Anticipatory climate governance in Central America

Working Paper No. 388

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

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Abstract

Anticipating the possible impacts of climate change has become a key global focus. Scenarios and many other methods and tools are used today to imagine climate futures and develop strategies for realizing new futures while governing climate change. With the proliferation of these processes in sustainability-related research and planning contexts, scrutiny of their role in steering decision-making becomes increasingly important. How can the benefits and challenges of these processes of anticipation be better understood as governance interventions?

Research into anticipatory climate governance processes in the Global South has remained very limited, while these regions are most vulnerable to climate change. This report therefore examines processes of anticipation in Central America. The research question we answer is: 'through what approaches are diverse processes of anticipation used to govern climate change in diverse Central American contexts?'.

In order to answer this question, we first examine what methods and tools are used to anticipate climate futures and their role in climate policy and decision-making. We then closely examine three case studies to understand their approaches to anticipatory governance. Additionally, we present the results of two regional meetings with stakeholders where we discussed the challenges that exist in each country to practice anticipatory climate governance and the opportunities to strengthen capacities in this field. Finally, we present recommendations for strengthening processes of anticipatory climate governance in the region.

Keywords

Foresight; scenarios; anticipatory governance; climate policy; climate; futures; sustainability transformations

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1. Introduction

Anticipating the possible impacts of climate change has become a key global focus. The Intergovernmental Panel on Climate Change (IPCC) has drawn up a set of influential climate and socio-economic scenarios. Many governments, researchers and practitioners are developing scenarios at regional and national levels to imagine and experiment with possible global climate futures. Games are used to experience alternative futures. The futures that are imagined in these processes give shape to actions in the present. But how can the benefits and challenges of these processes of anticipation be better understood as governance interventions, particularly in the regions vulnerable to climate change?

1.1. About the RE-IMAGINE project

The RE-IMAGINE project is co-led by Dr. Joost Vervoort (UU) and Prof. Aarti Gupta (WUR). It investigates how anticipating diverse climate futures is linked to realizing appropriate and effective modes of climate governance in the world's most vulnerable regions. The project analyses various influential processes of anticipation in diverse sustainability contexts across the globe to achieve more reflexive and inclusive climate governance. In doing so, RE-IMAGINE bridges research on foresight processes that envision climate futures with climate governance research.

RE-IMAGINE builds on climate foresight expertise of the CGIAR Scenarios Project under the Climate Change, Agriculture and Food Security (CCAFS) Program, global climate policy and governance expertise from Wageningen University & Research and the University of Oxford, and foresight and climate governance expertise within Utrecht University. It also works with regional governmental organizations in four global regions that are highly vulnerable to climate change: Central America, West Africa, South Asia and Southeast Asia. In these regions RE-IMAGINE collaborates closely with the CCAFS network and regional partners UCI, ICRISAT, GIZ and ICCCAD. In addition, a Scientific Advisory Committee consisting of leading foresight and governance researchers provides advice throughout the project.

RE-IMAGINE has been made possible by the BNP Paribas Foundation's Climate Action Call, which aims to strengthen anticipation of climate change processes, and further our

understanding of impacts on our environment and local populations around the world. The project started in October 2018 and runs until December 2022.

1.2. Anticipation and anticipatory governance

Many methods and tools are used today to imagine climate futures and develop strategies for realizing new futures. These include, for example, more formal foresight tools such as participatory scenario analysis (Kok et al., 2007; Vervoort et al., 2014) and modelling (Mason-D'Croz et al., 2016; Sampson et al., 2016), but also visioning and back casting (Quist et al., 2011; Robinson et al., 2011) cost-benefit analysis (Atkinson, 2015), experiential methods (Candy & Dunagan, 2017; Candy & Potter, 2019), gaming (Baena, 2017; Vervoort, 2019) and critical research methods (Hajer & Versteeg, 2019; Späth & Rohracher, 2012) can be used with a future-orientation. With the proliferation of these processes in sustainability-related research and planning contexts, scrutiny of their role in steering decision-making becomes increasingly important (Vervoort and Gupta, 2018).

A growing body of scholars in the social sciences and sustainability sciences have used the notion of anticipatory governance to examine these processes of anticipation, including in environmental governance, public planning, responsible research and innovation, science and technology studies and transition management. We understand the concept most broadly as governing uncertain futures in the present (Vervoort & Gupta, 2018). Research into anticipatory climate governance processes in the Global South has remained very limited, while these regions are most vulnerable to climate change. This report therefore examines processes of anticipation in one of the climate vulnerable regions of the Global South.

The research question we answer is: 'through what approaches are diverse processes of anticipation used to govern climate change in diverse Central American contexts?'.

In order to answer this question, our inquiry follows several steps. We first examine what methods and tools are used to anticipate climate futures and their role in climate policymaking. We then closely examine three case studies to understand their approaches to anticipatory governance. Additionally, we present the results of two regional meetings with stakeholders where we discussed the challenges that exist in each country to practice anticipatory climate governance and the opportunities to strengthen capacities in this field.

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Finally, we present recommendations forward to strengthen processes of anticipatory climate governance in the region.

