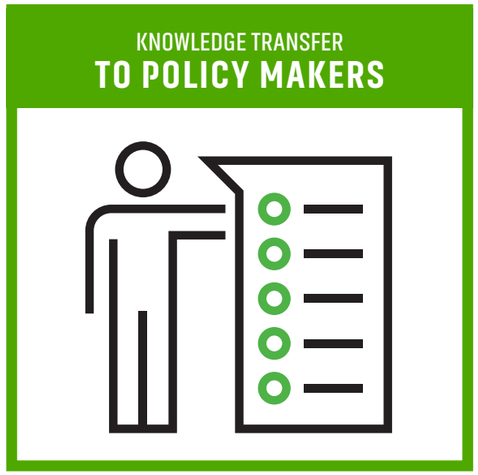
The role of science in shaping climate policies, building capabilities and raising awareness has become increasingly important, since climate change is at the top of political agendas.

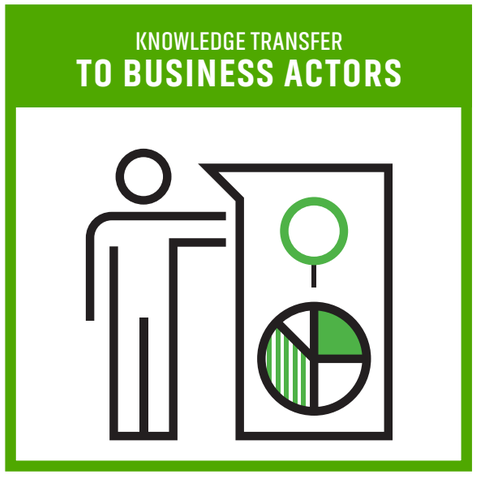
A fundamental part of BC3 work is to contribute, through science, to the climate policy making process.

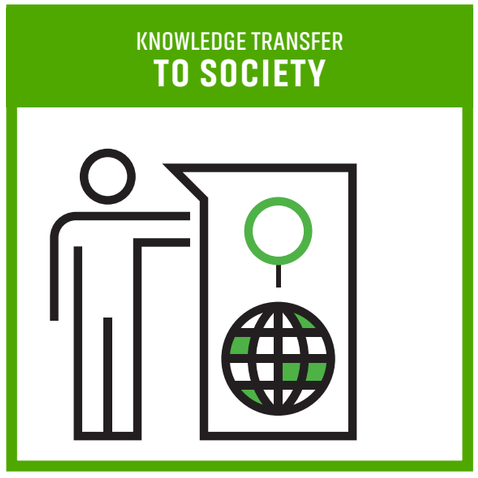
The BC3 Knowledge Transfer deployment is brought into action through the centre´s Dissemination and Strategic Communication Plan (SCP) 2014-2017 that were designed in 2013 and started being implemented during 2014. This plan pursues excellence in research, training and dissemination making the knowledge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

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









BC3's Dissemination, Training & Capacity Building and 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 2014, 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
Biannual conference of the International Society for Ecological Economics	Reykjavik	University of Iceland	Modelling trade-offs among ecosystem services in agricultural systems
EGF at 50: The future of European grasslands	Aberystwyth	IBERS	Synergies between mitigation and adaptation to climate change in grassland-based farming systems
Resilience 2014	Montpellier	Cirad	Linking soil biodiversity, water regulation and agricultural production: a conceptual framework
First Global Soil Biodiversity Conference	Dijon	Inra Dijon	On the values of soil biodiversity and ecosysten services
The Sixth Atlantic Workshop on Energy and Environmental Economics	A Toxa	ZEW and Economics for Energy	The use Bonus-Malus schemes for the promotion of Energy efficient household appliances: a case study for Spain.
Basque Ecodesign meeting	Bilbao	IHOBE	Impacto económico de la eco innovación en la CAPV
ENSO seminar	Oslo	CICERO	Expert Network on Second Opinions
International Conference on Earth Systems Governance 2014	Norwich	University of East Anglia	From local to global: filling the gap between Northern open economies and global environmental change
International Ocean Research Conference (IORC)	Barcelona	Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO)	Value and Environmental Cost of Transferring Energy and Communications within the Mediterranean and Black Sea
OECD 2nd Workshop on “Cost of Inaction and Resource Scarcity: Consequences for Long-term Economic Growth (CIRCLE)	Paris	OECD Environment and Economy Integration Division, Environment Directorate	The Economic Feedbacks of Loss of Biodiversity and Ecosystems Services

4.1 TO ACADEMIA | 4.1.2 Supervised post-graduate students

As one of the BC3 training key activities, during 2014 the following Phd and Masterstudents were supervised by BC3 Knowledge body.

PhD Students

TITLE	PhD STUDENT	SUPERVISOR
Mass-balance modeling and measurements to study GHG mitigation strategies using energy cropping systems under humid Mediterranean climate	Patricia Gallejones	Agustin del Prado
On sea level rise on the Basque Coast: evidence and economic valuation	Elisa Sainz de Murieta	Ibon Galarraga
Economics of Climate Finance	Maria Victoria Román	Dirk Rübbelke and Iñaki Arto
Combined application of cost–benefit analysis and multi-criteria analysis for decision support in air quality management policy: a case study in the metropolitan area of Lima and El Callao, Peru	Gerardo Sánchez	Aline Chiabai
Coupling models and life cycle assessment to evaluate agricultural mitigation strategies involving organic resources management	Guillermo Pardo	Agustin del Prado
Political Ecology of soil management	Amaia Albizua	Unai Pascual
A socio-institutional analysis of wildlife conservation in Africa	Hiroe Ishihara	Unai Pascual
The value of agrobiodiversity under climate change	Stella Nordhagen EU	Unai Pascual
Towards a new conception of urban planning through optimization of urban energy metabolism	Marta Olazabal ES	Unai Pascual
Economic and institutional analysis of sustainable agroforestry adoption by smallholders in Chiapas, Mexico. Cambridge University, UK	Aiora Zabala	Unai Pascual
Development of a methodology for optimum design of wastewater treatment plants under uncertainty	Mansour Talebizadeh	Marc Neumann
Distributional implications of environmental policies	Xaquín García	Mikel González Ruiz de Eguino
Energy and climate policy interactions: an Integrated Assessment modelling approach	Iñigo Capellán	Mikel González Ruiz de Eguino
A socio-institutional analysis of wildlife conservation in Africa	Giulia Wegner	Unai Pascual

