STRATEGIC - SCIENTIFIC PLAN

Hub Argentina - My Climate Risk

2024 - 2028

VISION

Be a regional leader in developing methodologies for producing scientifically robust and socially relevant climate risk information.

MISSION

Promote inter- and transdisciplinary dialogue and include regional actors and institutions, in order to address climate risk research based on multiple sources of information and co-production of socially relevant knowledge.

ABSTRACT

This document has two functions. Firstly, it provides a guide for the collective work of the Argentina Hub of My Climate Risk during the period 2024-2028. We expect that this is a living document that will change depending on the reflections and results that we will reach during the process. Secondly, it functions to share the conceptual framework and objectives that guide the work of this Hub with the rest of the My Climate Risk community. In this sense, it could help to integrate new groups of scientists who wish to join the international My Climate Risk network of the World Climate Research Programme (WCRP).

The document begins with a brief description of the positioning of our Hub in the international context within the WCRP framework. We then describe the conceptual framework of our Hub through the presentation of our collective understanding of our work streams. Bearing in mind that these understandings will be modified through the work of the Hub, this section can be interpreted as a conceptual starting point. In the final section, we describe our objectives for the next five years.

1. Introduction

The World Climate Research Programme (WCRP) was established in 1980, under the sponsorship of the World Meteorological Organization (WMO), the International Council for Science (ICSU) and the Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO), to answer the following questions: (i) to what extent can the world's climate be predicted, and (ii) how has humanity influenced climate? The WCRP has made considerable progress in the understanding of these questions, but the evolution of climate research in recent decades, as well as the global understanding and concern about climate change, required a redefinition of the scientific objectives of the Programme. For these reasons, the WCRP Strategic Plan for 2019-2028 set out the following four objectives: (1) to advance fundamental understanding of processes, variations, and changes in the climate system; (2) to predict the near-term evolution of the climate system; (3) to refine the ability to anticipate future pathways of climate system change; and (4) to support the development of theory and practice in the integration between natural and social sciences.

In order to advance these four objectives, the WCRP has developed a number of Lighthouse Activities. These activities are designed to make rapid progress on some of the new science and technologies, as well as institutional frameworks, needed to manage climate risk and meet society's urgent need for usable and robust climate information (robust: that the information has validity in terms of quantity, quality, and consistency: Mastrandrea et al. 2010). One such lighthouse activity is My Climate Risk (MCR), which aims to develop and integrate a bottom-up approach to regional climate risk. This approach starts from the context and decision scale of a problem and allows relevant climate information to be introduced into that context (Rodrigues and Shepherd, 2022). To advance in this direction, MCR has proposed the creation of regional communities of practice (hubs) by institutions/researchers that are working on climate risk issues at local and regional scales. Thus, in March 2022 the Hub MCR CONICET Argentina, the first hub in South America, was created.

2. Conceptual starting points

The MCR CONICET Argentina Hub (hereinafter, Argentina Hub) is formed by a group of researchers and undergraduate and graduate students from different disciplines: Anthropology, Atmospheric and Oceanic Sciences, Physics, and Geophysics. Given the plurality of disciplinary perspectives to achieve the objectives mentioned in section 3, in the Argentina Hub we propose to initiate our work from the following five conceptual axes.

2.1 Spacial and temporal scope

Spatial and temporal scales are intrinsic to the scientific definition of climatic phenomena, including those that can lead to risk to society. These different scales lead to the existence of various branches for the study of climatic phenomena: micrometeorology, mesometeorology, synoptic meteorology, large-scale, among others. However, when risk is addressed from a bottom-up approach, the definition of spatial and temporal scales need to be based on aspects linked to the territories and the communities concerned in each case.

The definition of the spatial scale ("the region" or "the location") is particularly challenging, given that it depends on the climate event to be analyzed but also on land use planning, the socio-economic factors of the populations (Hernández et al., 2015), and the interpretation given by each sector and/or discipline. Depending on the scale of analysis there are possible combinations of circumstances that increase or decrease exposure and vulnerability to climate variability and climate change (Hernández et al., 2015; Morón et al., 2015).

In the Argentina Hub, we do not intend to cover an a priori defined territory (as it could have been, for example, the national territory), which is why we don't need a strict definition of the concepts of "local" or "regional". Instead we will define the spatial scales according to the needs of climate information of each community participating in our projects and initiatives. This responds to the fact that the objective of the Hub is oriented towards methodological development based on research experiences in different territories. In this way, the activities of the Argentina Hub in Latin America can be complementary to those developed by existing or future hubs.

