STATE OF THE ART OF CLIMATE CHANGE ADAPTATION AND MITIGATION AT THE METROPOLITAN AREA OF BARCELONA

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Introduction

This report is one of the first outcomes of Project TeRRIFICA that helps identify the state of the art of climate change adaptation and mitigation at the metropolitan area of Barcelona (Spain) as one of six pilot regions. It contributes to achieving the following objectives:

- to create a comprehensive overview on the state of the art of climate change adaptation research and innovation strategies, tangible climate change adaptation examples and communication strategies and methods at different levels of complexity,
- to create an overview and corresponding information and exchange structures between science, civil society and local government,
- to highlight areas that TeRRIFICA can address and improve,
- to identify useful content for TeRRIFICA from recent and current projects about climate action and climate change,
- to reflect on climate change adaptation ideas and strengths and weaknesses (co-creation),
- to define and adapt supporting innovative outreach and dialogue actions and formats for general public, education, policy makers and the virtual platform, ready for implementation in partner institutions and collaborating organisations,
- to develop common methodologies and recommendations of implementation for Pilots with special focus on social innovation corresponding to SDGs.

Recognition of the current state in the field of climate change adaptation and mitigation activities undertaken by academia and education, local government, civil society and business in each pilot region is helpful to select the relevant case studies for the purpose of accomplishing next TeRRIFICA tasks aimed at enhancement of climate actions as well as strengthening stakeholders engagement and co-creation.

Abbreviations:
NGOs – non - governmental organizations
CSOs–civil society organizations
SDGs – sustainable development goals
CSR– corporate social responsibility
RRI – responsible research and innovation
SMEs – small and medium enterprises

Glossary – key definitions

Climate change refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC).

Climate change adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise. Examples of adaptation measures include: using scarce water resources more efficiently; considering fresh air corridors in urban planning to improve the air quality in cities; and setting aside land corridors to help species migrate. Adaptation strategies are needed at all levels of administration: at the local, regional, national, EU and also the international level. Due to the varying severity and nature of climate impacts between regions in Europe, most adaptation initiatives will be taken at the regional or local levels. The ability to cope and adapt also differs across populations, economic sectors and regions within Europe (Description of Actions).

Climate change mitigation refers to a wide scope of efforts to reduce or even prevent the emission of greenhouse gases. These efforts range from changing consumer behaviour to boosting the efficiency of out-dated equipment to the use of newest technologies and renewable energies. Planning a new city can be a means of mitigation as well as the replacement of an old furnace. This means that mitigation often involves fundamental changes in the way individuals and societies as a whole produce and use energy (Description of Actions).

Responsible Research & Innovation (RRI) - building blocks:

- **public engagement** - in Responsible Research and Innovation is about co-creating the future with citizens and civil society organisations, and also bringing on board the widest possible diversity of actors that would not normally interact with each other, on matters of science and technology.
- **open access** - the global shift towards making research findings available free of charge for readers, so-called 'Open access', has been a core strategy in the European Commission to improve knowledge circulation and thus innovation. It is illustrated in particular by the general principle for open access to scientific publications in Horizon 2020 and the pilot for research data.
- **gender equality** - in Horizon 2020 Gender is a cross-cutting issue and is mainstreamed in each of the different parts of the Work Programme, ensuring a more integrated approach to research and innovation.
- **ethics** - For all activities funded by the European Union, ethics is an integral part of research from beginning to end, and ethical compliance is seen as pivotal to achieve real research excellence.
- **science education** - Building capacities and developing innovative ways of connecting science to society is a priority under Horizon 2020. This will help to make science more attractive to young people, increase society's appetite for innovation, and open up further research and innovation activities (European Commission).

Co-creation: Collaborative development of new value (concepts, solutions, products and services) together with experts and/or stakeholders (such as customers, suppliers etc.). Co-creation is a form of collaborative innovation: ideas are shared and improved together, rather than kept to oneself. It is closely connected to – and mentioned alongside – two other buzz-words: "opensource" and "mass-customisation" (**http://fronteer.amsterdam/what-is-co-creation/**).

A case study is understood as an example of current actions allowing for identification both good and bad practice in climate change adaptation and mitigation. It is related mainly to a pilot region. A case study is focused on a co-creation process.

Identification of the state of the art of climate change adaptation and mitigation

GENERAL CHARACTERISTICS OF THE PILOT REGION

1. Name of the region, its location and a short description

Metropolitan Area of Barcelona

The Barcelona metropolitan area (from now on AMB) (Catalan: Àrea metropolitana de Barcelona, Spanish: Área metropolitana de Barcelona) is a metropolitan area in Catalonia, north of Spain, centered on the city of Barcelona. The metropolitan area occupies a strategic position in southern Europe, in the middle of the Mediterranean corridor that connects Spain with the rest of the continent. This privileged position has allowed it to become the epicentre of Catalonia. Its territory includes the agricultural areas of Llobregat Delta, the fully urbanised areas of the Barcelona plain and the large green areas of the massifs of Garraf and Collserola and Marina mountain range. The metropolitan area of Barcelona is home to 3,239,337 people in a territory of 636 km2. The AMB represents one of the largest metropolitan areas in Europe and occupies the eighth position in terms of population. (Source: Eurostat: metropolitan regions. Eurostat, 2012) Approximately half of the region (48%) is built land and the rest is occupied by forests and agricultural and natural areas.

The AMB is the core of economic activity in the region of Barcelona, as well as of Catalonia. The AMB concentrates 50.9 % of production (GDP) and workers of Catalonia.

AMB a supra-municipal administration, has an explicit competence in the coordination and formulation of measures against climate change (Law 31-2010, from the 3rd of August, of the 'Àrea Metropolitana de Barcelona, article 14, section E subsection a).

More information:

http://www.amb.cat/en/web/area-metropolitana/coneixer-l-area-metropolitana

2. Strategies/agendas/reports developed by the local government

(please provide max. 3 cases using the criteria below for each example)

CASE 1 Tercer informe sobre el canvi climàtic a Catalunya (CADS)

Title: Third Report on Climate Change in Catalonia (TICCC)

The Third Report on Climate Change in Catalonia (TICCC) is an independent report from the scientific perspective, covering Catalonia (with the necessary references to the global and European situation) on the state of the climate and how it is evolving as regards natural and human systems. The report aims to provide the broadest possible thematic and service-based coverage for the country's various stakeholders.

Timeframe:
2015-2020

Main challenges and goals regarding climate change identified:

Sixteen of the seventeen warmest years since records began have been recorded since 2000, and the planet's average global temperature (the air above the surface of the land and sea) exceeded pre-industrial levels by 1°C for the first time ever in 2015. Finally, permanent atmospheric concentration levels of carbon dioxide (CO2) now exceed 400 parts per million for the first time in eight hundred thousand years.

This warming will have numerous effects, and will clearly determine our collective future. Catalonia is also subject to climate change and its effects. The average annual air temperature for Catalonia as a whole has risen by 0.23°C/decade, and this figure is slightly higher than the global levels for the period between 1950 and 2014. The projections point to a rise in temperatures and a slight reduction in rainfall in the coming decades. This will be more pronounced by the middle of this century, with a greater likelihood of more intense rainfall and an increase in the amount and duration of droughts.

The main challenges and goals regarding to climate change that have been identified by analysing the recent and future developments relating to climate in Catalonia, are:

- the effects of climate change on natural and human systems,
- the contribution of those systems to greenhouse gas emissions (GHG), and
- the adaptation to climate change.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

OA1.1 Open access literature
PE2 Policy-oriented engagement with science
OA3 Social media outreach/take-up of open access literature
GOV2 RRI-related governance mechanisms within research-funding and performing organisations

Main actions aimed at climate change adaptation:

The report offers a special section entitled 'Natural systems: impact, vulnerability and adaptation', which focuses on natural systems, and examines the climate risks and impact on water resources, the coastline and terrestrial, aquatic and marine ecosystems. This section also considers the specific characteristics of soils.

In this section, the authors discuss the trends for the main climatic variables recorded during recent decades and the projections that have been produced for the period until 2050. In overall terms, there are a number of events or situations which will almost undoubtedly increase in frequency and often in intensity. It is very safe to say that climate change will lead to an increase in very high temperatures and extreme heat waves, there will be more tropical nights and warm periods will last longer. However, there is no significant general trend towards an increase in the number of days of heavy rain, or in maximum precipitation in a twenty-four hour period, or any related indices. The duration of dry spells is also very likely to increase.

This will be most obvious in the summer—the season when the rise in temperature and the fall in precipitation will be most marked. These changes will have a marked impact on agriculture and the state of ecosystems, because the soils will be drier in the spring and the dry summer will last longer. The availability of water resources will also be affected, as they will diminish and become more variable. This will make them more difficult to manage in order to cope with periods of drought. The large amount of water that is stored in snow will also continue to decline. If there are more prolonged hot and dry periods, crops will need more water and water stress in plants will increase; this is the logical consequence of an increased demand and decline in the availability of water.

Main actions aimed at climate change mitigation:

The report offers a specific section entitled 'Human systems: impact, vulnerability, adaptation and mitigation', which presents the impact, vulnerability and proposals for adaptation to and mitigation of climate change in various areas and human systems in Catalonia (agriculture, livestock farming and fishing; energy; industry; tourism; health; waste and resources; transport, mobility and logistics; territory and the urban space; and the interaction between human and natural systems in high mountain areas).

The general actions aimed at climate change mitigation are mainly focused on:

- Climate change and food security
- Energy and industry: two key sectors for reducing GHG emissions
- Mobility: a question of habits and planning
- Tourism: the search for new models
- Waste - from a problem to a resource
- Climate change is a health issue
- Rethinking the territory
- The challenge of the mountains

Are the guidelines for operationalization of activities related to the climate change provided? If yes, please describe them.

No guidelines provided.

Indicate the SDGs relevant for the region:

SDG3, Ensure healthy lives and promote well-being for all at all ages
SDG4, Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
SDG5, Achieve gender equality and empower all women and girls
SDG6, Ensure availability and sustainable management of water and sanitation for all
SDG7, Ensure access to affordable, reliable, sustainable and modern energy for all
SDG8, Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
SDG9, Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
SDG 11, Make cities and human settlements inclusive, safe, resilient and sustainable
SDG13, Take urgent action to combat climate change and its impacts*
SDG14, Conserve and sustainably use the oceans, seas and marine resources for sustainable development

SDG15, Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

SDG17, Strengthen the means of implementation and revitalize the global partnership for sustainable development

Is there a need for cooperation between different groups of stakeholders articulated/described?

☑YES □NO

If YES,mark the appropriate stakeholder groups and describe them

The 'Governance and management of climate change' section of the report addresses the policies and instruments required, the importance of public opinion, the state of research in Catalonia and the process between signing the Kyoto Protocol and the Paris Summit.

The Government of Catalonia has the Catalan Office for Climate Change and a special inter-ministerial committee on this subject. As part of Catalonia's strategy against climate change, the Catalan Energy and Climate Change Plan 2012-2020 and the Catalan Strategy for Adapting to Climate Change with a time frame of 2013-2020 have been established in recent years. In Catalonia, local authorities, through the Covenant of Mayors for Climate and Energy promoted by the European Commission, and various tools and support networks for governance, have become heavily involved in the fight against climate change, despite the economic and technical limitations and the restrictions on their powers. Nevertheless, adapting to climate change means that a change towards governance on a local level is necessary.

Describe the forms of cooperation between stakeholder groups or the ways of their involvement in climate actions (e.g. public meetings, local workshops, focus groups) *(maximum 3000 characters including spaces)*:

No provided by the report.

Web link to the document:

Full report (in Catalan):
http://cads.gencat.cat/web/.content/Documents/Publicacions/tercer-informe-sobre-canvi-climatic-catalunya/TERCER_INFORME_CANVI_CLIMATIC_web.pdf

Executive summary of the Third Report on Climate Change in Catalonia (in English):
http://cads.gencat.cat/web/.content/Documents/Publicacions/tercer-informe-sobre-canvi-climatic-catalunya/Resum_executiu_TICCC/RESUM_EXECUT_TICCC_web_EN.pdf

CASE 2 Pla Clima i Energia 2030 (AMB)

Title: Pla Clima i Energia 2030 (2030 Climate and Energy Plan)

Timeframe:

2018-2030

Main challenges and goals regarding climate change identified:

In Catalonia, the parliament very recently passed Climate Change Act 16/2017 (Llei de Canvi Climàtic) on 1 August, whose aim is to reduce Catalonia's GHG emissions by 40% by 2030, as well as encouraging a shift towards a low-carbon economy, among other goals.

Article 14 of Chapter I of Act 31/2010, constituting the Barcelona Metropolitan Area, regulates, among other matters, the authority to formulate measures to combat climate change. The AMB Environmental Sustainability Plan (approved on 28 January 2014) already established some measures related to Aspect 2, Energy and Climate Change, as well as the 2011-2015 Carbon Management Strategy approved by the Metropolitan Council on 5 February 2013, and also the first Climate Change Adaptation Plan, passed on 27 January 2015.
These instruments contain the operational details of the AMB's climate-related commitments:

- Climate Declaration (Metropolitan Council, 24 November 2015)
- Metropolitan Panel for a New Energy Model (created on 29 April 2015 and formally set up by the Government Assembly of 31 May 2016)
- Coordinating body of the EU's Global Covenant of Mayors for Climate & Energy (Metropolitan Council, 26 April 2016).

In 2016, as a result of the points considered after the Paris Agreement, the AMB decided it needed to react quickly and decisively against climate change. The "2030 Climate and Energy Plan" provides a summary of the complete strategy up to 2030 related to energy transition, the reduction of emissions and adaptation to make the metropolitan area and its people more resilient. On September 25, 2018, the Metropolitan Council approved the Climate and Energy Plan 2030 (PCE30) of the AMB, which constitutes the metropolitan strategy on energy transition and climate change to advance towards carbon neutrality in the metropolitan area, and integrate the objectives of energy sovereignty, promotion of renewable energies, energy efficiency and saving, reduction of GHG emissions and adaptation to climate change. The Plan involves all the areas of the AMB's competences, as well as 58 companies and entities that provide metropolitan services. The PCE30 contains 92 actions, grouped into 13 lines of action and 4 transversal areas of action, at three levels: metropolitan, municipal and institutional:

- Renatural spaces to be more resilient to the impacts of climate change (19 actions).
- Promote renewable local generation and more energy / resource efficiency (49 actions).
- Territories and citizenship active and committed to climate justice (10 actions).
- Metropolitan governance coordinated with the city councils (14 actions).

- METROPOLITAN: actions associated with projects requiring a metropolitan perspective or operation, shared and related to the metropolitan level of authority or with coordinated policies.
- MUNICIPAL: actions carried out at a municipal level and in collaboration with the councils, involving one or more municipalities.

- INSTITUTIONAL: actions affecting the AMB institution, including facilities, licensed companies, offices, official vehicles, etc.

The AMB Climate and Energy Plan contains an energy transition strategy for the area in question, as well as a revised carbon management strategy related to the services provided by the AMB. It also contains the adaptation measures required for the metropolitan region to become more resilient to the impact of climate change.

Regarding AMB services (waste treatment, water cycle, mobility, etc.), the Plan establishes a target of **reducing emissions by 43% compared with 2005**. However, taking into account all the actions planned, both for the region and also regarding the services provided by the AMB, it is estimated that the Plan **will help to reduce emissions by 13.2%**. Everyone's collaboration is required to achieve the European target of a 40% reduction: councils and other administrations, the main logistics operators, inhabitants, etc.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

SLSE3 – Science communication culture.
GOV1 – Use of science in policy making.

Main actions aimed at climate change adaptation:

Mainly adaptation actions:

- Work has been carried out on improving knowledge about the risk and vulnerability to climate change in the metropolitan area. Several specific studies have been carried out, about heat waves, heat islands and bases for the climate refugee plan.
- Creation of a platform for collective public investment to promote projects for the generation of renewable energy.
- Investment in energy rehabilitation in public buildings with nearly zero energy consumption (nZEB).
- Strategy for a new energy culture.
- Water Director's Plan (working).
- Recovery of road space and creation of spaces of shade and freshness (climate refugees) to reduce the heat impact.
- Guarantee the availability of water through the preservation and promotion of the use of alternative hydric resources.
- Awareness, training and environmental education for a citizen more committed to the fight against change climatic.