Master students

TITLE	MASTER STUDENT	SUPERVISOR
Climate change and risk of flooding: a case study for Spain	Pablo Martinez Juarez	Aline Chiabai
The effect of the energy labelling for buildings.	Francesca Conti	Ibon Galarraga Gallastegui
El Desarrollo de la Agroplasticultura	Zamira A. Haché Ulloa	Mikel Gonzalez Ruiz de Eguino
Introducción al modelo de dispersión aermod para el cálculo de concentraciones medias anuales de nox so2 y pm10 de emisiones de centrales termoeléctricas en el país vasco	Inaki Sagarna Zudaire	Joseph Spadaro
Stochastic Modeling Of Hydrometeorological Extremes and their Possible Relation With Global Change	Thomas Rosmann	Anil Markandya
Modeling the Impact of Climate Change on Water Resources Availability and Transboundary Agreements in the Tagus River Basin	Nadine Sahouri	Marc Neumann
Propuesta de Inclusión de Enfoque de Manejo Adaptativo a Planes de Adaptación al Cambio Climático	Xabier Lecanda	Anil Markandya

During 2014, Dr. Sérgio Faria also supervised an undergraduate student of the University of the Basque Country in the category of External Practises.

4.1 TO ACADEMIA | 4.1.3 Classes given in post-graduate courses

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

TYPE OF COURSE	TITLE OF COURSE	UNIVERSITY
PhD Course	The Economics of Climate Change	Danish Technical University
Master course	Economy, Technology, and Sustainability (4250ECON_4962STSS_STSS6940)	Department of Economics, Rensselaer Polytechnic Institute
Master course	Eutrophication and Harmful Algae	UPV/EHU
Master course	Environmental Economics	UPV/EHU
Advanced course	Course on Ecological Economics	UPV/EHU
Advanced course	II Curso de economía ecológica	UPV/EHU
Advanced course	II Curso de economía ecológica	UPV/EHU
Advanced course	Soil ecosystem services: a social-ecological approach. UPV-EHU Summer School: Theme: "Hacia una estrategia vasca del suelo". Donostia 28 July 2014. Palacio Miramar. Donostia.	UPV/EHU
Advanced course	International Economics and Globalization (1309_ECON_4190 STSS)	Department of Economics, Rensselaer Polytechnic Institute
Advanced course	Advanced course on Payments for Ecosystem Services	CIHEAM - Instituto Agronómico Mediterráneo de Zaragoza

4.1 TO ACADEMIA | 4.1.4 Seminars given

From BC3 we organized in 2014 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.

BC3-UPV/EHU joint Seminars

DATE	LECTURER	INSTITUTION	SEMINAR TITLE
2014/11/12	**Pallab Mozumder**	Department of Earth & Environment, Department of Economics and Social Science Laboratory, International Hurricane Research Center, Florida (Colombia).	Emission Tax, Health Insurance and Crowding out of Energy Conservation Behavior: An Experiment
2014/09/25	**Juan Camilo Cárdenas**	School of Economics, Universidad de los Andes, Bogotá (Colombia).	Social learning through economic experiments: an intervention in three rural water systems
2014/06/13	**Carmen Arguedas**	Departamento de Análisis Económico: Teoría Económica e Historia Económica, Universidad Autónoma de Madrid.	On Fraud and Certification of Corporate Social Responsibility
2014/06/05	**Vaibhav Chaturved**	Research Fellow at Council on Energy, Environment and Water, New Delhi (India).	Implications of risk perceptions for long term future of nuclear energy in India: A sensitivity analysis around nuclear energy cost within an integrated assessment modeling framework
2014/05/30	**Margaret Armstrong**	Cerna, Centre d'Economie Industrielle MINES, ParisTech	How nuclear power plants in Spain have reacted to the introduction of renewable energy
2014/05/27	**Luis Maria Garrote**	Technical University of Madrid (UPM). Dept. of Civil Engineering; Hydraulic and Energy	Assessment climate change adaptation policies for surface water availability in Mediterranean Europe
2014/05/15	**Kurt Kratena**	Austrian Institute of Economic Research - WIFO.	Direct and Indirect CO2 Emissions of Households: A Dynamic Consumption Model in an Input-Output Framework
2014/03/19	**David R. Yáñez-Ruiz**	Animal Nutrition Institute (CSIC)	Putting the break on belching ruminants: strategies to reduce methane emissions

BC3 Seminars

DATE	LECTURER	INSTITUTION	SEMINAR TITLE
2014/12/11	**Dae-Jin Lee**	BCAM	Environmental and ecological modeling with non-parametric smoothing techniques
2014/11/26	**Christoph Böhringer**	University of Oldenburg	Vertical Fiscal Externalities and the Environment
2014/11/26	**Alejandro Cardenete**	University of Loyola	MCDM and CGE Models Applied for Environmental Issues
2014/06/17	**Juan Angel Acero**	Tecnalia	Methodologies to analyze Urban Climate and improve thermal comfort from a planning perspective: the case of Bilbao
2014/05/28	**Erik Dietzenbacher**	Interindustry Economics at the University of Groningen	How to write scientific articles?
2014/05/21	**Leif Vogel**	Earth Observation Science Group,Space Research Centre, University Leicester, UK	Remote sensing of trace gases from ground and space based instruments
2014/04/30	**Julio Díaz**	Instituto de Salud Carlos III	Certezas e incertidumbres sobre el impacto de los extremos térmicos sobre la salud y de otros factores ambientales asociados a las altas temperaturas
2014/04/30	**Nobuhiko Azuma**	Nagaoka University of Technology (Japan)	The molecular structure of ice grain boundaries and its role in the dynamics of polar ice sheets.
2014/04/30	**Brian Voight** **Ioannis Anasthasiadis** **Ken Bagstad** **Luke Scott** **Gary Johnson**	Various	Ecosystem Services Modelling