Likewise, the temporal scales analyzed will depend not only on the type of meteorological phenomenon considered but also on the duration of the impacts on the communities that we are working with and the social temporalities involved (economic, political, historical) since we will take into account factors associated with the resilience of socio-environmental systems.

2.2 Risk

To work interdisciplinarily in the My Climate Risk framework we aim at developing a common understanding of the "risk" concept. During this first stage of the Hub we have identified two widely used frameworks provided by natural and social science disciplines (Webinar).

The natural sciences definition is formulated by the Intergovernmental Panel on Climate Change (IPCC, Reisinger et al., 2020), and is a useful definition for working at multiple spatial scales. As such, this definition is a key tool for comparing the risk that different regions, sectors, and actors are facing in the context of climate variability and change.
The IPCC defines climate risk as the combination of a climate hazard, the exposure of people and ecosystems to that hazard, and their vulnerability. This combination is specific to each context. Thus, the risk assessment will be characterized by having a regional/local imprint that contemplates the different territorial realities in the face of the occurrence of climatic phenomena with the potential to generate impacts.

Hazard: a climatic phenomenon that may endanger a group of people and/or their environment, e.g. drought, heat wave, flood.
Exposure: he presence of people, livelihoods, species or ecosystems, environmental services and resources, infrastructure, or economic, social, or cultural assets in locations that could be adversely affected.
Vulnerability: the degree to which a system is susceptible to and unable to cope with the adverse effects of climate change, including climate variability and extremes. Indicators to measure vulnerability can be based on parameters such as access to health and education, inequality, food security or access to other basic needs.

The social sciences work on the concept of "risk" from different perspectives and contemplating the interaction of multiple dimensions (social as well as natural). From a critical approach to the social theory of risk, in the contemporary world, the notion of risk penetrates all areas of social life, making it a key concept for understanding the present. New risks are constantly being created. These risks overlap with pre-existing inequalities and transcend geopolitical borders, and have differential local implications. These new risks, characteristic of modernity, are produced in a scientific-technical manner, and, therefore, in order to define them, a dependence is created on the so-called "expert knowledge" (Beck, 1986). In this sense, the conditions of production and circulation of scientific knowledge can constitute a factor of inequality. Climate change is the most complete example of this process of creation of new global risks that generate particular effects and are strongly dependent on expert knowledge for their characterization.

Because social processes and relationships distribute risk unequally, concrete and specific conditions of vulnerability are generated in each local context. These are not only related to the socio-material conditions of existence but also to the capacity to prepare for and adapt to risk, depending on how this risk is understood and represented in each context.

In recent years there has been a change in the way of understanding and addressing disasters, shifting the focus from disaster management (paradigm based on emergency response) to disaster risk management (paradigm focused on pre-emergency risks that treats disasters as processes and integrates social dynamics as an active part of the construction of risk). A series of empirical studies carried out in the Global South, especially in Latin America (Gellert de Pinto, 2012), were fundamental antecedents in this process, which allowed evidencing that disasters are results of social processes, particularly in the countries of the South, where the growing social and economic vulnerability is the main responsible for the disasters that have occurred and the increase in the social construction of risk (García Acosta, 2004).

2.3 Co-production

The co-production of climate knowledge is understood as a process of social interaction between heterogeneous actors, both in terms of the knowledge they mobilize (interdisciplinarity) and in relation to the interests that motivate them to become involved in this process (intersectionality). Conceptually, the notion of co-production has gained great relevance in the field of anthropogenic climate change studies, so, in each case it is necessary to specify the content given to this notion. In the Argentina Hub we understand co-production as a hermeneutic process based on three premises (Hernández et al., 2022): 1) dialogue among participants to privilege open listening, making room for difference; 2) cognitive plurality which assumes the symmetrical valuation of the different knowledge systems that participate in the co-productive process; 3) the framework of social relations in which co-production is carried out, which involves asymmetries according to the social structure of power. Based on these premises, we assume that the co-production process develops over a long period of time, based on an active co-presence of all participants in the co-productive dialogue, and that the products of co-production are a common good (Webinar).

2.4 Multiple lines of evidence

For the construction of robust information on climate variability and change we rely on the use and distillation of multiple lines of evidence (Doblas-Reyes et al., 2021; Webinar). The lines of evidence are constructed using different sources of data, information, and methodologies, such as different types of i) climate models (dynamic and statistical; global and regional), ii) observations (in situ), iii) estimates (satellite, reanalysis), iv) reports at subnational and national levels from public and private institutions and v) knowledge (scientific/technical as well as local and indigenous). Also, the co-production process may lead to the generation of new sources of climate data and information (Hernandez et al., 2022).

