



An extreme climatic event and systemic vulnerabilities in the face of conflict: insights from the Taliban insurgency in Swat, Pakistan

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Abstract

The association between climate change and conflict is a contentious topic which reflects a small but growing body of evidence. While scholars report climate change as a driver of armed conflict with marked inconsistencies, the ways conflict and terrorism exacerbate the impacts of climate change and stand as a barrier to reduce exposure to and risks associated with future stressors have received little attention. Here, we aim to understand how the Taliban-led conflict affected the capacities of people living in conflict zones to cope with one extreme climatic event, namely the devastating flood of 2010. Using key informant interviews, focus group discussions and household surveys, we develop an understanding of how the interlinkages between economics, culture, and politics, alongside deteriorating natural resources, accentuated land ownership disputes that led to the Taliban insurgency in Swat, Khyber-Pakhtunkhwa (KPK) Province, Pakistan. Our findings reveal how the insurgency magnified the impacts of the 2010 flood and eroded rural livelihoods (e.g. farming and tourism) in the region. We demonstrate how existing and reproduced vulnerabilities alongside key stressors (i.e. armed conflict, the flood of 2010 and deforestation) became barriers to risk reduction. The study illustrates how these vulnerabilities, especially ownership disputes, and barriers to risk reduction can magnify the current and future risk environment. This case study highlights armed conflict as a contributing factor in the intensification of climate change impacts and associated extreme events.

Keywords Climate change · Conflict · Vulnerability · Barriers · Risk reduction

Introduction

The interplay between climate change and society (including culture, economics and politics) is complex and nuanced and can present profound challenges when responding to climate-related stressors. Even in countries with sound social, economic and political structures, high levels of vulnerability can attenuate a society's ability to absorb shocks, preserve livelihoods and recover from extreme events. In regions defined by conflict, the erosion of support structures can magnify these vulnerabilities and limit people's capacities to cope with future shocks. The relationship between extreme climate events and conflict is not well understood and, to date, scholarly inquiry has predominantly focused on the role of climate change as a catalyst for conflict. Lewandowsky et al. (2013) suggest that mass migration in response to climatic stressors has contributed substantially to conflict between displaced and local populations in a number of locations around the world, albeit with limited specificity. More explicitly, Price and Elu (2017) posit that increased average temperatures and decreased rainfall in Nigeria have acted as

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drivers of armed conflict plaguing several of the nation's provinces. Yet, despite these advancements in our understanding of the relationship between climate change and conflict, the role of conflict in exacerbating the impact of climate-related stressors has received little attention. The debate over which is the greater confounder remains unresolved (Theisen 2017), and to this end, we present the first study to investigate the role that conflict has played in amplifying vulnerability and exacerbating the impacts of the extreme event of the 2010 flood in Pakistan.

However, conflict can take many forms, ranging from disagreements over natural resource allocations to acts of terror and formal military combat. The differences in how conflict is defined and manifests add further complexity for scholars when aiming to disentangle the relationship between climate change and conflict. For example, the comprehensive Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change defines (armed) conflict—derived from the Uppsala Conflict Data Program—as ‘more than 25 battle-related deaths per year’ (Adger et al. 2014; UCDP 2020) but neglects other manifestations and struggles. Furthermore, acts of terror, often described as conflict, do not always conform to this definition as, in an armed conflict, the enemy is seemingly visible. The report also takes an ostensibly narrow view on the connection between climate change and conflict with a primary focus on the role climate change has played in fuelling armed conflict (as identified above). Less considered, however, is how climate change may act as a catalyst for any number of different types of conflict.

