Approaches to anticipatory governance in West Africa: How conceptions of the future have implications for climate action in the present

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ABSTRACT

Methods and tools to anticipate futures are growing in prominence to guide decision-making under climate change. A research agenda into the steering effects of these processes is growing but has largely ignored *how* imagined futures impact present-day actions beyond the Global North. This paper presents a case study analysis of anticipatory governance in a highly climate-vulnerable area - West Africa. It examines processes of anticipation through an analytical framework that identifies four distinct approaches to anticipatory governance in terms of their conceptualization of the future, implications for actions in the present, and ultimate aims intended to be realized. The study finds two dominant approaches that appear in hybrid forms which are quite technocratic in character. These hybrids assess probable or plausible futures to inform and build capacities for strategic risk reduction. Many anticipation processes are participatory, but often focus on transferring expert-based knowledge to stakeholders or discussing adaptation options rather than opening up dialogue on *what* and *whose* futures to engage with. The paper argues that more plural and critical dialogue is needed in which stakeholders have agency to shape futures and address power imbalances, particularly in these contexts where anticipation relies on western funding and science.

1. Introduction

The adoption of the Paris Agreement served as a catalyst for many countries to gain support for addressing their climate futures (Jordan et al., 2018; Sova et al., 2015a). Many anticipation methods and tools are used to explore climate futures below a 1.5-degree temperature increase (Mason-D'Croz et al., 2016; Riahi et al., 2017; Vervoort et al., 2014). Anticipation is a broad term for processes that explore futures and guide actions in the present (Muiderman et al., 2022) and is commonly associated with formal foresight (see for existing typologies Bradfield et al., 2005; Sardar, 2010; van Notten et al., 2003; Wilkinson & Eidinow, 2008). Foresight typically includes model-based scenarios (van den Berg et al., 2016), participatory scenarios (Hebinck et al., 2018), back-casting (Quist et al., 2011; Robinson et al., 2011), and formal visioning processes (Wiek & Iwaniec, 2014). But methods such as vulnerability and impact assessments, cost-benefit analysis, risk analysis, and technology assessments are also used to explore futures and inform action in the present (Muiderman et al., 2020; Turnpenny et al., 2015).

With the growing focus on anticipation is parallel concern is growing about the extent to which the future is subject to steering

(Vervoort & Gupta, 2018). Anticipation practitioners often do not specify their conceptions of the future and how they hope to intervene in governance contexts (Henrichs et al., 2010a; Muiderman et al., 2022). However, futures are neither determined nor fully open (Urry, 2016); assumptions about the future shape how we visualize the future and decide upon the future in the present, such as investments in certain sectors and prioritization of groups (Granjou et al., 2017; Vervoort & Gupta, 2018). Consequently, acting on some futures can have destructive effects on other futures (Paprocki, 2019). Examples include the image of a desiccating Sahel that slowed down international responses to the extreme rainfall and floods in 2010 (Tschakert & Sagoe, 2010; see also Hulme, 2001; Batterbury & Warren, 2001), or policies promoting biofuels that resulted in land grabbing in Ghana (Tsikata & Yaro, 2011). Futures work has also been criticized for maintaining dominant belief systems (Andersson, 2018; Urry, 2016), particularly those of the Global North (Appadurai, 2013; Escobar, 2020; Sardar, 1993).

It is thus important to examine *how* conceptions of the future steer actions in the present, particularly beyond the Global North. The lens of anticipatory governance allows for such scrutiny. Anticipatory governance means, most broadly, the governance of uncertain futures in the present (Vervoort & Gupta, 2018). Consequently, it takes an explicit future-orientation in sustainability governance debates. A research agenda on anticipatory governance is growing but has largely ignored the Global South (Macnaghten et al., 2014; Vervoort & Gupta, 2018). More generally, global sustainability governance has remained western-oriented (Sénit & Biermann, 2021) and countries in the Global South rely on western science and technologies to govern climate futures (Akamani, 2016). This points to an urgent research agenda and the aim of this paper: to examine the conceptions of the future in methods and tools of anticipation and how they impact actions in the present to govern climate futures in the Global South.

This paper examines anticipatory governance processes in a climate-vulnerable context - West Africa. Addressing the research gap in this region is important and urgent because West Africa is considered one of the world's regions that will be most impacted by climate change (Heinrigs, 2010; Lee et al., 2021; Niang et al., 2014; Sylla et al., 2016), least able to cope with its impacts and largely dependent on international donor funding to govern climate change (Noblet et al., 2018; Tschakert et al., 2016; Yaro & Hesselberg, 2016). In this context, processes of anticipation are examined using a recently developed analytical framework on anticipatory governance. The framework identifies four distinct approaches to anticipatory governance in terms of their conception of the future, implications for the present, and ultimate aims (Muiderman et al., 2020). This paper is the first application of the analytical framework to this domain. Consequently, it provides important empirical insights into how conceptions of the future steer climate action in the Global South, and in West Africa in particular, and contributes to the conceptualization of anticipatory governance.

2. Four approaches to anticipatory climate governance

Anticipatory governance is a concept that is growing in prominence in the social sciences and interdisciplinary sustainability sciences to examine futures work. Scholarly fields include research and innovation, science and technology studies, transition and
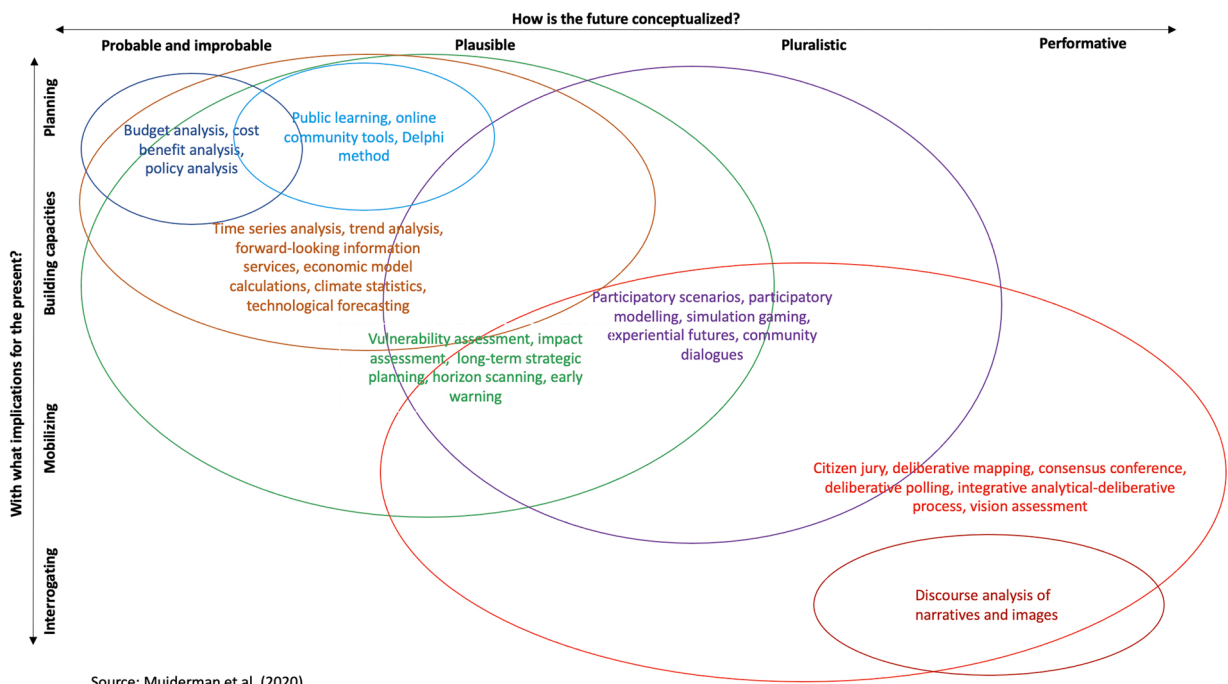

