STATE OF THE ART OF CLIMATE CHANGE ADAPTATION AND MITIGATION IN PAYS DE LA LOIRE, BRITTANY AND NORMANDY (FRANCE)

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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 in Pays de la Loire, Brittany and Normandy (France) 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 & Innovations (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

I. GENERAL CHARACTERISTICS OF THE PILOT REGION

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

The French TeRRIFICA pilot region is sometimes called the Grand Ouest (Grand West) and includes three administrative regions of the Western and Northern part of France: Pays de la Loire, Brittany and Normandy.

The region is composed of major but middle size cities such as Nantes, Anger, Rennes, Brest, Caen or Le Havre, but also includes a variety of natural areas, including regional natural parks (Brière in Pays de la Loire, d'Armorique in Brittany or des Boucles de la Seine Normande in Normandy).

Important parts of the three regions are on the littoral of the Atlantic Ocean and therefore the territories have generally moderate and oceanic climate. Littoral economic activities such as tourism and port activities (maritime transportation, fishing and trade) have been developed and marine renewable energies are a potential for the region. The Loire River Valley and Loire Estuary also characterize the region Pays de la Loire.

The three regions are historically and today still farming lands: some areas are particularly specialized in milk production, but others are specialized in fruits and vegetables, vineyards, crops and meat production. Important part of the region historical landscape is called "bocage", which means an agricultural landscape of a blend of fields and meadows of multiple forms, delimited with hedgerows and embankments and sometimes woods and ponds[1].

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

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

Title: **Plan for the development of Agroforestry – National Agriculture Ministry**

Timeframe: 2015 - 2020

Main challenges and goals regarding climate change identified:

Hedgerows and trees within farms seem to be diminishing, whilst agroforestry can have several positive impacts on climate mitigation and adaptation, including:

- Production of timber (renewable energy);

[1] Leaflet of the National Office for Hunt and Wild Fauna https://afac-agroforesteries.fr/wp-content/uploads/2018/05/Bocage-et-biodiversité-V4.pdf

- Carbon capture and storage;
- Nitrogen fixation.
- Shelter for animals;
- Micro-climate and hydraulic regulation;
- Fostering biodiversity.

In accordance with the United Nations Framework Convention on Climate Change, and particularly the National Strategy Low Carbon established through the national law on Energy transition and Green Growth in 2015, the plan introduces two goals:

- From 500 000 hectares of hedgerows between plots in 2015, the objective is to reach 700 000 hectares in 2035, according to a survey on the potential of agriculture for climate mitigation.
- A second objective of reacking 122 000 hectares of trees within plots in 2035.

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

Not foreseen.

Main actions aimed at climate change adaptation:

1. To increase knowledge on diversity of agroforestry systems and their functioning
- Fostering the means of monitoring and gathering data on agroforestry systems
- Fostering the coordination of actions between research institutions, agriculture technology institutes, agriculture chambers, national organizations dedicated to agriculture and Technology Mix Networks
- Fostering research topics on agroforestry
- Evaluating the role of agroforestry in the blue and green line (ecological continuity)
- Establishing a network of agroforestry farms of references

2. To improve the frameworks and strengthen financial supports
- Designing proposals on subsides
- Strengthening mobilization of available tools for actors at regional levels
- Making safer relations between landlords and farmers
- Fostering agroforestry in the framework of compensation measures of environmental impacts
- Studying fiscal leverage supporting agroforestry planting

3. To develop consulting, training and promotion of agroforestry
- Fostering hedgerows and trees within trainings
- Strengthening the structure of agroforestry consulting network on the territory
- Strengthening the civil movement around one organization
- Capitalizing and analyzing knowledge through synthetic awareness tools
- Conducting promotion actions

4. Improving the sustainable economic valorization of agroforestry production
- Supporting development of chains and valorization of food and non-food products
- Developing synergies between quality and other labels on products
- Implementing sustainable agroforestry management plans and promoting it
- Developing a national approach to producing locally produced trees and bushes

5. To promote and publicize agroforestry internationally

- Promoting development of agroforestry at European level
- Promoting development of agroforestry at international level
- Developing research on agroforestry at European and international levels
- Developing European and international educational exchanges on agroforestry

Main actions aimed at climate change mitigation:

Idem

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

The plan establishes goals and specific actions to implement the goals. Foreseen partners for the implementation are identified.

Indicate the SDGs relevant for the region:

SDG 7: Affordable clean energy

- 7.2.1 Renewable energy share in the total final energy consumption

SDG 13: Climate action

- 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- 13.2 Integrate climate change measures into national policies, strategies and planning

SDG 15: Life on land:

- 15.1.1 Forest area as a proportion of total land area
- 15.2.1 Progress towards sustainable forest management

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:

The strategy includes the mobilization of:

- National federations of associations for agroforestry, and other associations: AFAF (French Association of Agroforestry) and AFAC-AgroforesterieS, EURAF (European Agroforestry Federation
- Research institutes, including: CIRAD and INRA, IGN (National Geography Institute)
- The Ministry of Agriculture and territorial collectivities (regional administrations) and APCA (National Network of Agriculture Chambers)
- Farmers through GIEE (*Groupements d'intérêts économique et environmental,* Group of economic and environment interest) working on agroforestry

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)*:
The strategy underlines some forms of collaboration between stakeholder groups, depending on the specific action, including:

- For several objectives, the strategy implements working groups led by the Ministry of Agriculture.
- For analyzing the state of the art on agroforestry research in the framework of the European Partnership for Innovation, the strategy implements a focus group.

Stakeholders are also collaborating through the RMT Agroforestry (*Réseau Mixte Technologique,* Mixt Technologic Network on Agroforestry), existing from 2014 to 2018, gathering all partners involved in agroforestry programs (associations, technical institutes, research centers and education centers, agriculture chambers).

Web link to the document: https://agriculture.gouv.fr/sites/minagri/files/160517-ae-agrofesterie.pdf

3. Strategies/agendas/reports developed by the local government
(please provide max. 3 cases using the criteria below for each example)

Territorial Energy Air and Climate Plans (*Plan Climat Air Energie Territorial (PCAET)*), example of Nantes PCAET
& Regional scheme of planning, sustainable development and equality of territories (Sraddet)

Timeframe:
PCAET were introduced in the Law on Energy Transition for Green Growth (*Loi de transition énergétique pour la croissance verte)* in 2015 to develop plans at inter-communal levels. Each town with more than 50 000 inhabitants had to establish a PCEAT by 31 December 2016, and by 31 December 2018 for town having more than 20 000 inhabitants. These plans must be reviewed every 6 years. PCAET have to be compatible with other local, regional and national plans, such as the Sraddet and the Low-Carbon National Strategy[2].

The PCAET of the Nantes Metropole will be described bellow as an example below. It has been adopted by the Metropolitan Council the 7th December 2018.

Sraddet were introduced in the law in 2015 (law NOTRE, New territorial organization). Sraddet are new schemes that must be developed by Regional Council by 2019-2020. The Sraddet aims at integrating several former planning documents into one, including the former
Regional Scheme for Climate Air and Energy, and the Waste Prevention Regional Plan. PCAET must abide by the future Sraddet objectives. The Sraddet must include energy management, climate change mitigation and clean air objectives.

[2] https://www.ecologique-solidaire.gouv.fr/strategie-nationale-bas-carbone-snbc

Main challenges and goals regarding climate change identified:

The normal temperature was 12,2°C between 1971 and 2000, this average was exceeded 16 years on 20 since 1998; some winters have been also particularly warm or cold. Nantes is located near by the sea and the Loire River estuary. The Metropole is 52 336 hectares where leaves 630 372 inhabitants. More than half of the territory is natural or agriculture area, and 30% is urbanized.

The Nantes Metropole Territorial Energy, Air and Climate Plan comprises an assessment of the energy consumption, Greenhouses Gas emissions and pollutants emissions:

- **Energy consumption:** The population has risen by 19% between 2003 and 2016 and the energy consumption has augmented by 3% on the same period.
- **Greenhouse Gas Emissions:** CO2 emission per inhabitants was 5.1 KtecqCO2 in 2003 and 4.1 in 2016. Road transportation is the first source of CO2 emissions with 43% in 2016), residential sector emits 27% in 2016, service industries 12% and industry 12%, agriculture 2% and waste management is less than 1%.
- **Usage of Lands, Change of usage and Forest:** depending on the usage of the land, Greenhouse Gas may be stocked or released. In 2016, overall the Usage of Lands, Change of usage and Forest absorbed 7,3kteqCO2, far from compensating 2 585 kteqCO2 emitted.
- **Pollutants emission:** pollutants analyzed are SO2, NOX, PM10 and PM2,5, NH3 and non-methane volatile organic compounds. Sulfur dioxide emissions have decreased thanks to measures on road transportation and the quasi-disappearance of coal consumption. Nitrogen oxide and fine particles are mainly due to transportation, whereas ammoniac emissions are mainly due to agriculture, and non-methane volatile organic compounds are mainly due to industry.
- **Renewable energy production:** the wood-energy supply chain is the most developed for producing heating but solar energy appears as the first source to expand renewable energy.