Main actions aimed at climate change mitigation:

Mainly mitigation actions:
- 40% reduction emissions territory AMB (EU objective)*.
(*) 43% reduction in the area of the influence of the services through the reduction commitment 57 companies and their own facilities and concessions of the AMB.
- 30% Energy Efficiency and 30% Renewable Energies.
- 380 photovoltaic installations in municipal public buildings of the metropolitan area.
- Implementation of a network of 100 electrical charge installations for vehicles, with solar energy source, in the metropolitan area.
- Creation of the Metropolitan Energy Agency and a public energy trading company.

Are the guidelines for operationalization of activities related to the climate change provided? If yes, please describe them.

Indicate the SDGs relevant for the region:

Goal 6 - Ensure availability and sustainable management of water and sanitation for all.
Goal 7 - Ensure access to affordable, reliable, sustainable and modern energy for all.
Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal 12 - Ensure sustainable consumption and production patterns.
Goal 13 - Take urgent action to combat climate change and its impacts.
Goal 16 - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
Goal 17 - Strengthen the means of implementation and revitalize the global partnership for sustainable development

Is there a need for cooperation between different groups of stakeholders articulated/described?

X YES□NO

Comprehensive and coordinated action between departments of the AMB, services, City councils and dealers.

If YES,mark the appropriate stakeholder groups and describe them

X local government □ civil society□ academia & education X business

Short description of stakeholders:

Metropolitan Area of Barcelona:
The AMB is the public administration of the metropolitan area of Barcelona, a large urban conurbation formed by a total of 36 municipalities.
The constitution as a public administration was carried out on July 21, 2011, in accordance with Law 31/2010 approved by the Parliament of Catalonia. Since then, the AMB has replaced the three existing metropolitan entities up to that date: the

Commonwealth of Municipalities of the Metropolitan Area of Barcelona, the Entity of the Environment and the Metropolitan Transport Entity.

- 37 people from 8 departments participated to review the actions, thinking about how the climate change can affect us:

  Town planning, Public works and public space, Mobility, IMT, Water cycle, Prevention and Waste Management, Environmental education, Strategic planning, Economic planning, IMPSOL.

Local Government:
36 town halls in the Metropolitan Board for the Energy Transition.

Business:
57 entities or services, part of the carbon management strategy.

Describe the forms of cooperation between stakeholder groups or the ways of their involvement in climate actions (e.g. public meetings, local workshops, focus groups) *(maximum 3000 characters including spaces)*:

Coordination, participation and dissemination has been carried out via ordinary meetings held by an AMB resilience panel, the Metropolitan Panel for a New Energy Model and the Specialist Monitoring Committee for the Strategy, with the participation of all agents involved depending on the requirements of each meeting, between AMB departments and also with other public administrations, citizens, private sector, industry, etc.

Coordination is also planned with the metropolitan municipalities regarding the adaptation measures affecting the AMB (see the table of synergies of the Adaptation Plan - PLACCs).

And also coordination and continuous dialogue with the companies and organisations involved in the Strategy to redefine and revise the emission targets in accordance with the current or future lines of action, via each organisation's roadmap.

Web link to the document:
http://www.amb.cat/en/web/medi-ambient/actualitat/publicacions/detall/-/publicacio/climate-and-energy-plan-2030/7155151/11818

Executive summary (English):
https://docs.amb.cat/alfresco/api/-default-/public/alfresco/versions/1/nodes/41cc4e17-206e-46df-9fa5-

e0870471b1ae/content/Pla_+Adaptacio_Canvi_Clima_2030_ENG.pdf?attachment=false&mimeType=application/pdf&sizeInBytes=3784403

CASE 3 Pla d'adaptació al canvi climàtic (AMB)

Title: Pla d'adaptació metropolità al canvi climatic (PACC AMB) - Metropolitan adaptation plan to climate change

Timeframe:
2015-2020

Main challenges and goals regarding climate change identified:

The AMB has developed its own metropolitan Plan to adapt to climate change (PACC 2015-2020) where 24 risks related to droughts, floods, marine storms, saline intrusion, forest fires, extreme climatic index evolution and extreme temperatures, were analysed. This identification has resulted in 50 actions aimed at combating climate change from the point of view of adaptation.

The PACC is developed in accordance with the operational objectives of the Catalan Strategy for Adaptation to Climate Change:
· Generate and transfer all the knowledge about adaptation to climate change in the specific area.
· Increase the adaptive capacity of sectors and/or systems, based on the reinforcement of resilience and the reduction of the exposure of systems and sectors under the premises of social, environmental and economic sustainability.
· To articulate an action plan that allows coordinating policies and adaptation plans of the 36 metropolitan municipalities.

The work describes the methodology used and the most relevant aspects of the current climate and future projections. From these elements can identify the potential risks that future scenarios can bring, and the necessary associated adaptation actions.

The PACC includes a dissemination and education plan.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

OA1 – Open access literature
GOV1 – Use of science in policymaking

Main actions aimed at climate change adaptation:

Once the above risks have been assessed, a program of actions associated to each of these risks was done.

The study of all the risks posed results in 50 specific actions, centered in different specific areas:
.- river areas (6 actions) – example: Maintenance of the hydraulic barrier against the saline intrusion of the Llobregat Delta aquifer.

.- water (21 actions) – example: Prepare the AMB's Alternative Water Resources Management Plan.

.- beaches (3 actions) – example: Expand the dune regeneration program to reduce the loss of sand caused by weather and wind.

.- terrestrial ecosystems (12 actions) – example: Implementation of flocks to facilitate forest management and fire prevention.

.- waste (3 actions) – example: Minimize odors and prevent early fermentation in the recollection frequencies of the organic fraction.

.- rounds (2 actions) – example: Define specific action programs in case of emergencies caused by extreme weather.

.- urban systems (15 actions) – example: Inclusion of energy and water saving systems, as well as climate insulation, at all promotions of buildings by the AMB.

.- health (2 actions) – example: Continue with the reconversion of the fleet of buses in hybrid or electric vehicles, such as measure to fight atmospheric pollution caused by higher radiation.

.- tourism (1 action) - Adaptation of the AMB's services with the greatest impact on tourism (beaches, public transport, etc.) to the new seasonal demands.

.- transversal aspects (10 actions) – example: Creation of a table of energy and climate change with the entities and key agents of the territory for the realization of studies and for the preparation of proposals for adaptation to climate change.

Also, some study of reference have been made, for the deployment of a powerful metropolitan strategy to deal with climate change, in the metropolitan territory:
- Study of the effect of heat island.
- Assessment study of the urban green.
- Study of the effects of climate change on the coast.
- Study of the effects of climate change on water resources.
- Regionalization of climatic projections.
- Study on the vulnerability of energy infrastructures against climate change.
- Analysis of urban fabrics from the energy perspective. Drawing up of cartography of the park of existing buildings in the AMB according to their degree of energy efficiency, available in the server.

Main actions aimed at climate change mitigation:

Are the guidelines for operationalization of activities related to the climate change provided? If yes, please describe them.

The general objective of the diffusion and education Plan is to disseminate the knowledge obtained about climate change, its impact on the metropolitan area and the risks identified and proposed actions to adapt to it.

Indicate the SDGs relevant for the region:
Goal 6 - Ensure availability and sustainable management of water and sanitation for all.
Goal 7 - Ensure access to affordable, reliable, sustainable and modern energy for all.
Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal 12 - Ensure sustainable consumption and production patterns.
Goal 13 - Take urgent action to combat climate change and its impacts.

Is there a need for cooperation between different groups of stakeholders articulated/described?

□ YES□NO

If YES,mark the appropriate stakeholder groups and describe them

□ local government □ civil society□ academia & education □ business

Short description of stakeholders:

Describe the forms of cooperation between stakeholder groups or the ways of their involvement in climate actions (e.g. public meetings, local workshops, focus groups) *(maximum 3000 characters including spaces)*:

A range of actions is grouped according to the type of priority target audience:

Internal communication:
.- Management: Technical work meetings / Publicly present the PACC .
.- Training: Organize training workshops on specific risks.
.- Education: Design new teaching material and reinforce / Extend existing activity about climate change.
.- Communication channels and participation: Enable a common metropolitan communication channel / Make a cooperative documentary platform.

External communication:
.- Management: Prepare an open and integrated agenda for environmental events.

.- Education: Offer specific activities for environmental risks / Design activities targeted at vulnerable groups / Take an act to attract volunteers for climate change / Integration of online educational resources.
.- Participation: Organize a participatory technical meeting of the PACC / Organize participatory workshops of the PACC / Make a participatory campaign in high school / Make a survey to assess the popular perception of risks / Enable a telephone and online communication channel / Opening the 2.0 participation in the Sustainability axis / Prepare a short video about the most imminent risks.
.- Outreach: Make a traveling exhibition / Prepare an informative dissemination dossier.

Media: Write a digital technical dossier / Prepare a press kit with thematic news / Convene a press conference to spread the PACC / Establish regular collaboration with local media (local radio stations, websites municipalities) / Schedule a series of advertising reports or capsules related to risks.

Web link to the document:
http://www.amb.cat/web/medi-ambient/sostenibilitat/canvi-climatic/adaptacio

3. Main stakeholders in the region (quadruple helix model)

a) Local government (indicate local/regional institutions and their main tasks referring to environmental protection and climate change adaptation & mitigation)

In the territorial scope of the pilot (the metropolitan area of Barcelona), there are several Administrations:

1.- Generalitat de Catalunya: The Generalitat is the institutional system in which the self-government of Catalonia is organized politically.

The Government of Catalonia has two formal instruments to approach the climatic change since year 2006: the Catalan Office of the Climatic Change and the Interdepartmental Commission of the Climate Change.

In recent years there have been four significant goals in the public policy of adaptation to Catalonia: the publication of the Third Report on climate change in Catalonia; the document for monitoring and evaluating the Catalan Strategy for Adaptation to Climate Change (ESCACC, Horizon 2013-2020), the Climate Change Law, and the completion of the Life MEDACC project, Adapting the Mediterranean to Climate Change. These achievements have meant the expansion of knowledge in adaptation to Catalonia, the realization that the impacts of climate change are a reality, and the integration with a regulatory nature of adaptation in sectoral public policies.

The Catalan Office for Climate Change is the technical unit of the Government of Catalonia, ascribed to the General Directorate for Environmental Quality and Climate

Change of the Secretary's Office of Environment, been in charge to promote the establishment of climate change strategies, plans and projects in Catalonia.

On the basis of the commitments adopted in the European Union, the Office promote the integration of mitigation and adaptation to climate change into the sectorial policies, and impulse projects and concerted performances with other governments on climate policies.

The Office is the organ of technical and administrative support Interdepartmental Commission on Climate Change in the exercise of their functions.

Tasks:
a) Promote and coordinate in Catalonia the normative development, the strategies, the plans, and the objectives about climate change, on the basis of the commitments adopted within the European Union.

b) Act as technical and administrative secretary of the Interdepartmental Commission on Climate Change.

c) Analyze the evolution of GHG emissions and carbon markets; the vulnerability of natural resources and systems, the economic sectors and the territories to the impacts of climate change and evaluate the degree of implementation of climate change policies in Catalonia.

d) Issue reports in the framework of the environmental evaluation process of plans, programs and projects.

e) To promote and carry out activities of awareness, information and dissemination to the society of all aspects related to climate change.

f) Promote the research activities of the Catalan scientific community on climate change, observation of the climate system and the generation of regional models.

g) Promote actions and projects to improve adaptive capacity against the impacts of climate change in Catalonia and the integration of adaptation to sectoral policies.

h) Coordinate the development of the Catalan inventory of greenhouse gas emissions (GEH) , including environmental sinks, and emissions projection systems, based on internationally approved methodologies.

i) Develop methodologies for calculating greenhouse gas emissions for organizations, their products and services.

j) Support the participation of companies, administrations and other institutions and organizations in projects and voluntary programs for mitigation and adaptation, and the use, where appropriate, of the mechanisms of flexibility of the Kyoto Protocol.

k) Exercise the powers that the legislation attributes to the General Directorate in about the emission rights commerce.

l) Support participation in the committees, networks and other bodies of representation, cooperation and decision-making in Spain, the European Union and international climate issues.

m) Any other similar function.

http://canviclimatic.gencat.cat/ca/oficina/

Interdepartmental Climate Change Commission:
The Interdepartmental Climate Change Commission, attached to the Department of Territory and Sustainability, meets at least once a year and performs indefinitely.

The main tasks are:
• Coordinate the actions of the Government of the Generalitat in the field of the fight against climate change.
• Promote actions between the different departments, about adaptation to climate change, in order to reduce its effects in Catalonia.
• Promote actions between the different departments to reduce the emissions of greenhouse gases, responsible for climate change.
• Track and evaluate previous actions.

Advisory Council for Sustainable Development of Catalonia:
The Advisory Council for the Sustainable Development of Catalonia (CADS) is the strategic advisory body of the Government of the Generalitat de Catalunya in the field of sustainability, and it develops this task through the consultation and participation of experts and the civil society.

CADS tasks have a particular emphasis on disseminating environment values and promoting the culture of sustainability in the Catalan society. CADS wants to aid reflection on the conditions that enable the sustainability culture to impregnate Catalan society and the decision-making processes, so that sustainability becomes a basic element in our country's social capital.

Climate change is a key area of work for sustainable development, in which CADS provides a global vision that addresses the scientific component, the environmental and social impacts, and the political and economic actions that relate to it.

CADS is one of the driving forces behind the Climate Change Report in Catalonia, the third edition of which is being prepared. Catalonia, with this Report, pioneered the attempt to regionalise the analyzes and projections carried out on a global and European scale by institutions such as the Intergovernmental Group of Experts on Climate Change (IPCC) or the European Agency of the Natural environment.

The third edition shows the consolidation of this periodic report.

http://cads.gencat.cat/ca/inici

2. Diputació de Barcelona: The Diputació de Barcelona is a local government institution that promotes the progress and well-being of citizens in its territorial area: the province of Barcelona -311 municipalities in the network-, which represents 24% of the total area of Catalonia and 74.4% of the total Catalan population (more than five and a half million people). Acts directly providing services and, above all, in cooperation with the municipalities.

Office of Climate Change and Sustainability:
The Office of Climate Change and Sustainability offers technical support and financial support to the city councils of the province of Barcelona when it comes to applying sustainability policies and at the time of assuming the actions of mitigation and adaptation to the Climate change driven from global forums.

https://www.diba.cat/en/web/directori/oficina-tecnica-de-canvi-climatic-i-sostenibilitat

3. Metropolitan Area of Barcelona:
The AMB is the public administration of the metropolitan area of Barcelona, a large urban conurbation formed by a total of 36 municipalities.
The constitution as a public administration was carried out on July 21, 2011, in accordance with Law 31/2010 approved by the Parliament of Catalonia. Since then, the AMB has replaced the three existing metropolitan entities up to that date: the Commonwealth of Municipalities of the Metropolitan Area of Barcelona, the Entity of the Environment and the Metropolitan Transport Entity.

The environment area addresses the main environmental challenges that arise in the metropolitan area of Barcelona, such as climate change, depletion of fossil fuels, energy sovereignty, air quality, biodiversity or environmental education.

In the fight against climate change and carbon emissions, the AMB has promoted a common strategy designed with the metropolitan municipalities, whose main objective is to reduce the carbon footprint (emissions of greenhouse gases) to the metropolitan facilities and those of the organisms that are part of it, and contribute, in this way, to mitigate climate change.

AMB also use tools such as sensitization actions to promote the application of sustainability criteria in the day to day, or participation in different European climate change projects.

The energy transition is a process of progressive change to replace fossil energy for renewable and local energy, but also a change in the ways of producing, distributing,

managing and consuming energy. In this regard, the AMB has launched a strategy to promote this new model and to move towards a new energy culture.

http://www.amb.cat/en/web/medi-ambient/sostenibilitat/canvi-climatic

4.City Council of Barcelona:
Barcelona is the largest city in the metropolitan region, assuming almost 50% of the metropolitan census.

For many years Barcelona has worked to combat and respond to the effects of climate change. Many projects, policies and plans have been set up in the city for this purpose, both with regard to the reduction of CO2 emissions by promoting, for example, the energy transition towards a 100% renewable city, and with regard to promoting adaptation and resilience measures, for example, by increasing and improving the urban green infrastructure.