Source: Muiderman et al. (2020)

Fig. 1. Diverse tools and methods of anticipation. **Caption:** The horizontal axis in the figure visualizes 'the conception of the future' and the vertical axis 'implications for steering in the present'. The circles represent a non-exhaustive set of methods and tools of anticipation for each of the approaches.

transformation studies, and future studies. These various fields understand the notion from very distinct ontological, epistemological and normative starting points, and not all necessarily employ the term itself (Boyd et al., 2015; Vervoort & Gupta, 2018; see also Fuerth, 2009; Guston, 2014). Therefore, a recent literature review analyzed different understandings of anticipation and anticipatory governance across these different bodies of literature (Muiderman et al., 2020). The authors identify four distinct approaches in terms of the conception of the future, implications for actions in the present, and ultimate aims intended to be realized (Muiderman et al., 2020). These elements have often remained implicit in future-oriented processes and as such the framework provides a new lens to address this gap. The four approaches are:

Approach 1: Probable Futures, strategic planning, reducing risks.

The first approach to anticipatory governance draws on perspectives in public policy and planning literature and probabilistic futures studies. It presents futures as scientifically uncertain and complex, but anticipation processes can assess probable and improbable future risks to inform strategic policy trajectories to reduce future risks.

Approach 2: Plausible futures, building capacity, navigating uncertainty.

Approach 2 draws on perspectives in responsible research and innovation literature and strands of climate policy and governance. The future is conceived to contain irreducible uncertainties that cannot be ranked in any way. Anticipation processes are used to explore diverse plausible future trajectories in a participatory. This allows for building adaptive capacities and preparedness in the present to diagnose and navigate diverse, uncertain futures as their trajectories unfold.

Approach 3: Pluralistic futures, mobilization, co-creating new futures.

Approach 3 is primarily identified in futures studies literature and sustainability sciences. It conceives futures as embedding multiple future worlds, that are shaped by interaction and diverse interpretations of the world. Anticipation processes can imagine these plural worlds by mobilizing diverse societal actors to collectively develop pluralistic, actionable pathways to generate a new and (more radically) transformed future.

Approach 4: Performative futures, interrogation, political Implications.

Approach 4 builds on perspectives in science and technology studies, sociology of the future, and critical (global) environmental governance. It envisions futures as imaginaries that are speculative. Anticipation processes can interrogate futures on their performative power, by examining how futures privilege actors, interests, and framings to identify their political and material consequences in the present.

As a second step, a set of methods and tools of anticipation are mapped onto the framework which shows that some processes align with given approaches, while other methods and tools cross-fertilize with multiple approaches (see Fig. 1, Muiderman et al., 2020). For example, cost-benefit analysis aligns predominantly with approach 1, while simulation modeling can be used as probabilistic assessment (approach 1) and plausibilistic exploration (approach 2).

In this paper, I argue that anticipation processes contain often-implicit assumptions about the future that steer actions in the present. Therefore, these processes need to be examined for their political implications. I use the four approaches outlined above as heuristics to understand, describe and explain the conceptions of the future embedded in anticipation processes, their implications for actions to be taken in the present, and the ultimate aims intended to be realized. In this framing, methods, and tools as infrastructures or spaces of connectivity that facilitate the exchange of ideas (Barry, 2020) and are therefore the starting point for this inquiry into anticipatory climate governance in various contexts of Western Africa.

3. Methodology

This section describes the methodological approach to the empirical analysis. I first describe the case study and then explain how data was collected.

3.1. Case study region: West Africa

This paper presents a qualitative case study of anticipatory climate governance processes in West Africa using the analytical framework on anticipatory governance by Muiderman et al. (2020). Climate change is projected to have a larger impact on the West African region than elsewhere in the world, particularly in its arid Sahel zone (Sylla et al., 2016) where land temperatures are projected to rise faster than the global land average (Niang et al., 2014). The region has one of the world's highest poverty, unemployment and illiteracy rate (Heinrigs, 2010). Climate change is considered an important driver of rapid social transformation in West Africa, including urbanization, migration, growth in food imports, and price fluctuations (Lambin et al., 2014). Similarly, the social and environmental context is impacted by, amongst others, conflicts, land privatization, encroachment of large-landholders at the expense of community land ownership, changing donor policies and priorities, and international infrastructural projects (Lambin et al., 2014; Mertz et al., 2012). Consequently, climate change is considered as being a development that quickly pushes West Africa's social and environmental systems beyond their coping capabilities (Heinrigs, 2010; Yaro & Hesselberg, 2016). However, the extent and direction of climate change are considered highly uncertain because of already high seasonal, decadal and regional climate variability (Lee et al., 2021; Niang et al., 2014; Tschakert & Sagoe, 2010). Climate data sets that model this region are less complete and climate learning tools are more scarce than in the Global North (Tschakert et al., 2016).

Following the ratification of the UNFCCCs Paris Agreement and the Sustainable Development Goals in 2015, international and national policymakers shifted the focus from addressing more present-day climate vulnerabilities to future climate challenges. Countries received, amongst others, support in drafting their National Adaptation Plan (NAP), to articulate medium-term and long-term adaptation needs (UNFCCC (n.d.)). Each country follows a different path. Some countries focus on mainstreaming climate

adaptation in diverse sectoral plans CGIAR (2015)), and others on integrating across sectors (Akamani, 2016; Niang et al., 2014; Sova et al., 2015b). Thus, a growing focus has been on anticipation processes to support this transition to more long-term future-oriented climate policy development (Noblet et al., 2018; Vervoort & Gupta, 2018). However, anticipation processes are still considered to be ineffectively integrated into policy plans (see e.g. for Senegal Noblet et al., 2018), particularly due to ad-hoc responses at the local level (Niang et al., 2014).

Thus, this study considers West Africa as a region in the Global South where examining anticipatory climate governance is urgently required. For the analysis, five countries in West Africa are considered, which are among the most vulnerable to climate change: Ghana, Niger, Mali, Burkina Faso, and Senegal (Huq & Ayers, 2007). I follow the justification as outlined by Förch et al. (2011), where they emphasize a) high climate impacts and related environmental problems; b) high poverty rates and a population dependent on agriculture; and c) employment of anticipation processes. The analysis documents the written statements in 30 process reports and policy documents, and the perspectives of 14 interviewees.

3.2. Data collection

I consider the type of methods and tools of anticipation as a starting point for the analysis of which approach(es) to anticipatory governance might be taken. Therefore, the first step was to identify methods and tools that have been used to anticipate climate futures in West Africa that are intended to inform decision-making processes. The aim was to explore their nature and to map how they relate to the analytical framework. The intention was not to cover all methods and tools illustrated in Fig. 1. Therefore, I started my search for research on anticipation processes on Scopus using the following keywords: [country] AND development AND policy AND climate AND change AND future. I read all abstracts and included papers with at least two of the following keywords: future, adaptation, anticipation, scenario, and foresight. This resulted in 11 papers that discussed anticipation processes in the climate adaptation domain. In addition, I looked on Scopus, Google Scholar, and Google for national and sectoral policies (e.g., agricultural policies) policies that prioritize climate adaptation, including government websites and UN websites (e.g., adaptation-un.org).

