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PEOPLE, PARTICIPATION & PATHWAYS: SUPPORTING THE INTEGRATION OF CLIMATE INFORMATION INTO DECISION MAKING IN WEST AFRICA

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Publishable Summary

This report considers how AMMA-2050 has combined scientific excellence with a process to co-produce relevant climate products in decision-making contexts that strengthen capacities of both partnering scientists and stakeholders.

Acronyms

AMMA-2050 - African Monsoon Multidisciplinary Analysis-2050
ANACIM - Agence Nationale de l'Aviation Civile et de la Météorologie – National Agency of Civil Aviation and Meteorology, Senegal
COMRECC - Comité Régionale du Changement Climatique – Regional Committee on Climate Change, Senegal
DFID - UK Government Department for International Development
FCFA - Future Climate for Africa programme
NERC – Natural Environment Research Council
PIPA - Participatory Impact Pathways Analysis

Introduction

Many of us are aware of the risks that climate change poses. Yet we are often constrained about how to use climate change information in adapting to these risks. The reasons for this are multiple but include a lack of access to climate change information, a limited capacity to interpret and use this information, competing demands for resources needed to take climate resilient actions, the economic and political discount rates of action and the uncertainty in projections of future climate risks.

The DFID and NERC funded AMMA-2050 project is a multi-stakeholder, multi-disciplinary and cross-sectoral collaboration that aims to inform medium term decision-making of the risks facing development from climate change. Ensuring that development decisions are 'climate-proofed' will increase the resilience of West Africa populations to future climate related stresses and shocks. This project combines scientific excellence with a process to co-produce relevant climate products in decision-making contexts that strengthen capacities of both partnering scientists and stakeholders. Ultimately, our objective is to help enable the use of climate information to support and inform decision-making on the 5-40 year timescale.

What are 'climate proofed'[1] decisions?

Climate change poses a serious challenge to achieving social and economic development objectives for Africa. In part, this is because many of the economies of African countries are based around climate-sensitive sectors such as agriculture. Importantly climate change also threatens poverty reduction efforts as the most vulnerable section of society to the impacts of climate change tend to be the poor. Clearly developed policies, need to be 'climate proofed' to ensure that development gains are not lost to the impacts of climate change. To be sustainable, development planning needs to fully integrate the risks of climate change. If, however, decisions ignore climate change, they may condemn many across Africa to a life of poverty.

AMMA-2050 is applying approaches to help make 'climate proofed' decisions in two pilot areas of sub-Saharan Africa. These pilots concern urban flooding in Ouagadougou, Burkina Faso and agricultural resilience to drought in Senegal.

We all see things differently

Our approach to facilitating the integration of climate risk into decision-making is based on the three concepts of: listening to people's different framings of the risks that climate poses; encouraging different people's participation in decision-making; and, co-developing pathways to achieve 'climate proofed' development. In particular, we refer to the need to consider and

[1] A number of other phrases are used to convey similar concepts such as 'climate resilient development'. Here we use 'climate proofed' as its usage is more widespread in the region, putting aside the nuances of different meanings attached to each phrase.

incorporate the different ways that different stakeholders understand the issues that climate change interacts with and how. For example, a newly arrived migrant to a city sees the problems of increased flooding, through climate change, differently to an elderly man who has been a resident for a longer time and this in turn is likely to differ to the understanding of a business woman or service provider. Different understandings, framings and knowledge around a problem are important to ensure that the actions or pathways that we decide to take are resilient to the uncertainty implicit in risk management. Indeed it could be argued that participation and pluralism aids better decision-making by making the inevitable blind spots of decision-making by any one individual or set of individuals, visible. Garnering different perspectives and knowledge on a problem allows a myriad of possible pathways to be explored that in combination may be more flexible, robust, economically efficient and equitable than when based on one understanding of a problem. This is important when one considers that predicting the exact impacts of climate change into the future is inherently uncertain.

Acknowledging the uncertainty of climate change is not to say that we know nothing about the impact of future climate change. We know that the future climate will be warmer, with increased evapotranspiration and reducing soil moisture. Research by AMMA-2050 has shown that for West Africa this will lead to significantly reduced crop yields, without adaptation, irrespective of any changes in projected rainfall (Sultan et al. 2013). This has the policy implication that we need to start breeding new cultivars that cope with a drier environment and change farming practices, now (Challinor et al 2017). We also know that rainfall will become more intense with future climate change. This will likely lead to more localised flooding without adaptation. Indeed, evidence from AMMA-2050 already points to an unprecedented trebling of the frequency of extreme Sahelian storms since 1982, linked to global warming (Taylor et al 2017).