The plan also analyzes the **territory vulnerability to climate change**:

- According to past climatic hazard effects, the territory is vulnerable to flooding and storms, sea rising in the estuary, but also heat waves. Areas with the most population density are the most vulnerable
- According to climate change projections, the territory is particularly vulnerable to:
  - Flooding risks dues to heavy raining and non-permeable soils in urban areas;
  - A high risk of droughts for farming during summer;
  - An increase of heat waves and pollution, including the impact on transportation infrastructures;
  - Perturbation of the biodiversity (for example, migration of species);
  - Water management; including the possible need to take water upstream.

The main goals identified are:

- To reduce Greenhouse Gas Emissions per inhabitants (compared to 2003 levels) by 30% by 2020, and 50% by 2030.
- To reduce the energy consumption per inhabitants (compared to 2003 levels) by 30% by 2020 and 50% by 2030.
- This goal includes to reach a rate of 20% of local renewable energy in the final energy consumption in 2030, with a contemplated share of renewable energy types favoring the wood-energy as the first source, geo-aerothermie and solar photovoltaic.
- Nantes Metropole set also the objective of reaching 30 000 housings will be connected to the heating network from wood heater and waste heaters, with a focus on social housing.
- The carbon storage on the territory must be also increased, through forest, farming and natural lands protection.
- The production of bio-sourced materials and recycled bio-sourced materials, especially in the building sector, must be encouraged.

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

The main indicators mentioned for monitoring the implementation of the plan and its evaluation are:

- Territorial Greenhouse Gas Emissions
- Renewable Energy Production
- Emissions of local atmosphere pollutants
- Air quality (concentration of local atmosphere pollutants)

Main actions aimed at climate change adaptation:

The Action Plan identifies two strategic orientations: 1. Live better with warmer climate, 2. To prepare to new climatic phenomenon. However, the plan mentions other local plans for managing risks of flooding from the river and heavy rains, violent winds, and heat waves.

For example, some measures have already begun, such as allowing access to the river shore to provide cool area during heat waves, or planning species less vulnerable to climate change. Some measures are also foresee, for instance, cultivating plants resistant to climate change, designing storage for rain water and grey water usage for economic activities, or burying communication and energy network lines in areas vulnerable to strong winds.

Main actions aimed at climate change mitigation:

The plan includes three strategic orientations for climate change attenuation: *A transition for 100% of the inhabitants*, *a territory valorizing 100% of its resources*, *a 100% citizen energy transition.* The plan then includes series of commitments. (We may note that these actions may contribute to adaptation). Below are a few examples of the main actions planned:

- Investing 100 millions euros in the Metropole by 2030 for thermic renovation of buildings.
- To double the number of renovation sites to reduce energy vulnerability of low-income inhabitants.
- To invest 1 billion euros in the Metropole by 2030 towards more sustainable mobility, including developing biking schemes and public transportation network.
- To systematize the speed limit of 30km/h in the city to increase walking and biking practices.
- To increase car sharing, for instance by experimentation roads only for car sharing.
- To develop remote working by creating coworking spaces in every towns and encouraging companies.
- To accelerate the development of “clean” buses, i.e. electric public buses.
- To invent sustainable logistic solutions in the urban area for delivering to shops for example.
- To mobilize all renewable energy sectors locally and in other territories in order to develop renewable energy production.
- To establish solar panels or green areas on rooftops. For example, it is planned to install 20 solar roofs on patrimony buildings.
- To reduce electric consumption of public lights by one third in 2020 (compared to 2016). This action would include a limitation of advertising panels by 10% in 2018.
- To develop by 2020 construction of positive energy urban projects, and to commit to using low environmental impact materials.
- To establish a “nature in the city” coefficient in all construction projects, in order to cool down areas where people live.
- To guarantee that every inhabitant has access to a cool area during heat waves. This action includes that in Nantes, the level of 37 square meters of green areas per inhabitants is maintained, which means developing 36 hectares of green areas by 2020 to follow the 1% increase of the population. The plan also intends to develop three existing urban forests.
- To favor a circular economy with zero waste and a decrease of 20% of waste per inhabitants in 2030.
- To reach this objective, to allow that all inhabitants have access to a compost site to sort and valorize bio waste locally by 2025.
- To favor re-usage and reparation of objects locally.
- To divide by 2 by 2025 and by 5 by 2030 food waste per inhabitants.
- To develop the offer of finance engineering to support local initiatives, by participating for example to the establishment of a regional investment fund on renewable energy in 2018.
- To use digital and smart grids to accelerate the energy transition.

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

The plan provides some guidelines for the operationalization, including the

implementation of two structures:

- An Open Conference on Energy transition, set up since 2018, is the structure of shared strategic governance. It is composed of around 30 representatives of the sectors and type of stakeholders concerned by the plan.
- A unique lab for the energy transition, which will be in charge of governance of actions. Its role will be to assist and animate innovative projects of actors from civil society.
- Internally, a community of project manager will allow the operationalization of activities.

Indicate the SDGs relevant for the region:

SDG 7: Affordable and Clean Energy
SDG 11: Sustainable Cities and Communities
SDG 12: Responsible Consumption and Production
SDG 13: Climate Action

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:

For each action, the plan includes a list of foreseen potential partners, such as:

- Citizens ad CSOs such as organizations promoting biking, Repair'Cafe, La Tricyclerie, farmers etc.
- Public administration and territorial collectivities: towns, departments, region, State but also housing administrations or hospitals etc.
- Funding organization, such as ADEME.
- Energy actors, such as ENGIE, ENERCOOP, EDF etc.
- Waste sector: administration and companies.
- University, such as Nantes University.
- Local companies networks and clubs, shopkeepers, service provides, etc.

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)*:

The plan has been developed after the Grand Debate on Energy transition of 2016-2017, and different means of public consultation.
Also, the plan includes some structures in order to foster the collaboration between stakeholders, including the implementation of citizen labs to create connections between initiatives or education programs.

Web link to the document:
PCAET of Nantes Metropole: https://www.nantesmetropole.fr/institution-metropolitaine/competences/plan-climat-nantes-metropole-en-pointe-28755.kjsp

Sraddet Normandy https://www.normandie.fr/le-sraddet
Sraddet Pays de la Loire https://www.maregion2050-paysdelaloire.fr/les-defis-a-relever/
Sraddet Brittany http://www.ambition-climat-energie.bzh

Climate Energy Plan of Brittany (2014-2019): https://ceser.bretagne.bzh/jcms/prod_217106/fr/plan-climat-energie-territorial?details=true

SCRAE Pays de la Loire: http://www.pays-de-la-loire.developpement-durable.gouv.fr/adoption-du-schema-regional-climat-air-energie-a2641.html

Low Carbon National Strategy: https://www.ecologique-solidaire.gouv.fr/strategie-nationale-bas-carbone-snbc

4. Strategies/agendas/reports developed by the local government
(please provide max. 3 cases using the criteria below for each example)

Climate change adaptation Strategy of the Grand West

Timeframe: Study published in 2013, led by the General Secretariat in Regional Affairs and conducted by two consulting companies – Artelia and STRATYS.

Main challenges and goals regarding climate change identified:
The strategy identifies the main challenges regarding climate change related to the specificities of the territory to define what are the major vulnerability factors:
Main climate change challenges for the **Brittany and Vendée (Pays de la Loire) inlands**:

- Threats on farming (crops and animals) due to draughts, heat waves and parasitic diseases, whilst the regions is heavily relying on this economy;
- Management of water: drinkable water but also water used for farming, sea rise and salted infiltrations into marches;

Main climate change challenges for **the Littoral regions near la Loire River:**

- Littoral erosion and sea rise are threatening especially urbanized area on the littoral and near the river, and water depletion may as well threaten the touristic economy
- Climate change may induce new repartition of fauna and flora, with some species migrating from South to North. Yet, urbanized areas are breaking "ecological continuity" that may threaten biodiversity resilience to these changes of natural environment and species mobility.

Main climate change challenges for the **Loire River Valley:**

- Reduction of water flow of the Loire River and its affluent during the low-flow

periods may threaten the security of the 4 nuclear energy production plants using the water to cool down the sites, this warm water may add to the quality reduction of the water and impact the biodiversity;
- Thermal comfort during heat waves in very urbanized areas of the region may cause sanitary issues, especially threatening the most vulnerable,
- There is a risk of flooding in the Loire River valley, questioning particularly transportation networks

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):
Not foreseen.