However, since policies were rarely published online, I added a snowball technique as a second data collection method. I shared my findings - the list of policies and processes found so far - with several regional experts working on the foresight-policy interface who then provided additional input into the findings. The snowballing started with the regional experts of the Research Program on Climate Change, Agriculture and Food Security (CCAFS) of the Consultative Group on International Agricultural Research (CGIAR). This is a large international network of research institutes that was established in 1971 to achieve future food security and a partner in the research project. Some of their experts helped to identify influential anticipation processes and climate policies. Based on these findings, other experts were contacted, and so on to triangulate data and validate the findings (Verschuren & Doorewaard, 2010). Selecting anticipatory governance processes thus occurred in a parallel-iterative rather than linear-serial process. Consequently, I learned more about the case context which helped to select cases (Bryman, 2012; Verschuren & Doorewaard, 2010).

For each country, I set the scope to approximately six prominent anticipation processes and climate policies that had been initiated after 2008. I also included a few processes with a regional orientation (see the 'regional' row in Table 1). All climate policies were at the national level. Table 1 illustrates the selected anticipation processes.

As a third step, I examined three processes of anticipation to further analyze the implicit and explicit ways in which conceptualizations of the future impact actions in the present (see the three projects written in *italics* in the blue boxes of Table 1). I chose processes that are (a) diverse in terms of the type of method/tool used, but (b) have in common an intention to inform decision-making. This allowed me to analyze (i) if processes align with a given approach or multiple approaches and (ii) how conceptions of the future are perceived to relate to actions in the present. The first anticipation process includes the climate models and policy workshops of the African Monsoon Multidisciplinary Analysis (AMMA-2050) program that has supported national climate adaptation planning in West Africa with climate scenarios and policy workshops. The second process is the participatory foresight process of the Future Scenarios Project of the CGIAR research program on Food Security, Agriculture, and Climate Change (CCAFS). Here, socio-economic and climate scenarios of a wide range of future drivers of change up to 2050 are developed to guide policy formulation. The third process is the workshop on climate information and generation of the West African Biodiversity and Climate Change (WABiCC) Program. This is a large five-year program in which many future-oriented capacity-building activities are organized to support countries in the formulation of National Adaptation Plans (NAPs). This third step in the analysis builds on 14 Skype and online semi-structured interviews with people working on both sides of the anticipation-policy interface. This included at least the designer/facilitator of the anticipation process (e.g., the workshop facilitator, modeler, etc.), an intermediary person (e.g., someone responsible for stakeholder participation and policy engagement), and a policymaker or person responsible for policy follow-up. The interviews were structured according to important topics (based on the analytical framework) yet without a fixed outline, to capture the perspectives and frames of the interviewees better inductively.

3.3. Data analysis

All data were analyzed in a qualitative case study approach that is suitable for the aim of describing, interpreting, and furthering

Table 1
Documents reviewed and three processes analyzed in-depth (in blue).

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conceptual understanding of anticipatory governance. The qualitative case study approach is an open way of gathering and triangulating data – in this case, the interpretation of texts and interviews. Rather than seeking to give a systematic overview of anticipation processes quantitatively, the aim of this research is to scrutinize anticipatory governance approaches in a narrative type of interpretative analysis. I used several research techniques - literature and document review, snowballing, and interviewing - in parallel to iteratively explore and refine the research findings. The dialogue between exploration and discovery of new findings is seen as a key quality of qualitative case study research (Kleining & Witt, 2000) as it allows for obtaining an in-depth understanding and holistic picture of the research object as a whole (Verschuren & Doorewaard, 2010; Yin, 2003) with sensitivity to the empirical complexity (Flyvbjerg, 2006; Hopkin, 2010). As a result, the analysis of (grey) literature on anticipation, policy documents, and interviews provided a more holistic picture of the diverse ways in which anticipation processes steer present-day decision-making.

The research presents both a deductive inquiry into anticipatory governance in practice and an inductive inquiry into the utility of the analytical framework based on the practice-oriented research (Toshkov, 2016). The analytical framework guided the research questions. The written statements in the 30 documents were first categorized in two tables: one focusing on the anticipation processes (see appendix A) and one focusing on the policy processes (see appendix B). I examined these documents on the methods and tools of anticipation that had been used, the stakeholders involved, and the way in which anticipation was seen to impact decision-making. Then, three processes were additionally analyzed based on perspectives shared in semi-structured interviews to further examine more implicitly embedded conceptions of the future in anticipation processes, their implications for actions in the present, and the ultimate aim intended to be realized.

4. Approaches to anticipatory climate governance in West Africa

This section presents the findings from analyzing the anticipation processes. Section 4.1. first examines written statements regarding 30 anticipation processes on the types of methods and tools used, the stakeholders involved, and the way in which anticipation was seen to impact decision-making. Section 4.2. analyzes written and spoken statements on three diverse processes regarding their conceptions of the future, implications for actions in the present, and ultimate aims intended to be realized.

4.1. Anticipation processes and decision-making

4.1.1. Anticipation in research and practice
The statements in anticipation research and practice illustrate that a combination of multiple and diverse methods and tools are used in a single project (see appendix A for details). Processes include primarily quantitative scenarios that assess probable (and improbable) futures based on the modeling of crop-, macroeconomic, or climatic trends (see e.g., Burkina Faso's National Climate Adaptation Plan, Ministry of Environment & Fishery Resources, 2015). These scenarios are sometimes used as standalone processes (see e.g., the SARRA-H model in the Sudanese and Sahelian savannas), but are often combined with participatory processes such as policy workshops (e.g., AMMA-2050 in Senegal). In addition, a few qualitative participatory scenario methods focused on exploring multiple plausible futures with diverse stakeholders: academia, policy, private sector, and civil society.

Almost all processes were organized and funded by international donor organizations (e.g., the World Bank, UNDP, and NEPAD), national donor governmental agencies (e.g., USAID and DFID), and research and development institutes (e.g., CIRAD and CGIAR). These organizations collaborate with West African partners such as ministries and research institutes to co-design the processes and involve more stakeholders. West African governments sometimes requested donor organizations to design a process. (e.g., the Burkina Faso government asked CCAFS). Only two processes seemed to be fully designed by African organizations (but funding information was not provided for one of these two).

Statements about how anticipation should inform decision-making differ in levels of explicitness. Particularly the more quantitatively and prediction-oriented forms of anticipation (e.g., the error correction model of the University of Ghana) provide recommendations without making explicit how those should inform decision-making. Some state the intention to inform decision-making without specifying a policy process (e.g., the practical consensual tool of the Institut d'Application et de Vulgarisation en Sciences). Others involve policymakers early in the design of the process to foster policy uptake without specifying how and where recommendations should be used (e.g., the Climate projection of AMMA-2050). Finally, a few processes state the intention to be designed specifically to guide the formulation of a specific policy process (e.g., the CCAFS Scenarios workshop in Burkina Faso). Anticipation practitioners much more clearly describe the design of the process than how they aspire to intervene in policy and governance contexts.