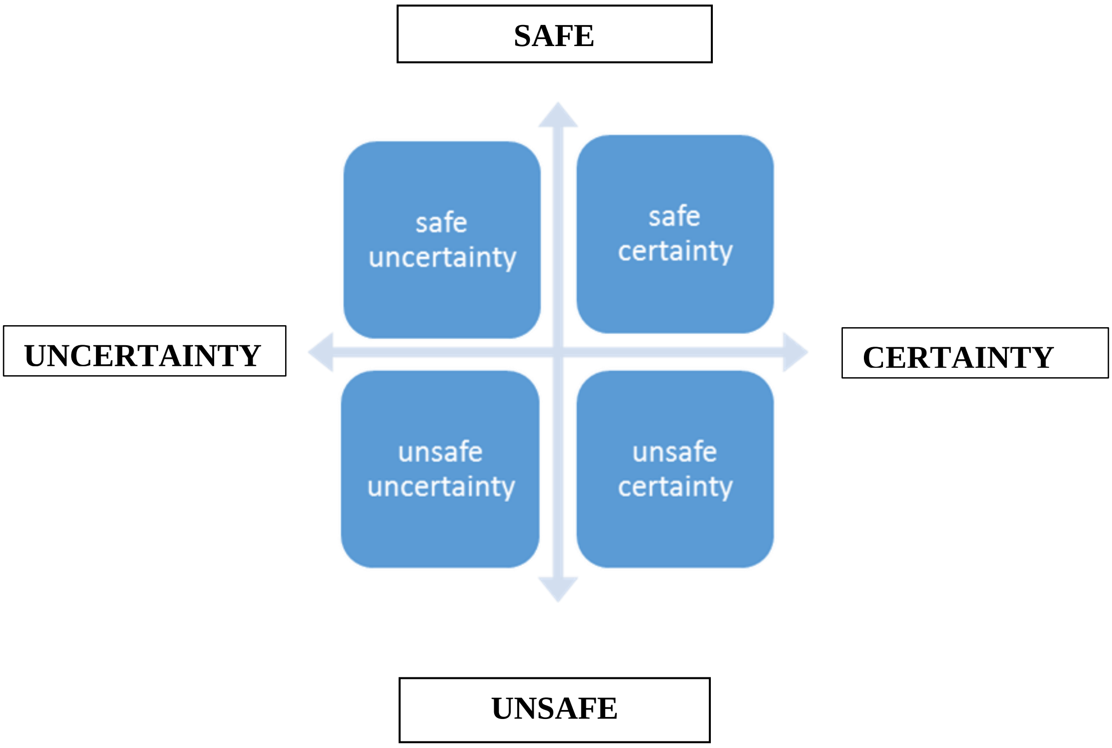
The AMMA-2050 approach

The starting point of uncertainty and safety

People frame the risks of and responses to climate variability and change differently. In our pilot studies these risks relate to flooding and agricultural development. Our first step is to locate these different framings in terms of perceived uncertainty (e.g. how sure people are of the impacts that climate change will have) and safety (e.g. how damaging these impacts will be) - see Figure 1.

Participants are then asked to consider what actions they would need to take in order to move them to a position of greater safety. The grid is then used again, to explore where these actions would place them once they have been invoked. This leads to the discussion of the implications of being in a place of safe uncertainty and unsafe certainty (Ayeb-Karlsson et al 2019).