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 BC3 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 2014 visitors

VISIT DATE	VISITOR	INSTITUTION	POSITION	LINK WITH BC3 RESEARCH LINE
March	**David Yañez-Ruiz**	CSIC-EEZ	Senior Scientist	Climate and Natural Environment
March - April	**Narendra Chan**	Kathmandu Gov	Policy and Programme Planning Officer, REDD- Forestry and Climate Change Cell, Ministry of Forests and Soil Conservation, Kathmandu	Climate and Natural Environment
April	**Brian Voight** **Ioannis Anasthasiadis** **Ken Bagstad** **Luke Scott** **Gary Johnson**	Various	Senior Scientist/ Modellers	Climate and Natural Environment
April	**Alina Tepes**	OECD	Researcher	Climate Policy
April	**Julio Diaz**	Instituto de Salud Carlos III de Madrid (ISCIII)	Researcher	Health and Climate
May	**Kurt Kratena**	Austrian Institute of Economic Research - WIFO	Professor - Research staff member	Low Carbon Climate Policy
May	**Hendrikus Dietzenbacher**	Interindustry Economics at the University of Groningen	Full Professor (Catedrático)	Low Carbon Climate Policy
May	**Luis Garrote de Marcos**	Technical University of Madrid (UPM)	Full Professor (Catedrático)	Climate and Natural Environment
June	**Vaibhav Chaturvedi**	Council on Energy, Environment and Water	Research Fellow	Low Carbon
June	**Alberto Abadie**	J. F. K. School of Government. Harvard University	Professor of Public Policy	Climate Policy
July	**Kai Chan**	Univ. British Columbia - Institute for Resources, Environment and Sustainability	Associate Professor & Canada Research Chair (tier 2)	Climate and Natural Environment
September	**Juan Camilo Cardenas**	Facultad de Economía - Universidad de Los Andes (Colombia)	Professor (Economics)	Climate and Natural Environment

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

BC3 has played an active role, organizing international Climate Change scientific events and workshops involving the most influential researchers in the field. During 2014, we organized 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:

Econ Adapt Workshop

"SECOND MEETING AND GENERAL ASSEMBLY MEETING"
26-27TH MAY 2014, BIZKAIA ARETOA, BILBAO.

ECONADAPT is an EC FP7 research project whose purpose is to support adaptation planning, building the knowledge base on the economics of adaptation to climate change and converting this into practical information for decision makers. On the 26-27th of May team members met in Bilbao. The ECONADAPT consortium brings together many of the leading research and policy teams pioneering adaptation economics in Europe, and it is led by the Economics Department at the University of Bath.

LiveM Workshop

INTERNATIONAL LIVESTOCK MODELLING AND RESEARCH COLLOQUIUM.
14-16TH OCTOBER 2014, MARITIME MUSEUM, BILBAO.

The LiveM conference, co-organized and hosted by BC3, took place in Bilbao between the 14th and 16th of October 2014. It brought together around 45 MACSUR researchers from LiveM, CropM and TradeM, as well as representatives of ATF (Animal Task Force), EAAP (European Federation of Animal Science), the GRA Animal Health and GHG Emissions Intensity Network, AgMIP (Agricultural Modelling Improvement Programme) and the SOLID project (Sustainable, Organic and Low Input Dairying).

The aims of the meeting were to showcase modelling research related to LiveM and MACSUR, to bring closer ties between partners and the external initiatives represented, and to hold discussions on the future direction and purpose of the theme as the MACSUR knowledge hub moves towards its second phase from 2015-2017.

The LiveM theme of the FACCE-JPI MACSUR Knowledge Hub brought together 30 institutes from 14 European countries with expertise in a diverse range of disciplines, from grassland and farm-scale modelling through to livestock disease and health research. The workshop was supported with funding from the Norwegian Research Council, which supports MACSUR with funding for joint workshops and the Norwegian consortium of Bioforsk, NILF and NMBU.

Flagship Workshop

"GOVERNANCE CHALLENGES, TERRITORIAL DYNAMICS AND THEIR FEEDBACK INTO INTEGRATED SCENARIOS BUILDING ".
24TH OCTOBER 2014, BILBAO.

BC3 hosted in Bilbao this Workshop organized in the framework of FLAGSHIP Research Project, an FP7 project funded by the European Commission (DG RESEARCH) under the "Socio-Economic Sciences and Humanities" theme, with the aim of developing a "Forward Looking Analysis of Grand Societal Challenges and Innovative Policies".

FLAGSHIP partners are fully committed to "put FLA knowledge to work", applying it to the formulation of policies that effectively address main challenges faced by the EU, and the world as a whole. The project is also supported by a Scientific Advisory Board, comprised of experts in policy analysis in the fields of economy, climate change, international governance and science and technology innovation. This workshop brought together different stakeholders with the aim of testing feasible effective policy formulations.

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

SOME HIGHLIGHTED WORKSHOPS:

LCP 3rd Workshop

"ENERGY ASSETS, INVESTMENT UNDER UNCERTAINTY AND REAL OPTIONS". 30TH AND 31ST OF OCTOBER 2014, REPSOL FOUNDATION, MADRID.

The energy sector is a fundamental pillar for the development of any society, and its specific weight both in the real and the financial sector can hardly be overlooked as energy investments typically take place in highly uncertain environments.

The workshop *"Energy Assets, Investment under Uncertainty and Real Options"* took place in Madrid on the 30-31st of October in the framework of the Low Carbon Programme with the aim to contribute to the valuation of energy investments. It brought together a number of world-renowned experts in futures markets, commodity prices, asset pricing models, and energy engineering. Among them were Eduardo S. Schwartz, University of California at Los Angeles (UCLA); Marco Antonio Guimarães Dias, Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio); Carlos Bastián Pinto (IBMEC Business School, Brazil), Luis Mari Abadie (LCP-BC3) or Gonzalo Cortazar (Pontificia Universidad Católica de Chile).