Relying on multiple lines of evidence is important as different sources of information and methodologies may yield different results. The different lines of evidence should be suitable in the specific context of decision-making (e.g., climate models with 100x100km resolution are not suitable to provide information at the scale of a city). We emphasize that different sources of

information can give contrasting and sometimes even opposite results, especially at regional and local scale (Doblas-Reyes et al., 2021, Figure 10.16). This is not only an obstacle to research, but can incentivize the scientist to seek the reason for this uncertainty and thus advance knowledge.

The context and values of each scientist determine the sources of information and the methodologies they choose to solve a particular problem (Chen et al., 2021, Doblas-Reyes et al., 2021). In terms of context, the most obvious examples would be the available human and economic resources, as well as bureaucratic and infrastructural issues. On values, for example, when analyzing greenhouse gas emissions scenarios, scientists make decisions about which scenarios (high emissions or low emissions) to prioritize: if they seek to analyze strong climate change signals, they will select scenarios with high emissions; if, on the other hand, they privilege the effect of the message they give to decision-makers, they will also choose scenarios with emissions that are consistent with the Paris agreement so as not to contradict the goal of a 1.5°C global temperature increase. Including values as part of the knowledge production process allows us to account for all the conditions (scientific and non-scientific) in which such a process takes place. Therefore, we seek to become aware of the choices we make and recognize that these are affected by our values and context. We also believe it is relevant to establish collaborative networks with other disciplines in order to facilitate the use of diverse lines of evidence.

Finally, this approach is particularly relevant in the study of regions where data are limited. For example, in a region where there is only one weather station at some distance from the place of interest (a very frequent situation in countries with limited human and economic resources), using, in addition, satellite information or simulations provided by climate models makes it possible to build knowledge more robustly and, therefore, of greater reliability. In this context, it is relevant to highlight the importance of the free availability of climate data according to the FAIR principles (Wilkinson et al., 2016; https://www.go-fair.org/fair-principles/). In this way, we can work towards the use of information sources and methodologies that are suitable for the problem to be solved.

2.4.1 Storylines

A line of evidence of particular interest for MCR is storylines, which are proposed as a tool to build information on climate risk from bottom to top (Rodrigues and Shepherd, 2022).

In social sciences the theoretical development and empirical analysis of what is called "narrative discourse" (stories, their storylines, and their storytelling) was initiated in the nineteenth century (Moezzi et al., 2017; Dick et al., 2017). Within the heterogeneous corpus that makes up narrative theory, narratives constitute a fundamental mode of social sense-making orienting both individual and collective meaningful action (Gadamer, 1965; Ricoeur, 1986; Bruner, 1991). Accumulated evidence around climate narratives from the social sciences indicates that stories play an important role in scenario building and the way problems and decision-making are approached (Bremer et al., 2017; Fazey et al., 2018; Lele et al., 2018; Saltelli et al., 2018; Saltelli et al., 2020; Krauß and Bremer 2020). It has been emphasized that the social relevance of stories lies not only in their discursive dimension (that which the story says) but principally in their performative capacity (their capacity to influence reality and social action; Austin, 1962). This implies that the stories and their lines of argument are not only considered as a logical cognitive object, but they are also in direct interaction with the actors who put them into circulation, in certain contexts and in the face of certain recipients. In this sense, the attributions of causality that a diversity of stories about a climate event put into play establish responsibilities and delimit possible horizons of action according to the social structures, interests, and power relations at play (Althabe and Hernández, 2004; Hernández et al., 2015; 2022).

In climate sciences, physical climate storylines have a much shorter history (a decade). Storylines are used both to communicate climate information and as tools for analyzing epistemic uncertainty. Epistemic uncertainty (which we can differentiate from uncertainty associated with the chaotic and complex nature of the climate system, and that of future scenarios) is associated with the different responses of different global climate models to climate change. The models are not perfect representations of the system and differ from each other, and we don't know which model gives the best representation of future climate. In particular, this brings large uncertainties associated with changes in precipitation patterns and extreme events on a regional scale (Shepherd, 2019;

Doblas-Reyes et al., 2021, Figure 10.16). These sources of uncertainty hinder the development of adaptation-relevant information and knowledge and the communication of scientific results to the general public. The generation and/or presentation of traditional climate knowledge often uses multi-model averages with a range of uncertainty given by the differences between models (Gutierrez et al. 2021, Figure Atlas.22). Storylines provide an alternative conditionally with both physical and risk perspective criteria (asking 'What if ...?' questions), focusing on decision space rather than predictions (Zappa and Shepherd, 2017; Shepherd, 2019; Doblas-Reyes et al., 2021, Box 10.2). Thus, from this methodology, it is possible to generate information on multiple plausible future climates, or on plausible extreme events in the future under certain assumptions. By comparing the climate experienced in the present and past with different plausible futures, a bridge between the complexity of social and physical aspects is formed. Physical climate storylines differ from narratives in the social sciences since they only take into account the discursive dimension of the narrative and the identification of the logic of its premises and conclusions in relation to the physical climate phenomenon under analysis (Webinar).