4.1.2. Anticipation in policy documents
Reviewing policy documents presents a bit of a different picture (see appendix B for details). Visioning processes are primarily used as a starting point instead of quantitative scenarios. As such, a vision for the country is set to a specific time horizon and policy priorities and ambitions are determined for reaching this vision. Visions can be based on more formal deliberative processes to include perspectives of various stakeholders (e.g., Niger's Strategic Framework for Sustainable Land Management). However, visions can also be considered to have been legitimized during elections (e.g., Ghana's Coordinated Program of Economic and Social Development Policies). Visioning processes are rarely standalone processes and are complemented with formal or informal backcasting approaches that help determine short, medium, and long-term interventions (e.g., the Emerging Senegal Plan). Furthermore, visions are often combined with model-based scenarios to assess macroeconomic trends (e.g., Ghana's Shared Growth and Development Agenda II) or climatic trends (e.g., Senegal's National Adaptation Plan for the Fisheries and Aquaculture Sector in the Face of Climate Change Horizon 2035). Other combinations include a strategizing tool (EIDOS, Mali), and participatory scenario analysis that was quantified

in a policy simulation tool (Threshold21, Senegal).

Policy documents mention relying on donor funding for the design and implementation of anticipation processes, but such information was not as detailed as in the reports and literature. For example, anticipation processes were often stated to have been initiated by the national government without specifying the department and its funding partners. In addition, there is generally little information about the design of the process and how its recommendations were used to inform decision-making was generally; and when provided, it was scattered throughout the policy document. Most clear accounts of the use of anticipation were the publication of quantitative scenarios in figures and graphs, but for participatory processes is it much more difficult to trace how recommendation informed decision-making.

4.2. Three processes: conceptions of the future, implications for actions in the present, and ultimate aims

The section now moves on to an examination of three processes that are diverse in terms of the type of methods and tools used but have in common an intention to inform decision-making. This allows for analyzing if anticipation processes align with a given approach or multiple approaches to anticipatory governance. Additional interviews were conducted to complement the analysis with perspectives regarding often-implicit conceptions of the future, implications for actions in the present, and the ultimate aims intended to be realized.

The first process is the West African Biodiversity and Climate Change (WABiCC) Program, a large five-year program where many future-oriented capacity-building activities are organized to support countries in the formulation of National Adaptation Plans (NAPs). The process was initiated and designed by Tetra Tech ARD in association with Palladium, the Center for International Earth Science Information Network (CIESIN) of the Colombia University, PCI Media, Pact Inc, and Born Free USA, and funded by USAID. In 2018, WABiCC organized a series of workshops facilitated by CIESIN (Columbia University) in West African coastal countries (Cote d'Ivoire, Ghana, Guinea, Liberia, Sierra Leone, and Togo) to deliberatively discuss how climate information, generation, and use could be improved in policy trajectories for future climate adaptation and coastal resilience. In its 2018 workshops series in West African coastal countries, WABiCC focused on improving the access to and understanding of high-quality portals and models. Participants worked for the meteorological services, ministerial departments (including water resources, agriculture, climate change, agriculture, food security, and energy), and the Environmental Protection Agency. During the workshops, climate scientists presented key (global) portals that give access to climate projections, after which participants self-reviewed and peer-reviewed key departmental policies on the quality of and gaps in climate information.

The second process is the Future Scenarios Project of the CGIAR research program on Food Security, Agriculture, and Climate Change (CCAFS). In this process, socio-economic and climate scenarios are developed to guide policy formulation. The process was initiated by CS-CSPA, the Ministry responsible for the PNSRII. In 2016, the government of Burkina Faso invited CCAFS to run a participatory scenario process to guide the reformulation of Burkina Faso's second National Plan for the Rural Sector (PNSRII, 2016–2020) after its precursor had come to the end of its term. CGIAR funded the process. Diverse stakeholders were included: research institutes, governmental bodies, civil society, and private sector. Stakeholders explored a wide range of possible environmental, future economic, political, geopolitical, social, and cultural changes up to 2050 and discussed their dynamics. The two most salient drivers were then mapped onto two axes that formed the basis for four diverse scenarios.

The third is the African Monsoon Multidisciplinary Analysis (AMMA-2050) program that has supported national climate adaptation planning in West Africa with climate scenarios and policy workshops. The process was initiated and designed by the African Monsoon Multidisciplinary Analysis (AMMA-2050) and funded by DIFD (Future Climate for Africa). The AMMA-2050 program developed multiple quantitative scenarios of diverse future trends, based on crop and convection-permitting modelling. These were discussed in policy workshops, amongst others with the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) in Ouagadougou, Burkina Faso (WASCAL, and AMMA-, 2050, 2018), as well as through a collaboration with research organization Climate Analytics (funded by the German Ministry of Environment and GIZ) who organized several workshops at national and district levels, including a participatory scenarios workshop. Participants in these workshops were researchers and local and national policymakers.

4.2.1. WABiCC climate information workshops

Conception of the future: WABiCC focused on understanding scientific uncertainty inherent to climate modeling over longer time horizons as well as the disagreement between prominent climate models on the direction of climate change (Interview, 19 March 2019). This is needed as the West African Sahel zone is marked by trends of both dryer and wetter climates, and the natural variability makes it harder to detect climate change. Moreover, detecting local temperature changes is much more difficult than global ones. It is considered that by contrasting multiple models scientific uncertainty about the direction of change can be reduced.

Implications for actions in the present: WABiCC work sought to align its work with the NAP process in particular: "We want to help them [policymakers] to better understand how they can better structure the process and make sure that their views are updated with accurate information to do the NAP" (Interview, 04 October 2018). Through its workshops, WABiCCs intended to build institutional capacities to generate, use and manage climate information. This included changing the mindsets of policymakers to learn to plan under scientific uncertainty in the absence of objective data and rely on 'robust enough' data and interaction with external experts. Capacity-building concerns focused amongst others on the national meteorological services, which have been underfunded since the countries' independence.

Ultimate aim: WABiCC aimed to increase preparedness and resilience to future climate risks.

4.2.2. CCAFS participatory scenarios

Conception of the future: The Future Scenarios Project pointed to the fundamental uncertainty of the future and developed a participatory scenario process that explores a wide range of plausible futures according to stakeholders from public and private sectors. The scenario narratives were developed in a consensual fashion.

Implications for actions in the present: The scenarios served as a tool for strategic policy planning and investment decisions and to this end CCAFS engaged directly with the PNSRII policy processes. The recommendations are intended to make the policy more robust to multiple uncertain future directions as perceived by a variety of stakeholders. It is considered to be of great value:

> "By getting stakeholders on board it allows for discussing policy priorities. The scenario process was seen as something coming from external, it is not a national process per se, it's CCAFS who's leading it. As such, people are just trying to be honest, transparent between each other vis a vis the process - seeing the scenario as the common agreed consensual process to undergo the identification of actionable recommendations." (Interview, 08 October 2018).

The PNSR II was believed to have been significantly improved by the processes. However, the document does not explicitly describe the process nor its impact on policy reformulation. The deliberative approach to scenario building was considered too political to write in the document.

> "If you go through the current version of the PNSR, you will hardly see a clear recommendation as it was highlighted through the scenario processes. This means that to really see the implication you have to read through the lines. […] The way of wording things in the policy doc cannot be as clear as in the recommendations. And we are not the only contributors. So, in a political way, they'll go for a more diplomatic way. But definitely, I think that it has a large impact. They won't mention - thanks to the scenario process, we were able to do this, etc… - it's not the right jargon" (Interview, 08 October 2018).

Ultimate aim: The SP/CPSA wanted to obtain technical expertise on how to mainstream climate adaptation measures into rural development sectors, but the Futures Scenarios Project aimed to introduce more fundamental uncertainties to predication-oriented policymakers and increase the reflexive navigation of futures.