The Low Carbon Programme (Joint Research Programme) was designed by the University of the Basque Country (UPV/EHU) and the BC3, with the support of the Repsol Foundation, in order to help create new knowledge, taking into consideration the relationship that exists between climate change and the functioning of economic systems. Hence, its main objective is to bridge the gap between economic analysis and the design of climate policy and it was set up to promote energy economics and climate change research to help deliver a low carbon future.

Klimagune Workshop 2014

"OPPORTUNITIES AND CHALLENGES FOR RURAL AREAS IN THE CONTEXT OF CLIMATE CHANGE". 4TH DECEMBER 2014.

Since its first edition four years ago, more than 300 people have participated in the Klimagune Workshop, a yearly 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.

Its fifth edition, which took take place in Bilbao, focused on the "Opportunities and challenges for rural areas in the context of climate change", as 14% of all greenhouse gas emissions worldwide come from agriculture, while deforestation is responsible for 18% of total emissions (largely used for the purposes of unsustainable livestock breeding). It was among the objectives of the workshop, to analyze the importance of the rural environment around us in different areas such as: (1) farming and livestock systems; (2) forestry management; (3) energy, transport and other sectors associated to the rural environment; (4) human behaviour, education and the role of public policies; (5) urban-rural duality and new socio-ecological land-use planning models.

The 2014 edition invited researchers and decision-makers to contribute and compare their reflections and analysis (theoretical and empirical alike) to allow constructive debate at the heart of Basque society in order to discern the challenges, opportunities and barriers of the rural world and therefore identify sustainable solutions to the global problem of climate change.

Scientific Committee members of Klimagune Workshop 2014.

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).

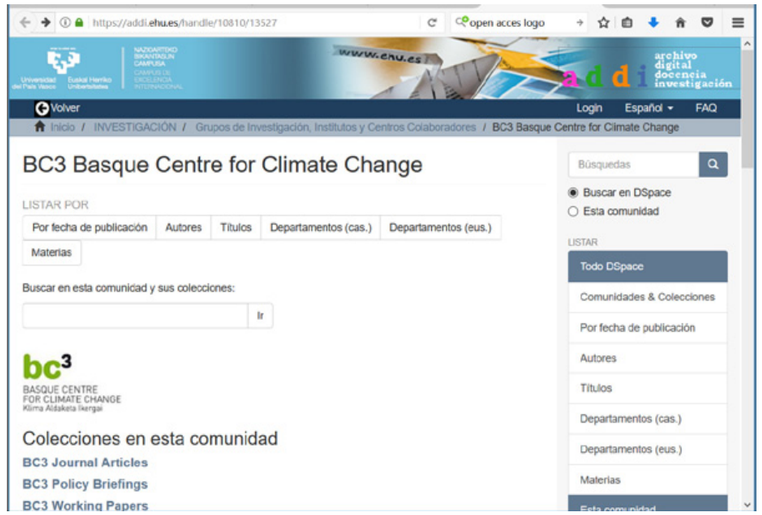
- **BC3 Working Paper [2014-08] La pobreza energética y sus implicaciones**
  Mikel González-Eguino
- **BC3 Working Paper [2014-07] Hunting spectro-temporal information in unevenly spaced paleoclimate time series**
  Josué M. Polanco-Martínez and Sérgio H. Faria
- **BC3 Working Paper [2014-06] The use of "Bonus-Malus" schemes for promoting energy-efficient household appliances: a case study for Spain**
  Ibon Galarraga and Luis M. Abadie
- **BC3 Working Paper [2014-05] A dynamic CGE modelling approach for analyzing trade-offs in climate change policy options: the case of Green Climate Fund**
  Alessandro Antimiani, Valeria Costantini, Anil Markandya, Chiara Martini, Alessandro Palma, and Maria Cristina Tommasino
- **BC3 Working Paper [2014-04] New climate scenario framework implementation in the GCAM integrated assessment model**
  Iñigo Capellán-Pérez, Mikel González-Eguino, Iñaki Arto, Alberto Ansuategi, Kishore Dhavala, Pralit Patel, Anil Markandya
- **BC3 Working Paper [2014-03] How are Italian and Spanish cities tackling climate change? A local comparative study**
  Marta Olazabal, Sonia De Gregorio Hurtado, Eduardo Olazabal, Filomena Pietrapertosa, Monica Salvia, Davide Geneletti, Valentina D'Alonzo, Efrén Feliú, Senatro Di Leo and Diana Reckien
- **BC3 Working Paper [2014-02] Implications of governance structures on urban climate action: evidence from Italy and Spain**
  Sonia De Gregorio Hurtado, Marta Olazabal, Monica Salvia, Filomena Pietrapertosa, Eduardo Olazabal, Davide Geneletti, Valentina D'Alonzo, Efrén Feliú, Senatro Di Leo and Diana Reckien
- **BC3 Working Paper [2014-01] Local air pollution and global climate change taxes: a distributional analysis**
  Xaquín Garcia-Muros, Mercedes Burguillo, Mikel González-Eguino and Desiderio Romero-Jordán

4.1.8 OPEN ACCESS

During 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.

ADDI is interconnected with OPENAIRE in a way that optimizes the visibility of open access BC3 publications series, which are available online:

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



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

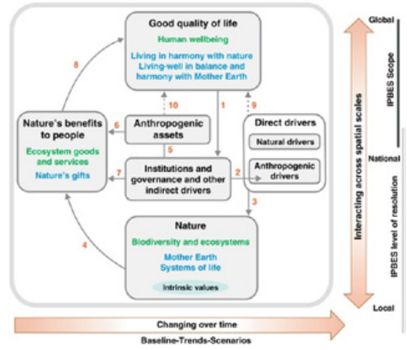
Climate change is nowadays at the top of political agendas and it is a fundamental part of our work to contribute to the design of related policies, as well as to facilitate, through science, their application in a regulatory framework, consistent with the protection of the planet.

Hence, our involvement in the most relevant 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.

IPCC Report: Impacts and Vulnerability Part A: Global Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)

Engagement with the IPCC (Intergovernmental Panel on Climate Change) is regarded as a proxy for assessing the visibility of BC3 members in the most authoritative scientific body dealing with climate change.

