



RESEARCH PAPER

**Thinking through Climate Change beyond Technofixes:
Community Vulnerability and Environmental Justice in Pakistan**

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ABSTRACT

This article examines the limits of climate technofixes in postcolonial spaces like Pakistan. I argue that if solutions to the recurrent climate change are thought only through technological responses alone, they remain incomplete. Without addressing the historical, social, and economic conditions that make communities vulnerable, recurring disasters will continue to recur. Pakistan's climate crisis requires urgent action, but urgency alone cannot become the basis of climate policy. A just climate response would begin by asking how vulnerability is produced and why only certain communities are expected to adjust their lives in the name of reform. I argue that climate solutions need to pay close attention to local environmental knowledge systems, histories of uneven development, and underlying causes of structural vulnerability, as much as, if not more so, technological solutions. Without this attention, climate action will continue to deteriorate further the conditions of those who are already on the margins due to environmental change.

KEYWORDS Technofixes, Environmental Philosophy, Climate Change, Environmental Justice, Climate Policy, Conservation

Introduction

In recent decades, Pakistan has faced repeated climate disasters, including floods, heatwaves and smog. Such events demand urgent responses. At the same time, urgency cannot be allowed to overwhelm climate policy with technical solutions alone. Climate change is a problem of emissions, and infrastructure, but it is also a problem of livelihood, and social injustice.

In this paper, I argue that climate technofixes are incomplete when they are separated from the social and economic conditions that make communities vulnerable. The paper begins by briefly introducing climate technofixes and the limits of technical climate thinking. It then moves to Pakistan's climate vulnerability and the dangers of understanding climate change only through emergency and crisis. The paper then discusses development, infrastructure, and participation in climate policy. It turns next to floods and conservation to show how climate and environmental responses can become incomplete when they do not begin from affected communities. The article ends by arguing for a climate policy that is locally grounded and attentive to the lives of those who are already made vulnerable.

Climate Technofixes and the Limits of Technical Thinking

In recent years, climate technological responses or technofixes have been presented as the more practical responses to the problem of climate change. Technofixes, like solar radiation modification (SRM) for example, are promoted because of their promise to bring immediate and urgent relief. In a worsening climate situation, such promises can appear attractive, and especially because they do not usually have to confront the more

structural questions like overconsumption, uneven development, or neoliberalism. Ecomodernism is one influential example of this tendency. It claims that using technology, humans can decouple nature from human effects, manage urbanity and population, and improve public health and infrastructure (Blomqvist et al., 2013; Asafu Adjaye et al., 2015; Blomqvist, 2015).

The problem with such thinking is that it can reduce climate change to a technical problem and make climate policy look like a matter of engineering and institutional management. This approach avoids the social and political dimensions of climate change. It does not ask why some communities are exposed to climate disasters more than others. It also fails to answer why the communities least responsible for climate change are often asked to bear the heaviest burdens of adaptation.

Efficiency assumptions and the calls for technological fixes play a central role in strengthening the structures of the present status quo. People who promote such fixes, instead of calling market capitalism into question to avoid ecological collapse, argue for more reliance on technologies, from carbon capture to nuclear power (Genovese & Pansera, 2021). Research on rebound effects and the Jevons Paradox also shows that efficiency gains can increase consumption when they are absorbed into larger growth systems (Greening et al., 2000; Barker et al., 2009; Jackson, 2009; Polimeni et al., 2012; Korhonen et al., 2018). Such an uncritical technological utopia reinforces the status quo and offers false solutions to the environmental challenges of our time (Gomez Baggethun, 2020). It is also devoid of an inclusive understanding of the world, especially of climate justice movements of the global South and their refusal to move towards a future that erases the claims of the past (Szerszynski, 2016). Climate policy in Pakistan is lived through land and labor. Technological fixes can help in producing early warning systems or flood protection mechanisms, but their limits become clear when they are treated as substitutes for social and structural questions.

