

FOOD SECURITY AND HEALTH

Fair, healthy and environmentally-friendly Food System and a better Air Quality

Executive summary

The EU Commission sets out a development strategy to transform the European Union into a fair and prosperous society without net emissions of greenhouse gases by 2050 and where economic growth is decoupled from resource use. Sustainable management of natural resources and climate action represents the pillars of the European Green Deal for the EU. Adaptation to climate change is explicitly mentioned in the Deal and climate services (CSs) are an essential support to preserve quality and quantity of environmental compartments. Throughout the CLARA project thematic Workshops and Forums were organized to involve developers and users in the process of co-generation and co-development of CSs. Climate services have to be user-friendly, simple and accessible. They must provide complete information about the future in order to support planning and management. Users are keen to adopt new technologies as far as they can provide effective support and financial benefits. The EU funding mechanism should be boosted to promote the use of CSs in selecting sustainable farming and irrigation practices, improving air quality. Innovation from projects can go to market but this process needs a specific source of funding and support from the EU.

Introduction

The European Commission (EC) has developed a European Green Deal, a new development strategy addressed to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy without net emissions of greenhouse gases by 2050 and where economic growth is decoupled from resource use. In the European Green Deal, the EC has already set out a clear vision of how to achieve climate neutrality by 2050, which the Farm to Fork Strategy is a key component. The **Farm to Fork Strategy** will strengthen European efforts to tackle climate change, protect the environment and preserve biodiversity.

The Commission's proposals for the **Common Agricultural Policy (CAP)** for 2021 to 2027 stipulates that part of its budget will contribute to the climate action: namely the promotion and implementation of technical measures for both mitigation and adaptation at farm level.

Given the pressure on natural resources, agriculture has to improve its environmental performance through more sustainable production methods and complementary services developed to meet the needs of specific

users. Climate Services (CSs) can facilitate the decision making process by assessing the benefits of farming practices and by addressing specific adaptation issues (i.e. water scarcity and drought).

Because Air quality, weather and climate are closely linked to each other, the use of CSs can help to anticipate the risks coming from poor air quality.

The ambitious European Green Deal plan proposes among other aspects a **zero-pollution environment**. The EC can achieve this goal with better monitoring, reporting, prevention and remedies for air pollution.

In this way, Copernicus Atmosphere Monitoring Service (CAMS) and Copernicus Climate Change Service's (C3S) data are often used as input for atmospheric dispersion modelling in air pollution and public health (downstream services).

Some of the targeted users of CSs are environmental and health authorities, irrigation water management authorities (e.g. water procurement and allocation agencies) researchers and consultants. In the CLARA project the users were engaged in the **co-generation and co-development process** of an



innovative set of CSs, through a Multi User Forum (MUF), workshops and meetings. The Co-generation process with users allows to simplify the scientific context and to provide a replicable and useful service.

Approach and results

Which are the climate services for food security and health?

Agriculture and irrigation:



WRI: provides numerical 7-day crop irrigation need forecasts and probabilistic seasonal anomalies of irrigation needs on an operational webGIS platform. The WRI users are agricultural water providers for optimal management of the resource.



IRRICLIME: the service uses inputs from Copernicus seasonal forecasts and exploits a water balance model, offering full access and interaction through an innovative cloud web application. The service payment system is via monthly subscription with 2 rates for authorities and farmers (pay-per-use system).

Air quality:

AIRCLOUD: is an in-cloud air quality modelling tool for high resolution assessments on the local and micro-scale/street level. The service use Copernicus Climate data as input and boundary conditions.



AQCLI: is meant to investigate air quality in present climate conditions and compare to future climate scenarios.

Moreover, CLARA project provides two services providing climate forecast data: **CLIME**, an horizontal service providing distribution of climate data to support many different uses, can supports farming and irrigation practices and air quality with climate projections and **PPDP** provides ready to use decadal predictions as input for operative CS.

What are the key elements for good climate services for food security and health?

A service to respond to users' needs

A key element for the development of functional and effective CSs is the involvement of users in

the service co-generation process. The MUF members help to design CSs project workflow, method and output, share and frame the innovation as to respond to users' needs, and design marketing strategies for harnessing the economic value of near term climate predictions and forecasts for better policy and decision making.