In order to examine the approaches through which futures impact on the present, we rely on a recently developed analytical framework on anticipatory governance developed by Muiderman, Gupta, Vervoort & Biermann (Muiderman et al, 2020, see Figure 1). This framework identifies four distinct approaches to anticipatory governance in the aforementioned social sciences and interdisciplinary sustainability sciences literature. These four approaches are distinct in terms of (a) how the future is conceptualized, (b) with what impact on action to be taken in the present, and (c) with what ultimate aim for engaging with anticipatory governance. The figure below presents the framework and maps the four approaches (in the boxes) onto a spectrum of conceptions of the future (the horizontal axis) and actions in the present (the vertical axis).
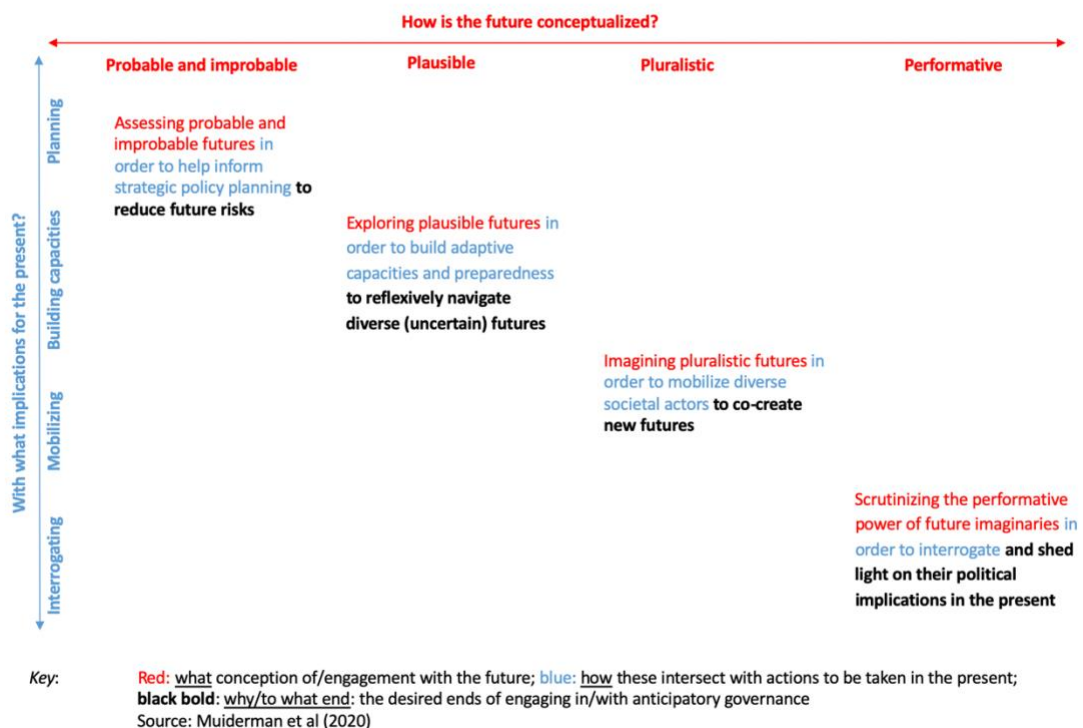

Figure 1. Analytical framework on anticipatory governance

1.3. About this report

This report presents the RE-IMAGINE research in one of its four regions: ***Central America***. Section 2 describes our methodological approach. Section 3 examines the methods and tools of anticipation and their links to decision-making. Section 4 analyzes the conceptions of the future, implications for the present and ultimate aims of three processes based on the analytical framework. Section 5 examines perspectives on the opportunities and challenges for anticipatory governance in practice.

2. Methodology

This section describes how we selected (Section 2.1.) and analyzed (Section 2.2.) our units of analysis.

2.1. Case selection and search strategy

Our unit of analysis are the various processes of anticipation and their approaches to inform climate decision-making. Our case selection included several steps. First, we set the scope to five vulnerable countries and selected five out of seven countries in the Central American region, namely El Salvador, Honduras, Guatemala, Nicaragua and Belize. We selected these countries as they have the lowest incomes in the region (four lower-middle income countries and lower-middle-income country Belize). Contrastingly, Costa Rica and Panama are high-income countries and were therefore excluded.

We then searched for policy documents, literature and process reports (grey literature) of anticipatory processes and climate policies in these five countries. The search started on Google by using the following key words in Spanish: [país], *política*, *desarrollo*, *cambio climático*, excepting the Belize cases, which used the English keywords [country], development, policy, climate change. We searched for literature on Scopus using the key words [country] AND development AND policy AND climate AND change AND future. The Spanish translation of the keywords did not result in any useful studies, while the English gave 1 result for Guatemala, 0 for El Salvador, 5 for Honduras, 1 for Nicaragua and 1 from Belize. Of these, 1 Honduras case was taken up in the study; the others were from before

2010 or not relevant. We therefore moved onto a snowballing technique and asked regional climate governance experts to help identify the most relevant processes and policies.

