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The influence of community governance on local adaptations to natural and anthropogenic changes and increasing environmental risks; four case studies from Southwestern Uruguay.

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ABSTRACT

During the last ten years, communities from the Southwestern region of Uruguay have experienced significant changes provoked by the intersection of land use change, the expansion of industrialized agriculture, new technologies, growth of multinational capitals at local levels, and climate changes. This study explores how community governance structures and processes influence communities' adaptive actions to environmental risks of natural and/or anthropogenic disturbances in four communities of Southwestern Uruguay. The method used in this study is composed by semi-structured interviews with key informants from the market, state, and civil society, participant observation, and secondary data from documents, censuses, and other studies. Preliminary results from this research show that multi-level institutional involvement in governance structures can constrain communities' adaptive actions when decision making processes are top-down and local actors are not included in decision making. When multi-level institutional involvement includes local actors' concerns and interests in decision making processes, communities are capable of developing adaptive and anticipatory actions to mitigate and/or adapt to environmental risks provoked either by climate or development projects. Results from this study could be informative to policy-makers, ongoing institutional programs, as well as other similar studies that focus on communities, governance, and adaptation to climate change and/or globalization.

INTRODUCTION

Natural and Anthropogenic Changes in Communities of Southwestern Uruguay

Communities are becoming more vulnerable, facing new risks from disturbances driven by phenomena, such as globalization and climate change (Wilson, 2012). A community can be defined as a social system in a specific geographical location, where local people meet their needs through organizations or institutions (Flora and Flora, 2012).

During the last ten years, communities from the southwestern region of Uruguay¹ have been critically affected by disturbances and increasing risks provoked by phenomena, such as climate change and globalization. This is a highly productive agricultural area with fertile soils and diversified agriculture, including a mix of row crops with livestock, dairy, horticulture, citrus, and others. Communities in this region highly depend on their agro-ecosystems, which provide goods and services. This dependency on natural capital, make these communities vulnerable to uncertain disturbances and/or changes provoked either by natural or anthropogenic phenomena, like climate and/or development changes.

Climate observations from the last century have shown climate variability and severe weather events have significantly increased in this region (Gimenez et al., 2009), increasing natural disturbances and associated risks. Recent severe climate events and changes, like the droughts in 2000, 2008-2009, and 2010-2011, hydric deficits in some parts of this region, and severe storms such as tornados, will increase and critically affect rural communities from this region. Increasing natural changes and associated risks are becoming critical for communities of this region, which need to adjust either to beneficial or negative consequences.

In this region, new technologies for row crops, artificial prairies, and agroforestry have facilitated the displacement of agricultural systems, particularly those based on natural pastures,

Figure 1- Selected Region



¹ See Figure 1.

critically affecting communities that depend upon them. These shifts have altered communities and their agro-ecosystems. During the last ten years, this region has been the epicenter of the Uruguayan agricultural growth and its associated transformations. New agricultural development has significantly impacted communities by increasing land speculations; thus, increasing land prices, dependency on global trade markets, and, in turn, increasing volatility in commodity and input prices. Additionally, increasing environmental risks have occurred, like overexploitation of their natural resources, erosion of productive soils, pollution provoked by new agricultural technologies, and deforestation, among other critical changes. Therefore, phenomena like climate change and globalization have challenged southwestern Uruguayan rural communities' capabilities to recover from possible disturbances and associated risks. These anthropogenic and natural disturbances or changes are a slow-onset, sudden incidents, or phenomena that occurred and/or are currently occurring and may represent risks.² They could negatively impact or change the social, economic, and/or environmental resources of these communities and/or their agro-ecosystems. These disturbances have been created by local factors (endogenous or from within communities) as well as by remote factors (exogenous or from outside communities), such as those created by global climate change or globalization.³

Table 1. Anthropogenic and Natural Changes

	Anthropogenic Changes	Natural Changes
Endogenous	Overexploitation of natural resources, pollution, human-induced desertification and erosion of soils, biodiversity depletion or reduction, deforestation, deterioration of public infrastructure (recreational spaces, routes, streets, etc.), increasing social insecurity, significant technological changes that represent risks.	Floods
Exogenous	Shifts in the market or global trade, and changes in energy availability.	Drastic changes in temperatures and seasonality that have affected communities' agro-ecosystems or people's health, extreme cold weather events, tornadoes or strong winds, and droughts.