In turn, conflict often arises as the result of complex and interrelated factors including social disparities, inequality, religious tension, resource scarcity, trans-border disputes over shared natural resources, contentious politics and hostilities resulting from internal migration, all of which can be aggravated by environmental factors. Disentangling the circuitous nature of these interactions and related feedbacks is nontrivial yet important when designing conflict-sensitive risk reduction strategies (Theisen 2017; Froese and Schilling 2019). In this instance, the Swat District of Pakistan presents a unique case, where armed conflict has occurred alongside acts of terror. As state actors, the Pakistani military engaged in protracted actions to remove the Taliban from the region (armed conflict) while the Taliban tried to maintain control of the local population through fear-based tactics (terrorism). Marked by the devastating flood of 2010, the Swat District of Pakistan provides an opportunity to examine how vulnerabilities to climate stressors manifest following a period of complex conflict.

While a number of scholars have examined the role of local power dynamics in resource governance and disaster management in Pakistan (Shahbaz and Suleri 2009; Kruseman and Pellegrini 2008; Shahbaz and Ali 2009; Geiser 2000; Geiser and Suleri 2010), few have explicitly assessed the link between climatic hazards and conflict

(we hereby use the term ‘conflict’ to encompass all forms of conflict engaged in by the Taliban in Swat including acts of terror). In our study, we highlight how conflict exacerbated the impacts of a climate-related extreme event and, alongside with pre-existing vulnerabilities, decreased the coping capacity of local residents. To address this research gap, drawing upon the case of Swat, Pakistan, we aim to answer the following research questions: (i) what is the landscape of vulnerability in post-conflict Swat; (ii) how do key stressors intersect with vulnerability to undermine rural livelihoods; and (iii) what are the current barriers to reducing risk and exposure to future stressors? We hereby contribute to the nascent body of scholarship and provide a novel lens to examining the relationship between the dynamics of the Taliban-led conflict and the impacts of extreme flooding in Swat. We begin with an overview of the study area, Swat, Khyber-Pakhtunkhwa Province, followed by a description of our methodology. We then present our research findings regarding the connections between the Taliban's upheaval, deforestation (conflict over access to natural resources), and the devastating flood of 2010. Thereafter, we examine the relationships between the key stressors and systemic vulnerabilities and their effects on livelihoods. Finally, we reflect on the barriers to risk reduction in the context of multiple stressors, followed by implications for the future.

Context of the study area

This research was conducted in the Swat District, situated in the Khyber Pakhtunkhwa (KPK) Province of Pakistan, a unique case study location for investigating the climate change-conflict nexus. In the Lower Swat (gently sloping plains), farming and trade are the primary livelihoods. In the Upper Swat (highlands), landholdings are smaller and livelihoods are primarily supported by livestock and forest-based resources such as wood, fruits and medicinal plants. In resource-scarce regions of the District, remittances received from migrant family members constitute an important livelihood strategy (Shahbaz and Ali 2009). Tourism was a major source of income for many households before the conflict (Nyborg et al. 2012) during which Swat fell under the rule of the Pakistani Taliban between 2007 and 2009. In 2007, the local militant group Tehreek-e-Nafizay Sharia Muhammad (TNSM) seized control of Swat and initiated anti-state activities including a ban on education, a campaign against polio vaccinations, illegal logging and timber theft. Due to failed negotiations between the provincial government and the militants, military operations were launched in late 2007 to retake control of the District. The conflict displaced thousands of residents, creating a social and humanitarian crisis across

the north-west of Pakistan (Fleischner 2011; Suleri et al. 2016). It destroyed the region's public infrastructure and severely eroded the health, education and livelihoods of rural populations (Afridi and Yousufi 2014).

Massive deforestation resulted from anti-state activities during the conflict. The Guardian reported the government suffered approximately 350 million USD in losses. Swat faced unprecedented deforestation which, in 2008, accounted for more than that of the previous two decades (Yusufzai 2012). Illegal loggers (known as the 'timber mafia') sponsored the Taliban in exchange for permission to cut trees and smuggle them across the country. In addition, indiscriminate shelling of militants' strongholds by the Pakistani armed forces caused large losses in forest cover, in some instances resulting in fire incidents in forest-rich regions of the District (Feyyaz 2011; Dawn 2016).