Main actions aimed at climate change adaptation:
Main actions proposed for climate change adaptation for the whole region:
- Transition to bio-climatic cities and energy sobriety;
- Safeguarding water availability and promoting a system price/usage value including ecosystems needs;
- Supporting existing adaptation projects in the building sector;
- Capitalizing on past experiences of adaptation and crises management;
- Reducing tourism impact on the environment;
- Acknowledging ecosystem services as precious but vulnerable advantages that need protection;
- Supporting alert system in prevention of sanitary crisis
- Adopting governance system allowing flexibility, reversibility, stimulating innovation, within a coherent framework;

Main actions proposed specifically for the Brittany and Vendée Inlands:
- Assisting with the restructuration of farming system towards more sustainable ones
- Implementing technical solution to safeguard water provision for farming

Main actions proposed specifically for littoral areas:
- Adapting to the evolution of coastal territories, based on risk culture and financial pragmatism, and human and environmental issues;
- Experimenting coastal management projects;
- Articulate littoral governance between different levels

Main actions proposed specifically for the Loire River valley:
- Maintaining basic functions of the territory and reduce vulnerability of the territory regarding natural disaster;
- Delivering in priority water to drinking usage and economic activities
- Assisting actors of the viticulture and vegetable farming chains with going towards a more sustainable farming systems

Main actions aimed at climate change mitigation:
Not foreseen.

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

The report includes recommendations for short, mid and long-term specific to each climate change issue identified.

Indicate the SDGs relevant for the region:

SDG 13: Climate action:

- 13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all countries
- 13.2 Integrate climate change measures into national policies, strategies and planning

SDG 15: Life on land:

- 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
- 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
- 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

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)*:

Not foreseen.

Web link to the document:
http://www.bretagne.developpement-durable.gouv.fr/IMG/pdf/MEDCIE-GO-Synthese.pdf

5. 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)

- **Local administration offices (non elected):**
  - Regional Direction of Environment, Planning and Housing *(Directions régionales de l'Environnement, de l'Aménagement et du Logement (DREAL)),* coordinating at the regional level the policies of the national Ministry of Environnement, including on environment protection and climate change policies.
  - Regional Direction of Food, Agriculture and Forest *(Directions régionales de l'Alimentation, de l'Agriculture et de la Forêt (DRAAF)),* in charge of implementing regionally the policies of the Ministry of agriculture.
- **Decentralized institutions (with elective representatives),** i.e. territorial collectivities are decentralized levels of government, with elective representatives. Each level has different competences related to climate mitigation and adaptation:
  - **Region:** Regional scheme of planning, sustainable development and equality of territories (Sraddet), including the former Regional Climate Air Energy Scheme (SRCAE)
  - **Department**
  - **Inter-communal:** Regional Energy Air and Climate Plans (*Plan Climat Air Energie Territorial (PCAET)*)
  - **Town and cities**
- **Agriculture Chambers *(Administration in the department and region, supporting farming with elected representatives of the farming sector)*:** help farming to reduce GES emissions (reducing emissions due to their production and by stocking GES), to adapt to climate change effects, to produce renewable energies. Regional Agricultural Chamber may participate to the Regional Observatory on Agriculture and Climate Change *(Observatoire Régional sur l'Agriculture et le Changement cLimatiquE ORACLE),* supported by ADEME, and aiming at designing agriculture adaptation strategies.
- **ADEME:** (French Environment and Energy Management Agency): implements public policies in the areas of the environment, energy and sustainable development; provides expertise to businesses, local authorities and communities, government bodies; finances projects (research and implementation). ADEME has regional offices in Bretagne, Pays de la Loire, Normandie. (www.paysdelaloire.ademe.fr ; www.normandie.ademe.fr ; www.bretagne.ademe.fr).

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: Bretagne has 3 329 395 inhabitants; Normandy has 3 319 067 inhabitants; Pays de la Loire has 3 786 545 inhabitants (*Source: Insee Estimation 2019).*

NGOs:
The three regions are not the one where there are the most NGOs in France: from 65 000 to 70 000 in Brittany, from 70 000 to 75 000 in Pays de la Loire and from 54 000 to 60 000 in Normandy (2017 figures)[3].

Examples of generalist NGOs on environmental protection including climate:

- ***Alternatiba, Greenpeace, Amis de la Terre*** (Friends of the Earth) are national NGOs or networks of NGOs working on general environmental protection, including climate change. There regional branches in Bretagne, Pays de la Loire and Normandie.
- ***Réseau Semences Paysannes*** is working on climate change mitigation and adaptation indirectly as it is a network of associations, organic farmers, and bakers, promoting the exchange of knowledge related to on-farm seeds. The nextwork is active at local level including in the pilot region.
- **Afac-AgroforesterieS:** is a national federation of Agroforestry professionals and organizations, indirectly working for climate mitigation and adaptation. There regional branches in Bretagne, Pays de la Loire and Normandie.

Examples of NGOs specialized in Climate action:

- **ANV-COP 21** is directly specialized in climate change as the organization was created during the Climate COP of 2015 and aims at creating a citizen non-violent movement for struggling against climate change. **Extinction Rebellion** is a movement born in UK in 2018 that has spread in many territories in France in 2018 and organizes civil disobedience to tackle the emergency of the ecological collapse and global warming.
- **Villes en Transition:** is a movement born in UK in 2006 in the city of Totners, based on Rob Hopkins transition model. The goal is to invite citizens of a local territory to be aware of the climate change deep future consequences on their own life and to prepare for them. The objectives are to reduce individually and collectively energy consumption and GHG emissions, to strengthen the territory resilience by relocating the economic system, to strengthen social relations, solidarity and cooperation between actors of the territory, to gain competences needed for the territory autonomy. The movement is based on a positive vision of the future, on the idea tha climate change may have terrible consequences but the new system that can be created can be much better than the current one. Local groups are working on stepping up the transition of their cities, including in the pilot region of Normandy, Pays de la Loire and Brittany.
- **Climate Action Network:** *Réseau Action Climat* is the French representative of the European and global network of NGOs working on climate change. The network includes local NGOs active in the pilot region:

- **Clim'actions Bretagne Sud**: is a NGO based in Brittany defining itself as a "idea and project laboratory in order to anticipate and act regarding climate change[4]".

[3] Recherches et Solidarités, *La France Associative en Mouvement,* n°15, September 2017, https://recherches-solidarites.org/wp-content/uploads/2018/01/La-France-associative-04-04-2018.pdf

The association organizes public meetings for sharing knowledge and annual events, promotes climate actions and good practices, implements innovative projects.

- **Effet de serre toi même**! Is a local association in Normandy working on anticipating climate change and contributing to the energy transition.
- **Virage Energie Climat Pays de la Loire**: the association aims at creating a "citizen expertise[5]" on climate and energy. Based on Negawatt and Virage Energie Nord-Pas-de-Calais scenarios, Virage Energie Climat Pays de la Loire developed a scenario of Greenhouse Gas emissions reduction and energy transition specific to the region Pays de la Loire.

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** of major cities: Rennes, 43 800 students between 18-24 years old; Angers 22 600; Brest 16 400; Nantes, 40 400, Caen, 19 900 and Rouen, 25 400 (*Source: Insee, Est. 2006)*
- **Research Institutions:**
  - **National Institute of Agricultural Research (INRA) Rennes** (Bretagne & Normandie): Climate adaptation and mitigation may be included in most of INRA research. CLIMASTER is a research program within the West Part of France. Objectives are to: identify climate change reality (tendencies, extreme climates, variability, spatial repartition); identify actual farming responses towards their perception on climate change; measure changes on water and soil by climate change; analyze the different perspectives towards climate change.
  - **LETG – Littoral, Environment, Télédétection - Géomation:** Environment Geography Laboratory of Nantes, Brest, Rennes, Caen.
  - **House of Humanities and Social Sciences, Cluster on Risks, Quality and Sustanaible Environment *(Maison Sciences Humaines Sociales, Pôle Risques, Qualité et Environnement durable*), Rennes University:** aiming at increasing expertise, fundamental research and communication on risks and vulnerability and environmental transition by multi-disciplinary knowledge.
  - **Nantes University, CLIMATRisk** project[6]: inter-disciplinary research project analyzing the population's perception of coastal risks and their resources and strategies to adapt to submersion risks.
  - **IFREMER: French Research Institute for Sea Exploitation** *(Institut*

[4] http://climactions-bretagnesud.bzh/

[5] http://www.virageenergieclimatpdl.org/propos-de-virage-énergie-climat-pays-de-la-loire

[6] https://climatrisk.univ-nantes.fr/accueil-1405274.kjsp?RH=1463133864578&RF=1462981493217

Français de Recherche pour l'Exploitation de la Mer), improves knowledge of the ocean, monitors littoral and sea environments, and sustainable development of marine activities.