In this sense, it may be highlighted that our Scientific Director, Prof. Anil Markandya, was a leading author of AR5 IPCC (Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)) reports, summary for policy makers (in the area of economics of adaptation). **M. Chambwera, G. Heal, C. Dubeux, S. Hallegate, L. Leclerc, A. Markandya, B.A. McCarl, R. Mechler and J.E Neumann. 2014. "Economics of Adaptation" in Climate Change 2014: Impacts and Vulnerability Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA pp 945-977**.



The main conceptual framework of IPBES

In 2014, BC3 contributed to the production of the main conceptual framework produced by the policy-science Intergovernmental Platform on Biodiversity and Ecosystem Services (IBPES), the intergovernmental body that assesses the state of biodiversity and of the ecosystem services.

IPBES is placed under the auspices of four United Nations entities: UNEP, UNESCO, FAO and UNDP and it is administered by UNEP, which links ecosystem services to human well-being and sustainability. Its main conceptual framework, as published on line in a paper in 2014, is the basis for all regional and global assessments under IPBES and it is recognized as the updated framework of the Millennium Ecosystem Assessment. This is already considered a "hot" paper due to the many times it has been cited in high impact publications. **Díaz, S., Demissew, S., Carabias, J., Joly, C. Lonsdale, W.M, Ash, N., Larigauderie, A., Pascual U. et al. 2015. The IPBES conceptual framework - connecting nature and people. Current Opinion in Environmental Sustainability 14:1-16**.

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

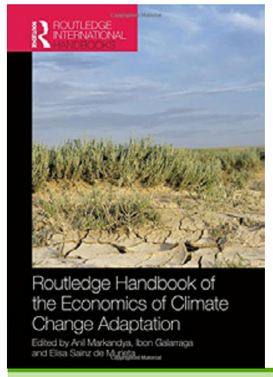
Costs of air pollution from European industrial facilities 2008-2012

BC3 team also contributed in 2014 to an updated assessment of the damage cost estimates to health and environment caused by pollutants emitted to air from Europe's largest industrial facilities. It was edited by the European Environment Agency (EEA). **Spadaro, J. (Contributor) 2014. "Costs of air pollution from European industrial facilities 2008-2012". European Environment Agency (EEA) Technical Report No 20/2014. ISBN 978-92-9213-495-2**.

Forest ecosystems in national economies and contribution of REDD+ in a green economy transformation: the case of Panama. United Nations Environment Programme (UNEP).

Since 2008, an international policy mechanism called REDD+ (Reducing Emissions from Deforestation and Forest Degradation) has been under development to encourage countries, mostly in the tropics, to conserve their forests, manage their sustainably and enhance their forest carbon stocks by means of international economic incentives.

The United Nations Environment Programme (UNEP) UN-REDD program's main objective is to conserve forests for the purpose of climate change mitigation. Protecting forests would also secure the provision of the other forest ecosystem services, including those relying on the conservation of biodiversity. Our publication **E. Midler, U. Pascual and S. Simonit (2014) Forest ecosystems in national economies and contribution of REDD+ in a green economy transformation: the case of Panama. United Nations Environment Programme (UNEP)**, could therefore help Panama to achieve a transition to a green economy by supporting the implementation of policies which tackle deforestation enhancing one of the country's most important natural capital assets.



Routledge Handbook of the Economics of Climate Change Adaptation

Climate change is one of the greatest challenges that humankind is facing due, among other factors, to the great uncertainty regarding future impacts, which will affect all regions and many ecosystems. The economics of climate change adaption (Markandya, A., Galarraga, I. and Sainz de Murieta, E. (Ed. 2014. Routledge Handbook on Economics of Adaptation to Climate Change. 1st ed. London. Routledge. 464. ISBN 978-0-415-63311-6.) is critical and therefore a central pillar of any adaptation strategy or plan.

This book, edited by BC3 researchers, Anil Markandya, Ibon Galarraga and Elisa Sainz de Murieta, targets at international researchers and policy makers in the fields of natural resources, environmental economics and climate change and deals with the difficulties that face the economics of adaptation. Critical issues include uncertainty; baselines; reversibility, flexibility and adaptive management; distributional impacts; discount rates and time horizons; mixing monetary and non-monetary evaluations and limits to the use of cost-benefit analysis; economy-wide impacts and cross-sectoral linkages. Other dimensions of adaptation are also included, such as the role of low- and middle-income countries, technology and the impacts of extreme events.

Moreover, at BC3 we impacted multilateral and international climate change policy debates through several reports for different international institutions. Other outputs that were used to support industry and domestic policy decisions included the analysis of the impacts of CO2 pricing (the existing EU ETS and other potential taxes) in the Basque iron and steel industry and also the analysis of the energy efficiency rebates scheme as well as other alternate policies (taxing bads).

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

ECOSYSTEM SERVICES

BC3 also developed decision making supporting 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 and academic or governmental institutions worldwide, to assist rapid ecosystem service assessment and valuation (ESAV).

Thus, BC3 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” benefits, which has plagued past valuation efforts.

LOW CARBON TRANSITION PATHWAYS

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

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 05-2014 / November 2014 / www.bc3research.org

A NEW ADAPTIVE MARINE POLICY TOOLBOX TO SUPPORT ECOSYSTEM-BASED APPROACH TO MANAGEMENT

Maialen Garmendia, Ben Boteler, Margaretha Breil, Areti Kontogianni, Emily Koulouvaris, Ina Krüger, Julien Le Tellier, Emma Gileva, David March, Anil Markandya, Elena Ojea, Marta Pascual, Gerda Roeleveld, Paolo Ronco, Sophia Saravanou, Didier Sauzade, Aleksandar Shivarov, Mihalis Skourtos

1-The Ecosystem-Based Approach (EBA) to management

Marine ecosystems (including estuaries, coastal waters and open sea) provide several ecosystem services such as food provision, leisure, purification of waters or climate regulation, which are directly and/or indirectly used by humans (Bertram and Rehdanz, 2013). However, these ecosystems –and thus the benefits they create - are subjected to competing uses such as fishing, food and energy production, waste disposal and marine transport to name a few. These activities together with the impacts of climate change are leading to concurrent shifts in marine ecosystems, with potentially wide-ranging biological effects (Bertram and Rehdanz, 2013). Under this scenario, in order to enable good governance of the marine ecosystems and ensure their sustainable exploitation whilst ensuring their preservation, decision support tools and methodologies need to be developed to support the implementation of the Ecosystem-Based Approach (EBA) to management.

