Whose voices, whose choices? Pursuing Climate Resilient Trajectories for the Poor

Summary

Climate Resilient Trajectories are routes to development progress that take into account aspects of climate change adaptation and mitigation in a sustainability context, offering a way to explicitly consider impacts of development and climate change choices on different sectors, scales, and socio-economic effects. Due to their scope and relevance, Climate Resilient Trajectories are of great interest to climate scientists, governments and the private sector, based on the urgent need to consider different strategies to decarbonize the economy. Pursuing such trajectories may also be beneficial in processes to implement the UN Sustainable Development Goals (SDGs) up to 2030 and beyond. This Communication describes the concept of Climate Resilient Trajectories and clarifies its relevance, with particular attention to the poor. It also outlines some of the necessary considerations to ensure no one is left behind. It highlights the need for the design of Climate Resilient Trajectories to be flexible enough to accommodate the specific and complex contexts in which poor and marginalized people operate; and that the involvement of all relevant stakeholders (e.g. governments, business and private organizations, policy makers, and whole communities) is necessary in order to ensure such trajectories yield the expected benefits. It further demonstrates that it is critical to consider both short- and long-term time frames when prioritizing and implementing development agendas for the poor.

Keywords: Climate resilience; Sustainable Development; Poverty; Adaptation; Vulnerability

1. The concept of Climate Resilient Trajectories

Climate Resilient Trajectories (CRTs), defined as the ways in which choices and actions lead to increased climate resilience over time, complement the original term of Climate Resilient Pathways used in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC-AR5). Climate Resilient Pathwaysdescribe the various routes which could be followed to enhance resilience. CRTs emerged from the need to integrate climate mitigation and adaptation actions, taking into account global commitments that may reduce climate change impacts, that provides a portfolio of options, in the context of numerous uncertainties and 014; complex, interlinked systems, to avoid making decisions on an *ad hoc* basis daptation (Buurman & Babovic, 2016). CRTs may be deployed to assist climate change short-term and long-term goals. CRTs assume that reducing vulnerabilities to climate change impacts in the context of sustainable development and development planning is not only a technical option for risk management, but also requires the integration of effective social, economic, political and institutional processes. In this sense, CRTs offer an epistemological approach

adaptation efforts, in support of transformation. They may also help in planning, prioritizing and implementing responses (Fazey et al 2016) and help to remedy the many problems encountered when dealing with the socio-economic impacts of climate change.

Current development trajectories are not currently succeeding as they should and many of the approaches currently used are neither sustainable nor climate resilient.. Climate change considerations are often heavily oriented towards climatic conditions only, such as mean or extreme temperatures, as compared to the full picture of risks and responses. Efforts to tackle climate change tend to emphasize mitigation, overlooking the socioeconomic drivers, opportunities, and challenges, in particular relating to energy and land use in the context of poverty and inequality. In many contexts, such as African farm system settings, climate change is only one among multiple stressors shaping food production systems, and might not even be the most important driver of vulnerability (Nyantakyi-Frimpong and Bezner-Kerr, 2015).

Substantial, simultaneous and multiple transitions are needed across sectors and regions to advance towards the Sustainable Development Goals (SDGs) and to reach the targets set in the Paris Agreement. Such transitions include movement toward energy and land use systems with near-zero emissions of greenhouse gases, ecosystem conservation and restoration, alongside infrastructure, investments, as well as community responses that support climate-resilient sustainable development. Both synergies and trade-offs will ensue. Adding another layer of complexity, the respective outcomes may change at different rates and scales. For example, transitioning towards clean-energy generation may reduce CO_2 emissions, but increasing bioenergy through large-scale land acquisitions may endanger food security and foster land competition among local communities. CRTs can help with assessment of these risks and trade-offs and the extent to which these kinds of multisector, multiscale decisions can enhance resilience.

In recent years, the key concept of low-carbon Climate Resilient Development has emerged in the development studies arena, with a view to integrating mitigation and adaptation efforts with development planning (Boyle et al. 2013; Miola et al. 2015; Frankhauser & McDermott, 2016; Johansson et al. 2018). Notwithstanding growing interest in this concept, it nevertheless often fails to account explicitly for the specific needs of the poor in any substantive way. This is despite the need to accommodate the continuous interplay between political, cultural, social, and biophysical factors that shape the vulnerabilities of the poor and influence decision-making processes, and the need to consider the overall sustainability of adaptation and mitigation measures (Jenkins, 2018). Low-carbon Climate Resilient Development also inadequately considers intersectionality and which groups ‘win’ or ‘lose out’ under particular choices, and how this can change and be amplified over time through interacting decisions and actions. The need to explicitly integrate the needs of the poor is reflected in the recent IPCC 2018 report, where Climate Resilient Development Pathways are elaborated as those that: “...strengthen sustainable development and efforts to eradicate poverty and reduce inequalities while promoting fair and cross-scalar adaptation to and resilience in a changing climate” (IPCC, 2018). With increasing impacts of climate change exacerbating social vulnerabilities, particularly in developing countries, development studies must increasingly focus on governance approaches that create space for inclusive politics to support more climate resilient and equitable futures (Schipper et al. 2020). This suggests that justice and equity

need to be central to the design of CRTs; without such a core, CRTs cannot be resilient in a transformative sense that leaves no-one behind.