The 2012-2022 Citizen Commitment to Sustainability (which grew out of the global Agenda 21 movement), is a benchmark framework with strategic values and inspiring goals that highlight the firm interest of Barcelona's citizen organisations in taking responsibility and contributing their criterion, creativity and strength, through participatory processes, towards joint progress in tackling climate change.

This Commitment is not merely a framework, it is also a space for reflection and debate on the city's challenges, which strengthens democracy and co-responsibility. With over 800 signatory organisations, including businesses, associations, schools and the Barcelona City Council itself, it demonstrates a determination to ensure ongoing networking to transform and build a shared vision of the future. The signatories accept the Commitment's goals and principles, and pledge to undertake specific initiatives in their fields of action.

The network of Commitment signatories resolved to take a step further at the COP21, held in Paris, by setting themselves ambitious alleviation and adaptation goals and specifying short- and long-term actions to achieve them. These goals and projects are brought together in the Barcelona Climate Commitment and in a whole series of specific initiatives and projects.

The Climate Plan gives an integrated overview of the measures to tackle climate change, allowing the objectives of the new Covenant of Majors for Climate & Energy, which Barcelona City Council has signed, to be achieved.

The Climate Plan's time-frame runs to 2030, and it includes both short term (2018-2020) and medium-long term (2021-2030) objectives and strategic measures. It has 4 strategic axes: mitigation, adaptation/resilience, climate justice and the promotion of citizen action.

http://lameva.barcelona.cat/barcelona-pel-clima/en/what-city-currently-doing/we-are-not-starting-scratch

http://lameva.barcelona.cat/barcelona-pel-clima/sites/default/files/documents/eng_climate_plan_def.pdf

5.Others Metropolitan Councils:
In addition to Barcelona, the metropolitan area is made up of 35 other municipalities, with its own entity, which are also implicated in the fight against climate change.

http://www.amb.cat/en/web/area-metropolitana/municipis-metropolitans

b) Civil society (population; voter turnout in the last elections related to the pilot region; number of NGOs and CSOs; indicate NGOs/CSOs acting for the environment and/or climate change adaptation and mitigation)

Population: 3,239,337 (source: Idescat 2012)

Non-governmental organizations (NGOs) and Civil Society Organizations (CSOs) play an important role in helping to tackle environmental issues and foster climate action for climate change adaptation and mitigation.

Having a strong NGO/CSOs community help regions, such as the Metropolitan Area of Barcelona, to tackle these issues more successfully. However, NGOs/CSOs face some constraints in pursuing their missions, such as a lack of understanding about their role in civil society, the lack of funding and general perception that the government alone is responsible for the implementation of the climate change adaptation and mitigation strategies.

Most important NGOs and CSOs dealing with environmental issues and climate change action (adaptation and mitigation) in the Metropolitan Area of Barcelona:

- Paisatges Vius
- IPCENA – Institució de Ponent per la Conservació i l'Estudi de l'Entorn Natural
- WWF Espanya
- Ara o mai
- Eco-Union
- Associació per la Defensa i l'Estudi de la Natura (ADENC)
- DEPANA - Lliga per la Defensa del Patrimoni Natural
- Ecologistes en Acció
- Ecoserveis
- Acciónatura
- GEPEC-EdC - Grup d'Estudi i Protecció dels Ecosistemes Catalans-Ecologistes de Catalunya
- Associació per a la Conservació dels Ecosistemes Naturals (CEN)
- Associació Hàbitats
- SUBMON

- Fundació Terra
- Fundació Fòrum Ambiental
- Centre per a la Sostenibilitat Territorial (CST)
- ACECMA - Associació Catalana d'Enginyeries i Consultories Mediambientals
- Associació Catalana d'Amics de l'Aigua

We have noted that most of these organizations are focused on environmental issues, such as the preservation of the ecosystems and biodiversity. Only a few are specialized in climate change adaptation and mitigation.

c) Academia & Education (number of students; indicate the most important research institutions/universities & basic directions of their research referring to climate change adaptation and mitigation; number of pupils from primary and secondary schools; indicate institutions promoting science or being involved in science communication)

Number of students in primary school (year 2014/2015): 789.960 (source: ideascat)
Number of students in secondary school (year 2014/2015): 501.033 (source idescat)
Number of students in higher education (year 2017/2018): 115.646 (source: idescat)

Most important higher education institutions

PUBLIC UNIVERSITIES
… and (some of) their activities related to climate change adaptation and mitigation.
Note: this is not an exhaustive list of all the activities done by these institutions related to climate change.

UNIVERSITAT DE BARCELONA

Institut de Recerca de la Biodiversitat (IRBio)
The overall objectives of the IRBio are enhancing the quality research in the field of knowledge and evaluation of biodiversity, understanding its genesis, maintenance, evolution and extinction, provide the technical information necessary to diagnose your condition, and propose and implement corrective actions, or at least soothing.

Scientific advice to public and private institutions:
Provide technical assistance to public authorities and institutions or private companies in the field of management and conservation of biodiversity and the natural environment. From the realization of strategic plans for conservation, environmental, technical studies, diagnosis etc.
Special focus on climate change and its effect on biodiversity with studies on marine life, running water ecosystems, forests, among others.

Dissemination of biodiversity
Increasing commitment of Biodiversity issues at different levels of society. Dissemination of research social and environmental issues.

Institut de Recerca de l'Aigua (IdRA)

The Institute is conceived as an agent that maximizes the University of Barcelona's research potential through research groups that study the field of water. The work is interdisciplinary and involves various faculties and courses.

Objectives

The institute's main objectives are:

- to foster the consolidation of multidisciplinary teams within the Institute that can provide rapid technological solutions for specific environmental issues, particularly those related to water;

- to collaborate actively in the technology transfer of knowledge attained through research, development and innovation undertaken with companies in the water sector;

- to support the development of the European Research Area through participation in European research projects, in recognized research centres that can link the planned European networks, and in assessment and other processes promoted by the European Union and other administrations;

- to increase and facilitate the mobility of Institute researchers and technicians and to consolidate staffing and maintenance of the existing research infrastructure.

The Institute's lines of research are always directly related to water. Some of them are listed below:

- Water quality (physics, chemistry, microbiology, parasitology, biology, etc.)
- Health issues related to water resources
- Unconventional water resources Natural mineral water
- Advanced wastewater treatment
- River and reservoir ecology
- Agronomy and improving crop yields for increased efficiency in water use
- Oceanography
- Modelling contaminated aquifers: salt intrusion and industrial or agricultural pollution
- Legislation affecting water: legal regime pertaining to water quality and dumping
- Economic instruments of environmental policy and water demand management
- **Climate change: variability and associated risk**
- **Climatology: urban, synoptic, historic and agricultural**
- Climatic atlas and precipitation analysis
- Analysis of hydrometeorological risks and of the related communication and social aspects

- History of the use and management of water resources
- **Socioeconomic and political repercussions of variations in the availability of water**
- Waterscapes: archaeological, cultural and scenic heritage
- Water Archaeology, past human-water relationships
- Landscape, visual poetics and water aesthetics

Among other projects, now working on the Project "HOlistic analysis of the impact of heavy PrEcipitations and floods and their introduction in future scenarios. Application to adaptation and resilience strategies (HOPE)".
More information on this project: https://hopeprojectweb.wordpress.com/

Catalan Institute for Climate Sciences (IC3)
Catalan Institute for Climate Sciences (IC3) responds to the need for more information about our climate, its history and its functioning, and the need to improve out capacity to predict climate changes in the short term (seasonal and inter-annual), and to learn to use such predictions for the benefit of society.
The ideas underlying climate predictions are no different from those of meteorological predictions: appropriate data, models and initialisation methods are needed, as well as continuous research to improve all parts of the process. One of the main differences between climate and meteorological predictions is the time scale involved. In addition, climate predictions use mainly oceanic initialisation data and the prediction models basically couple the atmosphere and the oceans (coupled GCM).
To improve our knowledge of climate and to be able to anticipate changes, it is essential to understand both its present and past behaviour, and to identify perturbations that are attributable to human action. This is the main objective of IC3: to contribute to our knowledge of global climate from the perspective of, and in relation to, our geographic area. The group aims to understand and characterise climatic variability on the regional scale (within the Mediterranean basin) and to identify the patterns of connections between the various components of climatic systems on a global scale.

UNIVERSITAT AUTÒNOMA DE BARCELONA

Centre de Recerca d'Ecologia i Aplicacions Forestals (CREAF)
CREAF is a public research center dedicated to terrestrial ecology, territorial analysis and global change, pursuing excellence in the production and dissemination of knowledge, in addition to the innovation, development, and transfer of methodologies.

The center strives to contribute to knowledge on conservation and management of the environment and the territory, in addition to adaptation to environmental change at local, regional, and global scales, functioning as a bridge between academia, administrations, and society, and promoting awareness within its scope of activities

Research areas:

- Chemical ecology, ecotoxicology, metabolomics
- Carbon and nutrient stocks and fluxes
- Water resources
- Interactions between atmosphere and ecosystems
- Conservation of soil functions
- Population dynamics and genetics
- Phenology and species distribution
- Ecological interactions
- Biological invasions
- Structure and dynamics of forest communities
- Forest management and conservation
- Forest decline and regeneration
- Forest wildfires
- Forest databases

Special focus on climate change (they use the term global change) adaptation and mitigation of forests, effects of climate change in water ecosystems and river basins, effects of climate change on biodiversity and citizen science for climate change adaptation strategies.

Despite the youth of the citizen science programs at CREAF, we have already shown that citizen science can be used to set up early warning systems, environmental management systems, or even the collaborative drafting of climate change adaptation strategies.

Institut de Ciència i Tecnologia Ambientals (ICTA)

The Institute of Environmental Science and Technology (ICTA-UAB) is a multidisciplinary centre that promotes academic research and postgraduate education in the environmental sciences. It aims to improve our understanding of global environmental change, and the nature and causes of environmental problems. In addition, it studies policies, strategies and technologies to foster a transition to a sustainable economy.

ICTA-UAB undertakes advanced research in 21 specific lines of environmental sciences, covering natural, social and engineering aspects. Our aim is to promote a better understanding of environmental dynamics, problems and their causes, as well as of policies and strategies to stimulate a socio-technical transition to a sustainable economy.

In addition to research and teaching, ICTA-UAB continuously develops and maintains partnerships with civil society, including NGOs, public authorities and private bussiness.

Research areas:
Earth & life sciences

- Aerobiology, entomology, atmospheric transport and health

- Climate and environmental biogeochemistry
- Conservation, Biodiversity and Global Change
- Earth System Modeling
- Environmental radioactivity
- Marine ecology and management
- Ocean acidification
- Palaeoclimate and ocean dynamics

Social environmental sciences

- Business environmental management & CSR
- Cities and environmental justice
- Ecological economics and political ecology
- Environmental and climate economics
- Environmental geography and water governance
- Laboratory for the Analysis of Socio-Ecological Systems in a Global World
- Science communication and environmental education
- Transport, mobility and the environment

Technology, environment & society

- Agricultural sustainability and waste management
- Energy and integrated environmental assessment
- Industrial ecology
- Life-cycle analysis and eco-innovation
- Science and technology studies

Universitat Politècnica de Catalunya

This institution has several research groups that focus part of their research on climate change:

- Research group on Nonlinear Dynamics, Nonlinear Optics and Lasers (DONLL). - research on climate change regarding temperatures in specific regions (i.e. Climate Advanced Forecasting of sub-seasonal Extremes - CAFE project)
- Research group on Environment (GIR Ambiental) - research on materials (reuse, optimal use, footprint of materials…)
- Research group on Nonlinear Fluid Dynamics - research on coastal morfodynamics and turbulence.
- Research Group on Sustainability, Technology and Humanism (STH) linked to the UNESCO Sustainability Chair - interdisciplinary research group, participates actively in the COP. Special focus on climate justice, equity and climate mitigation.
- University Research Institute for Sustainability Science And Technology (IS.UPC) - Its mission is to generate technical and conceptual tools to create a more sustainable production model, and to collaborate in the UPC's endeavour to provide scientific and technical support for social, cultural and economic progress. Water, energy, building and waste are among their

research priorities and often linked to climate change and adaptation to climate change (from an international perspective).
- Maritime Engineering Laboratory (LIM) - conducts research on climate change and vulnerable coastal zones such as the coasts of Catalonia (they consider the Mediterranean as a climate change hotspot). One of its current projects is studying the adaptation routes for climate change in the Mediterranean coasts (M-CostAdapt and PaiRisClima)
- Research and training on renewable energies, zero waste and zero emissions from different departments at the university.

UPC is a partner of the InnoEnergy Knowledge Innovation Community focused on pioneering change in sustainable energy.

UPC is the academic partner of the Barcelona Supercomputing Center
Barcelona Supercomputing Center-Centro Nacional de Supercomputación (BSC-CNS) is the national supercomputing centre in Spain. We specialise in high performance computing (HPC) and manage MareNostrum, one of the most powerful supercomputers in Europe. Among their research priorities **they have several areas that touch upon climate change such as** climate science, computational earth science, agriculture and water management, ocean forecasting, ice variability, etc.

UNIVERSIAT POMPEU FABRA

UNESCO Chair in Life Cycle and Climate Change
The UNESCO Chair aims to promote research and education, set up collaborative networks and create documents to encourage the sustainable development of products and processes at an international level. This makes it possible to bring about substantial improvements in all life-cycle methodologies applied to climate change, as well as taking action and adding value to the present state of the art. The Chair has a clear international vocation.

The Chair has taken part in and/or coordinated a number of Spanish and international projects that analyse life cycles, ecodesign (in markets such as recycling, electronic toys, packaging and construction products), green purchasing and environmental product communication (ecolabelling), carbon and water footprints and environmental management governance, and that explore how to integrate social and economic aspects into environmental assessments. Funded by public and private organisations, these projects provide solutions to match market demands, social expectations and respect for the environment.

The Chair is a member of the UNEP–SETAC Life Cycle Initiative and leads the Green Dot Observatory on Packaging Life Cycle. It places great emphasis on communicating the findings of research to both the scientific community and the media and the general public.

The **Complex Systems Laboratory** of the Institute of Evolutionary Biology (IBE, CSIC-UPF) and the **Centre for Mathematical Research** (CRM) conduct research on strategies to modify organisms that would help to offset the impact of humans on the Earth.

Planetary wellbeing

A new multi-, inter- and transdisciplinary initiative in the field of Planetary Wellbeing. The aim is to equip UPF with a vision committed to tackling the major challenges facing global society in the 21st century and to generate transformative energies to reshape both the university and its urban environment, i.e. the city of Barcelona.

The primary goal is to increase knowledge and understanding of the set of complex, interrelated and systemic issues affecting the wellbeing of humans, animals and the planet itself, including climate change.

Universitat Oberta de Catalunya (online institution)

MPhil in Contemporary Challenges (1 year programme - 60 ECTS)

This Master's degree in Philosophy forms professionals capable of exploring and coping with the great challenges of the contemporary world: techno-scientific developments (robotics, digitalization, artificial intelligence ...), environmental and ecological challenges (climate change, resource shortages. ...) or sociopolitical (the legitimacy of political systems and institutions, feminisms, migrations ...) from a reflexive approach. The study of philosophy has become an enriching element in the political, social, legal and techno-scientific areas, which favors a transdisciplinary and, at the same time, more holistic view of the problems of our world.

Urban Transformation and Global Change Laboratory (TURBA Lab)

TURBA aims to explore the complex and multi-scalar geographies of socio-environmental and technological urban transformations from a critical and interdisciplinary perspective, incorporating approaches from the fields of geography, urban studies, environmental studies/sciences, political science and science and technology studies (STS).

The group is organized into three research lines:

1. Political Ecology of Socio-environmental Change explores processes of reconfiguration of environmental governance and social-ecological resilience against the backdrop of economic, technological and social change;
2. The Geographies of Urbanization contributes to the understanding of the political, economic, cultural and socio-environmental implications of contemporary processes of urban restructuring from a multi-scalar perspective;
3. Digital Co-creation and Citizen Science examines processes of collaborative creation of knowledge in digital and non-digital environments.

TURBA Lab participated in the Climate Plan of the City of Barcelona (research on the co-creation processes of the Climate Plan): https://www.uoc.edu/portal/en/agenda/2018/agenda_211.html

PRIVATE UNIVERSITIES

… and (some of) their activities related to climate change adaptation and mitigation. Note: this is not an exhaustive list of all the activities done by these institutions related to climate change.