- **The Research Institute in Sciences and Techniques of the City[7]:** *(Institut de Recherche en Sciences et Techniques de la Ville)* is based in Nantes, Pays de la Loire. The institute is a federation of research from the National Center for Scientific Research (CNRS) conducting pluri-disciplinary research on urban micro-climate end energy transfers in order to develop useful knowledge to evaluate mitigation and adaptation strategies of the city to climate change.

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)

- **SMEs and large enterprises:**
  - Number of establishments in 2015: 301180 in Brittany, 322 148in Pays de la Loire, 269672 in Normandy. (Source: Insee 2015)
  - Between 26 to 30% of employees are in large enterprises in the three regions. Between 28 to 29.5% of employees from Brittany work in SMEs, and between 29.5 to 31% in Normandy and Pays de la Loire. (Source: Insee 2010)
- **Employment:**
  - Active population (employed and unemployed) of total population is 73.1% in Brittany, 73.1% in Normandy, 75.2% in Pays de la Loire. (Source: Insee 2015)
  - Unemployment rate (rate of unemployed compared to active population): Brittany 7.9%, Normandy 9.4%, Pays de la Loire 7.8%. (Source: Insee 2017)
- **Economy sectors:**
  - Rate of Agriculture in total added-value: Brittany 3.3%, Normandy 2.4%, Pays de la Loire 2.7%
  - Rate of Building in total added value: Brittany 6.5%, Pays de la Loire 6.7%, Normandy 6.2%
  - Rate of Industry in total added-value: Brittany 15.8%, Pays de la Loire 18%, Normandy 20.8%
  - Rate of merchandised Third sector in total added-value: Brittany

[7] https://irstv.ec-nantes.fr

48.9%, Pays de la Loire 50.3%, Normandy 44.7% (Source: Insee 2015[8])

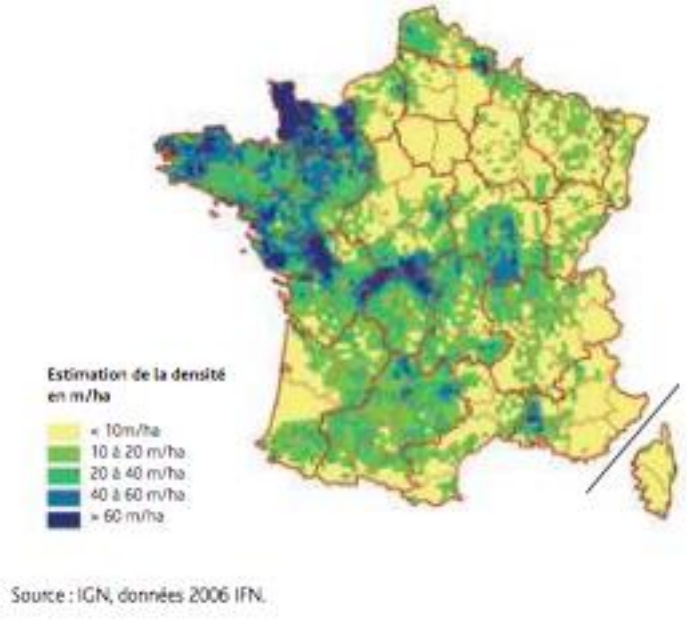
- **Regional Smart Specialization (RIS3):**
  - **Brittany S3 priorities**
    - Social innovation for an open and creative society
    - Maritime activities - Blue Growth (including Marine renewable energy, sustainable use of biomass and biotechnology, new models for exploiting living resources, Boats of the future)
    - Sustainable food supply chain
    - Technologies for the digital society
    - Advanced technologies for industrial applications
    - Observation, and energy and ecological engineering
  - **Lower Normandy S3 priorities**
    - New Smart and sustainable materials
    - Innovation in Bio medical technologies
    - Digital economy and society
    - Energy transition (including dismantling nuclear power plant, decontamination of materials, waste management, renewable marine energy)
    - Food safety and security (including aquaculture, milk and meat production)
  - **Pays de la Loire S3 priorities**
    - Marine industries: naval construction (offshore construction, renewable energy)
    - Advanced production technologies
    - Marine industries (renewable marine energy, marine bio-resources and products)
    - Food and bio-resources (including sustainable agriculture)
    - Design of cultural and creative industry (including urban green areas)
    - Information and Communication Technologies ICT – electronics
  - **Example of enterprises addressing issues of climate change:**
    - Industries innovating in the "blue energy" such as GUINARD Energy in Brittany (https://www.guinard-energies.bzh/fr/guinard-energies/),
    - Cooperatives of local renewable energies such as ENERCOOP Pays de la Loire and Brittany (https://paysdelaloire.enercoop.fr https://bretagne.enercoop.fr), local companies in timber renewable energy,
    - Organic farming: organic production is 5.9% of the total agriculture surface in the region in Brittany, 4.3% in Normandy,

8 https://www.insee.fr/fr/statistiques/c=indicator&i=clap.ettotnn&i2=tcr063.val_ajout_ternonmarch&s=2015&s2=2015&selcodgeo=53&view=map3

8.2% in Pays de la Loire. However, the numbers of organic farms in these regions are quite high, Pays de la Loire is the 5th French region where there are the most organic farms, Brittany the 6th but Normandy the 9th [9].
6. 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)
The Grand West region is particularly vulnerable to some climate change effects due to several specificities, including the urbanized and touristy littoral, the Loire River Valley, the weight of maritime and farming activities in the economy in the region. The coastal location of the region is putting the region at risk of sea rise, coastal erosion, but also marine pollution (ex: algua proliferation in Brittany) or fishing resources depletion. Climate Change may also provoke flooding or very low water levers during draught periods around the Loire River valley. Farming activities may be particularly impacted by climate change mainly because of draughts or weather deregulations or due to parasites and biodiversity depletion. Meanwhile, urbanized areas are vulnerable to sanitary crises, especially due to heat waves and air pollution. The Bocage, this traditional farming landscaping, contributes to mitigate and adapt to climate change. However, hedgerows and trees have been declining since the 1950's, whilst organic farming is not yet very developed in the region[10].

[9] http://www.agencebio.org/wp-content/uploads/2018/10/dossierdepressechiffres-juin2018.pdf

[10] Leaflet of the National Office for Hunt and Wild Fauna https://afac-agroforesteries.fr/wp-content/uploads/2018/05/Bocage-et-biodiversité-V4.pdf



Estimation of Bocage in France.

The institutional framework is currently in transition (like in all the country), as strategies to mitigate climate change are being developed or just adopted at the level of inter-communality in order to replace the former climate plans. The new plans are to be coherent with the wider regional strategies - also under development - and national plans.

II. PROJECTS AIMED AT CLIMATE CHANGE ADAPTATION AND MITIGATION

1. Projects aimed at climate change adaptation and mitigation implemented by civil society (NGOs, CSOs) *(please provide max. 3 cases using the template below)*
CASE 1 - LowTechLab, Brittany (Concarneau)
Source of funding and the budget: Private Foundations but also crowdfounding are supporting the organization, depending on the project,. For instance, Nomade des Mers is financed by Arte, Fondation Schneider Electric, Explore.
Timeframe: 2015 - ….
Main challenges and goals regarding climate change identified: The Low-tech Lab is a Collaborative Research and Documentation project aiming at publicizing and promoting low-technologies solutions that will help reaching the SDG.
Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators): Not foreseen.
Main actions aimed at climate change adaptation: The Low tech lab has three actions: - Gathering documentations on low technologies, including through a collaborative platform, - Communication campaigns to share the low-tech solutions, - Assisting other communities or associations, with the implementation of low-tech solutions. Several projects link to the Low tech lab: - *Nomades des Mers*: an expedition on a boat from France to Indonesia, aiming at testing low-tech solutions, communicating and discovering new solutions (2016 – 2018) - *Low-tech tour*: a tour around France to discover and publicize low-tech solutions for sustainable housing (2017) - *Habitat Low-tech:* to experiment a low-tech house (2018) - *Mission Biosphere*: expedition of one person on a low-tech and self-sufficient boat to test low-tech solutions and their interactions, analyzed by a network of scientists and experts.

(2018)

- *Low-tech for Refugees:* aiming at replying to vital needs of Refugees in Lesbos (Greece), and working on new solutions through collective intelligence. (2018 – 2020)

Main actions aimed at climate change mitigation:
Idem.

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

The association Golf of Bengal (http://goldofbengal.com/apropos/) is implementing the project.

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:
The Low-tech lab is a non-profit organization project, involving experts on low technologies.

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)*:
The Low-tech lab is a CSO initiative, fostering collaboration between low-tech lab users, creators, experts linked to low-tech innovation and actors from the education sector.
The Low-tech lab puts in place a collaborative platform in order to document the low-tech solutions and movements, inviting individuals, fablabs, companies, NGOs and schools to contribute to the lab.
The platform also enables anyone to access to guidelines to make low technologies by themselves, accessible in open data.