4.2.3. AMMA-2050 climate scenarios and policy workshops

Conception of the future: AMMA-2050 focused on "*a scientific understanding of climate change using data from convection-permitting modeling of future scenarios*" and "*provide key messages about what we can confidently say about a changing climate in West Africa*" (Communication, 22 March 2019). This was partly driven by data scarcity: "*In Senegal, we didn't have a good quality of data […] the national meteorological office do a little bit of climate projections but only since the last 10 years*" (Interview, 19 April 2019).

Implications for actions in the present: AMMA-2050 intended to build institutional capacities for promptly using scientific information on future climate variability for medium-term development planning processes (WASCAL, and AMMA-, 2050, 2018). This focus was partly due to its donor:

> "The most important thing for the BMU, the ministry of environment in Germany, was the capacity building. We do capacity building [they said]. That was very specific for this project, a lot of work, but really good to do it "(Interview, 19 April 2019).

From the onset, they sought to engage with policymakers to use the climate projections in support of identifying long-term adaptation options (Visman et al., 2017). As part of this effort, AMMA-2050 collaborated with Climate Analytics who used the AMMA-2050 data to produce vulnerability reports and organize policy workshops (Bah et al., 2019; Faye et al., 2019; Sadio et al., 2019). Climate Analytics organized, amongst others, a participatory scenarios workshop to improve "*policymakers' understanding of climate science for better long-term science-based decisions*" (Interview, 19 April 2019). The Secretary-General of the Ministry of Environment and Sustainable Development underlined the policy relevance of the project in a public video (PAS-PNA - Science-based National Adaptation Planning in Senegal (n.d.)), but at the time of research low institutional capacities were delaying the mainstreaming of outcomes into national, sectoral, and regional policies.

Ultimate aim: AMMA-2050 aimed to identify climate vulnerabilities and reduce climate-related risks.

5. Discussion and Conclusions

In this article, I analyzed anticipation processes in a climate-vulnerable context of the Global South – West Africa. These processes are examined through an analytical framework that identifies four approaches to anticipatory governance in the social science and interdisciplinary sustainability sciences (Muiderman et al., 2020). Each of the four approaches in the framework embed a different: a) conception of the future; b) implication for actions in the present; and c) ultimate aim to be realized with anticipatory governance. The framework further illustrates that some methods and tools of anticipation generally align with a given approach and others with multiple approaches. Two key findings emerge from the analysis that are discussed here.

The first insight identified is that the anticipation processes often complement multiple methods and tools of anticipation aligning with approaches 1 and 2. Quantitative scenarios and visioning processes are most often used to imagine futures, as well as a few participatory scenario exercises. These methods and tools are used in combination with diverse participatory processes (such as policy workshops) to discuss impacts and adaptation options. The two dominant approaches are used in several hybrid forms, as illustrated by the three examples examined in detail. The first WABiCC process is fundamentally probability-focused and conceives future uncertainty as something that can be reduced to arrive at a most likely future, as associated with approach 1. The intended actions in the present are building institutional capacities for planning under scientific uncertainty, which is approach 2 in service of 1. The ultimate

aim is to increase resilience to future climate risks, which combines the aims of approaches 1 and 2. The second CCAFS process explored plausible futures, as associated with approach 2. The actions for the present and the ultimate aim also aligned with approach 2 from the practitioner's perspective, namely to strategize robust planning processes to navigate future risks more reflexively. However, from the policy perspective anticipation informed strategic planning to reduce future risks, as associated with approach 1. Finally, the AMMA-2050 process assessed probabilistic future processes, which is associated with approach 1. The process seeks to develop a science-based understanding of climate adaptation strategies, which is approach 1 action with language borrowed from 2. The aim is to reduce future risks, also associated with approach 1. This hybridity is an important finding, as it indicates that the fundamental assumptions underpinning the approaches are mixed. The three examples illustrate that anticipation processes can start from one conception of the future (probable or plausible) to inform actions in the present that combine approaches 1 and 2, and sometimes also to realize such combined aims. Nevertheless, there is a tendency to formulate actions in a more technocratic way – as shown by the dominance of approach 1 over approach 2, and the absence of approaches 3 and 4. This absence is the second key insight.

5.1. Conflicting assumptions within hybrids of approaches 1 and 2

The hybrid approaches thus recognized the deeper uncertainties and complexities of futures to some extent, but predominantly propose prediction-oriented anticipation and technocratic forms of actions to reduce future risks as most viable and desirable intervention in the present (approach 1). For example, actions to build capacities focused on supporting institutions to 'get the science right' - seeing capacity building as a vehicle for better knowing and managing climate risks (see e.g. AMMA- (n.d.), 2050; USAID, 2017) rather than for a better navigation of diverse uncertain futures, as associated with approach 2. Fundamental uncertainty is reduced to risk – which assumes that a more objective and calculable account of the future is possible (Maechler & Graz, 2020). This clashes with the principles of the plausibilistic tradition (approach 2), which depicts future uncertainty as incalculable, and in demand of some form of subjective judgement (Andersson, 2018). The actions proposed for the present assume that the future can be made partially knowable and manageable – which conflicts with recognizing deep uncertainty. Language is thus used of approach 2 but its principles are abandoned.

The role of stakeholders in participatory processes also epitomizes the dominance of approach 1 over approach 2 in the hybrids. Most projects had a participatory component but the dialogue about future possibilities was relatively closed. For example, the WABiCC process aimed to transfer knowledge from experts to policymakers. This relates more to approach 1 than to approach 2, which would be more of an open dialogue and knowledge exchange about possible futures (Wiebe et al., 2018), or approach 3, which would be the co-creation of alternative futures, or an approach 4 type of critical examination of anticipation. The participatory scenario exercise by Climate Analytics and AMMA-2050 sought to improve policymakers' scientific understanding of climate change (approach 1). Thus, participatory approaches to anticipation do not necessarily aim to give participants agency over *how* and *what* futures are imagined, as associated with approaches 3 and 4. Instead, they ask participants to help determine politically sound pathways from expert-based future possibilities. Such statements were made Burkina Faso's National Climate Adaptation Plan: "stakeholder empowerment is essential for successful implementation and behavioral change" (Ministry of Environment & Fishery Resources, 2015, p. 59), using the term empowerment in a paradoxical way - to advance buy-in of adaptation measures.

For approach 2 in particular, researchers have argued that a lack of full engagement with what is associated with approach 2 here can result in inadequate efforts to build the adaptive capacities of those whose futures are at stake. Others also argued that by focusing primarily on a technology transfer of capacities one does not really connect to the local institutional context (Croxatto et al., 2020) and may constrain policy processes (Dessai et al., 2009). Several interviewees indeed pointed to such challenges, for example, they encountered a lack of institutional capacities to implement the recommendations from anticipation processes as to how to build exactly those institutional capacities (e.g., in the case of the meteorological services). In short, while the examples in this study point to a dominance of a technocratic orientation in the hybrid of approaches 1 and 2, there are several issues that may arise when in practice, as the framework helps bring to light. Alternatively, participatory approaches with agentic perspective, as associated with approaches 3 and 4, as seen to provide opportunities for building local learning spaces for anticipatory capacities (Tschakert & Dietrich et al., 2010) and such new configurations of approaches are important to explore.

