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Towards the Ethical Design of Climate Services

The greenhouse gas emissions associated with anthropogenic activities are rapidly destabilizing the Earth's climate which in turn has effects that are threatening billions of people globally. Climate services offer tools which may help communities build resilience to climate-related risk through adaptation, but they must be carefully designed to avoid unintended consequences. In this paper, I will argue that employing contextual design of climate services to avoid entrenching existing power imbalances is critical to their success. I will first establish the need for climate services then demonstrate why contextualization is important and the consequences of careless design**.**

Concentrations of atmospheric greenhouse gases are rising, and the average global temperature is rising with them. This is leading to a changing climate which has a variety of consequences for communities around the world. These include more frequent and intense anomalous weather events such as heat waves, droughts, and floods; increasing prevalence of disease; exacerbated food and water insecurity; and increasing prevalence of collective violence (Levy & Patz 2015). A 2004 study by the World Health Organization estimated that climatic changes since the 1970s may be causing approximately 150,000 deaths annually (Patz et al. 2005). According to the 2023 report by the International Panel on Climate Change "approximately 3.3 – 3.6 billion people live in contexts that are highly vulnerable to climate change" (IPCC 2022). These consequences disproportionately impact impoverished communities and other vulnerable groups such as women and members of minority groups (Cuomo 2011, Denton 2002). The field of climate services has emerged as a means to bridge the gap between climate science and decision-making

by offering valuable tools to assist vulnerable communities in adapting and building resilience to impacts wrought by climate change.

The objective of these climate services is to increase human security by providing usable information to aid in decision-making to manage climate risk (Adams et al. 2015). When well designed, climate services can make significant contributions to the resilience of their target communities. For example, climate services were successfully deployed in Senegal and Mali using the Participatory Integrated Climate Services for Agriculture (PICSA) approach to provide information to farmers. Rural people in sub-Saharan Africa are reliant on the rainy season for agriculture which makes them particularly vulnerable to climate change. PICSA aims to provide farmers with historical climate information, seasonal forecasts, and other information to aid in agricultural decision making. Farmers use this information to make decisions regarding sowing timing, crop variety choice, and soil conservation measures. The service was found to be "very useful" by all men and 95% of women that participated in the study, and the approach was deemed successful in building resilience for farmers in Senegal and Mali (Dayamba et al. 2018). Climate services also have the potential to support the food security of those dependent on marine resources by informing fishery-related decision making (Capson 2021) as well as aid in predicting outbreaks of disease (Lowe et al. 2017). However, the efficacy of climate services does not solely stem from improved information dissemination. Poor implementation of climate services can have consequences ranging from waste of resources to inadvertent further entrenchment of power imbalances in their target communities.

Climate service implementation must be contextual to be successful. The PICSA approach was successful in Senegal and Mali because it emphasized 'the recognition that each farmer operates

within his own biophysical and socioeconomic context and that different options will be appropriate for different contexts (Dayamba 2018; Dorward 2015). In a demonstrative example, the Mali Agrometeorological Advisory Program was initially designed to leverage an existing patriarchal power structure in Mali as an emergency means to increase yields of key staple grains. The success of this program led to the decision to scale it up to a broad developmental tool to provide information to all farmers in Mali rather than just the senior men. This led to the application of the program outside of its original purpose and context. After scaling up, it was found to only be useful to a small percentage of senior men in southern Mali – the demographic that the program originally targeted (Carr & Onzere 2018). This case emphasizes the importance of understanding the context in which a climate service is deployed.

Contextual implementation does not solely refer to the composition of the target demographic. Understanding the culture and history of the demographic is also necessary. There must be a focus on 'co-production' wherein the service develops as the result of iterative cooperation between the 'users' and 'producers'. This, too, is fraught with potential pitfalls. Two programs in Tanzania which were funded by international entities aimed to implement climate services with an emphasis on co-production. However, a lack of understanding of the cultural landscape led to a result that further entrenched power imbalances. Since the funding for the program came from Western sources, the scientific way of knowing was considered to be "superior" to the traditional way by the entity implementing the climate service – the Tanzania Meteorological Agency. This resulted in the agency disregarding information received from the agro-pastoralist population since it could not be scientifically verified. Additionally, Tanzania's history had led to agro-pastoralists distrusting government agencies and having the feeling that their way of life is not

respected (Daly & Dilling 2019). Despite the emphasis on co-production, the programs failed because there was no true integration between the ways of knowing.

If the cultural backdrop is understood and addressed, climate services do have potential to help vulnerable communities adapt. The African-American farming community of the Southeast United States is largely composed of small-scale impoverished farmers. Due to a history of race-based oppression as well as to broken promises by institutions meant to serve them, they have a general distrust of government entities. Despite this distrust, a climate service was implemented involving a series of workshops where climate scientists worked with the farmers to develop adaptive approaches informed by climate science. Critically, this involved a long-term commitment to build trust and understanding between the farmers and the agencies that had continually failed them in the past (Furman et al. 2014).

There is a rapidly growing need for climate services as climate change threatens the security of a vast number of communities around the world, but we must be careful when designing them. I have shown that well designed climate services focused on the co-production of knowledge can build resilience in target communities as well as what the consequences are when they are not designed contextually. The ethical design of climate services must center around understanding the populations they are meant to serve, or risk doing more harm than good.

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