Climate Crisis and Community Vulnerability in Pakistan

Climate change in Pakistan is not experienced evenly. Rural communities, riverine communities, informal workers, women, landless laborers, small farmers, and poor urban settlements face climate harms through already existing vulnerabilities. Floods expose the already solidified historical weaknesses in housing, public health, and livelihood security. In a country like Pakistan, climate change cannot be separated from poverty and development. Capitalist development and corporate neoliberalism have a history of being used for imperialist endeavors by projecting a crisis of poverty, freedom, and oppression in third world countries (Escobar, 1995; Stiglitz, 2002; Harvey, 2005). Climate change is now highlighted as the next big crisis in line.

Pertinent to this is the issue of unintended consequences. Usually, techno corporate fixes, like carbon capture, are solutions presented to solve the climate crisis requiring quick and effective actions while disregarding unintended consequences (Mann & Toles, 2016). While it is easier to project technical solutions, it is harder to make a case for just solutions through quick fixes and recognize that quick fixes are bound to have different effects on different geographies. Quick fixes allow rapid, resolute, and unchallenged actions to be propagated. The need to be democratic and consensual is usually ignored. Rhetoric of crisis and the logic of impending catastrophe as an impetus for action are used (Meyer, 2019). A highly depoliticized, post political rhetoric in which climate is reduced to a scientific and managerial problem is produced (MacGregor, 2014; Kenis & Lievens, 2014; Swyngedouw & Ernstson, 2018).

As much as it is a scientific problem, climate vulnerability in Pakistan should primarily be understood as a social and historical condition. This vulnerability is shaped by unequal access to land, uneven development, and limited participation of affected communities in planning. Sultana argues that climate coloniality is expressed through continued othering, dispossession, extractivism, displacement, and destruction (Sultana, 2022). This point is important because climate harm cannot be understood without recognizing the political and economic arrangements that decide who is exposed and who is protected.

The language of crisis can also make climate policy narrow. Such dystopian and apocalyptic portrayals increase ecological anxieties and define everyday living experience within and through crisis. An automatic assumption of imminence is applied in which people feel something horribly harmful is pressing on the present conditions, suggesting the need for immediate and solution oriented actions (Whyte, 2020). Quick solutions are desired and devised. Rapid, resolute, and unchallenged actions are propagated. The need to be democratic and consensual is usually ignored. The result has been a highly depoliticized rhetoric in which climate is reduced to a scientific and managerial problem (Swyngedouw & Ernstson, 2018; Kenis, 2019; Pepermans & Maesele, 2016).

For Pakistan, this matters because climate action must be urgent and participatory at the same time. Floods, heatwaves, and displacement require immediate response. Yet climate policy cannot be built only through emergency thinking. Emergency thinking can make it easier to ignore long histories of vulnerability. It can focus attention on water, roads, dams, housing, and relief without asking how communities became vulnerable in the first place. A just climate policy must keep the crisis in view without allowing crisis to erase history.

The Question of Development and Local Participation

In Pakistan, techno infrastructural expertise remains insufficiently politicized (Akhter et al., 2022). This means that technical planning might appear neutral, even when it shapes livelihoods and access to land. Development planning, despite entailing social, political, and environmental consequences, continues to be treated as a technical question. The question, therefore, is not whether Pakistan needs infrastructure because it clearly does. The question is how infrastructure is imagined, who participates in the planning, and whether affected communities are treated as serious participants.

Pakistan's development history shows that there has always been a difficulty in separating infrastructural planning from social consequences. Pakistan's backwardness has usually been represented as a technical problem of economic and infrastructural development (Anwar, 2014). This framing can make development appear as the obvious answer to poverty and vulnerability. But the communities most affected by development projects experience this progress through displacement and loss of livelihood. Climate policy should learn from this history and should not repeat the assumption that technical improvement alone can resolve social vulnerability.