Key Points

- *As a consequence of increasing threats to the marine ecosystems, new decision support tools are necessary to support the implementation of the Ecosystem-Based Approach (EBA) to management in order to ensure their sustainable exploitation whilst ensuring their preservation.*
- *To operationalize Ecosystem-Based Approach (EBA) to management and translate scientific knowledge into decision tools, an innovative Adaptive Marine Policy Toolbox has been created. It provides policymakers with necessary framework and resources to develop adaptive policies according to the EBA.*
- *The Adaptive Marine Policy Toolbox provides a one-stop single location to access all the guidelines and resources necessary to design and implement adaptive marine policies according to the Marine Strategy Framework Directive.*
- *The toolbox presents a high transferability to additional regulations calling for the Ecosystem-Based Approach to management such as the Ecosystem Approach of the Mediterranean Action Plan and the Black Sea's Strategic Action Plan.*
- *The Resources existing within the toolbox are presented in a user-friendly format. The presence of assessments and models capable to cope with uncertain conditions allows for high flexibility and adaptation in management strategies when future conditions change.*

The EBA for management has grown consistently over the last number of decades. EBA represents a much broader view than how marine ecosystems have been managed traditionally, taking into account the interconnectedness and inter-dependent nature of the components of ecosystems, and the fundamental importance of ecosystem structure and functioning in providing humans with the broad range of services that are taken for granted (Curtin and Prellezo, 2010). Accordingly, several regulations have recognized and require applying the EBA for managing the marine environment, including the UNEP's Mediterranean Action Plan-Ecosystem Approach, the Coastal Zone Management Act and the Common Fisheries Policy among others. From a European policy perspective, in 2008 the European Commission adopted the Marine Strategy Framework Directive (2008/56/EC) which aims to achieve or maintain the Good Environmental Status of Europe's seas by 2020. For this purpose, European countries need to develop marine strategies based on the EBA to management.

In order to assist policy-makers developing and implementing the EBA to management under the requirements of the Marine Strategy Framework Directive, a new Adaptive Marine Policy Toolbox (AMP-Toolbox) has been developed. The main objective of this policy briefing is to present this innovative toolbox. For this purpose, firstly the requirements of the Marine Strategy Framework Directive will be revised. Secondly, the objectives and the structure of the AMP-Toolbox will be presented.

Acronyms:
AMP-Toolbox: Adaptive Marine Policy Toolbox
EBA: Ecosystem-Based Approach

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 2014, BC3 produced 8 Policy Briefings altogether.

These documents provide policy recommendations based on the centre 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.

These Policy Briefings are accessible through the BC3 website (www.bc3research.org/policybriefings) 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 ofhits 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 2014 BC3 Policy Briefings:

- **BC3_PB [PB2014/Special Issue-02] Warning to navigators: IPCC report on climate change mitigation.**
  Mikel González-Eguino and Iñaki Arto
- **BC3_PB [PB 2014/ Special Issue-01] IPCC WGII Fifth Assessment Report (AR5): Expanding the solution space for adaptation**
  Elisa Sainz de Murieta, Marc B Neumann and Anil Markandya
- **[2014-06] La pobreza energética y sus implicaciones**
  Mikel González-Eguino
- **BC3_PB [2014-05] A new adaptive marine policy toolbox to support ecosystem-based approach to management**
  Maialen Garmendia, Ben Boteler, Margaretha Breil, Areti Kontogianni, Emily Koulouvaris, Ina Krüger, Julien Le Tellier, Emma Gileva, David March, Anil Markandya, Elena Ojea, Marta Pascual, Gerda Roeleveld, Paolo Ronco, Sophia Saravanou, Didier Sauzade, Aleksandar Shivarov, Mihalis Skourtos.
- **BC3_PB [2014-04] Is the current EU climate instrument mix adequate?**
  Luis Rey, Mikel González-Eguino, Anil Markandya
- **BC3_PB [2014-03] Ingredientes de una transición sostenible hacia una ciudad baja en carbono**
  Marta Olazabal y Unai Pascual
- **BC3_PB [2014-02] The adoption of ecosystem-based adaptation in the international climate agenda**
  Elena Ojea
- **BC3_PB [2014-01] Discounting the value of natural resources in costbenefit analysis: a case study for policy making**
  Aline Chiabai and Ibon Galarraga

4.2 TO POLICY-MAKERS | 4.2.4 Training & Capacity Building

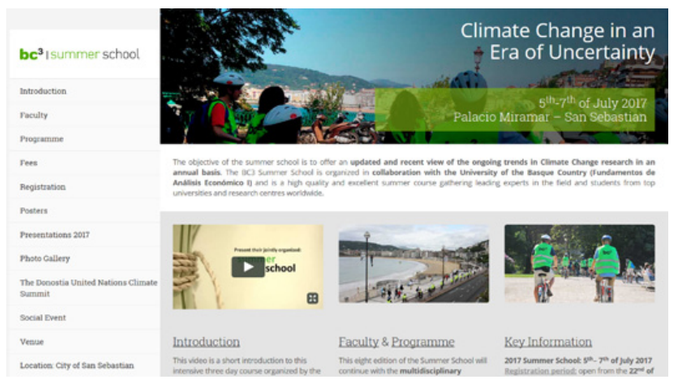
International Spring University on Ecosystem Services Modelling

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) and during 2014, the programme was consolidated with a new edition.

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.

BC3- UPV/EHU Summer School

Another relevant course was the annual Summer School on Climate Change, first launched in 2010 with the collaboration of the University of the Basque Country. The objective of this 3-day course was to offer an updated view of the ongoing trends in climate change issues, gathering leading experts in the field and students from top universities and research centres worldwide. The year's edition topic was "Climate Change Understanding the Challenge".



