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Fitting existing knowledge into the planning process:
An integrated database on adaptation and mitigation measures in Europe

Abstract

Climate planning has significantly risen since the Paris Agreement in 2015. Many different climate actions are being planned, implemented, and documented, covering a variety of hazards, sectors, and particular social or economic groups in the cities. However, there is no uniform way of responding to the climate crisis. Proposed compilations of climate actions generally present: (1) a lack of coherency regarding the level of abstraction and goals and (2) neither a common framework aligned with existent climate planning development tools to characterise them. Both facts might add uncertainty to climate planning development.

The LOCALISED Adaptation and Mitigation Measures (LAMM) Database compiles measures at the same level of abstraction in an integrated adaptation and mitigation approach. We propose a framework to match climate actions to their role and goal into the implementation process, and classify them between measures and instruments.
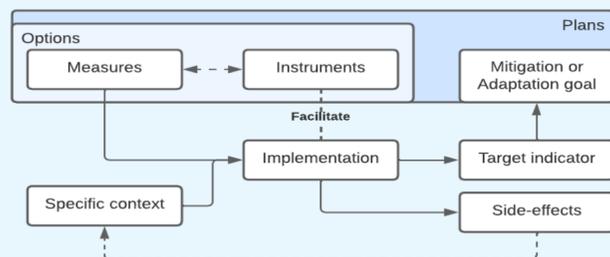
Measure: Actions to address mitigation and/or adaptation goals linked to specific contexts and sectors. Measures have an outcome measured by an indicator and have side effects.

Instrument: Actions taken and/or mandated by a government or other stakeholder to initiate or accelerate the implementation of mitigation and adaptation measures.

Climate actions will be characterised by a framework aligned with the Baseline Emission Inventories (BEI) and Risk Vulnerability Assessments (RVA) to develop Sustainable Energy and Climate Action Plans (SECAP) by the Covenant of Mayors. Further, the Database contains relevant data for implementing the measures, such as costs, time for implementation, common administrative scale, and potential stakeholders involved, as well as considering the possible synergies and trade-offs between mitigation and adaptation, sectors, and hazards. With that, the LAMM Database aims to provide data to produce quality climate plans, following existing literature findings. Despite being unable to provide specific data for one region, it contains valuable information for climate planners.

To ensure the future reliable and coherent reproducibility and expansion of the Database, we built a detailed methodology to systematically select and classify climate actions in the LAMM Database. Firstly, a five-question decision tree is applied to assess the climate action abstraction level. Secondly, we developed a method based on keyword detection to semi-automatically assign the attributes in the SECAPs' BEIs and RVAs framework to each one of the climate actions.

Ultimately, the LAMM Database compiles 314 measures and 213 instruments selected from 12 databases, projects, and literature. There are 18 variables in the Database for each measure, distributed into four types of data: measures' descriptors, main attributes, data for implementation, and associated instruments and SDGs Oriented Indicators (SOIs). The first three data types (16 variables) define a measure. The Associated Instruments provide a list of instruments that a planner can use to facilitate the implementation of a measure. At the same time, the SOIs offer a list of relevant indicators that are useful to assess the outcomes of the measure concerning its target.

1. Explore the measures dataset using filters per attribute, or data ranges.

2. Find out common instruments attached to each measure.

3. Display relevant Sustainable Development Goals Indicator, used to evaluate the success of a measure in meeting adaptation and mitigation goals. Can be used to assess synergies with different Sustainable Development Goals (SDGs).

Building the database

The building of the database can be summarised into three main blocks:

1. Compilation of climate actions

The 12 existing European climate action projects, repositories and reports feeding the LAMM Database are Climate-ADAPT, RESIN Database, RESCCUE Database, CLARITY Project, Carbon Disclosure Project Adaptation Actions and Emission Reduction Actions datasets, IPCC 6th AR Group II, IPCC 6th AR Group III, European Environmental Agency on Greenhouse Gas Policies and Measures, SuM4All Catalogue of Policy measures, TEG Taxonomy Database, ENSU 2022 Sufficiency Policy Database.

All climate actions found in those sources are real planned and/or implemented climate actions throughout Europe.
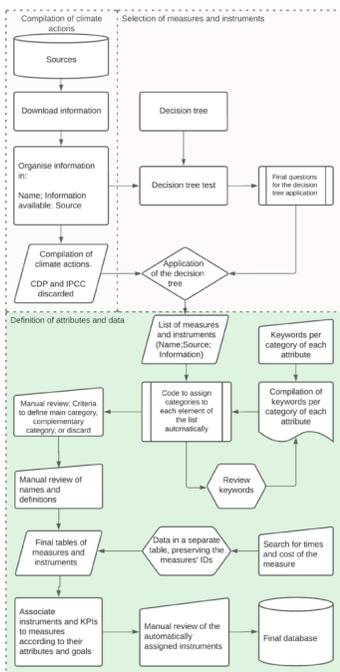
2. Selection of measures and instruments