2. Areas of Action: Proposed CRTs for the Poor

Adaptation pathways are sets of possible actions that may be implemented over time, depending on possible future economic and societal dynamics (Bosomworth and Gaillard, 2019; Fischer, 2018). Such pathways explicitly consider uncertainty and embed flexibility within planning processes. Low greenhouse gas (carbon) emission trajectories are at the heart of CRTs to harness the full potential of both sustainability and equity objectives, and to advance towards achieving the SDGs. Hedging against risks and seeking robust adaptive options is central to ensure equitable trajectories, especially if higher emission scenarios prevail.

Poor and vulnerable communities commonly rely directly on thriving ecosystems (Costanza et al. 2017; Roy et al. 2018), whereas others are unable to take advantage of ecosystem services or environmental assets, which in turn can undermine their livelihoods, leading to (or exacerbating) poverty. Indeed, when the ecosystems are degraded, the vulnerability of local communities to climate hazards increases, especially in terms of food, water and energy insecurity (van der Geest et al. 2019). Globally, climate change impacts and hazards disproportionately affect the poorest groups and compromise opportunities for a safe, equitable and sustainable future (Roy et al. 2018). This underscores the need to make sure the poor are afforded explicit consideration when developing CRTs.

Byers et al (2018) considered people with income <$10/day as 'vulnerable to poverty' in the three Shared Socioeconomic Pathways (SSP), which currently consider 4.2 billion people. In the context of increasing global emissions and warming temperature levels, climate risks to the poor are an order of magnitude greater (8–32 times) in high poverty and inequality scenarios (SSP3) compared to sustainable socioeconomic development (SSP1) (Byers et al. 2018). Thus, CRTs for the poor (Figure 1) consider as a baseline that ~ 4.2 billion people are vulnerable to poverty, and this number might increase or reduce, especially in developing countries, under three different scenarios of increasing global emissions and temperature warming. In Figure 1, a global temperature increase to 1.5° C implies increasing detrimental impacts on the poor, with communities becoming more even more vulnerable in a world that is 2°C warmer. Even though new options may become available to mitigate the adverse effects of degrading ecosystems on which many livelihoods rely, 1.5° C should not be understood as a “safe” socio-ecologically acceptable level (Roy et al., 2018). With global temperature changes of less than 1.5° C seen today, it remains the poorest groups who are least able to adapt and develop.