Users suggest that CSs should be **user-friendly, simple and accessible**, should provide a sufficient accuracy about the future in order **to support planning and management**. However, CSs should not present redundant information, but it should be synthetic and reliable. CSs are developed as an integrated tool because climate is not the unique component, but one of the required to perform an analysis.

Identification and overcoming barriers

		DEGREE OF RELEVANCE		
		H	M	L
LEVEL OF AGREEMENT	H	USAGE LEGISLATION	COMMUNICABILITY	
	M			
	L		FUNCTIONAL RISK	

The application of a Business Model (BM) pattern allows to identify users, to analyse CSs value and to highlight the main barriers, and potential opportunities in term of users' involvement in the design, development and eventual launch of the service.

The MUF members, interested in water management for agricultural irrigation and air quality assessment, outline the **usage legislation** as a real barrier, both because it is necessary to comply with the objectives of European policy with responsibility and for the lack of adaptation strategies at regional and local levels. The main regulatory gap arises from the non-binding nature of the national adaptation climate change plan.

In the application of CSs, **communicability** is often a barrier due to use of terminology and logic unknown to users and of new technology application. **Functional risk** has not been

identified as a relevant barrier although users need their own uncertainty management model in order to exploit the uncertainty associated to long range forecasts for mid-term and seasonal decision making.

Moreover, users are well-disposed to adopt new technologies as a best practice to obtain financial benefits.

Overall, overcoming barriers, the market grew: **new actors** and **new products** came out in the past years and this provides innovative revenue-generating activities. In this sense, the results of research community effort arise out.

Conclusion

The engagement of different user communities in climate service dialogues with research and development teams allows CSs design and development not only in general but also specifically in each application domains. The CSs are normally probability-based and this directly impacts on the decision-making process even if there is increased recognition of the role of weather forecast and climate projections in supporting business decisions. On the other hand, CAMS and C3S data consultation is

currently increasing by mass-media in addition to research community, becoming even more authoritative and recognised source of thought-leadership, in particular recently Copernicus data were used as support of analysing and monitoring air quality in the context of COVID-19.

It's essential to build trust in marketing CSs products, for this reason a science-based evaluation framework together with a public-led quality assurance mechanism would produce an informative price signal to the market. Users assign the value depending on accuracy of the forecast matter and science would become a driver of the customer's willingness-to-pay. Public authorities assume a role of data provider being involved also as partner in the CSs design: this can guarantee the payment-free for the service and overcome the lack of money.

The role of the public sector is important to ensure that CSs guarantee accurate scientific knowledge, to limit the spread of inaccurate information and to provide services for general goodness.

Implications and recommendations for a successful CS for Food security and Health

CSs can **support in projecting future** towards a more sustainable and resilient agriculture and a better air quality. CSs can **be introduced for** decision making and also for **assessing benefits of** best practices.

Therefore, the **EU funding mechanism** could be boosted to **promote the use of CSs** in selecting sustainable farming and irrigation practices, improving air quality, define adaptation and mitigation measures and finally compute benefits in terms of sustainable use of resources and environmental impacts. Innovation cannot flourish without a strong and continuous flow of funds. Further funding waves may work to support the **marketability** of these **complex innovations**, but strongly call for a co-funding mechanism.

Users and stakeholders recognized the importance of a common legal framework to reconcile interests and the creation of an intermediate body which reports the interests of low administrations to the higher level (eventually, also EU). Member States of the EU have agreed on rules to improve the lives of European citizens: contribute to **climate change mitigation** and **adaptation**; foster **sustainable development** and **efficient management** of natural resources such as water, soil, and air; contribute to the **protection of biodiversity**, enhance ecosystem services and preserve habitats and landscapes.

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Acknowledgments for review: Giulia Villani (ARPAE), Roberta Amorati (ARPAE), Vittorio Marletto (ARPAE), Paolo Mazzoli (GECOSISTEMA), Stefano Bagli (GECOSISTEMA), Christian Asker (SMHI), Giuliana Barbato (CMCC), Pasquale Schiano (CMCC), Paola Mercogliano (CMCC)

This Policy Brief is edited by Andrea Taramelli (ISPRA), Jaroslav Mysiak (CMCC)

First published July, 2020

Rev. April, 2021