Figure 1. Safe/Unsafe/ Certainty/Uncertainty Grid adapted from Mason 1993



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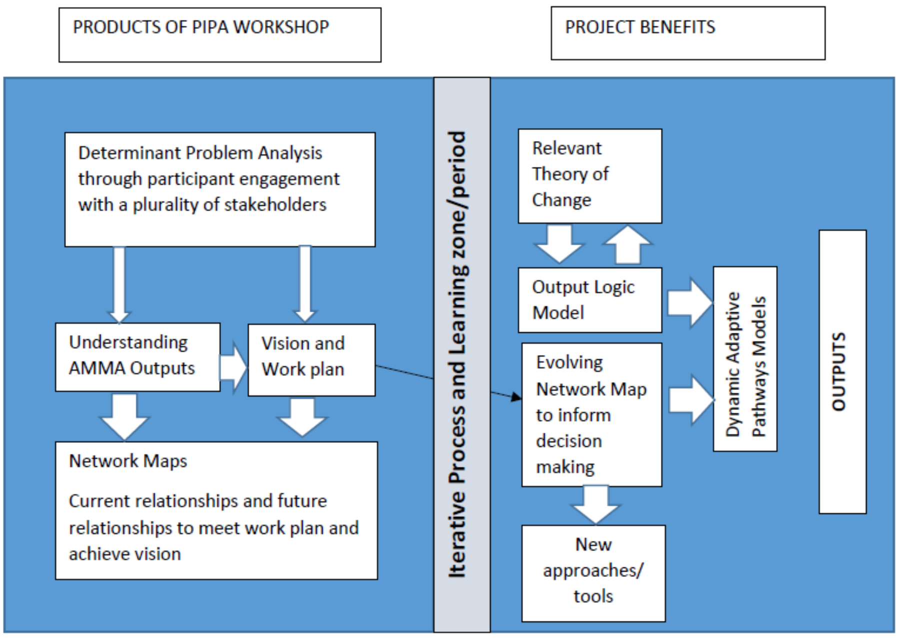
Participatory Impact Pathways Analysis (PIPA)

The next step in our approach is to explore in more detail the root causes of the difficulties in achieving climate change adaptation. Here we use an adapted Participatory Impact Pathways Analysis (PIPA) approach. PIPA is a practical technique that was developed to plan and establish a collective theory and understanding for change related to project (in our case AMMA-2050) outcomes. We have adapted the approach, for example, to bring stakeholders and decision makers together from all levels to help them collectively explore solutions related to accessing and using climate information in mid-term decision-making. PIPA helps participants understand the determinant problems – the cause rather than effect of a barrier. It then uses techniques for understanding how the problem(s) might be resolved from a number of points of view.

The methodology involves constructing a problem tree; developing a work plan to solve this problem; identifying who need to be involved now and in the future (Network Map) and then to align the actions of the work plan to the project (AMMA-2050) outcomes (Output logic model).

PIPA also gives project staff an opportunity to understand the needs of stakeholders in relation to their research so that they better understand the projects relevance. It provides a flexible approach that can be tailored to the specific requirements of each pilot study (Figure 2). Once the cause of a problem (determinant) has been identified by stakeholders they can work with the project team to develop a work plan to address this problem. This is takes the form of an Output Logic Model. These models are a depiction of the relationships between the resources, activities, outputs and outcomes of a program.