A total of 46 documents were identified and reviewed. We read each document and included only those that mentioned two of the following future-oriented keywords: future, adaptation, expected, anticipation, scenario, foresight. Then, documents were thoroughly read to understand the use of anticipation in guiding policy and decision-making.

Second, we set the scope to five cases (i.e. linkages) per country. Consequently, of these anticipatory processes and climate policies we chose those that had been initiated after 2010 to focus on the most recent state of affairs. Furthermore, we sought to include cases that showed diversity in terms of: a) stakeholders that initiated the process – national and regional governments, multilevel organizations, private sector and/or NGOs; b) the type of anticipation practice used. Per country, we aimed to select at least two key policies and two anticipation practices. After discovering that many anticipatory processes and policies had a regional focus, e.g. on Latin America, the Caribbean or Central America, we decided to include in our analysis also 4 regional cases. We excluded several processes and policies on the municipal, sub national, or river basin level. These were not included, as they would complicate the comparison between cases. One of the anticipation practices selected is an exception to these criteria, focusing on the City of Belize, due to the fact that the majority of the country's inhabitants live within the boundaries of the city and this therefore can be seen as a national strategy.

Finally, based on these criteria, 25 of the most relevant anticipatory processes and climate policies were selected, including 7 for Guatemala, 3 for El Salvador, 4 for Honduras, 3 for Nicaragua, 4 for Belize, and 4 regional cases for Central America.

As a next step, we selected three examples for further scrutiny of the approaches to anticipatory governance. Examples were included that are diverse in the methods and tools used. We searched for additional reports on the anticipation processes (e.g. workshop reports) and also held semi-structured interviews with stakeholders on both sides of the anticipation-policy interface. We interviewed at least three key stakeholders involved in each process: one informant who took part in the facilitation of the practice; one

intermediary informant who connected the anticipation practice with policy making; and one informant from the policy side.

As a final step, we held 2 regional focus groups with diverse stakeholders to discuss our findings and better understand why certain approaches may dominate.

2.2. Approach to the analysis

Our case study analysis relied on qualitative research methods to understand, analyze and describe the approaches through which anticipation informs decision-making. First, the literature and grey literature on anticipation processes were analyzed on the types of methods and tools and any statements regarding their guidance on actions in the present. Second, the climate policies were assessed on their statements of anticipation methods and tools that guided the policy formulation. We analyzed processes and policies independently in order to compare the ways in which anticipation is stated to have informed decision-making.

Then, the three cases were examined on the approaches to anticipatory governance with help of the analytical framework by Muiderman et al. (2020) based on the policy documents, process reports and interviews. This triangulation of data helped to verify and contrast findings.

Finally, and to answer our final research question, we organized two workshops to discuss findings and possible opportunities and challenges for strengthening anticipatory climate governance capacities. In El Salvador, 25 stakeholders participated, whereas in Guatemala 18 stakeholders, in both cases from the public and private sector, academia, and non-governmental organizations. We discussed what processes of anticipation were used, the challenges that exist in each country to practice anticipatory climate governance and the opportunities to strengthen capacities in this field.

3. The role of anticipation in policy formulation

This section first reviews policy documents, process reports and academic literature on the types of methods and tools used to anticipate climate change and their role in climate decision-making.

The table below (Table 1) illustrates the anticipation processes included in this study and by whom they were initiated and funded.

Table 1: Methods and tools of anticipation

What type of process was held?	Who initiated and/or funded it?
Belize	
Urban development scenarios for Belize City 2010-2030 (Bethancourth, 2011)	Initiated by the Government of Belize, financed by PADECO, technical assistance by International Development Bank
El Salvador	
El Salvador: effects of climate change on agriculture (Ordaz et al, 2010)	Initiated by regional governmental organ CCAD, developed by CEPAL, financed by DFID
Guatemala	
Climate change and Biodiversity; Elements to analyze their interactions in Guatemala with an ecosystem approach (IARNA-URL, 2011)	Researchers from Universidad Rafael Landívar (IARNA)
First report evaluating knowledge about climate change in Guatemala (SGCCC, 2019)	Developed by the Guatemalan System of Climate Change Science (SGSCCC). 24 authors of academic, research and governmental institutions. Study by IARNA. Climate change scenarios developed by University of Nebrasca. Financing unknown.
The economics of climate change in Guatemala (CEPAL et al, 2018)	Initiated by CEPAL and MARN (Ministry of Environment and Natural Resources), finances by IDB, Nordic development fund. Study led by CEPAL experts
Final Report Climate Impacts for Guatemala: Preliminary Results of Regional and Global Climate Models IPCC AR5 (Oglesby & Rowe, 2014)	Initiated by MARN, Financed by IDB, developed by University of Nebrasca
Honduras	
Environmental Assessment and Climate Change For the preparation of IFAD's 2012-2016 National Strategic Opportunities Program (Reiche et al, 2012)	Initiated and financed by International Fund for Agriculture (IFAD)

