



Creating an enabling environment for investment in climate services: The case of Uruguay's National Agricultural Information System

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ABSTRACT

Increasingly challenged by climate variability and change, many of the world's governments have turned to climate services as a means to improve decision making and mitigate climate-related risk. While there have been some efforts to evaluate the economic impact of climate services, little is known about the contexts in which investments in climate services have taken place. An understanding of the factors that enable climate service investment is important for the development of climate services at local, national and international levels. This paper addresses this gap by investigating the context in which Uruguay's Ministry of Livestock, Agriculture and Fisheries invested in and developed its National System of Agriculture Information (SNIA), a national-level climate service for the agriculture sector. Using qualitative research methods, the paper uses key documents and 43 interviews to identify six factors that have shaped the decision to invest in the SNIA: (1) Uruguay's focus on sustainable agricultural intensification; (2) previous work on climate change adaptation; (3) the modernization of the meteorological service; (4) the country's open data policy; (5) the government's decision to focus the SNIA on near-term (e.g., seasonal) rather than long-term climate risk; and (6) the participation of key individuals. While the context in which these enablers emerged is unique to Uruguay, it is likely that some factors are generalizable to other countries. Social science research needed to confirm the wider applicability of innovation systems, groundwork, data access and champion is discussed.

Practical Implications

This paper, which identifies and describes six factors that contributed to the decision to invest in a national-level agricultural climate service in Uruguay, is intended to inform both research and practical applications regarding the development of climate services around the world.

As the paper makes clear, investment in climate services varies widely across the globe. While some factors thought to condition this variation have been identified (e.g., the economic development of the country, its climate exposure, and/or the predictability of the climate system in that area), a host of other considerations seem likely to shape climate service

investment decisions as well. Our paper is one of the first to investigate these factors in context, identifying the circumstances that led Uruguay's Ministry of Livestock, Agriculture, and Fisheries to make a sizable investment in the development, delivery and use of climate-related information for national- and local-level decision making.

As such, our paper informs future research activities intended to explore similar questions regarding the factors that help shape design in developed and developing countries alike. The paper is also relevant for government organizations and international donors who may like to identify and/or help to create contexts conducive to climate service investment and can use the factors identified here as guideposts. The role of groundwork and of agricultural innovation systems should be particularly useful in this regard.

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1. Introduction

While society has always struggled to manage climate-related risk, increased vulnerability and the specter of climate change have stimulated recent investment in climate services (Hewitt et al., 2012). Often provided in the form of tools, websites, and/or bulletins, climate services involve the timely production, translation, transfer and use of climate information for societal decision-making; they are increasingly seen as critical to improving the capacity of individuals, businesses, and governments to adapt to climate change and variability (Vaughan and Dessai, 2014).

Investment in climate service development varies widely across the globe; some countries have well-developed climate services while others have very few or even none (Brasseur and Gallardo, 2016; Hewitt et al., 2012). A number of factors are thought to contribute to this – including the economic development of the country, its relative climate exposure, and the predictability of the climate system in that area (Stern and Easterling, 1999). While it is clear that these factors are important, it is equally clear that these are not the only determinants of investment, and that a host of other considerations help to shape climate service investment decisions as well.

One factor that appears to have stymied investment in climate services is the relative dearth of information regarding the economic impact of climate services; without estimates of the value of climate information in particular contexts, governments and the private sector have found it difficult to invest beyond the pilot level (Clements et al., 2013; WMO et al., 2015). To remedy this, a growing cadre of researchers has dedicated considerable effort to understanding the value of climate services in socio-economic terms, albeit with somewhat mixed results (Lazo et al., 2008; Perrels et al., 2012; Solís and Letson, 2013; von Gruenigen et al., 2014).

While this field continues to grow, less attention has focused on the institutional and policy factors that shape investments in climate services. This stands in contrast to a relatively robust literature on the role that such factors have played in influencing climate change adaptation more broadly (Biesbroek et al., 2009; Eisenack et al., 2014; Ioris et al., 2014; Moser and Ekstrom, 2010). In many cases, this work has involved explicating the notion of “adaptive capacity,” in such a way as to characterize the barriers and enabling factors that affect adaptation action (Ford et al., 2013; Grothmann et al., 2013; Williamson et al., 2012).