Figure 2. AMMA-2050 PIPA approach



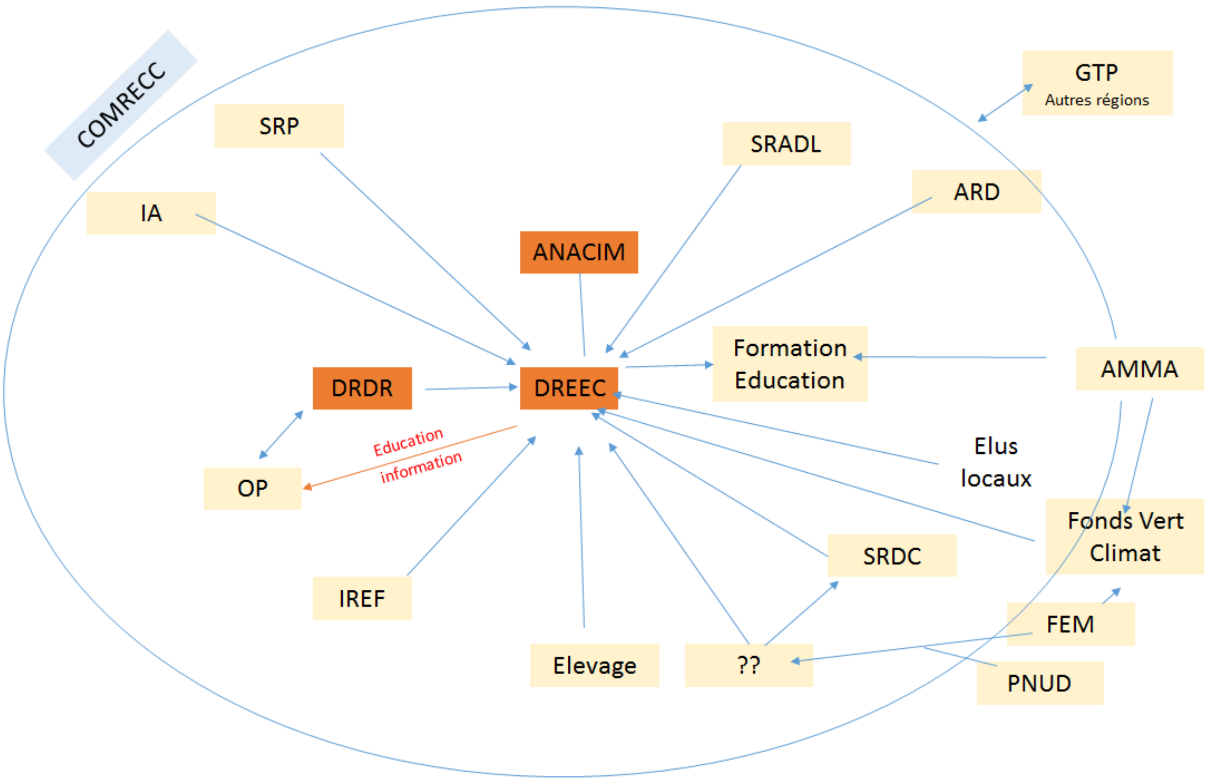
Key to the PIPA process is the identification of who should be involved in the change process. This is known as the Network Mapping.

Network Mapping

The PIPA process also allows stakeholders, from all walks of life, to understand what the project (AMMA-2050) is seeking to achieve and how it may benefit them. It allows them the opportunity to express who, from their perspective, should be involved to deliver the outcomes of the action plan. This takes the form of a network map.

Participants draw a ‘now’ network map showing current key relationships between stakeholders and a ‘future’ network map showing how stakeholders need to link together to achieve the project’s vision.

Fig 3. Network Map Illustration of PIPA exercise in Senegal case study



This Network Map, above, was drawn by stakeholders to determine which actors should be involved to address the issue of 'insufficient communication and expertise of climate change information' within farming support institutions, in Senegal. The pink boxes illustrate which agencies are currently involved in the communication of this information whilst the yellow post notes suggest who should be involved from everyone's perspective, to achieve the desired changes.