Using expert judgments to inform economic evaluation of ecosystem-based adaptation decisions: watershed management for enhancing water supply for Tegucigalpa, Honduras (Procter et al, 2017)	Researchers from the University of British Colombia (Canada) and CATIE (Costa Rica)
Nicaragua	
Mainstreaming of climate change in Nicaragua: Evaluation of risks and opportunities (PNUD, 2010)	Initiated and financed by UNDP
Climate Smart Agriculture in Nicaragua (World Bank, CIAT, 2015)	Initiated by CAC and CIAT, developed and funded by CIAT
Central America	
Climate Change in Central America: Potential Impacts and Public Policy Options (CEPAL et al, 2015)	Initiated by multiple regional governmental organs CAC CCAD COSEFIN and CEPAL, developed by CEPAL and financed by UKAID and DANIDA
Impacts of Climate Change on Agriculture in Central America, mitigation and adaptation strategies (Viguera et al, 2017)	Developed by CATIE, initiated and funded by Conservation International
Climate change and challenges for the tourism sector in Central America (Schatan et al, 2010)	Initiated and financed by CEPAL

The anticipation methods generally explore current and future impacts of climate change on development and the economy, or, more specifically, on environmental factors such as biodiversity and water availability, agriculture and tourism. The time frame used in most anticipation practices was mid- to long term, ranging from 2030 to 2100. The review of literature and grey literature illustrates that anticipatory processes mainly included quantitative climate modelling (11 out of 13 cases), often combined with qualitative vulnerability and risk assessments (9 out of 13). In addition, 2 cases used participatory qualitative methods such as scenarios development and a comparative land-use scenario study to robust decision-making about water, flooding, and other climate related issues. A final two studies used solely quantitative modeling (future climate scenarios, land use, crop yields, crop suitability) without combining this with other methods and tools.

Half of the anticipation processes analyzed were part of four large-scale research programs on the possible impacts of climate change. These were initiated by four different organizations. The Economic Commission for Latin America and the Caribbean (ECLAC, CEPAL for its acronym in Spanish) published a series on the economy of climate change in several countries in Latin America. The CGIAR research program on Climate Change,

Agriculture and Food Security (CCAFS) published a series of studies on climate smart agriculture in vulnerable countries of Latin America. The International Center for Tropical Agriculture (CIAT) published a series of impact studies of climate change on different subsistence and cash crops. Finally, the United Nations Development Program (UNDP) published a series on mainstreaming climate change in countries in Central America.

Most anticipation processes were initiated as an independent process while intending to guide policy and decision making about climate change. Of the 13 cases, 4 were developed to guide a specific policy, plan or strategy. Another 9 were developed independently, of which 6 state that they are aimed at guiding policymaking in general. In guiding policy, most focused on exploring key climate risks, while others took a more prescriptive focus and intended to inform strategic planning purposes.

At the same time, it is hard to find statements about their actual influence on policy development. This is rarely explicitly stated. Only four anticipation processes stated to be developed to specifically to guide policy development, for example the environmental and climate change study developed by International Fund for Agricultural Development (IFAD, a United Nations organization) is to guide their internal 5-year countries´ strategic opportunities program (called COSOP).

On the other hand, the urban development scenarios for the City of Belize did however provide a clear link. It supported the development of the Master Development Plan and Master Tourism Plan and prioritized investments for the city's development.

Also, more indirect policy engagement can be found in the fact that policy makers are often involved in the anticipatory process. Most cited studies were born from a collaboration between a national or regional government institution, an NGO or multilateral organization with strong research background (such as CEPAL), or an academic or research-oriented institution (such as CIAT or CATIE).

In addition to these processes described above, we also looked at diverse policy documents and examined what was said about the type of method and tools that were used and how this was seen to inform policy development (Table 2).

Table 2. Policy documents examined

Guatemala
National action plan on climate change (PANCC) (SEGEPLAN, 2016)
Institutional Climate Change Agenda 2013-2016 of the National Forest Institute (INAB, 2013)
K'atun National Development Plan: our Guatemala 2032 (CONADUR/SEGEPLAN, 2014).
El Salvador
National Climate Change Plan (MARN, 2015)
National strategy for hydrographic basins of El Salvador (DGFCR, 2017)
Honduras
National climate change strategy Honduras (SERNA, 2010)
National Strategy of Adaptation to Climate Change for the Agrifood Sector (SAG, 2015)
Belize
National Climate Resilience Investment Plan (Government of Belize, 2013)
National Biodiversity Strategy and Action Plan (Ministry of Agriculture, Fisheries, Forestry, the Environment, Sustainable Development & Immigration, 2016)
National Climate Change Policy, Strategy and Action Plan to address Climate Change (CCCCC, 2014)
Nicaragua
Adaptation Plan to Variability and Climate Change in the Agricultural, Forestry and Fisheries Sector (Ministerio Agropecuario y Forestal, 2013)
SICA region (Central America and Dominican Republic)
Climate Smart Agriculture strategy for the SICA region 2018-2030 (CAC, 2017)

All policies included in this study used methods and tools to anticipate climate change and define goals, strategies and actions in the present.