While this work has been useful in helping to identify the contexts in which investments in adaptation are likely to take place, it does little to illuminate the factors that lead countries to invest in climate services per se. Distinguishing the factors that enable investments of this nature is an important step in advancing our understanding of adaptation readiness (Ford and King, 2015); it is even more critical in advancing the field of climate services, where such knowledge can inform the planning and investment strategies of local, national, and international actors.

This paper addresses this gap by assessing the drivers of investment in climate services within a nation. Semi-structured interviews were used to identify several factors that contributed to the decision to invest in and develop a national-level climate service for the agricultural sector in Uruguay. The climate service itself, Uruguay’s National Agricultural Information System (Sistema Nacional de Información Agropecuaria, known as the SNIA), as well as the context in which it was developed, are described in Section 2. Section 3 provides an overview of our study methods, before results and analysis are presented in Section 4. A discussion of the potential implications for the study of other contexts in which climate services may be developed is included in Section 5. Conclusions are found in Section 6.

2. Uruguay’s National Agricultural Information System

The SNIA was officially launched in June 2016. Representing a significant investment on the part of the Uruguayan government in climate change adaptation, this national-level climate service is relatively unique with regards to the breadth of the endeavor and the extent to which it characterizes the adaptation challenge primarily as one of near-term (e.g., seasonal) climate risk management, rather than focusing on climate scenarios to 2050 and beyond. As such, it makes an interesting case from which to explore the role that social and institutional factors have played in enabling investment in climate services.

2.1. Climate & agriculture in Uruguay

Uruguay is one of the more affluent countries in South America; it rates high for most development indicators and is known for its secularism, liberal social laws, and well-developed social security, health, and educational systems. Agriculture contributes roughly 6% to its GDP, but accounts for 13% of the workforce and more than 70% of exports (CIA World Factbook, 2017). Taking into account associated activities, Uruguay’s Ministry of Livestock, Agriculture and Fisheries (MGAP) estimates that the total contribution of Uruguay’s agricultural sector reaches nearly 25% of GDP (OPYPA, 2014).

In this context, the Uruguayan government has viewed agricultural production as an important piece in Uruguay’s development – increasing efforts to support sustainable intensification and focusing on high-value, well differentiated products that can be marketed at a premium in Europe and the US. Many Uruguayan farmers have embraced this strategy, actively looking for ways to increase the efficiency of their production (Equipos Mori, 2012).

Climate risk management has captured particular attention as the country has experienced a series of damaging climate shocks in recent years. The government has estimated, for instance, that economic losses associated with the 2008–2009 drought neared \$1 billion USD (Paolino et al., 2010). The 2015–2016 El Niño event also contributed to the worst floods experienced in Uruguay in more than 50 years, with more than 12,000 people made temporarily homeless and economic losses in a range of productive sectors (El Observador, 2016).

Uruguay’s humid subtropical climate is marked by strong inter-annual variability. Mean annual temperatures ranges from 16° to 19 °C and mean annual precipitation from 1100 to 1600 mm (INUMET, 2017). While total precipitation is expected to increase over the course of the coming century, long-term climate projections suggest that the country will face an increase inter-annual variability and in the frequency and intensity of extreme weather phenomena, including rainstorms and drought (Cabré et al., 2016; Magrin et al., 2014; Oyhantcabal et al., 2013). In this context, roughly 15% of Uruguayan farmers report climate fluctuations as a significant challenge (Equipos Mori, 2012).

2.2. National Agricultural Information System

Given the importance of agriculture to Uruguay’s national economy, an information system to support decision making was first proposed by the MGAP in 2011; the concept was further developed by actors in and outside of the country and ultimately funded, in 2013, under the auspices of a World Bank project entitled Development and Adaptation to Climate Change (DACC).

The SNIA brings a range of data produced by the MGAP together with information developed by other national-level actors; this includes information on soils, vegetation, and land use and on water, weather, and climate. Agricultural census data, including that regarding production and sales, are also included (Baethgen et al., 2016).

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