UNIVERSITAT RAMON LLULL

ESADE is a partner of the InnoEnergy Knowledge Innovation Community focused on pioneering change in sustainable energy.

UNIVERSITAT INTERNACIONAL DE CATALUNYA

School of Architecture - research on the level of integration of climate adaptation and mitigation in cities" (Dr. Lorenzo Chelleri)

OTHER RESEARCH INSTITUTIONS

… and (some of) their activities related to climate change adaptation and mitigation. Note: this is not an exhaustive list of all the activities done by these institutions related to climate change.

Barcelona Institute for Global Health - ISGLOBAL

The Barcelona Institute for Global Health (ISGlobal) was set up in 2010 as a result of an initiative of the "la Caixa" Foundation working with academic and government institutions interested in creating a centre of excellence in research and knowledge translation in Barcelona equipped to meet the new challenges facing global health in the 21st century. ISGlobal's Board of Trustees included the "la Caixa" Banking Foundation, Hospital Clínic, Mar Health Park, University of Barcelona, Pompeu Fabra University, the Government of Catalonia (Generalitat), the Government of Spain, Barcelona City Council, and the Ramón Areces Foundation.

ISGlobal belongs to the CERCA network of research centres, has become a pioneer in its field, combining research on communicable diseases with research on chronic diseases and their environmental and climatic causes. It is now ranked internationally as one of the world's leading research and policy centres in the field of global health.

ISGlobal has a specific research program on Climate and Health, led by iCREA researcher Xavier Rodó, aims to address **the effects that environmental changes**

associated to climate change may have on human health, and develop predictive computational models.

Its research lines include extreme temperatures and precipitations, heat waves, the impact of climate change on the spread of infectious diseases like malaria, dengue, leishmaniosis, chikungunya, or Zika, the El Niño phenomenon and other climate and environment factors, and their relationship with Kawasaki disease and other inflammatory diseases.

Institut d'Investigació y Tecnologia Agroalimentàries (IRTA)

IRTA is a research institute owned by the Government of Catalonia ascribed to the Department of Agriculture.

IRTA's mission is to contribute to modernising, improving, boosting competitiveness, and fostering sustainable development in the sectors of agriculture, food, agroforestry, aquaculture, and fishing, as well as in all areas of activity directly or indirectly related to the supply of healthy, high-quality foodstuffs to end consumers, while also contributing to food safety and safe processing of foodstuffs and in general enhancing the health and well-being of the population.

Its general objectives are to promote research and technological development in the area of agri-food, to facilitate the transfer of scientific advances and to evaluate its own technological advances whilst seeking the utmost coordination and collaboration between the public and private sectors.
Since it was founded, IRTA has sought to establish long-lasting collaboration agreements with other public bodies that operate in Catalonia in the areas of technological research and development. This approach has led to the creation of a consortium network of centres (involving IRTA, universities, CSIC, public-sector bodies, etc.), which is, in effect, an R&D cooperative system.

Research contributions on sustainable development and climate change from the agriculture and food technologies.

SCIENCE COMMUNICATION INSTITUTIONS AND/OR INSTITUTIONS PROMOTING SCIENCE:

- All higher education institutions (mentioned above)
- Hospitals in the Barcelona metropolitan area
- Science Museums (mentioned below)
- Associació Catalana de Comunicació Científica (ACCC)
- Fundació Catalana per la Recerca i la Innovació (FRCi)
- Institut Botànic de Barcelona
- Ciencia Divertida
- Institut de Cultural de Barcelona

- Institut municipal d'educació de Barcelona
- Centro de Estudios de Ciencia y Comunicación y Sociedad (belongs to the Universitat Pompeu Fabra)

SCIENCE MUSEUMS IN THE METROPOLITAN AREA OF BARCELONA:

- Museu de Ciències Natural de Barcelona (Barcelona) - https://museuciencies.cat/
- CosmoCaixa (Barcelona) - https://cosmocaixa.es/es/
- Museu de la Ciència i la Tècnica de Catalunya (Terrassa): https://mnactec.cat/es/
- Fundació AGBAR, Museu de les Aigües (Cornellà de Llobregat): https://www.fundacioagbar.org/ca/museu
- Museu de Ciències Naturals de Granollers (Granollers): http://www.museugranollersciencies.org

d) Business (SMEs and large enterprises (number, employment in SMEs and large enterprises, (%) of total employment in a given region); Regional Smart Specializations (RIS3); general overview of the different industrial sectors which can be found in the region; indicate enterprises actively involved in climate change adaptation and mitigation actions and define the field of their activity)

The number of enterprises in the territory of the AMB on the 4th quarter 2018 was 118,342, representing the 45.9% of the total number of enterprises in Catalonia. 76,018 of these entreprises, which is equivalent to the 29,5%, are located in Barcelona.

Most of the AMB's enterprises are part of the services sector, being production services (35.4%) and commerce, restaurants and hotels services (34.8%), the main activities.

In the case of Barcelona, the weight of enterprises dealing with production services (41%) is higher than that of enterprises working in the field of commerce, restaurants and hotels services (33%). However, in Catalonia, the situation is the opposite: commerce, restaurants and hotels services (36%) exceeds production services (29%).

Number and percentage of enterprises in the AMB by group of activity
Agriculture: 92 (0.1%)
Industry: 7,722 (6.5%)
Construction: 9,119 (7.7%)
Production services: 41,882 (35.4%)
Transport and Communications: 5,375 (4.5%)
Commercial, restaurants and hotels services: 41,168 (34.8%)
Public administration and education: 4,514 (3.8%)
Healthcare and social services: 8,354 (7.1%)

The number of SMEs (entreprises with up to 250 employees) in the AMB is 117,611 (99.3%). Among them, the enterprises with up to 10 employees, are the most numerous amounting 100,398 (84.8%). The average size of enterprises in the AMB (12.5 employees) is similar to that o Barcelona (12.7) and higher than in Catalonia (10.6).

On the contrary, large enterprises with more than 250 employees, estimated at 731, are the less common constituting the 0.6% of the total number of enterprises in the AMB.

The number of people employed in the territory of the AMB on the 4th quarter of 2018 was 1,701,184, representing the 51.9% of the total number of employees in Catalonia. Regarding the previous year, the occupation in the AMB grew 3%, the same rate experienced in Catalonia and in Barcelona. The majority of the employees of the AMB belong to the services sector, being production services (34%) and commerce, restaurants and hotels services (25%) the main activities. Transport and communications (6%) and construction (5%) sectors showed the most market increases.

Number and percentage of employees in the AMB by group of activity
Agriculture: 998 (0.1%)
Industry: 162,932 (9.6%)
Construction: 77,757 (4.6%)
Production services: 571,133 (33.6%)
Transport and Communications: 98,238 (5.8%)
Commercial, restaurants and hotels services: 422,813 (24.9%)
Public administration and education: 204,162 (12%)
Healthcare and social services: 162,23 (9.5%)

Most of the 390,094 contracts registered in the AMB were temporary (85%). Among these contracts, 190,188 (41.6%) lasted for a maximum of one month.

The number of unemployed registered people in the AMB was 154,452 which represents the 39.3% of the total number of unemployed registered people in Catalonia. The unemployment rate in the AMB decreased progressively until reaching 10%, below the rate of Catalonia (11%) but above the rate of Barcelona (9%). **In comparison to the previous year, the unemployment in the AMB decreased by 6%.** The number of unemployment people benefiting from a subsidy in the AMB decreased by 3% year-on-year and the **coverage rate stood at 58%.** This means that the 42% of the registered unemployed people did not receive any benefit.

https://docs.amb.cat/alfresco/api/-default-/public/alfresco/versions/1/nodes/7cf48f2c-f5ee-4702-a36e-668a3b83a4af/content/20190225_flaix_4t_trimestre%202018.pdf?attachment=false&mimeType=application/pdf&sizeInBytes=2132849

Regional Smart Specializations (RIS3)

The Strategy for the Smart Specialisation of Catalonia (RIS3CAT) defines the framework within which the Catalan Government establishes research and innovation (R&I) priority actions and programmes over the 2014-2020 period and provides support for the generation and development of innovative projects. The RIS3CAT Action Plan has a budget of more than 400 million euros from the European Regional Development Fund (ERDF).

RIS3CAT establishes four strategic objectives:

1. To modernise the business fabric by improving the efficiency of production processes, internationalisation and the reorientation of consolidated sectors towards activities with greater added value;
2. To promote new emerging economic activities through research and innovation to create and develop new market niches;
3. To consolidate Catalonia as a European knowledge hub and link technological and creative capacities to existing and emerging sectors in the territory;
4. To improve the overall Catalan innovation system, increasing the competitiveness of companies and steering public policies towards promotion of innovation, internationalisation and entrepreneurship.

The four pillars of action are:

- Leading sectors (food, energy and resources, industrial systems, industries based on design, industries linked to sustainable mobility, health industries, cultural industries based on the experience)
- Emerging activities
- Cross-cutting enabling technologies (ICT, nanotechnology, advanced materials, fotonics, biotechnology, advanced manufacturing)
- Innovation environment

The main instruments and tools are:

- **RIS3CAT Communities** (Voluntary groups of companies and scientific and technological agents that promote R & D & I plans in Catalonia, which will create new products and services in accordance with the RIS3CAT strategy)
- Specialization and territorial competitiveness projects (PECT)
- Emerging technologies
- Technological centers
- Knowledge transfer
- Knowledge industry
- Public procurement of innovation

- Reinforcement of the technological capabilities of research and innovation infrastructures
- Digital Innovation Hub of Catalonia
- Catlabs
- Advanced digital technologies
- Innovation projects of public administration framed within the open innovation and science paradigm

The main public policies are: digital agenda, entrepreneurship, ecoinnovation (green economy), non-technological innovation, training and talent.
http://catalunya2020.gencat.cat/web/.content/00_catalunya2020/Documents/estrategies/fitxers/pla-accio-ris3cat-2018.pdf

The AMB participates in RIS3CAT through the project REFER (Energy Reduction and Flexibility in Buildings in Rehabilitation).
http://www.amb.cat/es/web/medi-ambient/sostenibilitat/transicio-energetica/projectes/detall/-/projecteobert/projecte-refer/6171279/11818?_ProjecteObertSearchListPortlet_WAR_AMBSearchPortletportlet_pageNum=1&_ProjecteObertSearchListPortlet_WAR_AMBSearchPortletportlet_detailBackURL=%2Fes%2Fweb%2Fmedi-ambient%2Fsostenibilitat%2Ftransicio-energetica%2Fprojectes

REFER:
The AMB has obtained about € 43,000 for the flexible energy management project REFER (Energy Reduction and Flexibility in Buildings in Rehabilitation) that is carried out in coordination with the RIS3CAT energy community.

This project aims to study and test real buildings new alternatives to this model of energy management, which focuses on the renewable generation distributed in the mode of self-consumption and the energy efficiency of the buildings themselves. The total budget of the project for the AMB is more than € 171,959.50.

The funding comes from the RIS3CAT grants from the ERDF program managed in Catalonia by ACTION and the project is included in the energy transition strategy developed by the AMB through its Environmental Services Directorate.

http://www.amb.cat/en/web/medi-ambient/actualitat/noticies/detall/-/noticia/projecte-refer/6170168/11818

Enterprises actively involved in climate change adaptation and mitigation actions

By way of illustration, the companies listed below are actively involved in climate change adaptation and mitigation actions:

- **Ferrer:** In the framework of Ferrer' Sustainable Strategy "Our Planet, Our Life", one strategic line of action is devoted to mitigating and adapting to climate change (minimising greenhouse emissions, making energy and fuel savings, energy efficiency, use of renewable energies and compensating emissions) https://www.ferrer.com/social-commitment/social-responsability

- **CaixaBank:** CaixaBank launched its first credit line of up to EUR 30m to promote projects helping to combat climate change via the European Investment Bank's dedicated climate action financing programme. For the first time, CaixaBank is allocating some of these EIB funds to financing the projects of individuals. The agreement signed by the two institutions aims to facilitate the financing of investments in climate change mitigation. This line of EIB-CaixaBank eco loans targets individuals, the self-employed, SMEs, mid-caps and public sector bodies. The credit limit has been set at EUR 12.5m for SMEs and individuals, and a maximum of EUR 25m for mid-caps. The maturity period is between two and eight years, with the option to activate a 12-month grace period.

  CaixaBank is a leader among financial institutions in the fight against global climate change. Environmental organisation CDP recently included the bank on its Climate List index of global leaders (a selection of the companies most committed to climate action in the world) for the fifth consecutive year. CaixaBank also recently featured – for the seventh consecutive year – on the Dow Jones Sustainability Index (DJSI), the main global index assessing company actions using social, environmental and corporate governance criteria. Since 2016, the institution has been on the board of directors of the Spanish Green Growth Group, which fosters economic growth linked to a low-carbon economy. In addition, last May it joined the United Nations Environment Programme – Finance Initiative (UNEP FI), which has three main goals: commitment to sustainable development, sustainability management and public awareness. CaixaBank is also part of the Forética Climate Change Cluster and is committed to the Equator Principles, guaranteeing that the projects it funds are carried out in a socially responsible way.
  https://www.caixabank.com/comunicacion/noticia/accion-contra-el-cambio-climatico-el-bei-y-caixabank-unen-fuerzas-para-financiar-proyectos-que-promuevan-la-accion-por-el-clima_es.html?id=41465

- **Aigües de Barcelona:** Aigües de Barcelona promoted the exhibition the Zone of Hope (TZOH) which enables visitors to experience the effects of climate change first-hand. The exhibition uses Immersive Extreme technologies to ensure a truly captivating immersion by pairing the real space with the virtual space. The Zone of Hope is an interactive and multi-sensory experience combining 360º composite images and visual effects at 90 frames a second, 3D geotagged sound effects, special effects using mechanical, climate, and tactile actuators, which allow visitors to appreciate the textures of the virtual world, to feel cold, heat, wind, humidity, etc. The experience is grounded in

the idea that "*there's only one way to halt climate change, and that's by experiencing it*". The exhibition underlines Aigües de Barcelona's commitment to innovation and its firm undertaking in the fight to halt climate change and demonstrates an understanding of the need for urgent action, mobilising society to effect positive change over time. https://www.aiguesdebarcelona.cat/explora-educa-y-participa/zone-of-hope

- **Matholding:** The Vicente Ferrer Foundation and the MAT Holding group signed a collaboration agreement to help combat climate change and promote environmental awareness among high school students in India, specifically the states of Andhra Pradesh and Telangana. The project includes the participation of 750 students from 100 schools distributed in eight regions. This initiative includes the planting of trees to help recover particularly arid areas due to drought and training through academies to train 750 high school students, aged 12 to 16, on issues related to climate change and global justice. The project, promoted by the Vicente Ferrer Foundation and the organization Plant for the Planet, aims to promote the leadership and active participation of young people as 'Ambassadors for Climate Justice', fostering and supporting their involvement as actors of real changes in actions that contribute to the sustainability of the planet. https://www.europapress.es/epsocial/responsables/noticia-fundacion-vicente-ferrer-mat-holding-promueven-concienciacion-ambiental-estudiantes-100-escuelas-india-20190425183210.html

- **Lavola:** Lavola offers design of strategies and actions to mitigate climate change and to adapt society to its effects.
  Regarding adaptation, Lavola defines tools and strategies to foresee risks involved in climate change and to detect opportunities that may derive from it: studies on climate vulnerability (analysis of climate risks, development of climate vulnerability mapping and studies of climate projections based on downscaling methods), local plans on adaptation to climate change (development of municipal road maps to increase resilience and integration of them into existing planning and management tools), national adaptation strategies (production of impact and climate vulnerability assessments with the participation of all key stakeholders).
  Concerning mitigation, Lavola contributes to achieve emission reduction objectives set out in national and international agreements with specific proposals for each sector: Emission inventories (quantification of the impact, establishment of the baseline and definition of future projections on a national, regional and local level), local mitigation and renewable energy plans (design of municipal road maps to reduce greenhouse gas emissions) and national mitigation strategies (support to the implementation of different mitigation tools: Nationally Appropriate Mitigation Actions (NAMA), contributions foreseen on a national level (Indcar) or Low Emission

Development Strategies (LEDS)).
https://www.lavola.com/en/solutions/climate-change/
Companies such as CaixaBank, Cellnex Telecom and Abertis, supported by Lavola, keep high scores on CDP Climate Change.