Looking closely at the practices used, most include model-based climate scenarios, as well as climate impact risks and vulnerability assessments. Climate scenarios as well as other quantitative model work (such as crop modeling) are the most common reference used by policy makers to understand possible impacts of climate change; 11 out of 12 policies referred to these methods. Quantitative scenarios are often, in nine out of 12 cases, complemented by vulnerability and risk assessments. The other three policies only used climate scenarios to justify their objectives. Three out of 12 policies used participatory and qualitative foresight methods such as Delphi methods and participatory scenarios development, but always in combination with quantitative climate scenarios and vulnerability assessments.

Most governments relied on processes that had been designed as independent processes (not in service of policy formulation). In four cases were these independent processes

complemented by foresight exercises (mainly scenarios) that had been designed specifically for policymaking. At the same time, not all policies clearly describe the method, nor how its outcomes were used to inform action in the present and more attention is needed to transparently report on this.

The examination of these documents thus highlighted gaps in reporting regarding how anticipations of the future have informed action in the present. This is problematic, since these have guided decision making but how cannot be traced.

4. In-depth analysis of three anticipatory governance processes

This section describes the findings from studying three processes in depth.

4.1. Honduras National Climate Change Adaptation Strategy for the Agri-Food Sector

In 2014, the Technical Committee on Climate Change and Risk Management was formed as an internal coordination body within the Ministry of Agriculture and Livestock (SAG) assigned to formulate Honduras' National Climate Change Adaptation Strategy for the Agri-Food Sector for 2015-2024 (ENACCSA). The technical committee was led by the Ministry of Agriculture and Livestock (abbreviated to SAG in Spanish) and consisted of a group of public officials from different entities working on climate change and food security within the Government of Honduras as well as other stakeholders such as non-governmental organizations (SCASA/SAG/MTCC. 2014).

The policy formulation process happened in several meetings where the committee defined the policies´ vision, objectives, strategic lines, expected results, indicators and those responsible for compliance. Seven consultants were hired to facilitate the different stages of the process and provide technical support. The Community-based forest management and adaptation to climate change (Clifor) project commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) provided funding, and CCAFS provided technical assistance (SCASA/SAG/MTCC. 2014).

Multiple types of anticipation informed the process. The IPCC climate scenarios were used, national climate change scenarios, and several environmental and vulnerability assessments of possible future impacts of climate change on agri-food livelihoods, ecosystems, agriculture and food security (USAID 2014, Argeñal 2010).

In addition, three workshops were organized, of which the one with an explicit future-orientation was facilitated by CCAFS (CCAFS 2014b). A diverse group participated, including policymakers, regional SAG officials working with farmers, farmers´ association representatives, NGO representatives, teachers and students from a local university specialized in agriculture. They revised a draft version of the policy and suggested recommendations of improvement. In addition, four regional scenarios of plausible socioeconomic and climate impacts on the future of agriculture, food security, livelihoods and environment were used. These were created the year before by a diverse group of experts from the region (CCAFS, 2014a) which were then downscaled to the context of Honduras. The socioeconomic scenarios were presented as narratives and images, its impacts were quantified and presented as model results.

The aspired action in the present was to use the downscaled scenarios to test the policy objectives, strategies and expected results for effectiveness. Stakeholders made recommendations to make the policy robust to diverse plausible future changes. Recommendations were presented to the technical committee soon after the workshop which led to the adding of a new strategic axe on climate adaptation measures and several changes to the policy.

The scenarios exercise matched three aims of the committee. The foremost important reason was that the methodology was participatory: they wanted critical feedback from regional stakeholders to make sure the policy, written by experts, would also be useful for farmers. At the same time, becoming aware of the scale of climate impacts, the committee hoped to encourage farmers to change their strategies, crops or livelihoods, establishing coherence between the institutional agenda and the proposals generated from the farmers and the territorial environment. Finally, most adaptation measures (such as genetic improvement of seeds) were based on current needs and circumstances (e.g., decreasing

crop yields), while these could change in the future. The scenarios exercise could help make their claims of the future more robust and plan responses.

4.2. Belize City Masterplan

In 2010 the government of Belize started developing a National Sustainable Tourism Master Plan with the Inter-American Development Bank (IDB) to increase tourism. The threat of climate change had only recently been recognized institutionally. In 2009, the Belize National Climate Change Committee (BNCCC) was established, and in 2012 the National Climate Change Office (NCCO) was created as part of the Ministry of Forestry, Fisheries and Sustainable Development to coordinate the country's national, regional and international response to climate change. But it was not until 2014 that the government developed a formal, overarching, national policy for climate change mitigation and adaptation, the National Climate Change Strategy and Action Plan (CCCCC, 2014). Amidst this growing consciousness of the need for preparedness and resilience, the government of Belize realized sea level rise and flooding risks were a threat to the entire economy, beyond tourism. Next to the Sustainable Tourism Master Plan was also a Belize City Masterplan developed to increase the livability for both locals and visitors, foster economic development, and protect the city through an integrated ecosystem-based adaptation approach.