Natural and anthropogenic disturbances have provoked risks for these communities, but they have been mitigated or avoided through local responses elaborated by different, local actors. On the other hand, risks associated with these changes have become critical when local actors are incapable of making collective decisions or finding resources for responses. It is difficult for

² Risk is a potential loss an undesirable outcome.

³ See Table 1 with disturbances faced by communities in Southwestern Uruguay.

local actors to individually respond and/or to successfully develop responses to these phenomena (Adger, 2000; 2003). Evidence from different parts of the world shows responses to risks associated with these types of natural and anthropogenic changes are successful when they are locally and collectively developed to satisfy local priorities, while considering the local context, extra-local linkages, and resources (Adger, 2000; 2003; IPCC, 2007; Ensor and Berger, 2009; Ashwill et al., 2011; Adger et al., 2009; Young, 2012).

During the last six years, and as part new decentralization policies and programs, Uruguay has created *Municipios* at communities and *Mesas de Desarrollo Rural* for their rural areas. In Uruguay, there are 19 departments. Each department has an *Intendencia Departamental* or departmental elected government located in its capital city. *Intendencias* are the second level of government after the national government. The third level of state government, and the smallest units of administrative and elected governments, is the new *Municipios* at the community level. They are locally-elected governments at community levels and composed of five elected officials (one *Alcalde* and four *Consejales*). The jurisdiction of these elected governments is politically designed by *Intendencias*, usually covering a town and ten kilometers encircling the town at its perimeter.⁴ Although the designation of *Municipios* for specific communities currently depend on the *Intendencias*, in 2009, *Municipios* were created by the national law, “*Descentralización política y participación ciudadana*” (N° 18.567) (modified in 2010 by the law N° 18644), for communities with more than 5,000 habitants. *Municipios* are general-purpose governments created to respond to the general needs of the community (Flora and Flora, 2012). In Uruguay, the general responsibilities of *Municipios* are to 1) implement regional and national plans at the local level when required by *Intendencias* or the national government, 2) apply departmental and national laws at the local level, and 3) cooperate and work with other *Municipios*, and other local, regional, and national actors to discuss and/or implement local plans (*Presidencia*, 2011). One of the main goals of *Municipios* is to create mechanisms for local decision-making or deliberation for specific topics related to the local community and to create spaces for civic participation at the local level (*Presidencia*, 2011). However, *Municipios*’ governance is still limited by other institutions from the departmental and national levels, and their regulations and policies (De Barbieri and Zurbiggen, 2011).

⁴ It is the *Intendencia*, who determines the geographical boundaries for each of these governments. The jurisdiction of *Municipios* varies from community-to-community, and sometimes they are not clearly mapped.

As part of national decentralization programs, the Ministerio de Ganadería, Agricultura y Pesca (MGAP) created the Mesas de Desarrollo Rural (MDRs). These are formal spaces for participation in rural issues for specific territories and communities, accompanied by the creation of Departmental Agricultural Councils to articulate national policies at the departmental level and local levels. These programs have attempted to decentralize the implementation of top-down national programs for rural areas, making local levels more connected with regional and national programs. These spaces include different market, state, and civil actors involved in agriculture and/or rural development. MDRs have had an important role not only in facilitating multi-level collaboration, but also facilitating the participation of local actors in rural/territorial issues.

During the last six years these new modes of governability, promoted by the Uruguayan government, have emphasized in new governance and collaborative efforts between private and public actors. Under these new sociopolitical scenarios, communities and local actors have gained an important role in public discourse and policies, as alternative localized sociopolitical powers to the traditional centralized states (Cannon and Kirby, 2012). In this sense, community governance can be defined as structures and processes, by which public, civic, and/or private groups of people or organizations (also referred as “institutions, stakeholders, and actors”) make collective decisions and act at the community level. The participation of diverse stakeholders in local governance represents high levels of social capital within communities, critical for communal benefits (Putnam, 2000) and an important part of the structure of governance. Community social capital is composed of social dynamic relationships that can provide collective access to resources (Portes, 1998; Putnam, 2000) to work toward common goals (e.g. responses to natural or anthropogenic disturbances). Two types of social capital can be distinguished—*bonding* and *bridging*—which describe connections within communities and connections with outside institutions and individuals, respectively (Flora and Flora, 2012). High levels of bonding social capital imply a strong presence of local actors from the state, market, and civic sectors, and their active participation in spaces for collective decision-making at the community level. Bonding social capital and collaboration in decision-making within communities are critical to mobilize resources from the bottom-up. On the other hand, when bonding social capital is low and only a few types of actors are actively involved in community governance, access to resources is limited (Adger et. al., 2009).