Examples of projects developed by Lavola are the following:

• CO2 management plans for organizations (Cellnex Telecom, Desigual, Sacyr, Promigas)
• Analysis of risks and opportunities (CaixaBank and Noel)
• Action plans linked to the logistic vector in the framework of the Lean & Green initiative (Lidl, GBfoods, Agora Group, Eroski, Campofrio, Capsa Foods)

In all footprints Lavola prepares proposals for organizations to reduce their greenhouse gas emissions.

4. Short summary of a pilot region (most important climate challenges indicated by the local/regional strategy or scientific regional agendas, culture of innovation, institutional framework of the regional innovation system; existing exchange structures between stakeholders; any other relevant information and additional comments)

Note: Although the "region" we have chosen for this pilot is the Metropolitan Area of Barcelona, it cannot be fully understood without taking into account the policies and strategies existing at the regional level, i.e. the Autonomous Community of Catalonia. We have therefore opted to include in this state of the art document several initiatives and policies that go beyond the metropolitan area of Barcelona.

Most important climate challenges indicated by local/regional strategy or scientific regional agendas:

The **Third report on Climate Change in Catalonia** identifies and foresees several (geological, socionatural, meteorological) challenges of climate change in Catalonia:

- Heat waves, cold waves, snow and frost
- Extreme rainfall
- Flooding
- Drought
- Forest Fires
- Landslides
- Avalanches

These challenges have direct and indirect effect on the biodiversity of the region as well as on the lives of the population of Catalonia and the Barcelona Metropolitan Area.

The Metropolitan Area of Barcelona (AMB), as in the rest of the major contemporary urban agglomerations, faces several environmental challenges, both global and local, derived from its own operation. It is in the metropolises where most of the planet's natural resources (energy, water, materials) are consumed and where a large part of greenhouse gas emissions (main responsible for climate change) and waste (urban solids, wastewater) are generated.

In this context, during the lasts years, the AMB has been making the improvement of the urban and environmental metabolism a transversal element of the set of policies and services of the metropolitan administration with the aim of reinforcing and guaranteeing the sustainability and resilience of the metropolitan territory.

This objective, which informs all the actions of the Environment Department, has been specified in actions such as:
- The improvement of the protection of natural resources and the metropolitan green infrastructure.
- The continuous improvement of efficiency in the use of basic resources, like water and energy
- The application of the principles of the circular economy in the management of municipal waste
- The fight against climate change and its adaptation to its effects and in the promotion of sustainable economic activities that must lead to the improvement of innovation
- The creation of jobs and the promotion of inclusive sustainable forms of development.

All of the activities by the Environment Department are essential and raised from a holistic and transversal perspective in order to favor the transition towards a more resilient metropolitan area and with a greater adaptive capacity that becomes a city of reference in the international context.

In this area, three main lines of action are:

- Transform the metropolitan city into a leader in the fight against climate change and atmospheric pollution.
- Develop water supply, supply and treatment in a balanced and socially just manner.
- To move towards a circular economy in the field of waste.

Culture of innovation and institutional framework of the regional innovation system

The AMB is the public administration of the metropolitan area of Barcelona, a large urban conurbation made up with 36 municipalities.

The metropolitan area is a territorial, social, demographic, economic and cultural fact that has been forming over the last century, as a product of the growth and connection of urban systems around the city of Barcelona. It is the largest metropolitan conurbation in the western Mediterranean, which generates half of the GDP in Catalonia.
The public metropolitan administration has as some of its objectives:

- The will to transform the metropolitan area into an intelligent city, where the use of new technologies can offer more and better services to citizens in an environmentally, socially and economically sustainable environment.
- The work of the AMB in environmental preservation is focused on natural areas, such as Collserola, as well as activities for the recovery and regeneration of Besòs and Llobregat rivers.
- The AMB manages 30 km of metropolitan beaches, from Castelldefels to Montgat, and develops a comprehensive maintenance of a network composed of 51 metropolitan parks.
- The metropolitan area of Barcelona is recognised as the most dynamic metropolitan conurbation of the Euromediterranean area. It shows its commitment to mobilise the skills and knowledge to increase our international presence, strengthen economic activity and attract people and innovative activities.
- The AMB gains competencies in the area of economic and social development, in order to promote economic activity and strategic planning, and to promote employment and entrepreneurship.
- Cohesion and territorial balance, water cycle, waste and environment (already in place since 1987).

The regional **Strategy for the Smart Specialisation of Catalonia (RIS3CAT)** defines the framework within which the Catalan Government establishes research and innovation (R&I) priority actions and programmes over the 2014-2020 period and provides support for the generation and development of innovative projects. The RIS3CAT Action Plan has a budget of more than 400 million euros from the European Regional Development Fund (ERDF).

RIS3CAT establishes four strategic objectives:

5. To modernise the business fabric by improving the efficiency of production processes, internationalisation and the reorientation of consolidated sectors towards activities with greater added value;
6. To promote new emerging economic activities through research and innovation to create and develop new market niches;
7. To consolidate Catalonia as a European knowledge hub and link technological and creative capacities to existing and emerging sectors in the territory;

8. To improve the overall Catalan innovation system, increasing the competitiveness of companies and steering public policies towards promotion of innovation, internationalisation and entrepreneurship.

PROJECTS AIMED AT CLIMATE CHANGE ADAPTATION AND MITIGATION

1. Projects aimed at climate change adaptation and mitigation implemented by <u>civil society</u> (NGOs, CSOs)

(please provide max. 3 cases using the template below)

Title: SOMBLAU project

Source of funding and the budget:

After the success of the Barcelona's 2015-2017 Climate Commitment projects, the Barcelona City Council launched a new series of grants to promote collaboration projects between the public authority and the city's citizens in order to:

- Boost citizen involvement
- Support collective citizen action
- Promote and support innovative initiatives
- Utilize co-creation processes
- Contribute to the achievement of Barcelona's Climate Commitment objectives

The Climate Plan provides for €1.2 million until 2030, with a call for projects every two years to contribute to fulfilling the plan's commitments. Over 140 organisations, and a total of 49 projects on diverse themes, participated in the first call for climate grants, published in April 2018 and endowed with a budget of €200,000. The 11 projects selected are driven by a minimum of three bodies who are working together and have received a maximum of €20,000 per project. SOMBLAU is one of this selected projects and it is funded by the City Council of Barcelona within the framework of Barcelona's 2018 Climate Commitment.

Timeframe: 2018-2019

Main challenges and goals regarding climate change identified:

SOMBLAU is a project developed by environmental and academic entities that was created with the aim of promoting education in climate change, as well as improving the communication of its effects on the marine and coastal ecosystems of the city of Barcelona. With a global perspective but with a local focus, the creation of strategies for adaptation and mitigation of climate change through communication and environmental education of the city's youth will be fostered, with the aim of raising awareness and training on the effects of climate change in Barcelona. The project is executed from different perspectives and sectors involved in formal and non-formal education. The educational bases for climate change will be reviewed, addressing key points such as the integration of this in academic curricula, education in extracurricular areas and the development of new strategies from traditional media and entities that have competencies in the world of environmental communication.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

MoRRI indicators:

- SLSE3 Science communication culture
- OA3 Social media outreach
- GOV1 Use of science in policy-making
- SLSE1 Importance of societal aspects of science in science curricula for 15 to 18-year-old students
- PE1 Models of public involvement in science and technology decision making

Main actions aimed at climate change adaptation:

- Work session: Bases of education for climate change (23rd May 2019, Barcelona)

Work session where multiple actors of formal and non-formal education will meet to address the integration of climate change into the didactic and pedagogical methodologies used by schools and training organizations. This meeting aims to formalize proposals for adapting climate change to academic curricula and educational programs within the school environment.

- Perception survey against climate risks in 2030

Main actions aimed at climate change mitigation:

- Program of environmental education and climate change in schools
- Workshop with experts in communication:

SOMBLAU organized a workshop on climate change and communication as one of the first of the actions carried out during the project. The activity took place on January 28th, from 10am to 2pm, at the Fábrica del Sol in Barcelona The workshop brought together participants from different national and local media such as La Marea, La Razón, Green Efe, Ballena Blanca, Crónica Global or APIA. There were also representatives of institutions that develop activities related to the communication of climate change, such as the City Council and the Diputació de Barcelona, Barcelona + Sostenible, the ACCC, the ACUP or the Blackboard creatives. The workshop was

organized with the collaboration of Surfrider Spain, who were in charge of facilitating the session, focused on the analysis and discussion of the current narrative on Climate Change. A debate was organized in order to identify common areas to outline a communication strategy on Climate Change. During the activity, potential communication tools on local risks and vulnerability were also defined and the importance of developing actions to promote citizen participation was highlighted.

Please indicate the institution/s responsible for the implementation and its/their main tasks

SOMBLAU project emerges from the cooperation of different entities of civil society and the academic sphere: Eco-union, Posidonia Green Project and Institut de Ciències del Mar, which work in the fields of scientific dissemination, public education, environmental and marine research.

Main tasks of the project - institutions:

- Reflection and education on the effects of climate change - Eco-union.
- The relationship of the effects of climate change on the coast of Barcelona and in the ecosystems of the Mediterranean Sea, as well as the construction of education tools in this context - Institut de Ciències del Mar.
- The identification of communication tools in relation to the strategies of adaptation to climate change - Posidonia Green Project.

Please tick the type of stakeholders involved and shortly describe them

☑ local government ☑ civil society ☑ academia & education □ business

Short description of stakeholders:

☑ local government: Barcelona City Council

The City Council of Barcelona (Catalan: Ajuntament de Barcelona) is the top-tier administrative and governing body of the municipality of Barcelona. In terms of political structure, it consists of the invested Mayor of Barcelona, currently Ada Colau, the Government Commission, and an elected 41-member deliberative Plenary (Consell Municipal) with scrutiny powers.

Barcelona City Council is committed to implementing locally the climate and energy policies agreed on a European and international level. The Council has signed the following agreements: Covenant of Mayors on Energy (2008), Citizen Commitment to Sustainability (2012-2022), “Making Cities Resilient” campaign and its “10 essentials” (2013), Paris Declaration committing cities to the fight against climate change (2015), Barcelona’s Commitment to the Climate (2015), Compact of Mayors (2015), Covenant of Mayors for Climate and Energy (2017), Global Covenant of Mayors for Climate & Energy (2017).

Barcelona has been working on climate issues for some years. Primarily on measures directly related to mitigation, such as energy efficiency and energy saving, with the Thermal Solar Byelaw (1999), the Energy Improvement Plan (2002), the Photovoltaic Solar Byelaw (2011) and the 2011-2020 Barcelona Energy, Climate Change and Air

Quality Plan and subsequently with the approval of other plans and strategies linked to adaptation.

☑ civil society: Eco-union and Posidonia Green Project

Eco-union (www.eco-union.eu) is an environmental association founded in 2005 by a multidisciplinary group of professionals and eco-activists. This non-profit association focus is on the development and implementation of public policies at different scales in the euro-mediterranean region to accelerate the transition of our society towards sustainable development, with a strong focus in the areas of green and blue economy, responsible tourisme, clean mobility, renewable energies and climate change. Their projects are mainly linked to the development and implementation of public policies at different scales, with a focus on analysis and management, the training of professionals in environmental management, public advocacy for environmental policies and sustainable development, and the dissemination of knowledge about the transition towards a green and inclusive economy in the Mediterranean.

Posidonia Green Project

Posidonia Green project (www.posidoniagreenfestival.com) is an international no profit association which promotes the ecologic culture respecting the environment through events, initiatives, awareness and communication campaigns. Posidonia Green Project supports the idea of balance between economic environment, social well- being and environmental protection. The project, is the development of all the activities linked to the Posidonia Festival, annual event developed since 2008 in three Mediterranean places between Italy and Spain.

☑ academia & education: Institute of Marine Sciences (ICM)

The Institute of Marine Sciences (Institut de Ciències del Mar - www.icm.csic.es) belongs to the Spanish National Research Council's (CSIC) Natural Resources Area and is the largest marine research center in Spain and one of the most important in the Mediterranean region. It is entirely devoted to the study of oceans and seas. The Institute's long experience and a team of over 200 specialists in different fields of oceanographic research (physics, chemistry, geology and biology) give the ICM a broad vision of the marine ecosystem, and the ability to assess changes and human impacts on the environment and seek appropriate solutions. The ICM is constituted by four departments: 1. Marine Biology and Oceanography 2. Marine Geosciences 3. Physical and Technological Oceanography 4.Renewable Marine Resources. The researchers of these departments take part in national and international projects and in oceanographic surveys in almost all the seas and oceans of the world.

To facilitate the scientific work of its staff, the ICM also has various technical and support services, which are presented briefly below. Some of these services (Chemical Analysis, Coastal Ocean Observatory, Electron Microscopy, Biological and Geological Collections and Flow Cytometry) can be used by researchers from other institutions and by the general public (Library). In conjunction with the CSIC's publications service, the ICM publishes Scientia Marina, the only scientific journal dedicated to

oceanography that is published in Spain. As public institutions, the ICM is also committed to communicating and disseminating the knowledge acquired through their activities.

Shortly describe the forms and tools of cooperation between partners involved in the implementation and the tools used for communication with the society

SOMBLAU is structured in four main activities that will involve workers in the education sector, different social agents, communication professionals and other key actors, thus promoting a multisectoral and transversal fit:

- Work session: Bases of education for climate change
- Perception survey against climate risks in 2030
- Program of environmental education and climate change in schools
- Workshop with experts in communication

The project has the mission of facilitating the joint work between the different actors and helping to build resilient societies to deal with the impacts of climate change through the tools and activities listed and described above.

Indicate the SDGs relevant for the project:

SDG3: Good Health and Well-Being
SDG4: Quality Education
SDG7: Affordable and Clean Energy
SDG11: Sustainable Cities and Communities
SDG13: Climate Action
SDG14: Life Below Water
SDG15: Life on Land

Web link to the project: www.ecounion.eu/portfolio/som-blau/

2. Projects aimed at climate change adaptation and mitigation implemented by <u>academia&education (research public or private scientific bodies, universities, schools, extracurricular education organisations)</u>

(please provide max. 3 cases using the template below)

NOTE: These cases have been selected above others because they include a strong co-creation dimension. There are numerous other excellent projects on climate adaptation and mitigation led by higher education institutions in the metropolitan area of Barcelona.

Title:

Climate Change Challenge. Big data for the city

Source of funding and the budget:

Ajuntament de Barcelona - Barcelona City Council (Pla Clima 2018-2030) 20.000 € (from Ajuntament of Barcelona) and 5.000 € more (organizers).

Timeframe:

December 2018- December 2019 (1 year)

Main challenges and goals regarding climate change identified:

- Transforming common spaces: since from data gathered conclusions can be drawn to allow urban planning with a climate dimension and evaluate how mobility, green areas, etc. affect urban quality of the city.
- Collective construction: since this initiative has a strong awareness raising objective and it emphasizes the collaboration between agents, communication towards citizenship and social and environmental innovation, with a strong scientific component.

Cross-sectional, the proposed Challenge also allows:

▪ To disseminate the values of the Climate Plan of Barcelona and its actions and objectives among the participants of the project by the University of Barcelona.

▪ To advance the knowledge of the effects of climate change on the city based on the massive and cross-sectional analysis of the available data.

The three final Challenges are:

The challenges are finally defined. All groups (of about 3-4 students) have to participate in the following three challenges:

1. Provide a global average temperature per day in Barcelona based on data provided by ISGlobal, beyond the data of the weather stations.
2. Relocate the 5 weather stations of the city in those most representative places.

3. Estimate the temperature based on a very fine mesh of the city of 100x100.
Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators): ● Knowledge and research indicators: ● Number of participations in research and awareness raising projects on climate ● change. ● Number of contents published in the resilience platform and other tools of access ● to information. ● Number of people trained on climate change. ● Number of people participating in the project. ● Number of people trained by the projecte (includes the participants and those that have accessed the content generated by the project) ● Number of people and projects reported (from the facilitation of the information and public results). ● Number of visits to project´s website.
Main research tasks or actions aimed at climate change adaptation:
Main research tasks or actions aimed at climate change mitigation: Expand the knowledge about the real temperature of the city of Barcelona in order to undertake more measures based on reliable data and that respond to reality. This aspect helps both in terms of mitigation and adaptation.
Does the project promote RRI? If yes, please shortly describe (*maximum 100 words*)
Please indicate the institution/s responsible for the implementation and its/their main tasks Universitat de Barcelona (UB), ISGlobal and Ana Villagordo **(anavillagordo.com).**
Please tick the type of stakeholders involved and shortly describe them
X local government X civil society X academia & education □ business **Short description of stakeholders:** **Ajuntament de Barcelona**

The City Council of Barcelona is the top-tier administrative and governing body of the municipality of Barcelona, Spain. In terms of political structure, it consists of the invested Mayor of Barcelona (for a 4 year period), the Government Commission, and an elected 41-member deliberative Plenary with scrutiny powers.