Several anticipation processes were used in support of both plans. IDB collaborated with the Japanese consultancy firm PADECO. They in turn worked with the Belize based urban development firm International Environments (IE) to coordinate the anticipation project. The overall aim to rely on anticipation was to understand what opportunities and risks the city portrayed, what type of city citizens wanted to live in for the next 20 to 30 years, support the planning of the city's development, prioritize investments accordingly, and manage possible future risks (Belize City Council, 2018). Policies that considered future risks were seen to have most return on investments.

It started with a participatory analysis of the cities´ strengths, weaknesses, opportunities, and threats (SWOT), showing that the city did not only face esthetic and infrastructure problems for tourism (mainly traffic jams) but also flooding risks from the delta river on which the city was built, rising sea level, and hurricanes that reached the seafront town.

Thereafter, a strategic environmental assessment helped identify complex relationships and possible future drivers of change. To this end, interviews were done with different stakeholders from the public and private sectors and civil society. Finally, a set of six possible land-use scenarios up to 2030 were created and visualized in maps, some showing positive future developments, others negative. A combination of two most desirable (in terms of economic development and environmental sustainability) and viable (in terms of governmental and IDB investments) scenarios were developed in a future vision for the city. This vision focused on all economic activities and people in the city boundaries and encouraging sustainable urban and infrastructural developments (IDB 2012). It outlined policy guidelines, laws, and investment priorities to reach this future vision.

The SWOT analysis, environmental assessment and land-use scenarios were used by the national government to develop the National Sustainable Tourism Plan, and by the city council to develop the Belize City Masterplan. The Belize City Masterplan included an investment plan with specific strategies and instruments for urban development, social stability, economic development, the environment, and the implementation and financing of the city's development. It also established a heritage database of historic infrastructure and recommended the implementation of a set of laws to support a cultural heritage trust fund set up by IDB (PADECO, 2018). For the Ministry of Tourism, the scenarios and accompanying vulnerability assessments were crucial to understand that the main problems the city was facing were systemic, not only social and economic, but also environmental. They supported the strategic policy planning of the Belize Masterplan and prioritized its investments and also helped local institutions better understand what impact climate change could have on the future development of the city. If Belize City was to grow in the future, a greater geographic area had to be included in the city's development. The project caused a change of paradigm; it made policymakers and citizens understand that the city had to live in harmony with water. The ecosystem services of the wider biological corridor help the city deal with flooding and other climate related issues. As a result of the masterplan, IDB approved a $10 million loan for a flood mitigation infrastructure program in Belize city, along with other investments to improve living conditions and urban spaces such as green areas, sidewalks and cycle-paths (IDB, 2011).

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4.3 The Economics of Climate Change: Studies by ECLAC and member institutions of SICA

Following a strategic revision in 2007 of the challenges faced by the countries of the Central American Integration System (SICA), the Subregional Headquarters in Mexico of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC, or CEPAL in Spanish) decided to initiate a work agenda on the economics of climate change. They approached the Central American Commission for Environment and Development (CCAD) of the Ministries of the Environment of SICA and jointly designed the initiative "The economy of climate change in Central America", that lasted until 2019. In the first years, it received assistance from the team that prepared the Stern Report, a global reference on the subject (Stern 2006). Financing came from the British Government with contributions from DANIDA, the Inter-American Development Bank (IDB) and the Nordic Development Fund (NDF). Between 2010 and 2019, 24 studies were published covering 6 countries with analysis of climate scenarios for the region and the potential impacts of climate change on agriculture, food security, tourism, health, biodiversity and ecosystems, water, hydroelectric energy generation and the economy in general. The main objective was to strengthen the understanding of possible climate impacts and promote the development of public response policies, especially in the Ministries of Finance and vulnerable sectors, through processes of discussion of the results and training.

More than half of the research are vulnerability or impact assessments of climate change on the regional economy, sectors or subsectors, such as coffee and basic grain production. At the request of some countries, national compendia of the results were prepared. Almost all publications end with recommendations on how to reduce climate risks and take adaptation and mitigation measures. A central theme that the initiative proposed, based on the discussion of results, is a prioritization of sustainable and inclusive adaptation, considering the reduction of greenhouse gas emissions associated with a transition to sustainable economies.

ECLAC's anticipatory studies follow several similar principles. Proposals for work programs, including research, training, and dialogue actions were determined jointly with government officials appointed to governance mechanisms of the Ministries of Finance, Agriculture, Environment, and Health. Subsequently, national and regional experts on climate change,

including from ECLAC, developed the analyses, consulting data, statistics and other inputs from national institutions. The possible impacts are then estimated for various scenarios, documenting the analysis methodologies as well as giving guidance on the uncertainties and limitations associated with these scenarios. Once the preliminary results are ready, they are presented, discussed, and refined with designated officials and other experts. Once the results are finalized, the possible implications and policy options for each sector are discussed to reach a consensus and published in co-publications with partner institutions.

This participatory approach has a relatively long history and originates in the diplomatic relationship between the United Nations program and its member countries. Both ECLAC and the Central American Council for Agriculture and Livestock (CAC) affirm that the involvement of policymakers ensures that the studies are policy relevant. Another important reason for working together from beginning to end is to strengthen technical capacities on complex issues such as the use of climate models, scenarios and data uncertainty. The co-production of knowledge has helped to find solutions and build institutional capacities to understand climate change in national realities.