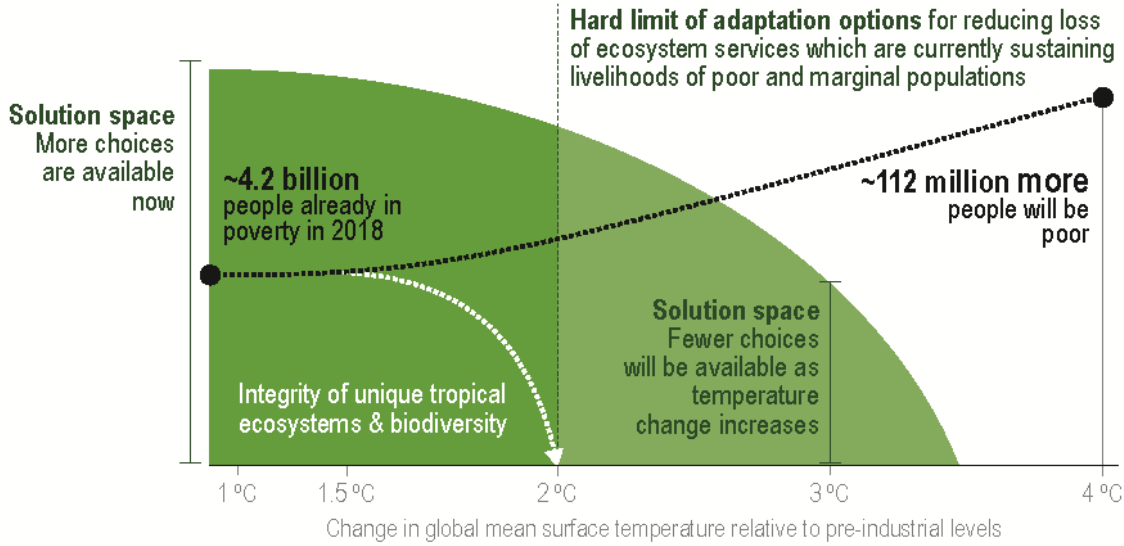

Figure 1- CRTs for the poor.
The X-axis displays warming levels considered under the representative concentration pathways to the year 2070, assuming warming of 1.5°C by around 2040, 2°C by approximately 2050 and 4°C and above by around 2070. Figure 1 assumes that absolute poverty will increase in the context of global warming, however, less so under a 1.5°C temperature rise within a Sustainable Low Emissions economic model which assumes intact ecosystems, improved equity and global cooperation, i.e. strengthened capacity to deal with climate impacts such as drought, flooding or extreme weather events that severely affect local livelihoods. Source: Authors

Climate change impacts according to projections to 2070 are expected to push between 3 and 16 million additional people into extreme poverty, depending on the trajectory taken. Such increased poverty is a consequence of impacts on agriculture, food price increases and livelihoods associated with the loss of ecosystem services (Roy et al. 2018). Thus, CRTs for the poor need to take into consideration their susceptibility to ecosystem changes, especially in the context of continuous global temperature increases. For instance, beyond 1.5°C coral reefs are anticipated to disappear, negatively affecting millions of poor fisheries communities (Roy et al. 2018; Hoegh-Guldberg et al 2018) and tourism industries. Freshwater availability may decrease substantially with global temperature increases beyond 1.5°C, which is expected to impact 8% to 14% of the global population, causing water insecurity (Schewe et al. 2014; Byers et al. 2018), which may affect the poor the most by endangering their livelihoods. If we use SSP1 as a baseline (which assumes a social system that delivers lower emissions and greater equity), it can be seen that in the most unequal scenario (SSP3) poverty increases a magnitude of 8 to 62 times more than it does under SSP1 (Byers et al 2018; SR15).

CRTs can support a broader understanding of the development choices shaping both climate action and equitable sustainable development. Sustainable trajectories towards the associated transitions depend on specific contexts, needs, and aspirations of different nations and actors. Even in the same country, all members are not exposed to climatic stressors in the same way, and there are differences among social groups (e.g., gender, age, culture, class) when it comes to vulnerability

to risks. There is consequently a need to consider a diversity of itineraries and not a one-size-fits-all development agenda. It is also vital to account for the differentiated impacts of risks, incorporating flexibility to accommodate the specific conditions of each social group, in the context of the relative importance of climatic and non-climatic stressors.

By reducing emissions of heat-trapping gases in ways that do not undermine adaptation and development, diverse climate change impacts will be reduced, including undesirable impacts such as losses of agricultural yields, biodiversity loss and ecosystem degradation, and decreases in economic growth where climate change affects the vitality of entire economies. Co-benefits, such as improved air quality and associated dividends for human health, as well as the creation of new jobs, may emerge. At the same time, emission reduction measures have potential risks that will disproportionately affect some groups, whether through increased energy prices, geographical shifts in resources and industries, or increased competition for land.

Table 1 provides some examples of how CRTs are being applied in development processes, providing insights through the lessons learned. These emerging examples of climate resilient development combine inclusive and sustainable development with climate change preparedness and responses.

Table 1. Examples of how CRTs are being applied in development processes, with lessons learned

Eastern Indonesian Islands
Summary: A 4-year project in Nusa Tenggara Barat Province, Indonesia, aimed to stimulate an adaptation pathways process. The goal was to support climate compatible development in a context with low stakeholder capacity, high poverty, and rapid environmental and social change. On these archipelagic islands, livelihoods are predominantly rural; far from political and urban centres. The project focused on the integrated top-down and bottom-up development planning that could enable climate compatible development at the local level, linked to provincial and national plans.
Lessons learned: ● Substantial gradients in both climate and livelihoods in island geographies necessitate fine-scale planning and make it difficult to scale up. ● Infrastructural investments, including roads, ports, and irrigation, are crucial to climate resilient development. If not well designed, such investments are prone to maladaptation, and can increase exposure to sea level rise. ● Although some development interventions are delivering climate resilience, such outcomes are often haphazard, rather than strategically conceived, coordinated, and delivered.
Citation: J.R.A. Butler, E.L. Bohensky, T. Darbas, D.G.C. Kirono, R.M. Wise, Y. Sutaryono 2016. Building capacity for adaptation pathways in eastern Indonesian islands: Synthesis and lessons learned. Climate Risk Management 12, A1-A10.
Northern Burkina Faso
Summary: Higher level adaptation activities have been initiated by government and international organizations. Their focus has been on technological solutions such as drought-resistant crop varieties, micro-irrigation, and integration of

seasonal climate forecasts. These strategies are redefined when implemented locally by agro-pastoralists.