4.2 TO POLICY-MAKERS | 4.2.5 Other highlighted contributions

Reporting at the Basque Parliament

BC3 collaborated with the Basque Parliament offering an assessment of the state of art of Climate Change at Basque Country scale (2014/12/03) and its implications for the industry, with the appearance of Ibon Galarraga, BC3's researcher, at the Basque Parliament Commission. This participation was requested by the member of the Basque Socialist group, Mrs Natalia Rojo Solana, in order to explain the centre´s assessment of climate change in the Basque Country.


EUSKO LEGEBILTZARRA
PARLAMENTO VASCO

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Comisión de Medio Ambiente y Política Territorial

03/12/2014

Tratarán temas relacionados con el cambio climático y Euskotren

Comparecencia de Ibon Galarraga, investigador del Basque Centre for Climate Change, a petición de la comisión, de conformidad con la solicitud formulada por D.ª Natalia Rojo Solana, parlamentaria del grupo Socialistas Vascos, a fin de que explique su valoración respecto al cambio climático en Euskadi. (10\10\06\03\0536)

Comparecencia de la consejera de Medio Ambiente y Política Territorial, a petición de la comisión, de conformidad con la solicitud formulada por D. Daniel Maeztu Perez, parlamentario del grupo EH Bildu, a fin de que dé explicaciones en relación con la postura del Gobierno Vasco para hacer frente al cambio climático. (10\10\06\03\0729)

Comparecencia de la consejera de Medio Ambiente y Política Territorial, a petición de la comisión, de conformidad con la solicitud formulada por D. Jesús María Zaballos de Llanos, parlamentario del grupo Socialistas Vascos, a fin de que informe sobre el mantenimiento de las nuevas unidades de Euskotren. (10\10\06\03\0751)

Comparecencia de representantes del Comité Permanente de Euskotren, a petición de la comisión, de conformidad con la solicitud formulada por D. Jesús María Zaballos de Llanos, parlamentario del grupo Socialistas Vascos, a fin de que informen sobre el mantenimiento de las nuevas unidades de Euskotren.

Climate Change Strategy of the Basque Country, KLIMA 2050

In 2014 it was launched the Basque Climate Change Strategy, Klima 2050, with the production of a strategic focus document in which we were involved as climate change experts.

Based on the emissions' cut expected by 2020 (scenarios of the Strategy for its first period (2015-2020)), BC3 worked on the assessment of the measures established in the Strategy and their cost, the economic impacts associated, as well as the main additional benefits (co-benefits). Specifically, the saving in energy bills and the improvement to public health arising from cutting atmospheric pollutants. An integrated environmental energy- economic model for the Basque Country was therefore carried out.


KLIMA 2050
BASQUE COUNTRY

Climate Change Strategy of the Basque Country to 2050

Tailor made model for Bilbao City Council

In the framework of the Low Carbon Research Programme, we designed and developed an input-output model to assess the impact of certain policies for Bilbao City Council. This model's purpose was to impact on the city's energy efficiency plan and to assess the economic impact of potential flooding events.

The research programme was carried out by BC3 and the University of the Basque Country (UPV/EHU), on issues related to energy poverty, and funded by Repsol Foundation.


B
Bilbao
UDALA
AYUNTAMIENTO

4.3 TO SOCIETY. Science Education and Public Awareness | 4.3.1 Training Caravan

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.

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

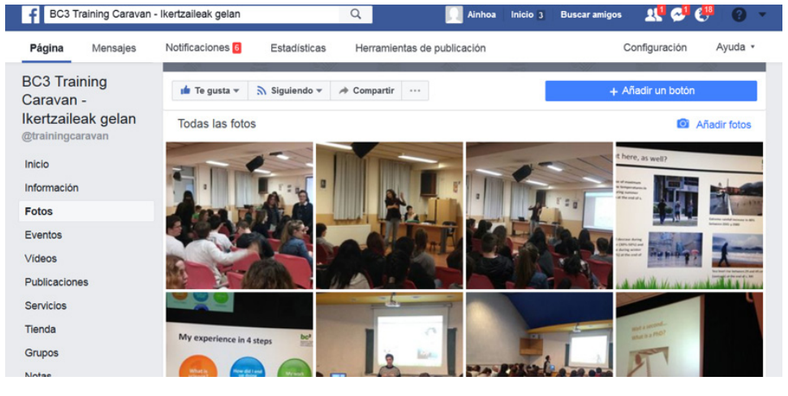
- BUILDING CAPACITIES AND DEVELOPING INNOVATIVE WAYS OF CONNECTING CLIMATE CHANGE SCIENCE TO SOCIETY (SCIENCE EDUCATION).
- TAKING THE "CLIMATE CHANGE CHALLENGE" CLOSER TO THE SOCIETY.
- BUILDING A MORE SCIENTIFICALLY LITERATE SOCIETY ABLE TO ACTIVELY PARTICIPATE IN AND SUPPORT DEMOCRATIC PROCESSES.

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 Caravan (Researchers at classroom) initiative since 2010.

The main objective of this activity targeted at Basque student's aged 16-17, is to raise and boost research vocations and careers amongst the students of the Basque Country and inform about climate change research. 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 5 years, we have reached over 3.750 students of the Basque Country Autonomous Community through 50 Training Caravan Speeches altogether. For more info, check our web or their social network activity (#trainingcaravan).