To level climate actions at the same level of abstraction, we developed an original five-binary questions decision tree methodology to objectively discriminate between measures, instruments, and options. According to the answers to the questions, the method allows for automatically understanding whether a climate action is a measure, an instrument, or an option.
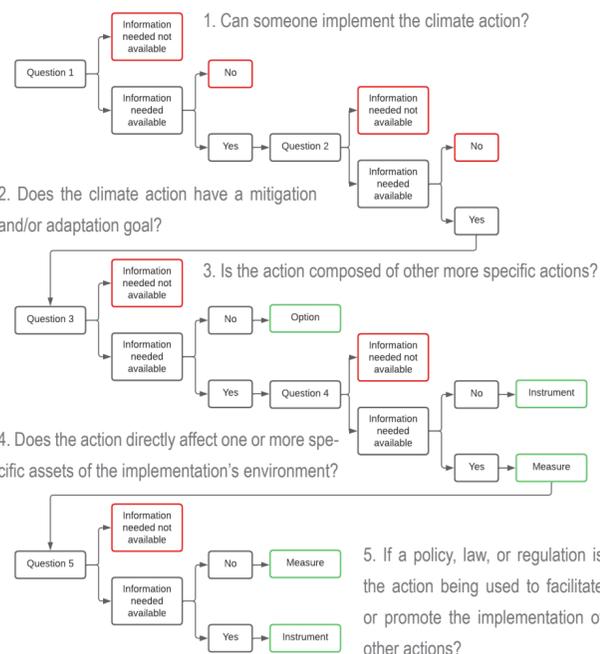
3. Definition of attributes and data

Not accounting for implementation times and long-term planning (IPCC, 2022), inappropriate planning scale (CDP; IPCC, 2022), and non-consideration of justice issues (Hughes et al., 2020) might lower a measure implementation rate. Moreover, accounting for responsibility in the planning stages, quantifiable adaptation and mitigation goals, and an adequate cost estimate increase the quality of plans (Reckien et al., 2023). Conjointly, considering synergies and trade-offs within measures and with sustainable development goals might significantly increase a measure effectiveness (IPCC, 2022). In sync, national regulations and international initiatives play a key role in developing local climate plans (Reckien et al., 2023). The Covenant of Mayors is one of the biggest, with more than 11.000 signatories, which commit to developing a Sustainable Energy and Climate Action Plan (SECAP). However, no alignment with the SECAPs templates provided by the CoM has been detected within existing climate planning literature. Thus, aligning the found data with those tools was central to our research.

Measures' descriptors		Complementary items	
ID of the measure	Measure ID in the Database.	Associated instruments	List of instruments thought to facilitate the implementation of a measure.
Name of the measure*	Name of the measure.		
Description of the measure*	Brief description of the measure.	SDG's Oriented Indicators	List of SDGs Indicators that might be used to quantify a measure outcome.
Sources	Sources.		
Data for implementation		**Attributes of the measure**	
Time for implementation [1][2]	Time needed to implement the measure.	Type of response [1]	Mitigation or adaptation.
Lifetime [1][2]	Life expectancy of the measure.	Main sector [1]	Main sector addressed by the measure.
Implementation costs [1][2]	Direct costs related to the implementation process.	Mitigation sector [1]	Only for mitigation measures.
		Complementary sectors	Identified sectors with synergies and/or trade-offs.
Maintenance costs [1][2]	Costs associated to the lifetime.	Main hazard [1]	Main hazard addressed by the measure.
Origin of the measure [1][2]	Administrative scale		
Stakeholders involved [1][2]	Typical stakeholders involved in a measure implementation.	Affected hazard	Identified hazards which might be affected by the measure.

[1] Variable transferable to SECAPs. [2] Estimated values

Instruments descriptors
ID of the instrument
Name of the instrument
Description of the instrument
Sources
Attributes of the instrument
Type of response
Main sector
Main hazard
Origin of the instrument
Type of instrument
SOIs
SOI ID
Name of the SOI
Main sector
Main hazard
Method
Unit
SDG related

PRELIMINARY RESULTS

Crossed analysis of different attributes allows a deeper understanding of European climate action. The graph shows intersectoral synergies at different scales. Size of each circle represents the amount of measures having an outcome on a specific sector. Dark colours simbolize measures addressing that specific sector as their main goal, while the bright aura simbolizes the number of measures having an indirect outcome on it.

TYPE OF RESPONSE   **SECTOR**   **HAZARD**
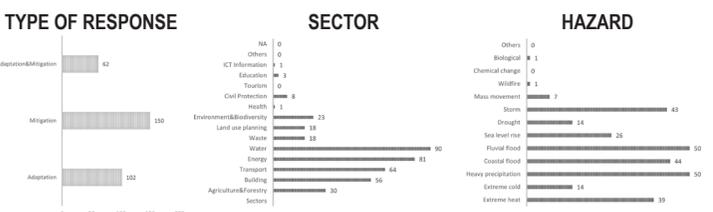
INSTRUMENTS IDENTIFIED TO ADDRESS SECTORS, PER TYPE

SECTORAL SYNERGIES PER SCALE AND TYPE OF RESPONSE
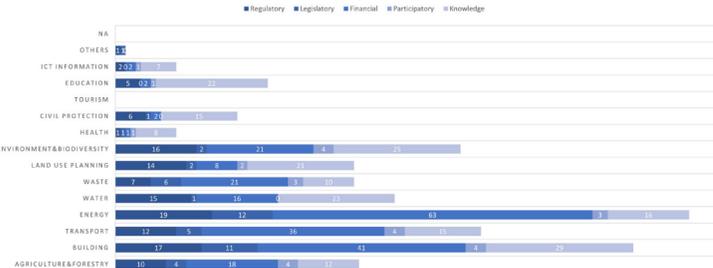
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