Lessons learned:

- Higher scale initiatives have persisted in technical forms in this context, geared towards increasing agricultural yields. By contrast, local strategies have prioritized diversifying livelihoods and securing off-farm income and animal fodder.
- Advancing adaptation necessitates attention to local contexts and needs, including integrated strategies that simultaneously address climate risks and livelihoods.
- Collaborative processes that involve local stakeholders from the start are needed to incorporate both adaptation and equitable, sustainable development, attuned to local contexts and aspirations.

Citation: L.V. Rasmussen 2018. Re-defining Sahelian 'adaptive agriculture' when implemented locally: beyond techno-fix solutions. World Development 108, 274-282.

Poyang Lake region, China

Summary: The Poyang Lake area is a rice-producing region that has historically experienced flooding from the lake, which is the largest freshwater lake in China. The flooding has posed threats to agricultural and economic outcomes. Levee construction has long been used to protect both agricultural and urbanized areas. Programs of economic development have simultaneously occurred.

Lessons learned:

- Rural livelihoods have increasingly diversified in parallel with broader patterns of industrial and urban development.
- State-led national economic development has had far-reaching consequences. Nonfarm employment, especially migratory work in urban centers, has increased income and decreased the sensitivity of rural livelihoods to flooding.
- Flood risk management in the region has served to decrease the exposure of agricultural households.

Citation: Q. Tian, M.C. Lemos 2018. Household livelihood differentiation and vulnerability to climate hazards in rural China. World Development 108, 321-331.

NIGER RIVER BASIN

Summary: The SUR1M project (Scaling-Up Resilience to Climate Extremes for over 1 Million People in the Niger River Basin) sought to strengthen the resilience of the NRB population to climate extremes in four distinct ecological zones that support different livelihood systems, i.e. the agro-pastoral belt; the planted millet and sorghum belt; the cropping/herding with high work outmigration; and the Niger River irrigated rice. The project targeted improved disaster risk preparedness and climate change adaptation in the face of droughts and floods, deepening mitigation practices, and building critical assets.

Lessons learned:

- Households rely on detrimental coping strategies to buffer the immediate impact of shocks. Adaptive/transformative strategies appear to have positive effects only in the medium to long term.
- Quasi-experimental assessments resemble a strategic, robust approach to evaluate the true impact of resilience-building interventions.

● Capturing positive effects of resilience-building resulting in long-term wellbeing of households requires longer timescales. Project-based interventions appear too small or too diluted to create the envisaged transformational change.
Citation: Béné C, Riba A, Wilson D. (2020) Impacts of resilience interventions - Evidence from a quasi-experimental assessment in Niger. International Journal of Disaster Risk Reduction 43:101390.

Without direct focus on vulnerable and marginalized communities, development choices and climate actions can reinforce and exacerbate existing inequalities and worsen poverty, as inequity and unsustainability are interlinked (Leal Filho et al 2019; Leach et al. 2018). For example, assessments of cost efficiency, combined with the availability of finance, could lead to coastal adaptation favoring protection and armoring of coastlines in richer, more densely populated areas. Communities in poorer areas -both urban and rural- may become trapped in increasingly hazardous environments or be forced to relocate. Long-standing historical injustices in housing and land-use planning interact with climate action in different political contexts, with the potential to adversely affect the most vulnerable. Frameworks considering equity and sustainability as drivers as well as outcomes of social-ecological system dynamics could guide the improvement of current CRTs (Leach et al. 2018).

3. Towards sustainable trajectories for transitions

CRTs demand certain prerequisites in order to yield the expected benefits. First, due consideration must be given to climate justice. A social justice approach encompasses particularism, pluralism and procedural justice (Wood et al 2018). Procedural justice can be facilitated by recognising local people's identities, cultures and values; and providing local people with meaningful participatory opportunities. It requires the management and challenging of power asymmetries; creating widespread recognition of, and meaningful participatory opportunities for, local people (Wood et al 2018). Local adaptation policies that reduce and remove barriers to effective adaptation are necessary. In the absence of policy, autonomous household climate adaptation is occurring, which may be successful but may also hinder long-term development and mitigation goals. Without broader climate policy intervention, mal-adaptations may occur across other spatial and temporal scales, threatening progress toward mitigation and development (Suckall et al 2014).