5.2. Placing politics central in anticipatory governance

The absence of approaches 3 and 4 has several implications for the anticipatory governance of climate change in West Africa. Approach 3 helps engaging with the constructed nature of futures by mobilizing new coalitions of actors who can co-create more radically transformative futures (Hajer & Versteeg, 2019; Mangnus et al., 2019), for example, in experimental and experiential methods (Candy & Kornet, 2019; Vervoort et al., 2022). In addition, approach 4 helps in the interrogation of visions of the future, by seeing anticipation as an inherently uncertain and normative process and a site of conflicting social interests (Urry, 2016). Anticipation can open up critical dialogue about what futures to engage with and make futures work more reflexive (Bellamy, 2016; Mangnus et al., 2021). Both these approaches accommodate maintaining more open-ended governance commitments, a focus on future risks as calculable and manageable (approach 1), which tends to reveal the contested nature of anticipation (Andersson, 2018; Gupta, 2011). As such, approaches 3 and 4 address the political role of science in informing decision-making about the future – since decisionmakers often turn to science for guidance on policy issues that are most uncertain and where political stakes are high (Jasanoff, 1987). The processes in this study illustrate how scientific and the policy process are considered as separate processes; scientists focus on getting the science 'right' and decision-makers can focus on making science-based decisions. Another example is that decision-makers are considered to have a normative vision for the country aligning with existing policy agendas and turn to anticipation for quantitative

expert-based future scenarios. As such, the political process (normative) is separated from the scientific process (descriptive and quantifiable). Consequently, climate anticipation and decision-makers each consolidate their authoritative power (Shackley & Wynne, 1996) instead of pointing to the ways in which epistemic authority is used to legitimize and steer policy choices (Gupta & Möller, 2018; Jasanoff, 2004). Stakeholder deliberation is considered pivotal to legitimately making decisions about uncertain futures (Boyd et al., 2015). However, the contested nature of future engagements is often concealed. For example, a process of concealing occurred when deliberate forms of anticipation processes were considered to be subjective judgements and less transparently communicated; this was done to not frustrate the decision-making process. In general, the policy documents analyzed lacked transparently regarding how the outcomes of participatory foresight processes were translated into the document. By contrast, visualizations of quantitative scenarios (visualizations such as graphs and descriptions of model-based climate scenarios) are frequently used to legitimize policy choices. Interviewees referred to a process of depoliticization of subjective outcomes of participatory anticipation. What are essentially value-laden choices are turned into so-called 'rational choices' (Andersson, 2018). Most importantly, the findings illustrate that also much participatory anticipation lack an agentic perspective, where those who are affected by change have the ability to determine what the future may look like. In addition, Tschakert, Dietrich et al. (2010) also argued that participatory approaches without agentic perspective, as associated with approaches 3 and 4, miss opportunities for building local learning spaces for anticipatory capacities. These findings point to important blind spots in the anticipatory governance of climate action in West Africa.

5.3. Consequences for anticipatory climate governance in West Africa

The ways in which approaches 1 and 2 are used in hybrid form might be specific to West Africa, and climate change decision-making especially. Researchers have pointed to the greater scientific uncertainty of climate change in West Africa than elsewhere in the world due to decadal and seasonal variability (Niang et al., 2014), which has drawn in the international community to increase scientific certainty about future climate change. Temperatures are expected to rise faster compared to global averages (Niang et al., 2014; Sylla et al., 2016) and the ability to cope with its impacts lowest (Yaro & Hesselberg, 2016). Researchers and decision-makers have thus called for anticipation that reduces scientific uncertainty and builds institutional capacities for anticipating those risks. The challenge is thus great and the implications huge for a region that this already severely impacted. Nevertheless, the findings in this study identify that in the search for a more future-oriented governance of climate change, it is important to create equal opportunities for imagining and shaping futures. Such ambitions have been set in the Paris Agreement, the Sustainable Development Goals, the National Adaptation Plans and the African Union's Agenda 2063 (African Union (n.d.)), to which many of the projects included in this research aim to contribute to.

However, rather than making futures more inclusive, anticipation practitioners and researchers run the risk of making anticipation an exclusive process, determined by Western science and technical expertise, which consequently includes out local worldviews and needs. Scholars have argued that anticipation often represents imagines of the world that are based on western science and western notions of what a modern society should look like in the future (Escobar, 2020). These visions are often very differently visualized by local communities (Paprocki, 2019). Therefore, questioning if anticipation processes tap into existing power imbalances or exacerbate them is important. Particularly in places with weak regulation and high scientific uncertainty of climate change impacts, are the places where international organizations are considered to have more authoritative knowledge and are consequently more powerful in shaping policy discourses (Boamah, 2014). There is an urgent role for the international community that is involved in shaping climate futures to approach anticipation in ways that open up and democratizes futures (Macnaghten et al., 2014).

However, this study points to tendencies to depoliticize anticipation. Such findings endorse and complement research in other contexts that pointed out that international organizations rather distance themselves from their political role and prefer apolitical claims (Kothari, 2005; Louis & Maertens, 2021). The work of international organizations is inherently political as they are involved in shaping global problems, but they interpret the world's most pressing problems in technical ways – trough quantification and categorization that portray knowledge as value-free - and meet them with technical solutions and assistance (Louis & Maertens, 2021). It is thus important to give approaches 3 and 4 a more prominent place in efforts to create more inclusive and equitable climate futures. While the other approaches each propose some form of stakeholder deliberation, provide approaches 3 and 4 more agency to stakeholders, and the fourth uses anticipation solely for the purpose of shedding light on power imbalances, as these futures create expectations and actions through which power imbalances further materialize. Examples include the overreliance on western science and technology which is seen to have left little room for the integration of local knowledge in climate governance and have had reverse effects on societal transformation (Akamani, 2016; Eriksen et al., 2011). Particularly the focus on technological solutions for climate change have paralyzed societal mobilization in West Africa (Brockhaus et al., 2012) and marginalized issues of power and equity (Tschakert, Dietrich et al., 2010).

5.4. Reflections on the framework

Applying the analytical framework on anticipatory governance has helped to identify implicit conceptions of the future and examine their implications for actions in the present. The anticipation processes were an important entry point for the analysis, as these are sites where the material (goods and people) and immaterial meet (ideas and visions of the future). Various excellent typologies exist on different types of anticipation processes (see e.g. van Notten et al., 2003; Loveridge & Street, 2005), combinations of processes (Henrichs et al., 2010b; Wiebe et al., 2018), or their role in decision-making (Turnpenny et al., 2015) to which the framework adds insights into implicit conceptions of the future as they are embedded in anticipation processes and their steering effects. As such, I saw the anticipation processes as spaces of connectivity through which past experiences connect to future imaginations and ideas

materialize (Urry, 2016).

Applying the framework to the West African context addressed an important empirical gap and provided new insights into the steering effects of future visions. It can be seen as a first step in opening up new research agendas on the political role of international organizations engaged in anticipation processes. Future research can look into the ways in which future visions reassert western authority (Kothari, 2005) or may colonize the future (Feola, 2019; Gram-Hanssen et al., 2022). Given the interdisciplinary research context in which anticipatory governance processes take place is the framework helpful for anticipation practitioners to become more aware of their political role and make more explicit what (hybrid) approaches to anticipatory governance are used and the implications for actions in the present.

Acknowledgements

Declaration of interest

The author declares no conflict of interest.

Appendix A

See Appendix section here.