Adaptive Actions

Community adaptation is composed by collective actions (*adaptive actions*) to reduce risks and/or adjust to disturbances and associated risks (Adger 2000; Wilson 2012). Recent studies highlight the importance of adaptations at the community level according to local and regional contexts (Wilson 2012). To understand adaptive actions at the community level, we need to identify the resources mobilized (through actions) by communities, either to minimize possible risks or to adjust to natural or anthropogenic disturbances.⁵ Adaptive actions can seek either individual or collective interests, but they become significant for communities only when they seek communal rather than individual benefits (Agrawal and Perrin, 2008; 2009).

Table 2. Adaptive Actions Explored in Communities from Southwestern Uruguay (Modified from Agrawal and Perrin 2008; 2009)

Adaptive Actions	Indicators (Presence or Absence of Adaptive Actions)	Types
Anticipatory/Reactive	Sharing information and/or plans about possible risks and/or consequences of natural or anthropogenic disturbances.	Widely available weather information, urban/rural planning that includes contingencies for changing conditions, mechanisms to identify new technologies, and widely available information about international markets.
	Development of new technologies and local innovations.	Plans, educational programs, special events, and financial incentives for the adoption of new technologies, technological innovation, and new management practices.
	Development of mobility plans	Relocation of households affected by floods, and relocation of livestock affected by drought.
	Storage improvement	Water reservoirs, crops, seeds, and forest products.
	Diversification	Educational programs for value added products, new crop varieties, new livestock breeds, and skills and occupational training.
	Improvement of market exchange	Local incentives for new economic projects, sharing information, educational programs, and training about: market access, insurance provision, transfer payments and new product sales.
	Improvement of Local infrastructure	Transportation networks (fluvial, terrestrial, and areal), recreational and public spaces, water supply, and sew system.

⁵ See Table 2: Adaptive actions explored in communities from Southwestern Uruguay

Adaptive actions may significantly vary among communities (Resilience Alliance, 2007). Therefore, they should be explored and identified at specific communities and their geographical contexts (Resilience Alliance, 2007), considering communities' adaptive actions to endogenous or exogenous disturbances and associated risks (Wilson, 2012; Young, 2012). Thus, communities' adaptive actions can be described as the collective actions developed by communities to mitigate risks and/or adapt to significant changes and risks. Adaptive actions can be either anticipatory or reactive to natural and/or anthropogenic disturbances (Wilson, 2012). Anticipatory actions are those to prevent or mitigate potential damages from disturbances and risks. Anticipatory adaptive actions reflect the learning aspect of behavior in response to a specific disturbance or risk (Gunderson, 2000). Anticipatory adaptive actions can also reflect levels of "start point vulnerability," and communities' acknowledgment of possible risks (Adger et al., 2009; Ensor and Berger, 2009). Anticipatory actions are usually composed of the development of plans to mitigate potential risks from natural or anthropogenic disturbances. They are usually developed in communities that have already experienced negative consequences from natural or anthropogenic disturbances (Adger et al., 2009).

Communities that institute anticipatory adaptations can decrease their risks and prevent them from potential damages (Wilson, 2012). On the other hand, reactive adaptive actions are post-event and usually improvised, when negative consequences from disturbances have been already observed and/or occurred, including emergency assistance in response to natural or anthropogenic catastrophes. The absence or presence of these and other adaptive actions at the local level determines different levels of communities' responses, either to minimize or adapt to risks and significant natural and/or anthropogenic changes. This study explores how community governance influences communities' adaptive actions to the risk of natural and/or anthropogenic disturbances and how multi-level institutional involvement in governance influences adaptive actions among four communities in Southwestern Uruguay.