In implementing CRTs, an understanding of the complexity of exclusive social-technical systems in poverty contexts is necessary, unravelling how the systems that strengthen the privileges of a few undermine the well-being of many. In contexts where there is a mix of well- and ill-functioning institutions, proposed transformations might even reproduce poverty patterns. Hence, knowledge intermediaries can play an important role. For the poor, this is often a role played by community-based organisations, non-governmental organisations (NGOs) and social movements (Ramos-Mejía, 2018).

Hansen et al (2018) propose four cross-cutting themes to allow for transitions in developing countries: (i) global-local linkages and external dependencies; (ii) stability and non-stability of regimes; (iii) undemocratic and non-egalitarian nature of regimes; and (iv) nurturing the development of niches versus the execution of individual projects (Hansen et al 2018). For example, global and local linkages occur in the global supply chain of goods and services provided by people living in developing countries. Rice farmers in India or shrimp farmers in Viet Nam are dependent on the global price of the commodities, while female factory workers in Bangladesh are dependent upon orders from the fashion and retail industry globally. Weaker, less stable formal governance regimes in developing countries could favour niche development and regime changes, and allow non-state intermediary actors to fill the void. Hence, civil society, NGOs and grassroots movements need to be encouraged.

Inclusive and participatory processes and informal interaction mechanisms can all help to put equality and inclusion at the center of more just transitions for the poor (Hansen et al 2018). Furthermore, it is necessary to create niches and structural changes that are large enough for landscape changes to occur (Loorbach, 2010). In the context of poverty, these include negotiating visions and expectations, building networks, encouraging learning, and supporting intermediary organisations and actors with local knowledge to deliver concrete changes that allow innovation and empower the poor (Ramos-Mejía, 2018). Expectations for change through innovation should be linked to ways in which poor people's survival strategies might reconfigure, while networking should understand the patron-client relationships of the poor (Ramos-Mejía, 2018). Wieczorek (2018) proposes that stimulating social entrepreneurship and bottom-up local innovation is more effective than traditional aid and technology transfer. Hence governing transitions in developing contexts needs consideration of institutional insecurity, path-dependencies, diverging views on sustainability, as well as the hybrid nature of incumbent systems.

Sustainable transitions necessitate attention to path dependency and lock-ins, which can reduce future options and their effectiveness. For example, near-term measures to reduce greenhouse gas emissions, e.g. through transitions to natural gas, may limit the speed of movement towards fully decarbonized energy systems; or stop-gap measures to address increasing inundation under sea level rise, such as road elevation, beach nourishment, or mangrove planting, may decrease resources that could support deeper, more fundamental adjustments.

Moving towards more sustainable trends, CRTs need to pay attention to the multiple transitions underway, and to the distributions of costs and benefits, with specific attention to the needs of the poor. Critical reflection is needed in terms of who is recognised and who participates in pathway definition, and whose voices inform development choices. Recognising who is missing is as important as noting those that are present. While it is clear that there will always be winners and losers (even if compensatory mechanisms are applied), equitable CRTs require co-production, integrating different kinds of knowledge across multiple domains of expertise and worldviews, considering trade-offs across multiple temporal and spatial scales as well as between adaptation, mitigation and development perspectives (Ficklin et al., 2018). Pursing CRTs that support these attributes is not straightforward.

4. Conclusions

Improved understanding of the interactions between adaptation, mitigation and sustainable human development is needed, in order to create equitable, sustainable CRTs. This requires:

- Research that improves climate risk characterisation and identifies network-held risks associated with climate events.
- Better understanding of the role played by policy frameworks, especially in contexts where multiple decision-making processes do not sufficiently take into account the many interacting risks and hazards faced by poor communities.

CRTs for the poor and vulnerable are fundamentally about addressing underlying issues of ethics, power, equity and justice. In this context, adaptation processes need to take into account the role of system behaviours and the (in)adequacy of responses, which may reduce or amplify the risks and hazards to which poor communities are exposed, and reinforce or exacerbate prevailing inequities. Recognising that equity and sustainability are inextricably interlinked when designing CRTs for the poor:

- A better understanding is needed of intertwined drivers and outcomes of such coupled systems dynamics that shape pathways.
- Improved determination of the required scope of interventions to trigger transformative changes and achieve positive long-term effects on wellbeing are needed to inform the design of appropriate CRTs for the poor and vulnerable.

Proper appreciation of the complexity of relationships between responses and resilience building is critical: in fostering institutional capacity for decision-making across risk domains, and in pursuing more sustainable pathways that allow the poor a voice in the choices being made to manage the challenges of a changing climate.

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