University of Barcelona (leader of the initiative)
Largest public university of Catalonia. It is comprehensive research oriented university. **www.ub.edu**

ISGlobal
The Barcelona Institute for Global Health, ISGlobal, is an innovative alliance between "la Caixa", academic institutions and government bodies to contribute to the efforts undertaken by the international community to address challenges in global health.

Civil Society
The participants of this initiative (students or former students).

Shortly describe the forms and tools of cooperation between partners involved in the implementation and the tools used for communication with the society *(maximum 3000 characters including spaces)*:

University of Barcelona: Leadership and preparation of the Challenge.

ISGlobal: Support in the definition of challenges and facilitation of data of health and climate. Lectures and information sessions on the problems related to the data gathered.

Ana Villagordo (consultant): Coordination, management, design and contents of the lectures and communication of the project. Responsible of the outreach of the project with agents that supply data to enhance the Challenge.

Ajuntament de Barcelona funds, supports and monitors the project.

- There are 3 face-to-face sessions organized, the last of which is open to the public to explain the resulting projects and know the winners. The other two sessions are for Challenge presentation and follow-up.
- Web page with a section that is only for participants and a section that is public aiming to explain the project and to present the Climate Plan to all those interested.
- Creation of a specific channel, Instagram, to bring the project to the general public and to other institutions in the environmental sector.

Indicate the SDGs relevant for the project:

- SDG 3

Ensure healthy lives and promote well-being for all at all ages

- SDG 11
  Make cities and human settlements inclusive, safe, resilient and sustainable

- SDG 13
  Take urgent action to combat climate change and its impacts

Web link to the project: www.climate-challenge.com (it will be launched 15th May)

Title:

RESCITIES: The political ecology of urban resilience to hydro-climatic events in Spain

Source of funding and the budget:
Agencia Estatal de Investigación- Ministerio de Ciencia, Innovación y Universidades (preliminary acceptance, pending of final resolution) 42350€. Up till now the project has been supported by IN3 funding covering staff costs.

Timeframe: January 2019 - December 2021

Main challenges and goals regarding climate change identified:

CHALLENGES:
1) The articulation of resilient cities with other urban paradigms;
2) The participatory governance of urban resilience;
3) The uneven impact of urban resilience.;
4) The multi-level articulation of urban resilience.

GOALS:
1. Examine how urban resilience strategies and policies are connected discursively and in practice with other urban policies, such as climate change and smart cities policies.
2. Analyse how urban resilience is articulated with socio-environmental strategies of management and transformation created with and by citizens.
3. Analyse the impacts of the strategies and policies of urban resilience on vulnerable communities.
4. Explore the tensions and challenges of the design and implementation of urban resilience policies, in the context of multi-level hydro-climatic management policies, and particularly of the uneven distribution of benefits and risks for local communities.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

- GOV1 Use of science in policy-making
- PE1 Models of public involvement in science and technology decision making
- PE3 Citizen preferences for active participation in science and technology decision-making

Main research tasks or actions aimed at climate change adaptation:

Review of community-based initiatives to build urban resilience in the two case studies (Barcelona and Seville), how they are networked, and their articulation at supra-local levels.

Examination of socio-environmental strategies of management and transformation of urban resilience in these two case studies.

Sharing and improving the analysed strategies of urban resilience.

Main research tasks or actions aimed at climate change mitigation:
Idem.

Does the project promote RRI? If yes, please shortly describe (*maximum 100 words*)

Yes, the project promotes RRI:

- by early engaging the stakeholders in the research process;
- by taking into account gender and intersectionality when collecting and analysing data;
- by asking for previous, free informed consent to interviewees;
- by planning spaces for sharing ongoing results and getting feedback about the research;
- by publishing in open access; and
- by planning dissemination and communication tools beyond the academ.y

Please indicate the institution/s responsible for the implementation and its/their main tasks
TURBA Research group of the Internet Interdisciplinary Institute (IN3) - Universitat Oberta de Catalunya

PIs: Hug March & Isabel Ruiz-Mallén in charge of developing the research.

Please tick the type of stakeholders involved and shortly describe them

X local government X civil society X academia & education X business

Short description of stakeholders: All. Barcelona & Seville municipalities, citizens, grassroots organisations, ngos, universities and schools (primary & secondary education), enterprises providing services to the municipality (e.g. water).
Shortly describe the forms and tools of cooperation between partners involved in the implementation and the tools used for communication with the society *(maximum 3000 characters including spaces)*: Workshops are scheduled and will be prepared with the city council and other stakeholders that are key. The rest of the forms and tools of cooperation will depend on the alliances and conditions in which the research will take place.
Indicate the SDGs relevant for the project: - SDG 10 Reduce inequality within and among countries - SDG 11 Make cities and human settlements inclusive, safe, resilient and sustainable - SDG 13 Take urgent action to combat climate change and its impacts -
Web link to the project: not available yet

3. Projects aimed at climate change adaptation and mitigation implemented by business (Corporate Social Responsibility, CSR strategies might be useful) *(please provide max. 3 cases using the template below)*
Enterprise Name: Aquatec – SUEZ Advanced Solutions
Sector of activity: Water management, recycling and waste recovery
Size and number of employees: 15.9 billion turnover in 2017 88,576 employees
Source of funding and the budget: European Union's Horizon 2020 Research and Innovation Programme. H2020-DRS-09-2015 - Disaster Resilience; Climate Change topic 1: Science and innovation for adaptation to climate change: from assessing costs, risks and opportunities to demonstration of options and practices ● **Budget**: 8.023.342,50 € ● **EU Contribution**: 6.896.991,76 €

Timeframe: 48 months (May 2016 – April 2020)

Title of the project: RESilience to cope with Climate Change in Urban arEas – a multi-sectorial approach focusing on water (RESCCUE)

Main challenges and goals regarding climate change identified:

The RESCCUE project aims to **help urban areas around the world to become more resilient to climate change.** More precisely, RESCCUE will bring this objective to practice by **providing innovative models and tools to improve the ability of cities to withstand and recover quickly from multiple shocks and stresses and maintain continuity of services.** An end-users – city managers and urban service operators – oriented **toolkit** will have the capability to be deployed to different types of cities, with different climate change pressures.

The models and tools will be validated in three different cities, carefully selected by their representativeness of the European diversity in terms of climate type and city characteristics: **Barcelona, Lisbon and Bristol**.

* Barcelona - Critical Hazards due to climate change scenarios: Urban flooding, combined sewer overflow during heavy storm events, drought, heat waves and sea level rise.

* Lisboa - Critical Hazards due to climate change scenarios: Urban flooding, sea-level rise and derived coastal erosion and heat waves.

* Bristol - Critical Hazards due to climate change scenarios: Coastal, river and pluvial flooding, droughts and sea-level rise.

RESCCUE will analyze an interconnectedness of different urban systems, **taking as starting point the water sector.** This sector has been highlighted due to the importance of water- related risks in the correct functioning of a city: droughts or heavy rains can produce critical impacts on strategic urban services such as water supply, solid waste, telecommunication, energy supply, transport, etc.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):
List of main indicators applied have not yet been developed.

Main actions aimed at climate change adaptation:

Most of world population will end up living in cities, therefore it is critical and highly urgent to have tools available to assess, plan and monitor urban resilience in an

integral way. There is where RESCCUE will contribute with a set of **innovative tools for urban resilience assessment, planning and management.** These tools will help cities with their climate change adaptation strategy and will also improve their current capacity to cope with emergencies.

In particular, the main impacts expected from the project are:

- **Rapid large-scale deployment and market uptake of innovative technological and non-technological climate change adaptation solutions with high replicability.**
- **Contribution to the development of technological and performance standards for adaptation options.**
- **Improving innovation capacity and the integration of new knowledge.**
- **Strengthening the competitiveness and growth of companies by developing innovations meeting the needs of European and global markets; and, where relevant, by delivering such innovations to the markets.**
- **Environmental and social impacts based on citizens' protection and security by enabling a better coordination of the city emergency teams and consequently, a faster response from their side.**

Mitigation and adaptation strategies will be defined and promoted to improve urban resilience and to cope with climate change effects. They will be defined with a multisectoral approach, avoiding risk transfer, and increasing urban resilience as a whole. Methodologies to assess their effectiveness and ease their selection (such as Cost Benefit Analysis or multi-criteria analysis) will also be used.

Main actions aimed at climate change mitigation:
RESCCUE mainly focus on climate change adaptation.

Please indicate the institution/s responsible for the implementation and its/their main tasks
ACUP does not have information on the main tasks corresponding to each partner institution.

Please tick the type of stakeholders involved and shortly describe them

■ **local government** □ civil society ■ **academia & education** ■ **business**

- Project coordinator: Aquatec - SUEZ Advanced Solutions
- 3 City councils of the cities included in the study: Barcelona, Lisbon and Bristol
- The United Nations agency UN-Habitat.
- Urban services companies: Endesa, EDP, Aguas de Portugal, and Suez Advanced Solutions UK.
- Research centres: Cetaqua, FIC, LNEC and IREC.
- Universities: Exeter and EIVP.

- SMEs: Opticits, Hidra and UrbanDNA.

Short description of stakeholders:

- **Aquatec - SUEZ Advanced Solutions:** SUEZ Advanced Solutions Spain is the business line of Suez that integrates all activities related to water solutions and technologies (Suez SA is a French-based utility company which operates largely in the water treatment and waste management sectors).
- **Barcelona City Council:** The City Council of Barcelona is the top-tier administrative and governing body of the municipality of Barcelona. In terms of political structure, it consists of the invested Mayor of Barcelona (for a 4 year period), the Government Commission, and an elected 41-member deliberative Plenary with scrutiny powers.
- **Lisbon City Council:** The Lisboa City Council is the executive body of the municipality and its mission is to define and execute policies that may promote the development of the County of Lisboa in different areas. The City Council comprises 17 elected Councillors, representing the different political forces, of which 1 is the Mayor.
- **Bristol City Council:** Bristol City Council is the local authority of Bristol, England. The council is a unitary authority, and is unusual in the United Kingdom in that its executive function is controlled by a directly elected mayor of Bristol. Bristol has 35 wards, electing a total of 70 councillors.
- **UN-Habitat:** UN-Habitat is the United Nations programme working towards a better urban future. Its mission is to promote socially and environmentally sustainable human settlements development and the achievement of adequate shelter for all.
- **Endesa:** Endesa is leading company in the Spanish electricity sector and the second largest operator in Portugal.
- **EDP:** EDP - Energias de Portugal (formerly Electricidade de Portugal) ranks among Europe's major electricity operators, as well as being one of Portugal's largest business groups.
- **Aguas de Portugal:** The AdP – Águas de Portugal group plays a structural role in the environment sector in Portugal and spanning the fields of water supply and wastewater sanitation.
- **Suez Advanced Solutions UK:** Suez Advanced Solutions UK deliver innovative methods of water and wastewater management throughout the UK.
- **Cetaqua:** Cetaqua, Water Technology Centre, represents a pioneering collaborative model among the sectors of government, academia and industry. This model has been established as a European benchmark in the application of scientific knowledge to water and the environment. Its mission is to anticipate society's needs to propose new R&D&I solutions in order to ensure the sustainability and efficiency of the water cycle, while taking local needs into account.
- **FIC:** The Foundation for Climate Research (FIC) is a non-profit, private and totally independent, whose founding objectives focus on research in the field

of climate change as well as in the fields of climatology, meteorology, environment and development cooperation.

- **LNEC:** LNEC - Laboratório Nacional de Engenharia Civil (National Laboratory for Civil Engineering) is a public institute of Science and Technology (S&T), with the status of State Laboratory that carries out research in all fields of civil engineering, giving it a unique multidisciplinary perspective.
- **IREC:** The Catalonia Institute for Energy Research was created to contribute to the objective of creating a more sustainable future for energy usage and consumption, keeping in mind the economic competitivity and providing society with the maximum level of energy security.
- **Exeter:** The University of Exeter is a public research university in Exeter, Devon, South West England, United Kingdom.
- **EIVP:** The École des ingénieurs de la ville de Paris or "Engineering School of Paris City" is the only French « Grande École d'ingenieurs», with an emphasis on urban engineering.Supported by the City of Paris, this higher education school is a member of the PRES Paris-Est, along with the École des Ponts.
- **Opticits:** OPTICITS Urban Engineering is a pioneer in the assessment, improvement and management of urban resilience. Our tool, HAZUR resilient SYSTEMS; brings together the best methodologies for assessing and managing resilience in urban systems.
- **Hidra:** HIDRA, Hidráulica e Ambiente Lda is a privately owned company with excellence in urban infrastructure, water services and related fields, with approximately two and a half decades of national and international experience, namely in Europe, Africa, Asia Central and South America, with the main clients abroad being the World Bank and the USA Millennium Challenge Account (MCA) and, in Portugal, AdP group companies, Private Operators and Central and Local Administration bodies.
- **UrbanDNA**: Urban DNA is a specialist company that aspires to work with progressive cities and their industry partners, in collaboration, to deliver better solutions faster to common urban challenges.

Shortly describe the forms of cooperation between partners involved in the implementation and the tools used for communication with the society *(maximum 3000 characters including spaces)*:

Cities, being complexes of interdependent systems, cannot be understood by sectorial and disciplinary approaches alone. In this sense, RESCCUE goes beyond conventional urban resilience approaches delivering a **forward looking, multi-scale, multisectorial and multi-hazard methodology.** In order to interconnect the several sectorial models, the project will take advantage of the existent HAZUR® tool. The **HAZUR® approach** is based on a method and software (as a service) to help city decision makers and urban resilience professionals make fully informed and structured choices to make their cities more resilient analyzing the interdependencies between different city services, monitoring the city and simulating cascade effects in case of impacts that may affect the city.

The main tools used for communication with the society is the website, the blog and the events.
Indicate the SDGs relevant for the project: From ACUP's perspective, the following SDGs are relevant for the project: - SDG 6: Clean water and sanitation - SDG 9: Industry, innovation and infrastructure - SDG 11: Sustainable cities and communities - SDG 13: Climate action - SDG 17: Partnerships for the goals
Web links to a project or to CSR strategy: http://www.resccue.eu/resccue-project

4. Projects aimed at climate change adaptation and mitigation implemented by <u>business (Corporate Social Responsibility, CSR strategies might be useful)</u> *(please provide max. 3 cases using the template below)*

Enterprise Name: Ship2B

Sector of activity: Management Consulting
(Specialities: social innovation, social entrepreneurship, social venture capital, lean startup, design thinking, impact investment, and startup acceleration)

Size and number of employees:
3 co-founders and 13 employees
ACUP does not have data related to turnover of Ship2B

Source of funding and the budget:
More than € 2M of financing achieved from several companies and foundations. This is, more than 400K€ invested for each one of the 18 beneficiary startups.

Timeframe: 2018 (1st call) and 2019 (2nd call)

Title of the project: LAB Tech4Climate - Technology and Innovation for Sustainability

Platform for investment and acceleration of startups with high social impact in the field of sustainability and the environment.

Main challenges and goals regarding climate change identified:

In the framework of the Tech4Climate platform, Ship2B looks for technology-based start-ups that:

- Encourage responsible consumption and the efficient management of resources such as water, energy and waste, including the improvement in the calculation of environmental footprints (carbon footprint, water footprint ...)

- Provide solutions for mitigation or adaptation to climate change, including the capture of CO2 or response to emergency situations to ensure water and food security.

- Contribute to making cities more sustainable and resilient, for example through their renaturation, promotion of biodiversity, urban and vertical agricultural production, sustainable mobility, etc.

- Contribute solutions to make agriculture and livestock more sustainable, with special emphasis on IoT and big data solutions for precision agriculture and livestock, syndromic surveillance, and ecological phytosanitary products.