Statements in anticipation process reports			
Country	What type of anticipation process was held?	Who initiated and/or funded it?	How did the anticipation process inform policy?
Senegal	Climate models and policy fora that include changes in the production system in response to changes in the biophysical and economic environment until 2050 (Amma (n.d.), 2050; Future Climate for Africa (n.d.); Hartley et al., 2016)	Initiated under the Africa Monsoon Multidisciplinary Analysis Program. Funded by the UK Department for International Development (DFID) and Natural Environment Research Council (NERC) Future Climate for Africa (FCFA) program.	A forum was conducted with national and regional decision-makers in Dakar to inform adaptation plans and NDCs but not specified policy outcome formulated in the documents assessed
	Ordered probit model estimating the simultaneous probabilities of sustainable and unsustainable adaptation practices to capture how future adaptation planning depends on the way in which SMEs deal with climate stress (Crick, Eskander, Fankhauser, & Diop, 2018)	London School of Economics, Kingston University and IED AFRIQUE-Innovation, Environnement, Développement en Afrique. Financial support from the UK Government's Department for International Development (DfID) and the International Development Research Centre (IDRC)	Policy recommendations were clearly listed, no explicit policy outcomes formulated in the document assessed
Ghana	Participatory scenarios workshop to address future climate uncertainty until 2050 with MoFA representatives, the Ghana Science-Policy Platform and CGIAR researchers, and stakeholders from the rural private sector and civil society of Ghana (*CCAFS Livestock Policy Report Ghana*(CCAFS, 2017))	Initiated by CCAFS based on a request of the Ministry of Food and Agriculture, funded by CCAFS	Scenario-guided recommendations were used to reformulate the National Livestock Policy of Ghana
	Downscaled climate change scenarios for the Wa District generated by the Model for the Assessment of Greenhouse-Gas Induced Climate Change (MAGICC) under IPCC A12 SRES. Scenarios were conducted by the Environmental Protection Agency (EPA) and the Ghana Meteorological Agency (GMet)	University of Cape Town, University Ghana, Environmental Protection Agency	Objective is to guide local medium-term development plans, no explicit policy outcome formulated in the document assessed
Burkina Faso	Climate projections and a workshop with national and local policymakers, researchers, and NGOs on climate information understanding and local needs using Participatory Impact Pathways Analysis (PIPA) from 4 to 50 years (Hartley et al., 2016; Karambiri et al., 2016)	Initiated under the Africa Monsoon Multidisciplinary Analysis Program. Funded by the UK Department for International Development (DFID) and Natural Environment Research Council (NERC) Future Climate for Africa (FCFA) program	Recommendations for local decision-making plans were formulated and presented to the Minister of Agriculture, Finance and Devolution and a policy brief was formulated. A workshop was held with national and local policymakers, no explicit policy outcomes are formulated in the documents assessed

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Statements in anticipation process reports			
Country	What type of anticipation process was held?	Who initiated and/or funded it?	How did the anticipation process inform policy?
	Participatory scenarios workshop with policymakers, researchers, few representatives from civil society and private sector to address short and mid-term challenges (CGIAR, 2015; Hebinck et al., 2018)	Initiated by the permanent secretariat for the Coordination of Sectoral Agricultural Policies and CCAFS, funded by CCAFS	Scenario-guided recommendations helped to formulate a renewed rural development policy, the PNSR II, particular focus on integrating long-term climate adaptation measures
	Practical consensual tool that assesses vulnerability and identifies responses to climate risks, followed by assessing future impacts using three quantitative scenarios and finally the development of an adaptation framework (Gahi, Dongo, & Badolo, 2015)	Developed by the Institut d'Application et de Vulgarisation en Sciences in Ouagadougou Research, funded by the West Africa Economic and Monetary Union (UEMOA)	The tool is designed to guide climate adaptation policy processes, no explicit policy outcomes are formulated in the document assessed
Niger (see regional below)	–	–	–
Mali	Cost-benefit analysis training with private sector, Small and medium sized enterprises (SMEs) using an interactive online tool that supports enterprises in analyzing climate change risks and developing individualized climate change adaptation strategies (Adelphi, n.d.)	Facilitated by Adelphi Consultants. Funded through the GIZ project Private Sector Adaptation to Climate Change (PSACC)	Local case studies highlight diverse ways of implementation of measures
	Participatory foresight to explore long term changes in an irrigation scheme using exploratory scenarios with different stakeholders based on interest and power: scientist, engineers, policymakers, local civil society representatives, private sector (Hertzog, Poussin, Tangara, & Jamin, 2017)	French center for international cooperation in agricultural research for development (CIRAD) UMR, IRD, IER ESPGRN (France, Mali & Senegal). Funded by CIRAD and the French development agency (AFD)	Provides policy recommendations, close collaboration with the Malian Institute of Rural Economy (IER), the Office du Niger operator and the Malian authorities, integration was abrupted by the Malian civil war
Regional	Population scenarios and climate scenarios to test the effect of population policies and population control on water stress under climate change horizon 2085 (Gunasekara, Kazama, Yamazaki, & Oki, 2013)	Initiated by Tohoku University, University of Bristol and University of Tokyo. Funded by Environment Research and Technology Development Fund (S-8) of the Ministry of Environment, Japan	Provides policy recommendations, no explicit policy outcomes formulated in the document assessed
	Error correction model to explore long-run equilibrium relationships and short-run dynamics to understand the effect of policy integration on agriculture and climate adaptation in ECOWAS (Tinta, 2017)	Initiated by the University of Ghana, not clear who funded the project	Provides policy recommendations, yet no explicit policy outcomes are formulated
	Process-based crop model SARRA-H calibrated to assess climate change impacts on sorghum and millet yields in the Sudanian and Sahelian savannas of West Africa (Sultan et al., 2013)	LOCEAN/IPSL, CIRED/CNRS, AGRHYME (institution of CILSS in Niamey), CIRAD, UMR AGAP & CIRAD, UMR TETIS (2 CIRAD departments). Funded by REGYNA (GIS-CES), the French National Research Agency (ANR) through the ESCAPE project (ANR-10-CEPL-005) and the R2DS network	No clear policy implications are formulated in the document assessed
	Times series of climatic events in the Sahel Researchers and engineers. Long term monitoring focused on documenting the simultaneous variability of rainfall, continental surface conditions and WAM dynamics (Lebel et al., 2009)	Initiated under the Africa Monsoon Multidisciplinary Analysis CATCH Program. Involvement of LTHE University Grenoble, Hydrosciences Montpellier, Colorado State University, CESBIO, National Center for Atmospheric Research, School of Civil Engineering and Environmental Science. Funded by IRD, INSU and the French Ministry of Research	Provides policy recommendations, no clear policy outcomes are formulated in the document assessed, yet successor AMMA-2050 projects have focused more strongly on policy integration
	Capacity building workshop on climate and vulnerability data, gaps in existing data, and exploration of capacity for future planning with participants from government-affiliated institutions and organizations	Initiated under the West Africa Biodiversity and Climate Change program. Funded by USAID	Policy recommendations and a roadmap were developed to inform internal policy, as well as ongoing exploration of follow up activities, no explicit policy outcomes are formulated in the document assessed

Appendix .