Most studies have been widely referenced throughout policy documents and climate change research in general in Central and South America. Interviewees that had been involved in policy processes indicated that several studies were used to develop the Regional Agriculture Policy for the SICA region (2018-2030), the Climate Smart Agriculture Strategy for the SICA region (EASAC, 2018-2030), and the Climate Law of Guatemala (2013). However, policy documents do not always reference to these studies.

Most of the studies have been widely referenced throughout policy documents and climate change research in Central and South America, as well as in the latest IPCC reports. Interviewees that had been involved in policy processes indicated that several studies were used to develop the Regional Agriculture Policy for the SICA region (2018-2030), the Climate Smart Agriculture Strategy for the SICA region (EASAC, 2018-2030), and the Climate Law of Guatemala (2013). However, policy documents do not always reference to these studies.

5. Regional discussions on the opportunities and challenges

In Guatemala and El Salvador, the opportunities and challenges for using anticipation to determine actions in the present were discussed in two focus group discussions. First, the discussion went about which processes participants were familiar with. These included vulnerability and risk assessments of socioeconomic, productive and environmental issues. Assessments focused on poverty and development indicators, or vulnerability to climate change. A second category was the quantitative modelling of climate change impacts on agriculture and other livelihoods. And third, quantitative climate change scenarios by national and international bodies, such as the IPCC and the National Institute of Seismology, Volcanology, Meteorology and Hydrology of Guatemala (INSIVUMEH).

These processes mainly pursue action in the present that focuses on strategic planning and prioritization of the focus, objectives and approaches of development projects. A second form of action was influencing governmental institutions and individual decision makers (lobby and advocacy work) to make steps to increase preparedness to climate change and incentivize sustainable and just government plans and policies.

Participants perceived as a main challenge for *developing* anticipatory processes the lack of a culture of prevention and a systemic approach to planning. The latter includes a lack of data, problems with obtaining data from public and private institutions, and dispersed data instead of centralized in a place accessible for all. Institutions that use anticipation indicated they need to increase their knowledge and skills in order to deal better with scientific uncertainty. Thus, the focus is very much on (building capacities for) linear and probabilistic types of future risk reduction, which seem to be a prerequisite for realizing more transformative futures somewhere further down the line.

Policymakers in Honduras indicated that the current institutional, political and socio economic difficulties challenge the use of anticipatory climate governance processes, such as high poverty, inequality and corruption: *¨How to address the future if we still have not*

resolved things in the present?¨ (Interview with a policymaker in the SAG team, 24 July 2019).

The main challenges encountered to *use* anticipation for actions in the present include a lack of skills, awareness and training. And also the lack of effective communication skills and coordination between institutions to disseminate and use findings for climate decision-making. Finally, a lack of funding was sometimes considered to be a key challenge.

On the other hand, opportunities were also shared that could benefit the development and use of anticipation processes. An interesting opportunity is that both countries have public and private institutions dedicated to research in climate change with experience in foresight and forecasting methods. In Guatemala there is the Private Institute for Research on Climate Change[1] and the University of San Carlos. In Guatemala, the Rafael Landivar University´s Institute of Agriculture, Natural Resources and Environment (IARNA) has an institute specialized in research and forecasting[2]. Universities have the opportunity to teach new generations of professionals in anticipation techniques. Scholars and students can do (applied) research on a large variety of subjects and play a vital role in collecting and analyzing data across multiple sectors.

Another opportunity that was perceived to make a positive contribution to anticipatory governance is the focus on participation. Anticipatory studies that were developed in a collaborative effort (including research institutes, universities, and government departments) were also more likely to be disseminated and used for policy and decision-making. The Ministry of Agriculture in Guatemala indicated to receive quite many studies and only approves those that are formulated in a participatory manner. This includes the involvement of governmental departments in the inception phase as this increases the uptake of recommendations.

[1] Instituto Privado de Investigación en Cambio Climático

[2] Instituto de Investigación y Proyección sobre Ambiente Natural y Sociedad (of IARNA)

6. Recommendations

Here we provide a list of priorities based on our analysis to support practitioners and decision-makers who want to be more mindful of the ways in which foresight work can impact actions for more sustainable futures in the region.