The grassroots movements, Indigenous and local participation are not always given the chance to redefine progress without the need to abide by imposing universal models of development. Such models have contributed to the plunder of nature, lifestyles, and local knowledge forms (Shiva, 1997; Shiva, 2016). When it comes to climate change, the problem of such plunders has to be taken more seriously. If environmental policy is designed without local consent and participation, the language of reforms can become another language of adjustment for vulnerable communities. Communities are

forced to change their relationship to their ancestral lands but the structural causes of their vulnerability are not addressed. A just and a sane climate policy would begin by asking how people have historically lived with climate vulnerabilities, and include such local knowledge systems as part of policymaking. Farmers, fishers, pastoralists, and forest peoples carry intergenerational and historical forms of environmental knowledge that do not appear in technical reports. Such knowledge systems are lived before they are translated into technical language. Climate planning in Pakistan needs this knowledge because technical expertise alone cannot understand the full meaning of vulnerability and environmental challenges ahead.

Climate Disasters and the License of Quick Intervention

The 2022 floods in Pakistan made the country's climate vulnerability visible to the world. According to UNICEF, the floods washed away villages and left almost 10 million children in need of immediate lifesaving support and at increased risk of waterborne diseases, drowning, and malnutrition (UNICEF, 2022). The floods also caused mass displacement and enormous damage to infrastructure, homes, and livelihoods. Such devastation creates a moment in which quick fixes become attractive.

With an infrastructure loss estimated in tens of billions, mass migration, and displacement, the ground becomes fertile for climate fixes and also for their unintended consequences. In the long run, rural communities, which have been affected the most, may be asked to sacrifice their ancestral environmental lifestyles to make way for the needed technical reforms. Such reforms usually bring infrastructure changes without addressing the consumption cultures of urban communities. They do not ask why floods have become a recurrent phenomenon for communities in southern regions and why the underprivileged and the underclass find themselves vulnerable to such disasters. They also do not ask why some communities are repeatedly placed in the path of danger while others are able to secure protection and mobility.

This does not mean that immediate relief and reconstruction are not necessary, but that flood response should be understood beyond immediate relief alone. Climate justice requires more than repairing damaged infrastructure. We need to ask why the same communities suffer again and again and why some houses are washed away more easily? Why is it that some livelihoods are vulnerable to collapse after every disaster? Without addressing such questions, climate responses will remain trapped in repair and renewed vulnerabilities. This is a cycle that can go on without break.

Moreover, crisis narratives requiring quick fixes suit existing power structures. Climate anxiety, as we have witnessed in recent decades, can paralyze popular will. In the time of bad despair, widespread end of the world thinking can help strengthen the status quo without addressing the structural problems at hand (Robbins 2020). This insight is important for Pakistan because climate despair can make people accept any solution that promises quick relief. It can also provide policymakers with an excuse to move too quickly toward infrastructure and technology without enough public conversation. A climate policy based only on urgency can miss the gradual and the not so visible slow violence that made disaster so devastating in the first place (Nixon 2013).

This does not mean that urgency should be rejected. Pakistan needs urgent climate action. The problem begins when urgency becomes the only language of policy. A flood affected community needs shelter and compensation immediately. But recent decades have shown that flooded communities also need long term security of land, livelihood, and public services. Climate policy must hold these needs together and must respond to emergency without reducing climate justice to emergency management. It must respond

to emergency without reducing climate justice to emergency management, and it must ask why the same communities are repeatedly left exposed when the next disaster arrives. Urgency should become a part of justice instead of becoming a substitute for it.

Conservation and Consensual Environmental Decision Making

While community consent is important for every kind of environmental decision, I want to focus here on the question of community participation specifically in environmental conservation. Environmental policy can create new forms of vulnerability when it treats local communities as threats to nature. Neo Malthusian and ecomodernist ways of thinking imagine that nature can be protected by separating humans from ecological spaces. Neo Malthusian literature calls for regulating populations to deal with the tragedy of the commons by keeping a check on local populations and their use of nature (Hardin 1968; Kaplan 1994; Homer Dixon 2001). Such depoliticized forms of environmentalism do not adequately address the structural colonial capitalist causes of the exploitation of nature. They can also further marginalize rural and Indigenous populations that are already made vulnerable.