Statements in policy documents

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Statements in policy documents					
Country	National policies for climate adaptation (approval year)	Who initiated the policy?	What anticipation methods and tools were used?	Who initiated, developed and funded the anticipation process?	How did the anticipation processes inform policy?
Country	National policies for climate adaptation (approval year)	Who initiated the policy?	What anticipation methods and tools were used?	Who initiated, developed and funded the anticipation process?	How did the anticipation processes inform policy?
Senegal	#3. Emerging Senegal Plan 2014–2035, implemented through Plans of Action (Republic of Senegal, 2014a, 2014b)	Government of Senegal with technical and financial support from partners and PPPs	A vision for the future in the ESP, and three macroeconomic scenarios as guidance for the PAP - trend, optimistic and pessimistic - based on a iterative prioritization method integrating the impacts on both economic and social factors	The government of Senegal, supported by the IMF	The vision guides short terms strategies and implementation choices. The Plan of Action (2014) builds on the optimistic scenario, prioritizing projects and investments that that increase economic growth and reduce vulnerabilities
	#2. National Adaptation Plan for the Fisheries and Aquaculture Sector in the Face of Climate Change Horizon 2035 (2016)	Ministry of Environment and Sustainable Development initiated the policy, technical support from the United Nations' Least Developed Countries Expert Group and financial support from USAID/ COMFISH	IPCC 5th assessment report scenarios RCP 4.5 and RCP 8.5 on temperature rise were used in two global models (MPI-ESM-LR and HadGEM2-ES) to calculate future climate variability (2031–2040) compared to the reference period (1967–2005), then downscaled to three regional models with finer spatial resolution (50 km), followed by risk and vulnerability analysis of sectors	The government of Senegal, led by the Ministry of Environment and Sustainable Development	Regional consultations with local stakeholders as well as prioritizing workshops with several ministries, NGOs, research institutes and farmer organizations were held to identify short-term, medium- term and long-term adaptation measures, policy priorities and budgets, which in turn formed the backbone of the policy (2035)
	# 2. Program of Acceleration of the Cadence of Senegalese Agriculture (Republic of Senegal, 2014c)	Ministry of Agriculture and Rural Equipment	Policy visioning based on guidelines of the Horizon 2035 which stems from the Emerging Senegal Plan	The government of Senegal	Integrating adaptation and mitigating measures in the agricultural sector
	#3. Prospective Study 2035	Ministry of Economy and Finance	Participatory scenario analysis quantified in policy simulation tool Threshold 21	Developed by the Millennium Institute	Providing medium-term and long-term trajectories for sustainable and inclusive economic development
Ghana	#1. National Climate Adaptation Master Plan (2015) (successor of the national Climate Change Adaptation Strategy (2012) and the National Climate Change Policy (2013))	Ministry of Environment, Science, Technology and Innovation, supported by donor countries, EU and UNDP	Scenarios on changing weather pattern, building on the scenarios	Developed under the UNFCCC Country Studies Project	Policies are seen to be robust to withstand different scenarios, decision must be based on hard evidence
	#3. Shared Growth and Development Agenda II (GSGDA II, 2014) (successor of GSGDA I)	The government of Ghana	Volume I: Vision 2020 - middle-income country in 25 years – as the guiding vision. Plus two scenarios of GDP growth dependent of oil production. Volume II operationalizes policy proposals	The government of Ghana	Long-term vision translated into medium-term development objectives and priorities, goals and values
	#3. Coordinated Program of Economic and Social Development Policies (CPESDP) 2017–2024 (successor of the CPESDP 2014 – 2020)	The President based on vision of the political party during elections. Funded by the Government of Ghana	Medium-term vision of the New Patriotic Party	The government of Ghana	Medium-term visions are translated into objectives, priorities and action

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	Statements in policy documents				
Country	National policies for climate adaptation (approval year)	Who initiated the policy?	What anticipation methods and tools were used?	Who initiated, developed and funded the anticipation process?	How did the anticipation processes inform policy?
Burkina Faso	#1. National Climate Adaptation Plan (2015) (*Mali Plan D' Action S National Pour La Mise En Place Du Cadre National Pour Les Services Climatiques*, 2016)	The Ministry of Environment & Sustainable Development through the Permanent Secretariat of the National Council for the Environment and Sustainable Development (PS/CONEDD)	Climate projection scenarios by the Mathematical Equation Analysis Laboratory (LAME) of the University of Ouagadougou, five regional climate models (CRCMs) from AMMA and nine global climate models (GCMs) by University of Cape Town. Followed by vulnerability assessment of sectors and participatory stakeholder consultations	Financial support scenario processes from NAPA-BKF-UNDP/ Japan. Technical support from LAME, Cape Town and AMMA	Short-, medium- and long-term adaptation measured were established in detail per sector, a five-year plan, and the cost of adaptation measures over a period of between 1 and 15 years
	#2. National Rural Development Plan II (PNSRII) (2018)	Several Ministries	Visioning process aligned with other policies and international treaties, socio-economic impact analysis by FAO, ECOWAS and CCAFS, discounted and disaggregated social accounting matrix Involvement of policymakers, researchers, smaller number representatives from civil society and private sector	CCAFS and FAO in two individual processes	Integration of climate impacts on several sectors and coherence between policies
Niger	#2. Nigeriens Nourish the Nigerian Initiative (3 N) (2012)	Initiated by the Government of Niger. Funded by UN and since 2014 also PAM, FAO and UNICEF	A shared vision for the country's economy and food security, in line with the broader institutional framework Development Plan for Agriculture in Africa and the Millennium Development, in frequent dialogue with regional and local government officials, civil society, private sector, producer organizations and development partners	The Nigerian government, directed by a High Commissioner appointed for the 3 N	The shared vision has been divided into five objectives and guides five strategic programs, and provides a framework for measures and investments in the short- and medium and long-term
	#2. The Strategic Framework for Sustainable Land Management 2015–2019 (SLM) (2014)	Initiated by the Government of Niger, funded by UNDP, WB, TerrAfrica, The Global Mechanism, NEPAD, IFAD	A participatory visioning process resulted in a vision for sustainable land management, horizon 2029, which was amended during the GS-Sustainable Land Management validation workshop	The government of Niger	The vision served as guidance for the making strategic policy choices, and serves as a reference framework for policies SDDCI, PDES, and 3 N
	#3. Sustainable Development and Inclusive Growth Strategy (SDDCI or 2035 Vision) (2016)	Initiated by the Government, all ministries and institutions are involved	Retrospective and prospective analysis, development scenarios Horizon 2035, and long-term strategic visions and directions	The government of Niger	The vision 2035 lays out a medium-term development strategy for Niger and serves as a reference framework for the SLM, 3 N and Economic and Social Development Plan (PDES 2015, the first of a series 5-year plans) with shorter timeframes
Mali	#1. The National Climate Plan of Action (PANC) (successor of the National Strategy for Climate Change (SNCC) (2011) and the National	Funded by the Norwegian government (embassy), technical support from Gesellschaft für Internationale Zusammenarbeit (GIZ), consulting services from	EIDOS strategizing tool (setting priorities and testing policies on their robustness) based on strategic policy priorities set in the PNCC	GIZ	EIDOS helped determine policy objectives in SNCC and PANC

(*continued*)

Statements in policy documents				
Country	National policies for climate adaptation (approval year)	Who initiated the policy?	What anticipation methods and tools were used?	Who initiated, developed and funded the anticipation process?	How did the anticipation processes inform policy?
	Policy for Climate Change (PNCC) (2011))	EcoSecurities (a carbon offset company). Coordinated by l'Agence de l'Environnement et du Développement Durable (AEDD)			
	#1. National Climate Adaptation Plan (Mali Plan D ', 2016)	Main funders seem to be the United Nations Development Program and GIZ	Several initiatives focusing on climate services capacities of meteorological institutions, projections and local information services	United Nations Development Program, GIZ, French Development Agency, African Development Bank, Institute for Research and Development	Assessment of climate service capacities and gaps
	#2. National Agricultural Investment Program (PNISA) (2015–2025) (2014)	Ministry of Rural Development	Macroeconomic model calculations horizon 2025 based on a comparison of production under the PRSP versus PNISA	MME model was used by the National Direction for Development Planning	Projections help determine policy priorities for the agricultural sector a consultative process was part of the institutional design of the policy, including NGOs, regional agricultural chambers, local governmental officials

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