DATE	SCHOOL	LOCATION	SPEAKER
30-Jan	**BALLONTI BHI**	Portugalete	Marta Pascual
20-Feb	**CARMELITAS SAGRADO COR.**	Vitoria-Gasteiz	Amaia Albizua
20-Feb	**KOLDO MITXELENA BHI**	Vitoria-Gasteiz	Amaia Albizua
24-Feb	**UROLA IKASTOLA AZK-AZP. BHI**	Azkoitia	Elena Perez Miñana
24-Feb	**ZUAZOLA-LARRAÑA BHI**	Oñati	Elisa Sainz de Murieta
26-Feb	**BHI IIPINTZA**	Bergara	Elisa Sainz de Murieta
27-Feb	**IES PIO BAROJA BHI**	Irun	Agustin del Prado
27-Feb	**IES LASARTE-USURBIL BHI**	Lasarte-Oria	Agustin del Prado
11-Mar	**LAURO IKASTOLA**	Loiu	Ibon Galarraga
11-Apr	**ELEXALDE BHI**	Galdakao	Sérgio H. Faria
8-May	**SAN ADRIAN BHI**	Bilbao	Joseph Spadaro

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

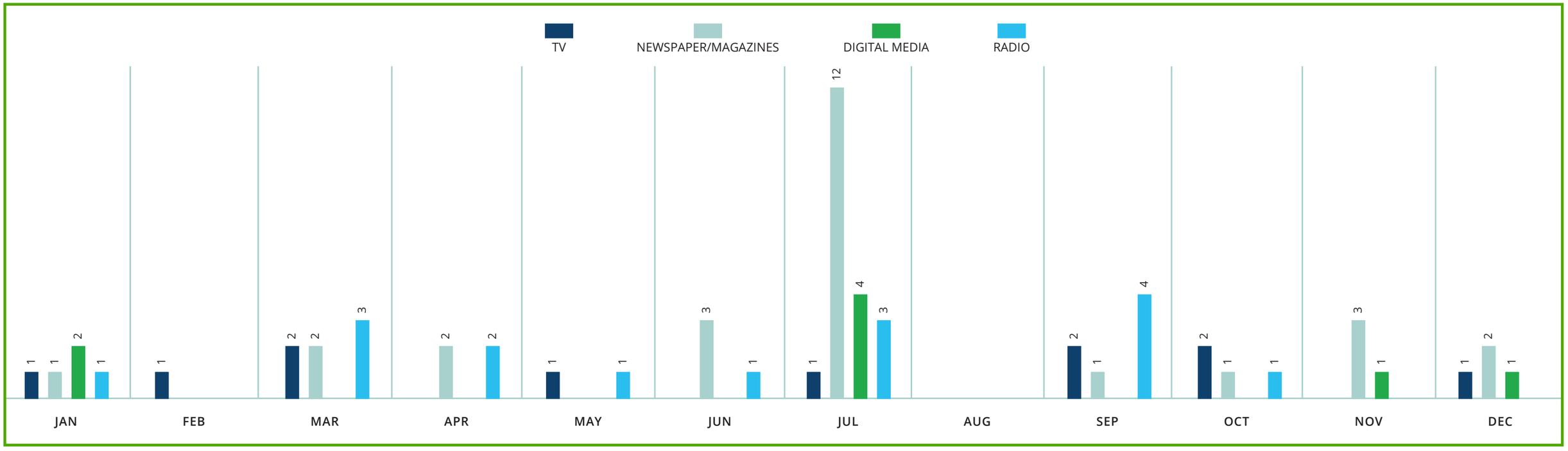
Besides the publication of our research results in leading scientific journals, at BC3 we make a special effort to build an institutional reputation in order to be a benchmark at the local, national or international level. In 2013, we designed the Strategic Communication Plan with this aim, which settled 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.

BC· is regularly consulted by different media as an expert adviser in climate change.. In this regards, the BC3 had significant presence in national and international communication media

IMPACT IN MEDIA DURING 2014:

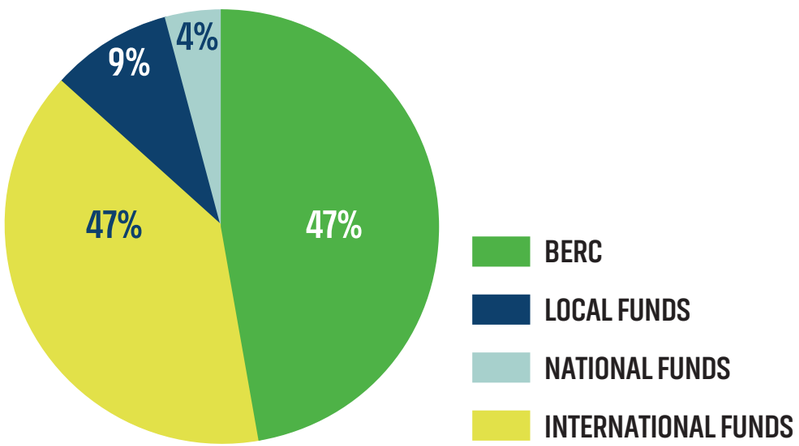
TV — **11**
Newspaper/ Magazines — **27**
Digital media — **8**
Radio — **16**
Press Releases — **9**
Tweets — **373**
Google Analytics (Visits) — **42465**



5. FUNDING

5.1 FUNDING SOURCES

DISTRIBUTION OF BC3 FUNDS



6. SET OF INDICATORS

PUBLICATIONS (Production)

Total number of publications published in the given year (* Published on line)	107
Number of articles published in the given year (* Published on line)	63
Number of Books and Chapters published in the given year	24
Other publications published in the given year	4
BC3 Policy Briefings published in the given year	8
BC3 Working papers published in the given year	8

PUBLICATIONS (Impact Factor)

% of Indexed articles in Quartile 1	87%
Citation number per year	553
H index	17

TRAINING

PhD - Defended thesis	2
PhD - Supervised students	14
Master - Supervised students	7

EXCELLENCE

ERC (Requested)	1
Ikerbasque Researchers	6

FUNDING

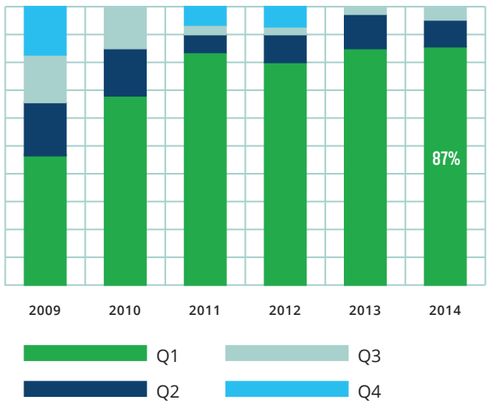
% of Funding (non BERC)	53

PEOPLE

Total BC3 Team	42
Number of researchers	38
Number of administration staff	4

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

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



bc³

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