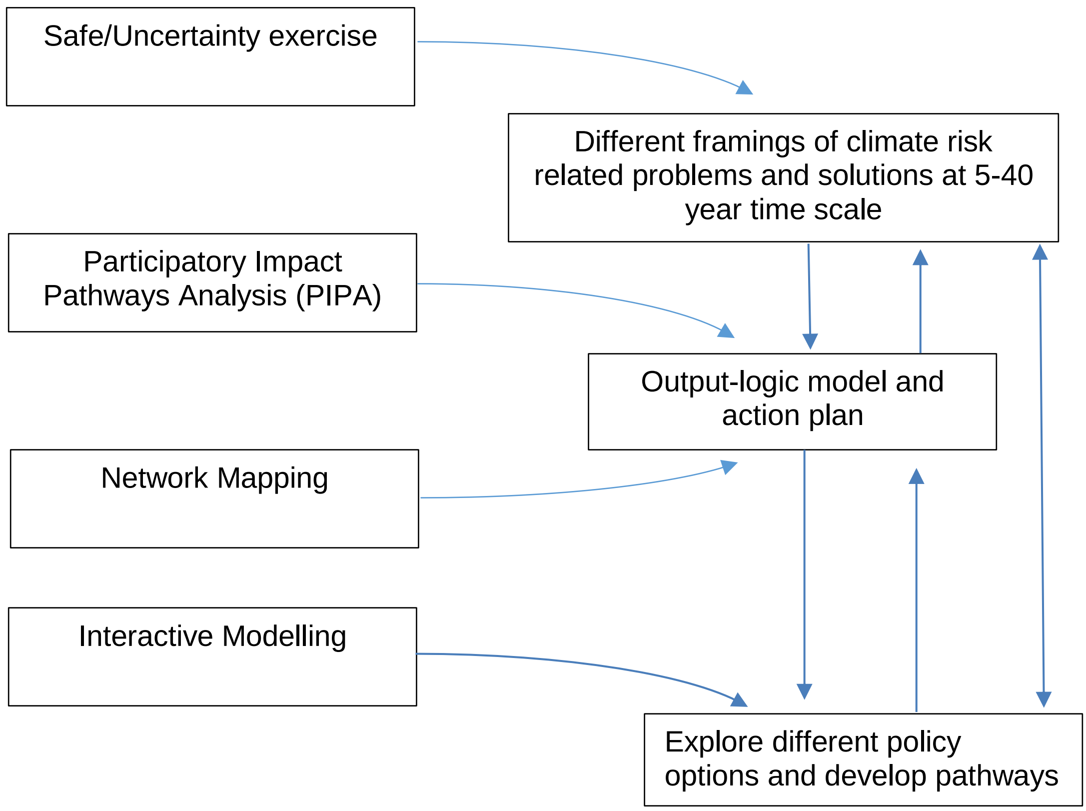
Exploring adaptive pathways

The third step in our approach is to combine the different understandings of the climate risk problem and solutions related to climate change adaptation by simulating the impacts of different polices that decision-makers can take as a function of time and climate change. For example, high-resolution model simulations of the extent and impact of flooding in Ouagadougou in the future have been created and compared with those that would occur with different adaptations, such as sustainable drainage system (SUDS), changes in housing and clearance of drainage channels. While in Senegal a bio-economic model of farming systems in the Peanut Basin, created by AMMA-2050 researchers (Ricome et al 2017), has been used to explore the influence of changes in crop varieties and farming systems such as an intensification of agriculture to livestock breeding and interventions such as insurance. In the latter case, model simulations of the use of weather-index insurance as an adaptation to climate risks have shown that it leads to a welfare gain only for those farmers located in the driest areas in the basin. However the analysis also finds that subsidizing insurance is not necessarily the best possible use of public funds in terms of adaptation. By contrast, reducing credit rates, subsidizing fertilizers, or just transferring cash as a lump-sum generally brings a higher expected benefit to farmers and leads to a higher increase in grain production levels. These insights allow decision makers to explore different adaptive policies and pathways in the context of a changing climate.

Importantly these model simulations are not being used to predict the future. Instead they are used to create an exploratory space to test the efficacy of different policies and actions. Deciding which combination of policies should be followed is then assessed on the basis of agreed principles, such as flexibility (as in can actions be changed as different conditions and knowledge evolve), robustness (as in actions that work under a variety of different future climates), equity (as in they do not benefit one section of society at the expense of others) and economic efficiency or low regrets (as in the choices made now do not disadvantage people if the conditions for which they are designed do not occur).

Conclusion

In summary the AMMA 2050 approach is:



Relevant AMMA2050 reading:

Ayeb-Karlsson, S., Fox, G. and Kniveton, D., 2019. Embracing uncertainty: A discursive approach to understanding pathways for climate adaptation in Senegal. Regional Environmental Change, pp.1-12.

Challinor, A.J., Koehler, A.K., Ramirez-Villegas, J., Whitfield, S. and Das, B., 2016. Current warming will reduce yields unless maize breeding and seed systems adapt immediately. Nature Climate Change, 6(10), pp.954-958.

Mason, B., 1993. Towards positions of safe uncertainty. Human systems: The journal of systemic consultation and management, 4: 189-20

Ricome, A., Affholder, F., Gérard, F., Muller, B., Poeydebat, C., Quirion, P. and Sall, M., 2017. Are subsidies to weather-index insurance the best use of public funds? A bio-economic farm model applied to the Senegalese groundnut basin. Agricultural Systems, 156, pp.149-176.

Sultan, B., Roudier, P., Quirion, P., Alhassane, A., Muller, B., Dingkuhn, M., Ciais, P., Guimberteau, M., Traore, S. and Baron, C., 2013. Assessing climate change impacts on sorghum and millet yields in the Sudanian and Sahelian savannas of West Africa. Environmental Research Letters, 8(1), p.014040.

Taylor, C.M., Belušić, D., Guichard, F., Parker, D.J., Vischel, T., Bock, O., Harris, P.P., Janicot, S., Klein, C. and Panthou, G., 2017. Frequency of extreme Sahelian storms tripled since 1982 in satellite observations. Nature, 544(7651), pp.475-478.