The Ecomodernist Manifesto, in a similar way, maintains that cities drive and symbolize the decoupling of humanity from nature, performing far better than rural economies in providing efficiently for material needs while reducing environmental impacts (Asafu Adjaye et al. 2015). Such thinking can make rural and Indigenous communities appear environmentally backward, although many of these communities have long histories of living with land, animals, and forests in a mutually respectful way.

Westernized models of conservation have also imagined nature as something to be protected from human use, especially when the humans in question are local and Indigenous (Guha 1989; Guha and Martinez Alier 1997; Cole and Foster 2001; Finney 2014). Conservation in northern Pakistan has produced complicated forms of conflict and exclusion that reproduce the separation between humans and nature found in global models influenced by Westernized conservation paradigms (Ali 2019). But it should be noted that communities in the mountains cannot be understood through simple ideas of remoteness or backwardness because their lives involve both continuity and transformation (Hussain 2015). Environmental policy becomes incomplete when it ignores such complexities of transformations and evolutions of local histories and community relations to land.

The technocratic paradigm treats human presence as damage without asking which humans, what histories, and what forms of use are being discussed. It therefore lacks a complete understanding of how communities interact with their environments. Conservation is necessary, but it cannot remain just if it separates communities from land without recognizing their knowledge, rights, and responsibilities. When conservation proceeds in this way, it can address ecological vulnerability while reproducing climate vulnerability for the communities whose lives are tied to those environments.

Local communities, especially land based, mountain peoples, river peoples, and forest peoples, should be treated as participants in environmental decision making. Their practices, responsibilities, and environmental knowledge systems have existed and survived through many forms of environmental and climatic change and need to be recognized. A just conservation policy should begin with this recognition and ask how communities have historically cared for landscapes. A community centered climate policy would ask what people need to remain with dignity in their places and how policy can value local forms of care that do not always appear as technical expertise.

Towards a Just Climate Policymaking

A just climate policy in Pakistan must move beyond the idea that vulnerability can be solved only through technology and must begin from the conditions that make vulnerability possible. For example, without addressing first the causes of unstable livelihood, poverty and historically uneven development, technological responses will not solve the wider issues of climate justice and vulnerability. However, these responses can help us fix things when they are promoted alongside these wider structural reforms. A response that begins only from technocratic reforms can miss the problematic social conditions that make disasters unequal. Floods then appear as natural events, while the histories of poverty and uneven development remain hidden.

Climate policy has to ask these questions if it is to become more than a temporary repair after every disaster. These reforms are unlikely to make any impact if they do not also address inequality and a lack of community consent. Climate policy should also avoid treating communities as passive recipients of expert solutions. The people most affected by climate disasters should be part of planning from the beginning. Such participation is necessary because climate change is lived locally. A flood can mean different things for different communities. Its effects are also revealed differently based on housing, health and income of the affected communities.

Finally, for the sake of just climate futures, we need to develop an inclusive understanding of the conundrum of progress. Progress cannot be restricted to infrastructure alone but should first and foremost be measured through the security and dignity of communities battling climate change day in day out. In climatic terms, progress would mean the protection of native environmental knowledge systems and making sure that rivers and land live a healthy life. This would also mean that communities are able to live climate change without repeated environmental displacements. Precisely because of this, the structural and the technical must be thought together.

Conclusion

In this article, I have tried to argue that climate technological fixes are incomplete if they are not taken alongside the wider structural issues of social injustices. Climate justice is social justice. The later without the former is empty. Pakistan's climate crisis, despite that it demands urgent action, should not become narrow by reducing itself through the actions of a technocratic climate policy. Technological solutions can only be beneficial if they do not overwhelm climate policy to the point that the primary political and ethical work of addressing the structural issues, that make communities vulnerable in the first place, is left unaddressed. In recent years, Pakistan's experience with climate disasters has taught us that climate action must be locally grounded. The challenge is to build a climate policy that protects lives in the present and also transforms the conditions that make climate disasters repeat in the future. Without this structural attention, climate action can never be inclusive but with it, it can provide us with a path towards environmental as well as social justice.

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