RESEARCH METHODS

This study was developed in the southwestern region of Uruguay in two departments with similar socioeconomic and geographical characteristics. I explored adaptive actions and

governance of four communities⁶ (case studies) with Municipios. After conversations with staff from the Intendencias of these departments, I selected two communities from each department. For the selection of these communities I considered communities with Municipios. In addition, I selected governance and adaptive actions as the main two key components for identifying variations and highlighting differences between communities. In addition, I considered them as part of a similar territory, their geographic proximity between them, and their similar or linked socioeconomic characteristics based on agriculture. Furthermore, for the selection criterion of the units of analysis, I considered the logistics and resources available for conducting this study, and my familiarity with these four communities and this region. These four in-depth case studies from Southwestern Uruguay allowed me to deeply explore their governance, as well as influence on local adaptive actions.

First, I gathered secondary data about the selected communities and utilized elected officials from the Municipios of communities as key informants. Using a semi-structured questionnaire as the primary methodological tool, two key informants from each community provided information about the presence or absence of local adaptive actions, as well as general characteristics of community governance. In addition, staff of the Intendencias provided additional data about the four communities, as well as departmental policies that affected both governance and adaptive actions at the local level. Elected officials and staff from Intendencias were asked about the key actors who participated in local governance. I used snowball sampling to identify all actors involved in governance at the community level. The snowball sampling method allowed me to select participants, who also provided contacts for other key market, state, and/or civic actors involved in community governance. Using a semi-structured questionnaire, actors involved in the selected communities were interviewed. Interviews with all actors identified from each of the four selected communities provided information about disturbances and risks, structures and processes of governance, and local adaptive actions.

Interviews with a staff from each of the Intendencias involved provided data about the four communities and departmental policies and plans, which affect governance and adaptive actions at the community level.

⁶ Letters are assigned to each community to protect anonymity.

In-depth structured interviews with elected officials (the Alcaldes and Consejales) from these four communities provided data about the natural and/or anthropogenic disturbances (slow-onset/sudden and endogenous/exogenous) and risks these communities face. In addition, these interviews provided information about the community institutional structure and process for governance, and detailed information of local adaptive actions—both anticipatory and reactive. Furthermore, interviews with these key informants provided contacts of stakeholders actively involved in community governance. I triangulated the information gathered from the elected officials with the information from the Intendencias to ensure reliability of the data collected from each of the communities and about the actors involved.

I used semi-structured interviews with one staff from each market, state, and/or civic's stakeholders mentioned by the locally-elected officials and staff from Intendencias. These interviews also provided information about the capacity of the institutions, their levels of involvement (regional, national, and/or international), characteristics of their resources, existing policies and/or regulations that affect their involvement at the local level, the opportunities these institutions have to participate in local decision-making, whether they believe their 'voices' are considered by other actors, and details about absence or presence of local and collective adaptive actions.

In total, I completed 82 interviews with key actors from the market, state, and civil societies involved in the four selected communities. I also utilized participant observation to gather data about governance and adaptive actions to environmental risks at public meetings at Municipios and Mesas de Desarrollo Rural, and other spaces for participation. Other secondary data collected during the field work include research materials, reports, regulations from Mesas de Desarrollo Rural (from 2009, 2010, 2011, and 2012), reports and presentations completed by different types of Non-Governmental Institutions (NGOs), new laws and regulations from the Ministerio de Ganadería, Agricultura, y Pesca (MGAP) (about feedlots, agrochemicals' applications, and soil and land use, among others), and the Ministerio de Trabajo, among others.

FINDINGS⁷

Community A has 10,630 inhabitants (INE, 2011). Its strong local organizations and institutions, and high levels of local civic engagement in local decision-making have historically characterized this community. According to key informants, this community has strong institutions and high levels of participation, based on democratic legacies from its immigrant founders. It has been historically linked with regional, national, and international actors. This community signed agreements for collaborations with governments of other cities from other countries. Its historical economic prosperity, based on diversified agriculture, its high governance with high participation of citizens at the local level, and collaboration of actors from different levels have historically facilitated many resources which have made this community a place “without problems” (Staff from Intendencia). Its structures and processes for governance have made local actors develop a diverse number of projects preventive to disturbances, which could represent environmental risks, such as droughts, environmental degradation, and/or pollution. Adaptive actions of this community have been anticipatory to natural and anthropogenic disturbances. Some key informants attributed preventive and anticipatory adaptive actions to the cultural and historical aspects of the community, such as immigrants’ origins and the struggles they faced both in their countries and in Uruguay at the end of the nineteenth century. These adaptive actions to possible risks provoked by both development or by nature are based on the diversification of agriculture, different plans to mitigate possible risks, continuous improvement of local infrastructure, strong networks for sharing information, and long-term local platforms for technological innovation.