4 Be more transparent on the ways in which anticipation is used to inform actions in the present: who was involved, the methodology, content, assumptions, and limitations

5 The co-creation of futures should start early in the design phase: from the conception of ideas to implementation of outcomes resulting from the anticipation of futures

6 Inform decision-makers, scholars, practitioners, and students on the different approaches to anticipatory climate governance

7 Build bridges between academia, NGO´s, governments, and research organizations to collectively discuss and critique imagined futures

8 To achieve more transformative futures: support the design, development and use of anticipatory processes at national public and private institutions in ways that mobilizes diverse groups of stakeholders for collective action

9 Question the assumptions that underly scenarios and how they help prioritize actions in the present

10 Exchange on best practices, for example an interregional exchange

11 Coordinate between international development agencies to canalize funding for capacity building

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Annexes

ANNEX 1. Interviews with key informants of in-depth case studies

HONDURAS CASE STUDY - National Climate Change Adaptation Strategy for the Agri-Food Sector for 2015-2024	
Marlon Duron – Policymaker of SAG team in charge of development of the policy	24 July 2019
Ivette Velásquez – Coordinator of SAG team in charge of development of the policy	17 July 2019
Marco Sotomayor – Consultant contracted by GIZ to support SAG in development of the policy	30 July 2019
BELIZE CASE STUDY - Belize City Masterplan	
Carlos Betancourth - project leader on behalf of PADECO at the time	25 September 2019
Abil Castaneda - Ministry of Tourism, Civil Aviation and Culture of Belize - Project Liaison Officer at the time	15 October 2020
Arcindo Santos - project leader on behalf of IADB at the time	15 January 2021
ECLAC CASE STUDY - The Economics of Climate Change	
Julie Lennox - Climate Change Focal Point and Head of the Agricultural Development Unit at ECLAC (CEPAL)	15 October 2019
Diana Ramirez – Author of several ECLAC (CEPAL) studies on the economy of climate change	14 January 2021
Manuel Jimenez – policymaker and former executive secretary of the Central American Board on Agriculture and Livestock (CAC)	9 January 2020
OTHER INTERVIEWS	
Alejandra Sobenes – Viceminister of Environment when Guatemala´s Climate Change Action Plan was developed	19 October 2018
Raúl Artiga – Consultant and author of the study ´Avances a nivel politico y estratégico en la adaptacion al cambio climatico´ (Global water Partnership)	10 January 2019

ANNEX 2. List of participants Regional Discussion Workshop EL SALVADOR

Lista de asistencia
Taller de Escenarios y Prospección Climática en El Salvador
19 de Octubre 2019, San Salvador
Organizan: RE_IMAGINE - CIAT- CCAFS-UCI-FIDA

Nombre y Apellido	Institución
Dr. Manuel Sosa	MAG
Ulises Juarez	MARN
Oscar Garza	MARN
Ernesto Bonilla	PROTECCIÓN CIVIL
Guillermo Perez	CONASAN
Daysi de Marquez	CONASAN
Valeria Peralta	PNUD
Rosa Amelia Campos De Martinez	FIDA
Julio César Quiñónez Basagoitia	PROINTER
Nelson Cuéllar	PRISMA
Raúl Caracamo	FAO
Sara Cortez	MAG
Magdalena López	MAG
Guillermo Navarrete	MARN
Omar Arriola	FAO
Sidia Marinero	MARN
Alfonso Rosalas	CONASAN
Makie Yoshida	PNUD
Alfredo Rodríguez	FONAES
Hazel Martínez	MAG
Jose Cristobal Escobar	CRS
Efrain Leguia	UCI
Marieke Veeger	UCI/CCAFS

ANNEX 3. List of participants Regional Discussion Workshop
GUATEMALA

Lista de asistencia
Taller de Escenarios Futuros y Prospección Climática en Guatemala.
23 de Octubre 2019, Ciudad de Guatemala
  Organizan: RE_IMAGINE - CIAT- CCAFS-UCI-FIDA

Institución	Contacto
Universidad de San Carlos - USAC	Ing. Werner Ochoa
Instituto Privado de Investigación sobre Cambio Climático - ICC	Elmer Orrego
Instituto Interamericano de Cooperación para la Agricultura - IICA	Maria Febres
Universidad Rafael Landivar de Guatemala - IARNA	Dr. Raúl Maas
Programa de las Naciones Unidas para el Desarrollo - PNUD	Dunia López
Ministerio de Agricultura, Ganadería y Alimentación - MAGA	Lourdes Castro
Instituto Nacional de Sismología, Vulcanología e Hidrología - INSIVUMEH	Inga. Rosario Gómez
Instituto Nacional de Sismología, Vulcanología e Hidrología - INSIVUMEH	Ing. Paris Rivera
Instituto Nacional de Sismología, Vulcanología e Hidrología - INSIVUMEH	Licda. Nora Machuca
Ministerio de Ambiente y Recursos Naturales - MARN	Karen Iveth Chacon
Ministerio de Ambiente y Recursos Naturales - MARN	Jenny Vásquez
Universidad del Valle de Guatemala - UVG	Diego Inver
Consejo Nacional de Áreas Protegidas - CONAP	Monica Barillas
Consejo Nacional de Áreas Protegidas - CONAP	Raúl Alvarez
Rainforest Alliance - RA	Alejandro Santos
Fondo de las Naciones Unidas para la Alimentación y la Agricultura - FAO	Amauri Molina
Ministerio de Agricultura, Ganadería y Alimentación - MAGA	Mariana Palencia
Ministerio de Agricultura, Ganadería y Alimentación - MAGA	Mariann Rodriguez
CCAFS - Universidad para la Cooperación Internacional – UCI / CCAFS	Marieke Veeger
Universidad para la Cooperación Internacional - UCI	Efrain Leguia