Indicate the SDGs relevant for the project:
SDG 3: Good Health, well-being for people:
- 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

SDG 9: Industry innovation and Infrastructures:
- 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

SDG 12: Responsible consumption and production:
- 12.2 By 2030, achieve the sustainable management and efficient use of natural resources

- 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
- 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

SDG 13: Climate Action:

- 13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all countries
- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

SDG 17: Partnership for the goals:

- 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries

Web link to the project: http://lowtechlab.org/

2. Projects aimed at climate change adaptation and mitigation implemented by civil society (NGOs, CSOs)
(please provide max. 3 cases using the template below)

CASE 2 – Virage Energie-Climat Pays de la Loire

Source of funding and the budget:
The organization was funded by the Region Pays de la Loire in 2011 with 25 000 euros and by the City of Nantes in order to finance Consulting services.

Timeframe: Since 2009

Main challenges and goals regarding climate change identified:
The organization was created to tackle climate change locally, and more specifically to foster the decrease of Greenhouse Gas Emissions and the energy transition in the Pays de la Loire region.

The organization summarizes what is at stake:

- Globally, according to the Intergovernmental Panel on Climate Change, the earth temperature has already increased by 0,8°C and will anyway reach +1.6°C. We used ¾ of the total carbon quota. Fossil fuels (oil, gas and coal) stocks declared by the industry reach 2 795 gigatonne. These reserves represent 30 times more than the carbon quota we could still emit.
- Locally, according to the energy and climate assessment of the Pays de la Loire region, the region emitted 34 billion of tones of equivalent-CO2 in 2006, which means an increase of 11% compared to 1990 levels. These emissions were 10 tones eqCO2 per inhabitant and per year in the region, i.e.

6 times more thant the sustainable individual carbon quota. In 2006, the first source of GHG emissions in the region was the agriculture (43% of emissions)[11].

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):
Not foreseen.

Main actions aimed at climate change adaptation:
Idem as mitigation.

Main actions aimed at climate change mitigation:

The main action was to elaborate a scenario specific to the Pays de la Loire region to decrease GHG and to realize the energy transition, based on existing scenarios: the négaWatt scenario (national energy transition) and the scenario by Virage Energie Nord Pas de Calais (for the region Nord Pas de Calais), and the scenario of Solagro "Afterres 2050".
The goals of the energy/climate scenario are:

- To develop an energy system based on renewable energy to ends the dependency to fossil fuels and nuclear energy.
- To reduce GHG emissions in Pays de la Loire by 30% or 40% in 2020 and 75% - 90% in 2050, in order to reach the IPCC defined level that would avoid a climate disaster.
- To ensure that the energy transition at the regional level will benefit the maximum of the population, with a focus on social justice.
- In parallel, the scenario aims at creating a "citizen expertise".

Please indicate the institution/s responsible for the implementation and its/their main tasks
The main institution in charge of developing the scenario was the association Virage Energie Climat Pays de la Loire, composed of volunteers.

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:
Three CSOs founded the organization: Attac44, Sortir du nucléaire 44 and 49, and Alisée (Association Ligérienne d'Information et de Sensibilisation à l'Energie et l'Environnement).

The group intended to use a participatory method:

- The group of around 50 volunteers, whether experts of not, were distributed

[11] http://www.virageenergieclimatpdl.org/content/les-enjeux-locaux

into thematic working groups: habitat, agriculture, transportation, renewable energy, industry and third sector.
- The association has collaborated with students from high schools and universities.
- The association also hired consulting offices to strengthen some parts of the scenario: INDDIGO for the topics of habitat, earth transportation, third sector and renewable energy, and SOLAGRO for a regional version of heir scenario on energy and agriculture Afterres 2050.

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)*:
Virage Energie Climat Pays de la Loire launched a network to communicate with similar initiatives in other territories, with the help of the national federation Réseau Action Climat.
The association also participated in local public consultations, different meetings, debates and workshops organized by the region to promote their scenario.
The association also provides a full educational exhibition, with panels for each topics of the scenario. The material for the exhibition can be freely downloaded online or booked in order to ensure a wide communication.

Indicate the SDGs relevant for the project:
Goal 7: Affordable and Clean Energy
Goal 11: Sustainable Cities and Communities
Goal 12: Responsible Consumption and Production
Goal 13: Climate Action

Web link to the project: http://www.virageenergieclimatpdl.org

3. Projects aimed at climate change adaptation and mitigation implemented by civil society (NGOs, CSOs)
(please provide max. 3 cases using the template below)

CASE 3 – Habitants sentinelles, observons et identifions les signes du changement climatique pour mieux nous préparer / Sentinel Inhabitants, let's observe and identify climate change signals to better prepare for it

Source of funding and the budget:
The project is funded by:
- Fondation de France
- Parc Naturel Régional du Golf du Morbihan
- Bretagne Vivante (local CSO for the environmental protection)
- French State: initiative 100 project for the climate

Timeframe: 2018 - …

Main challenges and goals regarding climate change identified:
The project will focus on the area of the Regional Natural Park of the Morbihan Golf. The main climate change goals identified for this territory are to develop energy and food self-sufficiency, to face sea submersion risk, to ensure biodiversity resilience, to preserve forests and to prepare the increasing attractiveness of the territory.

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):
Not available information.

Main actions aimed at climate change adaptation:
The main action engaged in this project is to create a network of "sentinel inhabitants", inhabitants keeping watch to observe and identify climate change signals, to mutualize good practices and valorize local initiatives. The objective is to analyze in the long term the data and openly share them, so as to develop a shared understanding and diagnostic and to provide a tool for decision-making.
More specifically, the project actions includes for instance:

- developing a methodology and observation protocols adapted to the territory;
- training sessions of the inhabitants participating in the project;
- developing computer tool for data collection; etc.

Main actions aimed at climate change mitigation:
Idem / to be identified.

Please indicate the institution/s responsible for the implementation and its/their main tasks
Clim'Actions – Bretagne Sud is responsible for the implementation of the network of inhabitants keeping watch on climate change signals and animating the community.

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:
The stakeholders involved are:

- Bretagne Vivante: a generalist environment protection association of the region.
- Regional Natural Park of the Morbihan Golfe: a regional natural park has a special status rewarded by the government. The administration of the Park has five goals: the protection and management of the natural and cultural patrimony, the territory planning, the economic and social development, education and information to the general public, and research and

experimentation. - LPO (Ligue de Protection des Oiseaux): birds protection organization. - Bretagne Sud University. - Other partners for providing with trainings.
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)*: No information available.
Indicate the SDGs relevant for the project: **SDG 11:** Sustainable cities and communities **SDG 13:** Climate Action
Web link to the project: http://climactions-bretagnesud.bzh/sentinelles-2/

1. **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)

CASE 1 - Participatory selection of "produced in farms" seeds – the example of PaysBlé "Development of a regional network to experiment, maintain and promote cultivated wheat diversity in Brittany territories in organic farming" *(« Développement d'un réseau régional pour expérimenter, maintenir et promouvoir la diversité cultivée des blés de terroir bretons en agriculture biologique »)*

Source of funding and the budget:
Brittany Region, 75 000 euros, ASOSC program (Social Appropriation of Sciences, aiming at fostering research institutes / associations partnerships)

Timeframe: 2009 - 2012

Main challenges and goals regarding climate change identified:
The main objective of the project was to develop a regional network to experiment, maintain and promote the diversity of local and organic wheat in Brittany. The project therefore aimed at observing the behavior of 3 different wheat varieties, from the seed to the bread, and to define the environmental footprint of the chain at each step.

This project is part of a bigger movement of participatory selection of "produced in farms" seeds, which allows scientists and farmers to select new populations of seeds with genetically heterogeneous and based on ancient or local varieties adapted to the local territories.
Participatory selection of seeds have several climate change adaptation and attenuation goals:

- Varieties are more adapted to organic farming and thus reduce GES emissions;
- Varieties are more adapted to local environment and thus more resistant without chemicals than commercial varieties;
- Varieties are more heterogeneous, creating biodiversity within the same field and therefore, increasing the resilience of farms in case of extreme weather condition or disease (not all the population will be vulnerable to the same choc);
- Varieties are being selected directly in the fields so are constantly evolving according to climate change (whilst it takes years to develop such resistance for laboratory seeds).

Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):
Identified main factors of qualitative variation between modern wheat variety (Renan) and the ancient one (Redon Wheat), and to correspond these factors with the baking techniques. The project allowed a better adaptation to baking practices

to regional wheat varieties.