According to key informants, recent changes created by industrialized agriculture have not impacted this community. Most of the small/family farmers in this region are increasingly incorporating new technologies, “since 2006-2007.” Many of those farmers who rented land, have left agriculture; but, those who own the land remained and incorporated new technologies, and are producing more with more intensification, using soybean and corn as alternatives for fodder, in addition to pastures, as an adaptive action to mitigate possible consequences of droughts. After severe droughts some people started to provide new services for fodder and

⁷ The results of this paper are based on preliminary analysis (still in process) of field notes and data obtained from November, 15th of 2012 to February, 12th of 2013.

irrigation. Actors from the market, state, and civil societies highlighted this community has incorporated new technologies, but with consciousness of the environmental risks that recent developmental changes could create. According to the interviewees, this community has historically maintained agricultural diversity as a key component of its sustainability and reduction of possible negative impacts from both natural and anthropogenic changes. Anticipatory and preventive adaptive actions have been mostly based on the diversification of the economy and caution use of the community's resources. This has been facilitated by the collective participation of different local actors as well as with actors from the departmental, national, and international levels. In this community, there are many opportunities for collective and active participation in decision-making of private, state, and/or civic actors. Opportunities or "spaces" for deliberation or decision-making are facilitated by different *comisiones* under the umbrella of Fuerzas Vivas, the Municipio, and the local Mesa de Desarrollo Rural. These actors and organizations have had a historical role in facilitating local and civic participation at the community level. These spaces for participation have also facilitated the active involvement of actors from regional, national, and international levels, such as recent agreements of collaboration between the Municipio of this community and the government of Switzerland,⁸ which facilitated new resources for the community. Therefore, in this community, processes of governance involve multi-level relationships that exist among the different actors collectively involved at the community level. Community governance is shaped by the level of collective deliberation among different types of actors involved at the local level (bonding social capital). Their interactions are configured at regional, national, and/or international levels (bridging social capital), which have positively affected local actions. Multi-level institutional involvement enhance processes of governance (e.g., empowering local women farmers) when local stakeholders are taken into account (Folke et al., 2002; Tompkins and Adger, 2004; Berkes et al., 2005; Folke et al., 2005; Beck, 2006; Meyer and Konisky, 2007; Davidson et al., 2010; Wilson, 2012). Actors operating at different levels enrich the deliberation processes, when deliberation extends downward and outward as well as upward (both top-down and bottom-up), which can improve the processes of governance adequate for adapting to increasing risks (Wilson, 2012).

⁸ See: <http://www.colonia.gub.uy/web2.0/index.php?seccion=leoNoticia&idNoticia=2592>

Community B has 9,857 inhabitants (INE, 2011). In the last ten years, this community has become the main port for the country to export agricultural commodities, such as soybean, wheat, maize, and agro-forestry products. From this community's port, commodities are shipped to Asia, Europe, North America, and the Middle East. During recent years, this community has been transformed by new development projects for agriculture and port enterprises. This community not only has been vulnerable to anthropogenic changes, but also to floods from the La Plata River and recent droughts, which have significantly affected the agro-ecosystems of this community. According to the key informants from this community, during the past five years the port has significantly increased its operations and this has created environmental problems, such as decreasing air and water quality. The Municipio for this community and the Intendencia Departamental facilitated the development of a strategic plan⁹ for sustainable development, which included the direct participation of diverse and local, regional, national, and international actors. This strategic plan includes guidelines for the development of the community and its agro-ecosystems. The plan identified some community disturbances, such as severe weather events, depletion of natural resources, pollution, and erosion of soils, and deterioration of the infrastructure, among others, which are a consequence of weather events, the growth of agricultural industries in the community, and the growth of the port industries. According to the staff of the Intendencia, some of the adaptive actions stated in its guidelines (plans for risk mitigation from pollution or depletion or natural resources, improvement of local infrastructure based on new regulations, storage improvement, and actions for public risk awareness, among others) have been already implemented or are still being discussed at the local level. According to staff of Intendencia, local actors have developed public spaces for participation to deliberate and develop local adaptive actions, also with the participation of different actors that operate at regional, national, and international levels. However, multi-level involvement in governance has implied some critical outcomes on the implementation of adaptive actions.