- Generate energy from clean sources or waste.
- Use models of circular economy applied to any field, with special interest in the urban, industrial, agricultural and livestock and food industries, thus contributing to reduce, eliminate or reuse waste.
- Provide sustainable solutions for food packaging (packaging removal, polymerization, ecological alternatives to glass ...).
- Promote a healthy and sustainable lifestyle, including the design of personalized diets, the production of foods with healthy effects, and the well-being of people.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

N/A

Main actions aimed at climate change adaptation:

Capture of CO2 or response to emergency situations to ensure water and food security among other actions.

Main actions aimed at climate change mitigation:

The ACUP does not have information on the main actions aimed at climate change mitigation.

Please indicate the institution/s responsible for the implementation and its/their main tasks

1) **Ship2B** provides startups with two main services:
   a) acceleration of business projects through strategic alliances with large companies in the sector and mentoring
   b) investment through a network/community of investors with more than 400 members and an Investment vehicle with € 4M (Equity4Good)

2) Aigües de Barcelona looks for technological startups that promote:

- Responsible consumption and efficient management of resources such as water and energy.
- Solutions to mitigate or adapt to climate change.
- Biodiversity, sustainability and resilience of cities.
- Models of circular economy and ecodesign to improve sustainability.
- Healthy and sustainable lifestyles.

It offers to startups:

- Knowledge and access to experts
- Partnerships for market
- Space of experimentation

3) Bodegas Torres looks for technological startups that:

- Reduce consumption and improve water treatment.
- Decrease the carbon footprint in the entire value chain.

- Provide eco-design solutions to improve sustainability.
- Develop innovative and efficient models of vertical crops, hydroponics, etc.

It offers to startups:
- Investment in early stages
- Knowledge and advisory
- Commercial agreements
- Pilot tests

4) Griñó Group looks for technological startups that:
- Improve transfer, selection and recycling of urban, agricultural and industrial waste of all types, especially organic and plastics - and facilitate their transformation and recovery into raw materials or products (new materials, fertilizers, etc.).
- Generate energy from waste efficiently (eg biogas, biomethane, etc.).
- Develop innovations in soil decontamination and / or water treatment.

It offers to startups:
- Investment in early stages
- Knowledge and advisory
- Commercial agreements
- Pilot tests

5) Fundació Futur looks for technological startups that:
- Facilitate healthy eating.
- Include vulnerable groups in the green value chain.
- Streamline local food markets and with small farmers.

It offers to startups:
- Knowledge and access to experts
- Partnerships for market
- Space of experimentation

Please tick the type of stakeholders involved and shortly describe them

□ **local government** ■ civil society ■ **academia & education** ■ **business**

Short description of stakeholders:

CO-FOUNDER PARTNERS:

Ship2B is private foundation that aims at accelerating business projects with high social impact by making a community of mentors, entities and large companies available to the best entrepreneurs. In addition, Ship2B has the first and largest impact investment network in Spain and a co-investment vehicle to invest in disruptive startups that generate double profitability: economic and social.

Aigües de Barcelona is a public-private company that manages the integral water cycle from capture to drinking water, transport and distribution, as well as sanitation and wastewater treatment to return to the natural environment or its reuse. In this way, it offers service to about 3 million people in the municipalities of the metropolitan area of Barcelona.

Bodegas Torres is a family winery founded in 1870 that has joined, from its origins, tradition and innovation to become a reference winery in the wine and quality brandies sector. It has a clear commitment to land for 2020: reduce CO2 emissions by bottle by 30% compared to 2008, in addition to the goal of achieving greater equity in international trade, based on transparency.

Griñó Group is a leading business group in environmental services and in the generation of green energy. With more than 80 years of experience and a constant commitment to innovation, it focuses on environmental services, waste treatment and energy.

Fundació Futur is a social project that, following the concept of healthy, dignified and accessible food for all, builds customized social-labor insertion itineraries. The goal is for the beneficiaries to regain their personal autonomy while improving food and the entire food production chain.

The Institute of Agrifood Research and Technology (IRTA) is a research institute owned by the Government of Catalonia. IRTA's mission is to contribute to modernising, improving, boosting competitiveness, and fostering sustainable development in the sectors of agriculture, food, agroforestry, aquaculture, and fishing, as well as in all areas of activity directly or indirectly related to the supply of healthy, high-quality foodstuffs to end consumers, while also contributing to food safety and safe processing of foodstuffs and in general enhancing the health and well-being of the population. Its general objectives are to promote research and technological development in the area of agri-food, to facilitate the transfer of scientific advances and to evaluate its own technological advances whilst seeking the utmost coordination and collaboration between the public and private sectors.

STRATEGIC PARTNERS:

- Municipality of Barcelona
- Inèdit (strategic eco-innovation study)

INVESTMENT PARTNERS: ABAC Capital, ACCIÓ, ARMOR, Caixa Capital Risc, Capital Cell, CREAS, Crowdcube, DiverInvest, Enisa, ESADE, GICOOP, Healthequity, Institut Català de Finances, IESE, Inveready, Investir, ISP, La Bolsa Social, Lánzame, Miura, Nauta capital, Openvalue, Zinkers, Roca Salvatella, Samaipata ventures, Sandman, Sitkacapital, Sumacapital and Tressis.

STARTUPS:

- Fundeen
- Prismab
- Kualito
- Green Killer Weeds
- Feltwood
- Sylvestris
- Entorno Agroindustrial
- Green Urban Data
- Farmidable
- Ciclogreen
- Cuits & Beans
- Ereuse.org
- Maichinery
- Solatom
- Smart Biosystem
- Aquapioners
- I am perfect food

Shortly describe the forms of cooperation between partners involved in the implementation and the tools used for communication with the society *(maximum 3000 characters including spaces)*:

Ship2B launches calls for access to its sectoral LABs (including Tech4Climate) to which startups with social impact from all across Spain reply. Among them, the best ones are selected by a committee formed by the co-founding partner entities and experts in each sector. During months, each of them receive the advice of expert professionals in the sector that will help to define a roadmap and will promote the generation of partnerships with large companies and public entities in order to boost their growth. In addition, the Ship2B investment team will analyze each of the startups to make an initial investment of € 40,000 in the first months and up to a total of € 400,000 in subsequent rounds. This investment will be made by Impact Equity4Good, an investment vehicle managed by Ship2B.
The main tool used by Ship2B for communication with the society is the website.

Indicate the SDGs relevant for the project:
From ACUP's perspective, the following SDGs are relevant for the project:

- SDG 3: Good health and well-being
- SDG 6: Clean water and sanitation
- SDG 7: Affordable and clean energy
- SDG 8: Decent work and economic growth
- SDG 9: Industry, innovation and infrastructure
- SDG 10: Reduced inequalities
- SDG 11: Sustainable cities and communities
- SDG 12: Responsible consumption and production
- SDG 13: Climate action

- SDG 15: Life on land - SDG 17: Partnerships for the goals
Web links to a project or to CSR strategy: **https://www.ship2b.org/tech4climate/#tab-1-4**

5. Projects aimed at climate change adaptation and mitigation implemented by <u>local government</u> *(please provide max. 3 cases using the template below)*
Title: Fem pinya contra el canvi climàtic **(Together against the climate change)**
Source of funding and the budget: Unknown budget, funded by "Barcelona + Sustainable"
Timeframe: January 2016 - January 2018 (2 years)
Main challenges and goals regarding climate change identified: The climate is changing. The citizens of Barcelona will have to deal with it to the challenges and opportunities that this phenomenon raises. A new way of life will be necessary. The project proposes to facilitate this transition through of the training of educational and cultural agents of the city in order to promote a change of habits and values in the citizens. The project has developed and implemented a motivating and action-oriented training program that highlights that climate change is a reality that will affect the quality of life of the people of Barcelona and what actions can be carried out to face it and adapt to it. Is another step forward a society where citizenship is more co-responsible and proactive in mitigation and adaptation to climate change. The project is based on the elaboration of a practical, simple and graphic guide that serves the programmers of houses, civic centers, etc. to incorporate criteria and advices to take into account sustainability criteria when scheduling workshops. With this guide, the programmer will be able to look for the type of activities that interest them to program and will obtain criteria and advices that can be taken into account, related information, a coherent speech to transmit and material of dissemination for the final users. The project also provides for a series of trainings that are carried out in various cultural facilities of Barcelona and the metropolitan area.
Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators): PE9 – Research and innovation democratization index PE10 – National infrastructure for involvement of citizens and societal actors in research and innovation. OA4 – Public perception of open access GOV1 – Use of science un policymaking
Main actions aimed at climate change adaptation: -Design of the training program on climate change for cultural world agents.

-Design of the training program on climate change for agents from environmental education world.
-Carrying out pilot training tests.
-Portal of programs and equipment based on climate change in the city.
-Program communication plan.
-Calendar of events related to climate change.

Main actions aimed at climate change mitigation:

Please indicate the institution/s responsible for the implementation and its/their main tasks

The Barcelona City Council is the leader and promoter of the "Barcelona + Sostenible" ("Barcelona+ Sustainable") network, which is a network of more than 1,000 organizations committed to the environmental, social and economic sustainability that collectively build a responsible city with people and the environment .

The "Fem Pinya contra el canvi climàtic" project is being developed within the framework of Barcelona + Sustainable commitments.

Please tick the type of stakeholders involved and shortly describe them

X local government X civil society X academia & education □ business

Short description of stakeholders:

Barcelona City Council:

The City Council of Barcelona is the top-tier administrative and governing body of the municipality of Barcelona. In terms of political structure, it consists of the invested Mayor of Barcelona (for a 4 year period), the Government Commission, and an elected 41-member deliberative Plenary with scrutiny powers.

Metropolitan Area of Barcelona:

The AMB is the public administration of the metropolitan area of Barcelona, a large urban conurbation formed by a total of 36 municipalities.

The constitution as a public administration was carried out on July 21, 2011, in accordance with Law 31/2010 approved by the Parliament of Catalonia. Since then, the AMB has replaced the three existing metropolitan entities up to that date: the Commonwealth of Municipalities of the Metropolitan Area of Barcelona, the Entity of the Environment and the Metropolitan Transport Entity.

Oficina Catalana de Canvi Climàtic:

The Catalan Office for Climate Change is the technical body of the Government of the Generalitat de Catalunya, attached to the General Directorate for Environmental Quality and Climate Change of the Ministry of the Environment, responsible for promoting the establishment of strategies in Catalonia, plans and projects in the field of climate change.

La Fàbrica del Sol:
The "Factory of the Sun" is an equipment of environmental education promoted by the Area of Ecology, Urbanism and Mobility of the City Council of Barcelona.
The rehabilitation of the space has integrated measures and environmental solutions, such as the use of rainwater, an interior vertical garden, a geothermal heat pump, a pergola and a dividing wall with photovoltaic panels, in addition to natural ventilation.

Lavola:
Company specialized in sustainability

Talher:
Environmental services and works company present throughout the national territory.

Cultural and Educational agents of the city:
All the civic centers and educators that have collaborated in the development and writing of the guide of good practices.

Shortly describe the forms of cooperation between partners involved in the implementation and the tools used for communication with the society *(maximum 3000 characters including spaces)*:

The program of the Barcelona City Council "Compromís pel Clima" ("Commitment to the climate") has a series of actions to fight against climate change.
Among these, there are nine collaborative projects, developed through the members of the Barcelona + Sostenible (Barcelona +Sustainable), aimed at action and with the objective of making explicit the commitment of the city, by the hand of the citizens, in the fight against climate change. "Fem pinya contra el canvi climàtic" is one of these nine collaborative projects.

The Citizen Commitment for Sustainability 2012-2022 is a document with strategic value and an inspiring will that serves as a reference framework for all citizen organizations that want to contribute to the improvement of Barcelona. The Commitment sets 10 major goals, each with 10 lines of action, on the horizon of 2022.

Committed organizations are integrated into the Barcelona + Sustainable network, currently formed by more than a thousand organizations, companies, educational centers and institutions. The purpose is to achieve the objectives of the Commitment with the sum of the actions of all members of the network.

Indicate the SDGs relevant for the project:
Goal 3 –Ensure healthy lives and promote wellbeing for all at all ages.
Goal 11 – Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal 12 – Ensure sustainable consumption and production patterns.

Goal 13 – Take urgent action to combat climate change and its impacts.
Web link to the project: https://www.youtube.com/watch?v=M-0QfwsHj0c&list=PL-_DKISeIjZklZLjv1sjlEwaS5Kvq4nzf&index=3 http://lameva.barcelona.cat/barcelonasostenible/sites/default/files/pagines/document/5535/posterscbpcprojectesfempinya.pdf http://lameva.barcelona.cat/barcelona-pel-clima/sites/default/files/documents/guia_canvi_climatic.pdf http://lameva.barcelona.cat/barcelonasostenible/ca/barcelona-sostenible/tags/page/accio-pel-clima

Title: Refugis climàtics a Barcelona **(Project GBG_AS2C - Blue, Green & Grey_Adapting Schools to Climate Change)**
Source of funding and the budget: 3,997,969.76 € funded by Urban Innovative Actions
Timeframe: ---
Main challenges and goals regarding climate change identified: Being a compact city of 1.6 million inhabitants with hot and humid climate in summer, Barcelona is particularly exposed to the heat island effect, while at the same time experiences a low degree of adaptation to heat of many infrastructures, equipment and public spaces. This reality is considered in the perspective of the climate predictions that foresee heat waves phenomena to get stronger, longer and more recurrent. For instance in 2100, the City will experience 30 additional warm days above 30ºC per year, and an increase of extreme temperatures by 3.5ºC up to 42.8ºC. In this context, the GBG_AS2C project aims to prepare the City of Barcelona to face predicted increasingly high temperatures in summer that would severely affect the city and its inhabitants -especially vulnerable ones- as a consequence of Climate Change. The project in numbers .- 4.500 kids will benefit from the pilot investments in their school .- 1.350 kids will benefit during summer camps hosted in schools playgrounds .- 3.000m2 of schoolyards will be transformed .- 4.500m2 of urban green areas will be added .- EUR 3,997,969.76 Total ERDF budget granted

The GBG_AS2C project solution relies on a package of measures to adapt schools to climate change. By nature, schools are relevant spaces where actions can be implemented to adapt the city to climate change for the benefit of all. Any action carried out in schools will be maximized considering the vulnerable population they host, as well as their low level of adaptation to heat due to infrastructures precariousness. Moreover, not only their spatial distribution in the city ensures great capillarity and penetration in the communities, but they also offer the possibility for continuous use throughout the year.

Therefore, schools playgrounds will be transformed into climate shelters and be open to the wider public in non-school period. Playground transformation will be operated through a threefold intervention - Green, Blue, and Grey - essentially articulated around the introduction of an aquatic (blue) component at the heart of the cities, as accessible municipal recreational point of refreshment. This will be combined with greening and applying traditional solutions (grey) to school facilities in order to combat heat.

Next to the infrastructure interventions, different processes will be implemented together with the school communities in order to raise Climate Change awareness. Especially, the participatory processes of playgrounds transformation as well as the adoption of an educational project including teachers training and the involvement of students and school professionals in the health impact assessment.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

GOV1 – Use of science in policymaking

Main actions aimed at climate change adaptation:

- A network of 10 Schools adapted to the Climate change as key-pilot with the goal to replicate the project to all the schools in the city.
- Healthier, playful and more inclusive schools: improving school experiences by promoting the diversity of games, genders, capacities and the contact with nature, abandoning the traditional and segregator model of hard schoolyards.
- Major Climate Justice: Creation of climate shelters with green and blue spaces, fun and refreshing, that will become part of the Climate Shelter Network planned by the Climate Plan to promote the Climate Justice.
- Coherent city of community base: Open courtyards to the community where it benefits of the blue and green, creating a space of empowering intergenerational and intercultural bonds.
- Citizens aware and responsibility for Climate Change: with the support of the pedagogical project and the participatory process of the school community, the measures will have even more power of awareness and dissemination among students and families.

- Sustainable city: No waste of water will be produced by the aquatic facilities, conversely, traditional Arabic solutions will be replicated for water reuse for irrigation.
- Blue city: Inclusion of the schools adaptation to the climate change on the municipal budgets of Measure to scale. The assessment in terms of health, communication and replicability will be essential to collect and disseminate the success of the process.
- Blue world: expecting that the project relevance can be used as educational and transformative tool for other cities.