3. Objectives

Within the framework of this Plan, we propose the following objectives:

i. Construction of the “risk” concept

To develop a common understanding of the “risk” concept that is useful within the MCR framework, and in particular, for the various activities of the Argentina Hub, starting from the disciplinary conceptualizations described in section 2.2 of this document. This includes evaluating strategies to identify risks from a "bottom-up" perspective. The construction of an interdisciplinary perspective of risk will address existing definitions of risk in the literature, although will not be limited only to those already existing. Likewise, we will take into account several research experiences developed by the members of the Hub around this problem.

ii. Dialogue and articulations with providers of hydrometeorological and environmental information, as well as with public agencies related to risk management

As a strategy for developing the bottom-up perspective on climate risk, it is essential to establish a dialogue both with providers of hydrometeorological services and with organizations oriented towards environmental and risk management. The former type of actor includes a set of scientific-technical organizations that produce and provide information, for example, hydrological and meteorological, including Meteorological and Hydrological Services at the national level and/or municipal and provincial agencies. The latter type of actor is oriented towards decision-making for integrated risk management based on information provided by scientific-technical agencies (socio-environmental configuration, resource use and management situation, risk thresholds, vulnerability, and impacts, etc). These include, for example, Civil Defense, and provincial risk management offices and institutions specifically oriented to the management of extreme events (fires, floods, etc.). Such agencies maintain links with various types of users and socio-economic sectors that are sensitive to

climate risks. From the Hub, we seek to foster dialogue and establish articulations with these organizations, as well as to learn about the specific needs of various users and sectors in the framework of collaborations in projects at regional and/or local levels.

iii. Co-production of scientific questions

There is a growing need to co-produce climate information (see 2.3) that is suitable for integration into decision-making in various social and economic sectors. This requires the adoption of theoretical and methodological frameworks that enable collaborative work among heterogeneous actors and knowledge. From the Hub, we propose to promote such theoretical and methodological frameworks for the interaction of people from the scientific community of different disciplines, as well as actors and institutions at local and regional levels to carry out the co-production of socially relevant knowledge, from the development of scientific questions oriented to that end. We also seek to promote workshops on the experiences of co-production to identify lessons that increase the individual and collective abilities of scientific communities and non-academic actors to co-produce socially relevant interdisciplinary knowledge.

iv. Encouraging the use of multiple lines of evidence

The use of multiple lines of evidence makes it possible to build robust information that can be integrated into decision-making related to climate risk (2.4). This is why, from the Hub, we encourage their use. Simultaneously, we will seek to reflect on the use of multiple lines of evidence on climate risk, based on i) the discussion of different ways of distilling information; ii) the study and visibility of the values and contexts that drive the use of multiple lines of evidence, and how they take on particular relevance when one or more sources of information are limited; iii) visualizing the inequality in data availability with respect to the Global North, given that we are a Hub in the Global South; iv) incentivizing the generation of information where information is scarce (e.g., in the Global South, the installation of in situ sensor networks and implementation of models adapted to the Global South instead of employing Global North configurations); and v) encouraging the use of existing observational data and

promoting their availability in accordance with FAIR principles (Wilkinson et al., 2016; https://www.go-fair.org/fair-principles/). In MCR there is a particular interest in exploring physical climate storylines as a line of evidence (2.4.1). From our Hub, we propose to employ them and put them in dialogue with social narratives.

v. Support of Latin American initiatives

From the Argentina Hub, we intend to encourage and support other initiatives in Latin America that prioritize local needs from a bottom-up approach. Therefore, another objective we propose is to identify and connect with those communities of practice that are applying, or wish to apply, the philosophy and methodologies proposed in this strategic plan and/or in the MCR framework (see 2.1).

vi. Dissemination of the initiatives and advances of the Hub MCR CONICET Argentina.

The activities carried out by the Hub can be found on our web page. These include, on one hand, the various research projects in which the members of the Hub participate. These research projects are key for the implementation of the bottom-up perspective and the development of diverse experiences and frameworks for the collaborative production of climate knowledge. The advances made in the framework of these projects are also discussed in meetings within the Hub, and the materials produced in this context (videos, presentations, bibliography) are made available for consultation in the resources space. On the other hand, we also disseminate and discuss our progress in seminars (see webinars), and presentations at national and international conferences, which are announced in the calendar.

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