Main research tasks or actions aimed at climate change adaptation:
The specific research objectives were to:

- Design technical referential to link bread production and wheat production;
- Study the impacts on the territory and bread production of various wheat varieties;
- Cultivate once again and select wheat called Redon (about 300 varieties stored in INRA Conservation Bank)

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

Does the project promote RRI? If yes, please shortly describe (*maximum 100 words*)
The project does not explicitly promote RRI but seems in line with RRI: the project was a Participatory Research project, with associations and universities/ research institutes partnering to conduct the research project. The project therefore particularly fosters public engagement (farmers, bakers, but also the general public trying and evaluating the bread).

Please indicate the institution/s responsible for the implementation and its/their main tasks
INRA Sad Rennes, coordinating the whole project, and Triptolème, leading the experimentation of wheat flour production and bakery.

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:
The project brought together scientists and several actors from the wheat supply chain: farmers, wheat flour producers and bakers.
Partners:
University and Research Institute: SAD Landscapte unit of INRA Rennes & Pôle Ecobio de l'université de Rennes 1
CSOs:
- Association Triptolème (working on seeds diversity, member of the Réseau Semences Paysannes)
- Interbio Bretagne (promotion of organic farming)
- Association Kaol Kozh (working on organic and diversity of seeds)
Associates:
Culture bio
ITAB
ONIRIS
Polytech Paris-UMPC

INRA Nantes

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)*:

PaysBlé was a participatory research project, implementing a co-creation process between searchers and practitioners all along the project.

Wheat varieties and the planting method was chosen collectively with INRA Sad Rennes and 5 farmers/bakers from the association Triptolème, who then grew the seeds. During visits on the fields, farmers could raise awareness of the general public on concepts such as vegetal patrimony.

Meetings between farmers/bakers allowed defining the vocabulary to observe and evaluate (for instance to describe the qualities of the bread), and to compare their multiple vocabularies and meaning, in order to establish a common glossary. The glossary helped to establish an evaluation grid of the breads, in order to evaluate the different wheat varieties.
They also defined a methodology to allow the general public to try and evaluate the breads, and organize evening events for the general public to try out the breads.
The project teams also communicated during their participation to the Ille et Bio de Guichen Forum.

The varieties were tested through baking experimentations, one at a baker and another in the laboratory of INRA Nantes in order to validate the evaluation grid.

Indicate the SDGs relevant for the project:

SDG 2: Zero Hunger:

- 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

- 2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising

SDG 3: Good health and well being for people:

- 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

SDG 6: Clean water and sanitation:
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

SDG 12: Responsible consumption and production:
- 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
- 12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production

SDG 13: Climate action:
- 13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all countries

SDG 14: Life below water:
- 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

SDG 15: Life on land:
- 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species
- 15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed

SDG 17: Partnerships for the goals:
- 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

Web link to the project: https://www.semencespaysannes.org/cultivons-la-diversite/le-groupe-ble-et-autres-cereales-a-paille/autres-actions-dans-le-reseau.html

2. Projects aimed at climate change adaptation and mitigation implemented by academia & education (research public or private scientific bodies, universities, schools, extracurricular education organisations)
(please provide max. 3 cases using the template below)

**CASE 2 - ODySéYeu (*Observation et compréhension partagées de la Dynamique Sédimentaire et des écosystèmes côtiers à l'île d'Yeu, Observatory and shared*

***understanding of Sediments Dynamic and coastal ecosystems in Yeu Island*)**
Source of funding and the budget: ADEME Nantes University Foundation
Timeframe: 2018 - 2020
Main challenges and goals regarding climate change identified: There is a lack of data regarding Yeu Island (Pays de la Loire), regarded less vulnerable than other islands of the area and there are no "Rapid Submersions" or "Coastline Management" plans for this island. However, the island is threatened by human activities and climate change, especially because of sea rise and more and more violent storms. The project ODySéYeu aims at studying the stocks of sand and sediments on the island and putting in place the means for a long term environmental monitoring.
Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators):
Main research tasks or actions aimed at climate change adaptation: - Synthesis of long term evolution of the coastline - Sampling of inland and ocean sands, in order to better understand sand movements - Geophysical campaign around the Island in order to identify sediments stocks - Monitoring tools in key places to better understand factors of sediments' movements - Educational communication of scientifical results - Establishment of a pilot structure for the long term environmental monitoring, including a research cluster to gather and analyze data, a consulting cluster to assist with coastal management decision making, a valorization cluster, to communicate scientific knowledge.
Main research tasks or actions aimed at climate change mitigation: Idem
Does the project promote RRI? If yes, please shortly describe (*maximum 100 words*) The project does not directly promote RRI but contributes to reaching RRI goals by engaging citizens (see communication tools with society) and ensuring open data (through the pilot long term structure).
Please indicate the institution/s responsible for the implementation and its/their main tasks Université Bretagne Occidentale (Occidental Brittany University) is coordinating the project involving 11 partners.

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:
Science:
ORSC Observatoire Régional des Risques Côtiers (Regional Observatory of Coastal Risks)
LabexMer
Nantes University
IFSTTAR
OSUNA (Observatoire des Sciences de l'Univers Nantes Anger)
LETG
GeoScience Ocean
Ifremer
Education
Collège les Sacardières
Cap sur la Réussite
Business:
DigiScan 3D: 3D scanning for companies and patrimony
Studio Matavai
CSOs:
Le Peuple des Dunes des Pays de la Loire: Association opposed to extraction of marine granulates in the Pays de la Loire region
Collectif Agricole Ile d'Yeu (farmers)
Club des Pêcheurs Plaisanciers de l'Ile d'Yeu (recreational fisherman club)
ANGES (Association Nord Gascogne Epaves Subaquatiques): diving association
Yeu Demain: association for the social, economic and environmental development of Yeu Isand
Local government:
City Council of Yeu Island

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)*:
Partnerships:

- Sampling of sands with professional and recreational divers;
- Sea exploration with IFREMER and IFSTTAR

Communication tools for the communication with society:

- "Percept'île": use of model and recreational activity for a better knowledge of the island, targeted to actors in charge of the littoral management;
- "Ramène ta science": pedagogical activities with secondary school students

- "Les randonnées du Paysage": walking paths bringing a better understanding of the landscape.

Indicate the SDGs relevant for the project:

SDG 4: Quality Education:

- 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

SDG 13: Climate Action:

- 13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all countries
- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

SDG 14: Life below water:

- 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

SDG 17: Partnerships for the goals:

17.17 Encourage and promote effective public, public- private and civil society partnerships, building on the experience and resourcing strategies of partnerships

Web link to the project: https://fondation.univ-nantes.fr/nos-projets/odyseyeu-un-projet-pour-prevenir-des-risques-sur-l-ile-d-yeu-2428171.kjsp?RH=1548424510455

1. 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)

CASE 1 - SCIC Bois Bocage Energie, SCIC Mayenne Bois Energie, SCIC Bocagenèse

Sector of activity:
Trading of woodchip produced from natural and local resources and sustainable management of hedgerows; management of collective platform or woodchip storage and drying; promotion of this renewable energy; survey and consulting to support territorial collectivities in implementing wood heating systems.

Size and number of employees:
- SCIC Bois Bocage Energie (Normandy): The cooperative company includes 204 trustees, including 2 employees.
- SCIC Mayenne Bois Energie (Pays de la Loire): The cooperative company includes around 150 trustees (users of wood-boilers, towns, employees and other members).
- SCIC Bocagenèse (Brittany): the cooperative company includes 66 trustees (territorial collectivities, farmers, companies and individuals).

Source of funding and the budget:
- 460 000 euros for the first phase of the project *Label Bois Bocager Géré Durablement*: European Union funds (through Local Action Groups of Sud Mayenne, Pays du bocage, and Pays d'Argentan d'Augeet d'Ouche, from the Inter-LEADER European program); funds from the Normandy, Brittany and Pays de la Loire Regions.
- 245 000 euros for the second phase: ADEME, Ministry for the Environment and Solidarity Transition, Agence Française pour la Biodiversité (Biodiversity French Agency), Brittany, Pays de la Loire and Normandy regions.

Timeframe: 2015 – mid 2019 for the first phase, 2019 – 2020 for the second phase

Title of the project: Label Bois Bocager Géré Durablement (Label Timber Bocage Sustainable Management)

Main challenges and goals regarding climate change identified:
The traditional landscape of Bocage in several regions of France have been declining since the modernization of farming, with today only around 750 000 km of hedgerows being sustained. Moreover, existing hedgerows are dying because there are not being properly managed due to the mechanization of farming and the loss of knowledge on hedgerows management. Also, the rapidly increasing demand for firewood from hedgerows has led to non-sustainable practices. Overall, the actual scenario is the disappearance of hedgerows in France.