Main actions aimed at climate change mitigation:

Please indicate the institution/s responsible for the implementation and its/their main tasks

Barcelona City Council – Urban Ecology Area: as the project leader, the City Council of Barcelona (urban ecology area) is in charge of the development and execution of actions derived from the project.

Please tick the type of stakeholders involved and shortly describe them

X local government X civil society X academia & education □ business

Short description of stakeholders:

Barcelona City Council:

The City Council of Barcelona is the top-tier administrative and governing body of the municipality of Barcelona. In terms of political structure, it consists of the invested Mayor of Barcelona (for a 4 year period), the Government Commission, and an elected 41-member deliberative Plenary with scrutiny powers.

Public Health Agency of Barcelona - sectoral agency:

The Public Health Agency of Barcelona directs and manages the public health centers and services of the city commissioned by the City Council of Barcelona and the Generalitat of Catalonia. Its reason for being is to watch over the health of residents of Barcelona and visitors, through:

- Knowledge of the state of health of the population and the factors that determine it.
- The development of policies to maintain and improve the health of the population.
- The guarantee of the provision of services in the field of public health, fully assuming the tasks that are derived for the exercise of the health authority in the city.

Barcelona Consortium of Education:

It is an instrument of co-management and decentralization, in a framework of institutional collaboration, which represents the will of the Generalitat of Catalonia

and the City Council of Barcelona to work together to improve the services of the educational centers and the citizens through a single educational network.

Barcelona Cycle of Water - Public Service Provider:
Barcelona Cicle de l'Aigua, SA (BCASA), is the company created by the Barcelona City Council that, as of January 1, 2014, manages the entire water cycle of the city and carries out activities and provides services directly or indirectly related to the water cycle, the beaches, the coastline and the environment. The company is attached to the Deputy Directorate of Environment and Urban Services within the Geriatric Urban Ecology.

ISGlobal: Barcelona Institute for Global Health - Higher Education and Research Institute:
The Barcelona Institute for Global Health, ISGlobal, is an innovative alliance between "la Caixa", academic institutions and government bodies to contribute to the efforts undertaken by the international community to address challenges in global health.

Institute for Environmental Science and Technology UAB - Higher Education and Research Institute
The Institute of Environmental Science and Technology (ICTA-UAB) is a multidisciplinary center that promotes research and postgraduate training in environmental sciences. The purpose is to improve the understanding of global environmental change, and the nature and causes of environmental problems. In addition, it studies the policies, strategies and technologies that will foster the transition to a sustainable economy.

Vila Olimpica School
The Vila Olímpica school is a center open to the world and to diversity. The activities, the projects and the educational challenges are elaborated in a transversal and functional manner: the relevance of the role of conversation in the classroom in learning, the transversal and integrated treatment of languages, the inclusive school understood as the social act of learning in which the cooperation of different people plays an important role, the importance of encouraging the self-esteem of children through their learning, the flexibility of the work of the team of teachers according to the needs of the students and the collaboration with the families. They take into account respect for the environment and sustainability and the constant presence of TACs (Learning and Knowledge Technologies).

Shortly describe the forms of cooperation between partners involved in the implementation and the tools used for communication with the society *(maximum 3000 characters including spaces)*:

Indicate the SDGs relevant for the project:
Goal 3 – Ensure healthy lives and promote wellbeing for all at all ages.
Goal4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Goal 6 - Ensure availability and sustainable management of water and sanitation for all. Goal 13 – Take urgent action to combat climate change and its impacts.
Web link to the project: https://www.uia-initiative.eu/en/uia-cities/barcelona-call3

Title: "Compartim un Futur" – Programa d'educació ambiental ("Sharing a Future - Environmental education program)
Source of funding and the budget: Unknown budget, funded by AMB (Metropolitan area of Barcelona).
Timeframe: 2018-2019 (every school year is updated)
Main challenges and goals regarding climate change identified: The AMB has awareness-raising tools to raise awareness about sustainability criteria and raise awareness about the carbon footprint problem. One of these tools is the Sharing a Future program. The educational program Sharing a Future is the main tool that AMB has for putting environmental education or education for sustainability in the forefront of work. It involves a cultural change in which the responsible action between administrations and citizenship is key, with the basis of the ecosocial responsibility in the wider spectrum (social equity, economic viability and ecological sustainability). The Metropolitan Education Program for the sustainability of the AMB is intended to promote environmental, social and economic sustainability in the metropolitan territory and, in the long term, to ensure that citizens incorporate more sustainable habits into their daily behavior. It is an educational instrument based on citizen participation, strategic planning and social responsibility in education and expresses the vocation of the metropolitan area as an educational territory. The AMB shares with the development of this program the purpose of the United Nations of the Decade of Education for Sustainable Development and of RIO + 20, which is based on the fact that education for sustainability is a Basic factor to promote and ensure progress, integration and social cohesion. The proposals are aimed at students of all educational levels, both from regulated and non-formal education, training of adults, families and individuals. In addition, these proposals have different types to adapt to the needs of the recipients. All the activities are free for the users.

During the course 2017-2018 there have been more than 44,000 participants in the different training activities of the program, and the educational offer has been incorporated as climate change, energy and energy efficiency or the knowledge of the metropolitan green infrastructure.

A digital didactic guide has also been created, a digital platform that allows you to find the different educational resources of the Sharing a Future program in an easy, fast, intuitive way and adapted to the needs of each one, both for teachers and for education in leisure or the general public. The didactic guide allows you to search for specific topics, such as water cycle, energy and climate change, sustainable mobility, waste and resources, environmental or environmental health, ecology and biodiversity:

- Educational activities: educational proposals are carried out throughout the year, are free and are aimed at an audience that includes all ages and backgrounds. The activities are talks, guided tours, workshops and activities in the classrooms of the schools that promote sustainability, favor the knowledge of the metropolitan area and reinforce the belonging to the territory.
- Publications and online activities: it deals with educational, technical and dissemination publications on environmental issues. All are free for educational centers, organizations, associations and individuals, and many have downloadable versions.

The catalogs of environmental education activities are divided into:

- Catalog for Regulated Education: participants who are studying some type of training that is contemplated by the Ministry of Education. It includes a wide range of educational activities related to the territory, ecology and biodiversity; energy and climate change; sustainable mobility; the water cycle; waste and resources, and environmental health.
- Catalog for Citizenship and Non-Regarding Training: Rest of non-formal training courses, leisure training, organizations, houses, a part of training in adults and the general public. It includes various proposals such as visits to water treatment plants or ecoparks, among other facilities, as well as activities related to climate change, renewable energies and environmental health.

In addition, a blog has been created, which is a further tool to achieve the objectives of the program, in which there are several contents that provide information, reflection and resources about education for sustainability.

Since 2018, the Program includes a guide for the incorporation of the gender perspective to all program activities.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):

SLSE2 – RRI-related training at higher education institutions
PE6 – Dedicated resources for public engagement
OA1 – Open access literature
OA4 – Public perception of open access

Main actions aimed at climate change adaptation:

As an education program, which develops a change of habits in users, all the actions derived from the program include adaptation and mitigation actions.

Below are some of the educational activities, and their main actions:

We experience the change!

Objective: Understand the concept of climate change and see the relationship with the greenhouse effect through an experiment. They also learn the impacts (both globally and in our territory) and different mitigation and adaptation measures.

What will we put in the survival kit?

Objective: Learn the cause of the temperature rise of the planet through thermometers and domes that illustrate the effect of the greenhouse. Through a Survival Kit you can see what elements are essential to cope with the impacts and consequences of climate change.

We build a windmill

Objective: Become familiar with renewable energies and, specifically, wind energy. Participants (children between 3 and 8 years old) will eventually build a windmill to take home. (it is a play-pedagogical workshop that takes place in parks or streets in the framework of parties, events, etc.).

Main actions aimed at climate change mitigation:

As an education program, which develops a change of habits in users, all the actions derived from the program include adaptation and mitigation actions.

Below are some of the educational activities, and their main actions:

We experience the change!

Objective: Understand the concept of climate change and see the relationship with the greenhouse effect through an experiment. They also learn the impacts (both globally and in our territory) and different mitigation and adaptation measures.

Are we running with renewables?

Objective: to know the operation of four renewable energy sources (solar thermal, solar photovoltaic, wind and hydraulic) through the experimentation and the importance of their use to mitigate climate change.

Water and energy at home: do we make our soundtrack?

Objective: Improve our individual management of water and energy at home. Through different dynamics (some rather artistic ones) you learn if we make good

use of these resources and what good practices we can apply to make responsible consumption. Each group will end up producing an own soundtrack based on its rhythm of consumption.

Get into the water and energy of your home!
Objective: Discovering the carbon footprint associated with energy consumption, how this consumption is reflected in invoices and learn techniques and habits that can be applied at home to optimize energy efficiency, either by reducing losses or being more self-sufficient. Participants will bring their own invoices and advice will be given to reduce their consumption and expense.

The secrets of climate change in the park of Can Rigal
Objective: to discover the role of urban parks in improving the environmental quality of cities and the relationship with climate change. They learn the concepts of greenhouse effect and climate change and the consequences of climate change on the planet and at the local level.

Please indicate the institution/s responsible for the implementation and its/their main tasks

The Metropolitan Area of Barcelona (Catalan: Àrea Metropolitana de Barcelona / Spanish: Area Metropolitana de Barcelona), as a supra-municipal administration, has powers in the coordination and formulation of a Metropolitan Action Plan for the protection of the environment, health and biodiversity, and measures to combat climate change.

AMB encourages every human being to acquire the knowledge, skills, attitudes and values necessary to forge a sustainable future and promote critical thinking and collective adoption of decisions.

The program responds to the desire to sensitize and educate citizens and metropolitan entities about the environment. The AMB, through various actions, helps citizens to incorporate more sustainable habits in their daily activity.

Education for Sustainability is a transversal axis of the environmental objectives and challenges that AMB has in metropolitan territory and aims to enable society to cope with environmental challenges.

The AMB plans the educational actions following specific managers, develops the objectives to be achieved, and details the values that drive each one of the formations and which must be transmitted.
The technical team of the AMB also monitors and supervises the satisfaction of the users, throughout the program.

Please tick the type of stakeholders involved and shortly describe them

X local government X civil society X academia & education X business

Short description of stakeholders:

Metropolitan Area of Barcelona:

The AMB is the public administration of the metropolitan area of Barcelona, a large urban conurbation formed by a total of 36 municipalities.

The constitution as a public administration was carried out on July 21, 2011, in accordance with Law 31/2010 approved by the Parliament of Catalonia. Since then, the AMB has replaced the three existing metropolitan entities up to that date: the Commonwealth of Municipalities of the Metropolitan Area of Barcelona, the Entity of the Environment and the Metropolitan Transport Entity.

Civil society:

All of the people who use the different activities offered by the program.

Academia:

The set of all the educational centers that incorporate the activities offered by the program in its lines of environmental education.

Business:

Currently, the company that carries out the training activities is Lavola.

Shortly describe the forms of cooperation between partners involved in the implementation and the tools used for communication with the society *(maximum 3000 characters including spaces)*:

Participation: didactic and pedagogical innovation is fundamental. For this reason, collaboration agreements with universities and the educational community are promoted.

Collaboration: collaborative networks are promoted with the educational programs of the metropolitan municipalities and are incorporated as a axes closely linked to metropolitan management to protect the environment.

Continuous improvement: the participants of the different activities can perform assessments on the educational actions, both at the level of contents and the development of the activity. The information received helps to improve the program year after year and adapt it to the evolution of the needs.

Indicate the SDGs relevant for the project:

Goal 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Goal 5 - Achieve gender equality and empower all women and girls.

Goal 6 - Ensure availability and sustainable management of water and sanitation for all.

Goal 7 - Ensure access to affordable, reliable, sustainable and modern energy for all.

Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal 12 - Ensure sustainable consumption and production patterns.
Goal 13 - Take urgent action to combat climate change and its impacts

Web link to the project:
http://www.amb.cat/en/web/medi-ambient/sostenibilitat/educacio-per-a-la-sostenibilitat

http://www.amb.cat/en/web/medi-ambient/actualitat/publicacions/detall/-/publicacio/compartim-un-futur-2018-2019--formacio-reglada-/7086143/11818

http://www.amb.cat/en/web/medi-ambient/actualitat/publicacions/detall/-/publicacio/compartim-un-futur-2018-2019--ciutadania-i-formacio-no-reglada-/7086184/11818

http://www.amb.cat/en/web/medi-ambient/sostenibilitat/educacio-per-a-la-sostenibilitat/guia-didactica

http://blogs.amb.cat/pmes/

Short summary of chosen projects(parts 1-4)

a) SOMBLAU project

SOMBLAU is a project developed by environmental and academic entities that was created with the aim of promoting education in climate change, as well as improving the communication of its effects on the marine and coastal ecosystems of the city of Barcelona. With a global perspective but with a local focus, the creation of strategies for adaptation and mitigation of climate change through communication and environmental education of the city's youth will be fostered, with the aim of raising awareness and training on the effects of climate change in Barcelona. The project is executed from different perspectives and sectors involved in formal and non-formal education. The educational bases for climate change will be reviewed, addressing key points such as the integration of this in academic curricula, education in extracurricular areas and the development of new strategies from traditional media and entities that have competencies in the world of environmental communication.

SOMBLAU project emerges from the cooperation of different entities of civil society and the academic sphere: Eco-union, Posidonia Green Project and Institut de Ciències del Mar, which work in the fields of scientific dissemination, public education, environmental and marine research.

b) Climate Change Challenge

An initiative that combines two research institutions (Universitat de Barcelona and ISGlobal), public administration (Barcelona City Council) and students. The overall objectives are:

- Transforming common spaces: since from data gathered conclusions can be drawn to allow urban planning with a climate dimension and evaluate how mobility, green areas, etc. affect urban quality of the city.
- Collective construction: since this initiative has a strong awareness raising objective and it emphasizes the collaboration between agents, communication towards citizenship and social and environmental innovation, with a strong scientific component.

c) RESCITIES: The political ecology of urban resilience to hydro-climatic events in Spain

This initiative combines a research institution (IN3 - Universitat Oberta de Catalunya) and the City Council of Barcelona. Although the central goals are not about climate adaptation and mitigation, there is a strong connection between their objectives and climate action with a co-creation approach. The main goals of this project are:

1. Examine how urban resilience strategies and policies are connected discursively and in practice with other urban policies, such as climate change and smart cities policies.
2. Analyse how urban resilience is articulated with socio-environmental strategies of management and transformation created with and by citizens.
3. Analyse the impacts of the strategies and policies of urban resilience on vulnerable communities.
4. Explore the tensions and challenges of the design and implementation of urban resilience policies, in the context of multi-level hydro-climatic management policies, and particularly of the uneven distribution of benefits and risks for local communities.

d) RESCCUE

The RESCCUE Project is anH2020 research project that aims to help cities around the world to become more resilient to physical, social, and economic challenges, using the water sector as the central point of the approach. RESCCUE will generate models and tools to bring this objective to practice, while delivering a framework enabling city resilience assessment, planning and management. This will be achieved by integrating software tools, methods, and new knowledge related to the detailed urban services performance into novel and promising loosely coupled models (integrated models), multi-risk assessment method, and a comprehensive resilience platform. These tools will allow urban resilience assessment from a multisectorial approach, for current and future climate change scenarios, including multiple hazards and cascading effects. The RESCCUE approach will be implemented in three EU cities (Barcelona, Bristol, and Lisbon) and, with the support of UN-Habitat, disseminate their results among other cities belonging to major international networks.

e) LabTech4 Climate

LAB Tech4Climate - Technology and Innovation for Sustainability is a Platform for investment and acceleration of startups with high social impact in the field of sustainability and the environment based on a partnership built by Aigües de Barcelona, Griño, Bodegas Torres, Fundació Futur and IRTA under the leadership of Ship2B. In the framework of the Tech4Climate platform, technology-based start-ups with the following characteristics are supported:

- Encourage responsible consumption and the efficient management of resources
- Provide solutions for mitigation or adaptation to climate change
- Contribute to making cities more sustainable and resilient
- Contribute solutions to make agriculture and livestock more sustainable
- Generate energy from clean sources or waste
- Use models of circular economy applied to any field
- Provide sustainable solutions for food packaging
- Promote a healthy and sustainable lifestyle