Different local actors mobilized to develop reactive and emergency adaptive actions for reducing on-going environmental risks they perceived, such as air quality controls. They created the Grupo de Trabajo (GT) supported by the local Municipio. According to all the actors interviewed from this community, they are struggling to implement and obtain results to reduce

⁹ See plan: <http://www.colonia.gub.uy/web2.0/index.php?idArticulo=123140>

environmental risks, due to omission from departmental and national institutions, and governments which promote the development of agricultural industries in this port, but omit the community's demands and problems. Local actors see the development of a local plan for sustainable rural/urban development as a tool for future development, but not as a current solution for environmental and infrastructural problems the community is facing. When a representative cross-section of local actors does not have a 'voice' in local decision-making, there is a low deliberation process in governance. In this case, governance is characterized by vertically-oriented (top-down) decisions (through increasing dependency of the communities in externally-controlled business and state institutions). New spaces for decision-making have been created at the local level with the creation of the GT. However, these new structures and spaces for governance lack legitimacy among actors from departmental and national levels, omitting ongoing environmental risks and problems, and limiting the community's outcomes from its adaptive actions.

Community C shares its city limits with another community. It has 4,600 habitants, but considering these two communities together provide 10,800 habitants (INE, 2011). **Community D** has 17,174 habitants (INE, 2011) and along with **Community C** are the most important communities in their department, after the capital city. These two communities are located in the center of the one of the most important regions of the country for grain and agro-forestry production. During the last ten years, these two communities have experienced significant environmental and infrastructural changes, due to expansion and intensification of these two types of agriculture and the increase of foreign investments in agri-businesses. In addition, during the last years, these two communities have faced several natural disturbances—floods, droughts, and severe weather events like storms and tornadoes.

Community C has not been exempt from disturbances (some of them difficult to observe) such as severe weather events, soil erosion, and natural resource degradation, among others. However, it has not developed local adaptive actions to minimize environmental risks. Some of the interviewees attributed the lack of adaptations to minimize risks historical social structures. "People in this community have been very individualistic..." was mentioned several times by local actors. According to what was mentioned by local actors and field observations, today, there is an important competition between the main local NGO and the Municipio. Their NGO was created during the 1970s because it "was most effective to respond to development

with the collaboration of different actors rather than working through elected officials and traditional state institutions” (One of the NGO founders). However, participation in the NGO is not open to everyone because the actors involved invite potential members, who have been described by some of the interviewees, “as part of the local elite.”

The Municipio is trying to change the old ways of politics/governance when citizens did not participate. Some people mentioned during the last five years, citizens’ participation in organizations and clubs have significantly decreased. Some of the interviewees said the Municipio and the main local NGO, who focused on development, could work together if elected officials and NGO’s members forget about their parties and political ambitions, and work for this community. In this sense the community has low bonding capital.

The Intendencia and the Ministerio de Vivienda, Ordenamiento Territorial, y Medio Ambiente (MVOTMA) developed a “territorial and sustainable development plan” for the department.¹⁰ The plan divides the department in three micro-regions. **Communities C and D** are considered key communities for the implementation of this plan, which states some guidelines for sustainable development for the communities they involve. Consequently, the Intendencia and the Municipios of these two communities have been working to implement some of the development guidelines, which include adaptive actions to anthropogenic and natural changes, such as mobility plans and improvement of the local infrastructure.

Community D has historically developed local responses to problems and challenges when was necessary. This community has a long history in agriculture, particularly with grains. Its history in agriculture and technological innovation make its local people proud. Like other communities in this region, this community has faced many changes during the past ten years. The characteristics of changes are similar to those observed in **Community C**, for which people highlighted degradation of natural resources, and air and water quality, and deterioration of local infrastructure during the last ten years.

This community has historically tried to develop its own local initiatives through its leaders and local entrepreneurs with the collaboration of regional or national institutions. Today, this community is experiencing an increasing economic boom, as a consequence of recent

¹⁰ See plans for each of the regions: http://www.soriano.gub.uy/www/manifiesto_ordenamiento_territorial.html

industrialized agricultural production. Local and regional actors operating at the community seem to be more concerned for economic growth, agricultural production, and their challenges than natural or anthropogenic disturbances and associated risks. Consequently, this community has many adaptive actions to developmental changes, but few collective adaptive actions to minimize or reduce environmental risks provoked by nature and/or development. Individual adaptive actions have focused on the challenges that development has created. Some of these developments of new technologies and local innovations, storage improvement, improvement of markets, and improvement of local infrastructure omit possible negative environmental consequences from both anthropogenic and natural changes.