Indeed, in order to develop a supply chain of wood fuel from hedgerows, the State,

ADEME and territorial collectivities have been financing biomass boilers fueled with woodchips, as a mean to support a local and renewable energy, and to stimulate hedgerows plantation and maintenance in farms. However, the intensive use of hedgerows wood fuel may lead to unsustainable management of hedgerows, including the development of service providers not guaranteeing the renewal of the wood resource. The supply chain has no mean of valorizing good practices: farmers and sellers cannot valorize the sustainable management of the hedgerows; territorial collectivities relying on woodchips cannot favor sustainable practices.

The label is seen as a solution and intended to be developed at the national scale, as it has been included in the national plan for Agroforestry.

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

Main objective/ indicator of result:

- By 2024, 3 500 famers certified, 35 000 kilometers of hedgerows in eight regions, and 175 000 tones of certified wood.

Main results and deliverables for the first phase (construction of the label):

- Requirements specifications for producers (farmers) and wood sellers (SCIC and others).
- Computer traceability system.
- Certification procedure, enabling independent control: certification groups for internal audits, and external audit by certifying body.
- Governance and national promotion of the label.

Expected results for the second phase:

- To extend the number of pilot regions (three)
- National promotion of the label

Main actions aimed at climate change adaptation:

The label is aiming at:

- Developing a renewable and sustainable supply chain, by bringing transparency and traceability all along the chain;
- Valorizing the sustainable management of hedgerows by farmers, including its related environmental services
- Enhancing farmers' interest in managing sustainably existing hedgerow and in planting new ones.

Generally, the label aims at ensuring the very existence of hedgerows in the rural territory, and fostering a sustainable management so that hedgerows are able to ensure eco-systemic services, including hydrologic effects, micro-climatic effect, wind break effect, increased animal well-being. These hedgerows' eco-systemic services improve farms resilience towards climate change.

Main actions aimed at climate change mitigation:

By enhancing and increasing hedgerows, the project aims at mitigating climate change as hedgerows are not only a renewable and local source of energy but also contributing to stocking carbon. Overall, agroforestry fosters sustainable farming, diminishing certain GES emissions.

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

- A national group is leading the national development of the label.
- Afac-Agroforesterie coordinates the Inter-pilot group.
- SCIC Bois Bocage Energie (Normandy), SCIC Bocagenèse, Lannion-Trégor Communauté et le Bassin Versant du Léguer (Brittany) and SCIC Mayenne bois Energie (Pays de la Loire) are collaborating with around 60 farmers participating to the label designing. There are in charge of the project locally, by mobilizing actors (farmers, new groups of farmers, institutions, sellers etc.) and implementing the label locally.

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:

- Afac-Agroforestry is the leading a network of agroforestry CSOs and thus representing nationally these organizations. Afac-Agroforestry is coordinating the project.
- SCIC are cooperative businesses structures, specialized in trading of woodchip used for energy (buying wood from farms' hedgerows and selling). They either include or collaborate with farmers, sellers, consumers, other organizations related to the bocage (farmers organizations etc.).
- Regional Councils of the three pilot regions (Brittany, Pays de la Loire, Normandy) are supporting the project. The State is also supporting the project in its second phase.

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 project has different territorial dimensions: local, regional and national. Thus, the project's institutions are in place to allow back and forth communication between local, regional and national levels. There is one global meeting per month, and several meetings on different focus. The groups are:

- The technical group: gathering competences of local actors, Afac-Agroforesteries ensures the collaboration at national level.
- Comity Inter-regional: pilot regions' Regional Councils, SCICs, new pilot region to be included, national partners (ADEME, AFB…)
- Comity of national monitoring: is meeting once a year. 30 national organizations, farmers trade union, energy sector, Institut National de l'Information Géographique et Forestière, CSOs, members of regional councils….
- Farmers group: farmers members of the pilot SCIC particularly involved in the project are meeting three times a year to work on focus points of the project, in

order to participate in the designing of the tools, and to test the tools directly on the field through field-trips.

The second phase aims at ensuring feedbacks between local actors and the national coordination, in order to adjust the label and related tools with feedbacks from the local implementation.

Indicate the SDGs relevant for the project:

SDG 2: Zero hunger:

- 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

SDG 6: Clean water and sanitation

- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

SDG 7: Affordable and clean energy:

- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix

SDG 12: Responsible consumption and production

- 12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products

SDG 13: Climate action:

- 13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all countries

SDG 15: Life on land:

- 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
- 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
- 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species
- 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

SDG 17: Partnerships for the goals: - 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries - 17.17 Encourage and promote effective public, public- private and civil society partnerships, building on the experience and resourcing strategies of partnerships
Web links to a project or to CSR strategy: https://boisbocageenergie.wixsite.com/boisbocageenergie/plan-de-gestion-de-haies https://afac-agroforesteries.fr/une-labellisation-nationale/

1. Projects aimed at climate change adaptation and mitigation implemented by <u>local government</u> *(please provide max. 3 cases using the template below)*
CASE 1 - Climate Energy Ambition *(=Ambition Climat Energie)* and the BreizhCOP *(=Brittany Convention of Paries)* in order to define the Sraddet of Brittany.
Source of funding and the budget: Region Brittany, State (Prefect of Brittany) and ADEME
Timeframe: February 2018 - 2020
Main challenges and goals regarding climate change identified: "Climate Energy Ambition" is a strategy carried out by the State, ADEME and the Region to foster energy transition in Brittany. The strategy will rely on the new Sraddet, which will be adopted by the Regional Council with a specific consultation called Breizh COP. The roadmap of the Sraddet defines three challenges[12]: the third one being "Addressing the global challenges of climate change, resources depletion, and biodiversity erosion". More specifically, coastal erosion, biodiversity erosion and water depletion are mentioned. One main objective is "Brittany sobriety[13]", with specific objectives of changing transportation for a better air quality and for climate mitigation, climate adaptation, zero waste and zero crop protection products.
Main indicators (of product/result/impact) applied (MoRRI indicators/SDGs indicators): To be defined.
Main actions aimed at climate change adaptation: To be defined.
Main actions aimed at climate change mitigation: To be defined.
Please indicate the institution/s responsible for the implementation and its/their main tasks The COP has been launched and is being implemented by the Regional Administration. The President of the region has established two steering institutions: o A Steering Committee, including institutional actors and actors from civil

[12] https://www.breizhcop.bzh/wp-content/uploads/2018/04/BreizhCOP_Session190418-3.pdf

[13] https://www.breizhcop.bzh/wp-content/uploads/2018/12/38-objectifs-Breizhcop.pdf

society networks (from State, territorial collectivities, business, NGOs and Economic and Social Council) (for the full list of members: https://www.bretagne.bzh/jcms/prod_416474/fr/liste-des-membres-du-comite-de-coordination)

- A Scientific Committee, including Searchers with various expertise (climate, environment, urbanism etc.) (for the full list of members: https://www.bretagne.bzh/jcms/prod_416475/fr/liste-des-membres-du-comite-scientifique)

Regional institutions will be in charge of the implementation of the final Sraddet that will be adopted in 2020.

Also, based on the COP model, territorial collectivities (included local elected representatives), economic actors, associations, actors of the education sector and citizens are invited to submit commitments addressing the 38 objectives already defined by the regional council.

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:

- Citizens of the Brittany region
- Companies of the Brittany region
- Public institutions of the Brittany region: Regional Council and Region Prefect, but also consultation of other institutions such as the Youth Regional Council, the Regional Economic Social and Environmental Council

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 public consultation to define the new Sraddet of the Brittany region was organized on the model of a Conference of Parties such as the COP21 on Climate.

In 2017, meetings and events were organized with various actors of the territory to define the outlines of the document that will be submitted to consultation.

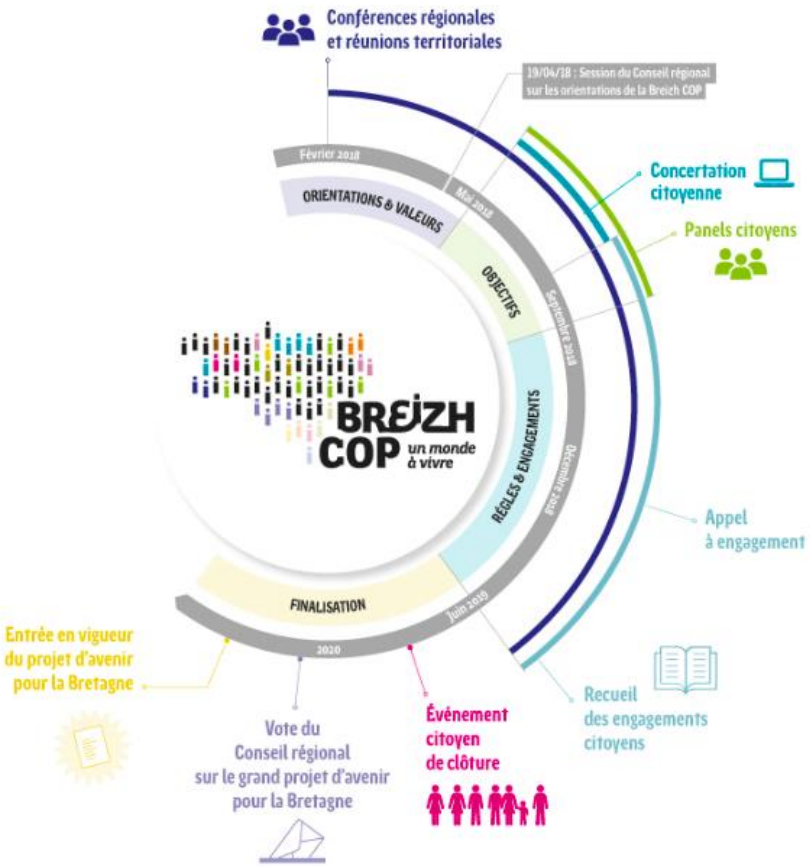
In 2018, citizens, businesses, associations, partners, institutions, were consulted on the values, the rules, guidelines and objectives of the COP through multiple tools:

- Atelier Breton (online consultation tool for citizens)
- Consultation kit: any citizen, association or other could initiate a consultation debate locally;
- A Citizen Panel: around 40 citizens have been randomly selected, representing the region sociology but with more youth represented and an under representation of the wealthiest. The panel of citizens met once physically for a general presentation, then met online 3 times with the help of online tools. An advice was then designed and transmitted to the region council.

- There was a possibility for associations, public institutions or companies to have a BreizhCOP label when organizing an event on one or several key objectives of the COP;
- "Strategiezh", public debate tool, which is a board game to raise awareness on issues, and then to define collectively a strategy for the region, results are communicated to the region;
- A serious video game on sustainable development and possible futures of the region Brittany;
- 5 territorial COP in Brittany: meetings where members of the regional council and technical professionals of the region, and members of the civil society were invited to discuss the 38 objectives defined previously by the regional council, and particularly determine which one were more a priority.

Until June 2019, commitments are collected to define how to implement the objectives. The Regional Institution is inviting stakeholders to commit for the strategy during meetings with different groups of actors (local elected representatives, business, farmers etc.).
In parallel, the Brittany Region, ADEME Brittany and the State also organize a selection of the 5 best innovative actions for a sustainable development, in the line of the Breizh COP objectives but also the SDG.

Elected representatives of the Regional Council will vote the final Sraddet in 2020.



Indicate the SDGs relevant for the project:

SDG 13: Climate Action:

- 13.1 Strengthen resilience and adaptive capacity to climate- related hazards and natural disasters in all countries

- 13.2 Integrate climate change measures into national policies, strategies and planning

SDG 13: Climate action

SDG 17: Partnerships for the goals:

- 17.17 Encourage and promote effective public, public- private and civil society partnerships, building on the experience and resourcing strategies of partnerships

Web link to the project:

https://www.breizhcop.bzh/presentation/etapes-demarche/
http://www.ambition-climat-energie.bzh

2. Projects aimed at climate change adaptation and mitigation implemented by <u>local government</u>
(please provide max. 3 cases using the template below)

CASE 2 - Notre Littoral Pour Demain *(=Our Coast for Tomorrow),* Coutances mer et bocages, Normandy

Source of funding and the budget:
Région Normandie
Agence de l'eau Seine Normandie (11th program, Water and Climate, and in the framework of the Strategy to adapt to climate change of the water basin Seine Normandy, http://www.eau-seine-normandie.fr/domaines-d-action/strategie_adaptation_climatique)
European Union (LEADER program)

Timeframe: 2015 - 2019

Main challenges and goals regarding climate change identified:
Normandy coasts are particularly vulnerable to erosion, rising sea levels, salted water infiltration, storms and marine submersion. Moreover, coast and riversides are more and more inhabited and economic activity places. Urbanization and soil permeabilization are increasing vulnerability of the area to floods. The projects aims at anticipating climate change consequences on the coasts of the region, in order to understand the risks and choices of local planning and an adaptation strategy by 20, 50 and 100 years. The project thus includes all the hydro-sediment cell of the region, which means 94 km of coast.

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

Main actions aimed at climate change adaptation:
Adaptation strategy and action plan to be defined.

The project has three phases:

- first phase is a training of elected representatives of the towns to evaluate what is at stake;
- second phase is the development of an analysis, and development of the analysis with consultation of stakeholders;
- third phase is the development of an action plan.

The analysis identified 4 main coastal risks related to climate change[14]:

- Coastal erosion: infrastructures are modifying the phenomenon of erosion and may report erosion to other parts of the coast. Therefore, common analysis and action plan between coastal neighbors is essential for an integrated action.
- Submersion risks: erosion of dunes is increasing the risk of sea submersion. Floods may be caused also during heavy rains by

[14] Journal du projet "Notre littoral pour demain », *Montée du niveau des mers et risques littoraux,* n°1, June 2018, https://fr.calameo.com/read/005627474e739692f6983

coastal or river submersions but also aquifer overflows.
- Natural ports (*havres)* are progressively filled, with complex consequences on marine activities, farming, but also on floods and sea infiltration.
- Because of rising of sea level, there is a risk of more intrusion of salted water into aquifers, impacting drinkable and farming water, located in the inland.

The survey has allowed identification of soft management solutions of coastal risks. The towns are experimenting some solutions (such as wooden barriers and send plants) and have identified some strategic withdrawal (delocalization of 3 houses and 1 farm)[15].

Main actions aimed at climate change mitigation:

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

64 towns in Normandy on the same "Hydro sediment cell": Communauté d'Agglomération du Cotentin, Communautés de communes Côte Ouest Centre Manche, Coutances mer et bocage, Granville Terre et Mer

Please tick the type of stakeholders involved and shortly describe them

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

Short description of stakeholders:

- 64 towns
- participation of the general public and associations in workshops
- Regional Institute of Sustainable Development Normandy
- Réseau d'observation du littoral de Normandie et des Hauts-de-France (Network of coast observation of Normandy and Hauts de France)

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 Regional Institute of Sustainable Development Normandy (Institut Régional du Développement Durable) is a partner of the project and especially supported with a training dedicated to the elected representatives of the towns (2014 – 2016)[16].

The communication of the project's results was done via a Journal[17].

In 2018/2019, the local administrations of towns organized workshops with technicians opened to the general public. The first round of meetings were

[15] http://www.eau-seine-normandie.fr/Coutances_Littoral_CC_aout_2018
[16] http://www.ird2.org/?foad=notre-littoral-pour-demain
[17] https://fr.calameo.com/read/005627474e739692f6983

organized to communicate the results of the survey, and the second round of meetings aimed at amending adaptation scenarios[18].
By the end of 2019, a cost-benefice analysis and law analysis of the two scenarios will be conducted, in order to choose one scenario and define an Action Plan. The action plan and adaptation strategy will be introduced to the general public.

Indicate the SDGs relevant for the project:
SDG 13: Climate Action: 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
SDG 14: Life below water: 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

Web link to the project: https://www.coutancesmeretbocage.fr/lesprojets/notre-littoral-pour-demain/

Short summary of chosen projects (parts 1-4)
The institutional framework of the region is moving as new local plans are being developed, embedding climate change mitigation and adaptation, with more or less public consultation. For example, the Brittany Region has chosen to follow the Conference of Parties framework as a mean of public consultation *(Breizh COP project).* CSOs are also participating in the planning process by developing sustainable scenarios (*Virage Energie Climat Pays de la Loire project)* or by creating networks of citizens analyzing climate change signals to inform decisions (*Habitants sentinnelles project).* As agriculture is an important sector of the region, several projects aim at making farming more sustainable through multiple stakeholders' participation. NGOs, farmers, Scientists, and local cooperatives supported by national and local institutions, are promoting the agroforestry model, contributing to both mitigate climate change and increase resilience of farms (*Label Bois Bocager Géré Durablement project)*. On the other side, Scientists and CSOs - including farmers – are collaboratively working for developing seeds adapted to organic farming, and thus mitigating the impacts of agriculture on the environment, and improving the resilience of farms to climate change (*Pays Blé project)*. Regarding adaptation to climate change, sea level rise seems to be a major threat identified and some projects from the Science community or from local government

18 https://fr.calameo.com/read/005627474f075f8b0dc2b?fbclid=IwAR22KssAah55cUtWsctpMJdiuCRGVo-KL4gjYDFrZ0ZlikBkCnEeL783jok

are trying to anticipate and manage this coastal risk (*ODySeYeu and Notre littoral pour demain projects)*.

Finally, there is a rapid development of the low technologies' movement, favoring frugal technical innovations rather than energy-consuming technical innovations. The *LowtechLab project* in Brittany is very emblematic of this movement, contributing to mitigating but also adapting to climate change.