CONCLUSIONS

Preliminary results from this study showed local and collective participation, and decision-making among different types of local actors (like in Communities A and B) can develop a significant number of diverse community adaptive actions to reduce environmental risks. On the other hand, , the presence and/or active participation of a few types of actors (low bonding social capital- like Communities C and D) can facilitate few resources for adaptation to environmental risks. They can facilitate the development of individual adaptations to developmental changes, like technological innovation and training programs.

When different types of stakeholders with linkages at local, regional, national, and/or international levels are actively involved, they can have equal opportunities to influence local decision-making (like in Community A). Communities with high quality governance (with equal participation across the actors involved) can develop a significant number, and diverse and anticipatory adaptive actions, according to local needs over time. Considering the preliminary results from Community A and its characteristics, other critical aspects to study are cultural and historical characteristics of rural communities, and how they influence governance structures, and processes and adaptive actions to climate and developmental changes.

High quality governance can facilitate communities' adaptations to natural or anthropogenic changes and risks. Robust governance structures and high quality processes involving different types and multi-level stakeholders (like those observed in Community A) can facilitate higher levels of anticipatory adaptation to different changes at the community level. In

this sense, high quality governance with cross-scale linkages through the involvement of local, regional, national, and/or international institutions can facilitate the mobilization of new resources (through actions) at the community level (Ostrom et al., 2002; Young, 2002; Berkes et al., 2005; Wilson, 2012; Young, 2012). When these resources are mobilized considering potential environmental risks from anthropogenic or natural changes, these actions can become anticipatory and may avoid negative environmental impacts on the community.

Today, the Uruguayan government is increasingly mobilizing resources for climate change adaptation and sustainable development through the Sistema Nacional de Respuesta al Cambio Climático, Grupo Interdisciplinario de Investigación del Cambio Climático, Instituto Nacional de Investigación Agrícola (INIA), Instituto Plan Agropecuario, MGAP, and the Universidad de la República (UdelaR). Under the increasing complexity and uncertainty of global anthropogenic and natural challenges, new policies and programs should focus on the efficiency and legitimacy of recent institutional transformations. These could facilitate organizational flexibility on multi-level collaborative platforms, including actors from the state, the market, and civil society from local, regional, national, and international levels (Berkes et al., 2005; Meyer and Konisky, 2007; Berkes, 2008; Dowsley, 2008; Davidson et al., 2010; Ashwill et al., 2011). This could lead to long-term institutional adaptive programs, and avoid the exclusive dependency on national or international aid and loans from international institutions. Therefore, high levels of local institutional governance can facilitate collaborative and flexible multi-level systems that can learn from experience, and generate knowledge to enhance resilience and empower self-organization at local levels (Folke et al., 2002; Berkes et al., 2005; Folke et al., 2005). This could potentially facilitate processes of coordination among different stakeholders to plan and achieve sustainable goals in complex contexts, as well as to build new institutions across different levels, capable of dealing with the complex and uncertain risks provoked by shocks from phenomena, such as climate change and/or globalization (Folke et al., 2002; Berkes et al., 2005; Folke et al., 2005; Armitage, 2008; Berkes 2008; Dowsley, 2008; Cullen et al., 2010; Davidson et al., 2010).

In Uruguay, the empowerment and legitimacy of communities with Municipios could lead to community-based governance for better locally-adapted strategies. The recent implementation of new decentralized structures of the state and the creation of new interdisciplinary governmental institutions, such as the Sistema Nacional de Respuesta al

Cambio Climático, and the future Centro de Transferencia de Tecnología Para Cambio Climático y el Desarrollo Sustentable (CTTPCCDS), are promising for the evolution of new institutional structures across different levels, sensitive to responses from phenomena like climate change and globalization. This study aims to significantly inform in this regard. Future studies should explore more in-depth the different types of governance under decentralization processes of governability, and their impacts in developing effective and local adaptive actions to reduce environmental risks from natural and/or anthropogenic changes. In addition, future studies could explore historical and cultural aspects that could influence communities' adaptations to both natural and anthropogenic changes.

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