By 2010, normalcy had returned to the region after fierce fighting between the Pakistani army and the Taliban. However, extreme monsoon rainfalls brought one of the worst floods on record to the Indus plains, devastating the economy and social life along the Indus River and its tributaries. Almost 20 million people, 2.1 million hectares of land and 1.5 million livestock were affected. Throughout Pakistan, 78 of the country's 141 districts recorded losses, with those of KPK declared the most severe (NDMA 2011). As such, ten of the Province's 24 Districts were reported as 'severely' affected by the flood (ibid).

The flooding progressed as headwaters of main rivers in KPK recorded severe rainfalls in late July 2010, with the Saidu Sharif Meteorological Station in Swat recording 338 mm of precipitation in the last four days of the month (Rahman and Khan 2013), which is roughly three times the average as recorded between 2006 and 2017 (Pakistan Meteorological Department). When the 2010 flood hit, Swat was already in a precarious situation having yet to recover from the recent war's end. In context, the Sustainable Development Policy Institute had ranked the District in KPK among the top five on the Multidimensional Poverty Index¹ just prior to the flood event (Naveed and Ali 2012). The complex situation in Swat resulted in widespread losses from the flood. The District recorded the highest number of displaced persons (101,220) in KPK with some 350,000 residents cut off from the rest of the nation. Similarly, the District recorded the second-highest death toll in the province with 95 fatalities and twice as many injuries (Khan and Mohmand 2011). In Swat, twelve major bridges and countless roads were damaged with widespread destruction of agricultural lands, which further undermined local residents' ability to recover from the earlier period of conflict (Nyborg et al. 2012).

In this paper, we intentionally focus on one single extreme event, namely the devastating flood of 2010, to tease out the linkages between conflict, deforestation, systemic

vulnerabilities and impacts on livelihoods. Although this single event does not provide evidence of climate change, the intensity and severity of flooding in this part of Pakistan, including the damaging 2020 flood, signal conditions in the local environment that will continue to plague the region (Rahman and Shaw 2017; NDMA 2020).

Following the narrative above, the confluence of vulnerabilities and stressors acting within and upon Swat has led to a complex landscape of risk. Key stressors including conflict and deforestation have interacted with pre-existing vulnerabilities resulting in heightened levels of susceptibility after the war. These vulnerabilities, along with those emerging post-conflict, then provided the setting for the devastating flood in 2010. The occurrence of this extreme event followed by a convergence of systemic and emerging vulnerabilities embodies the high-risk environment that is Swat and provides the context for our research (Fig. 1).

Methodology

Data collection

Data was collected in Swat with a first fieldwork season in June–September 2017 and a second from July 2018 to January 2019. The first phase allowed for a careful selection of communities from three distinct administrative units (*Tehsils*), based on increasing distance from the centre of Taliban influence in the region. All three communities—here referred to as C1, C2 and C3 (see Table 1)—were affected by the 2010 flood along the Swat River. During this phase, twelve key informant interviews were conducted involving government officials from the agricultural extension and forest departments, local political figures, NGOs, journalists, academics and community activists ($n=2$ per category). Interviewees were between 30 and 60 years of age, all male, and had provided consent to participate in the study following the University of Western Australia's human ethics protocol (RA/4/1/9073). These participants were identified through institutional ties, with an aim to target those who had intimate knowledge of and a historic perspective on the Taliban insurgency, and had worked in the region after the flood of 2010. Interviews were conducted at the participant's place of employment or domicile, in Urdu, and lasted between 60 and 120 min. They were guided by semi-structured questions focused on the flood, conflict and deforestation as well as the impact of each on rural livelihoods.

During the second fieldwork phase, focus group discussions and surveys (Bernard 2012; Patton 2002) with residents of the three communities (C1-C3) were conducted to obtain more nuanced insights into lived experiences and impacts

¹ (depth and breadth of poverty)

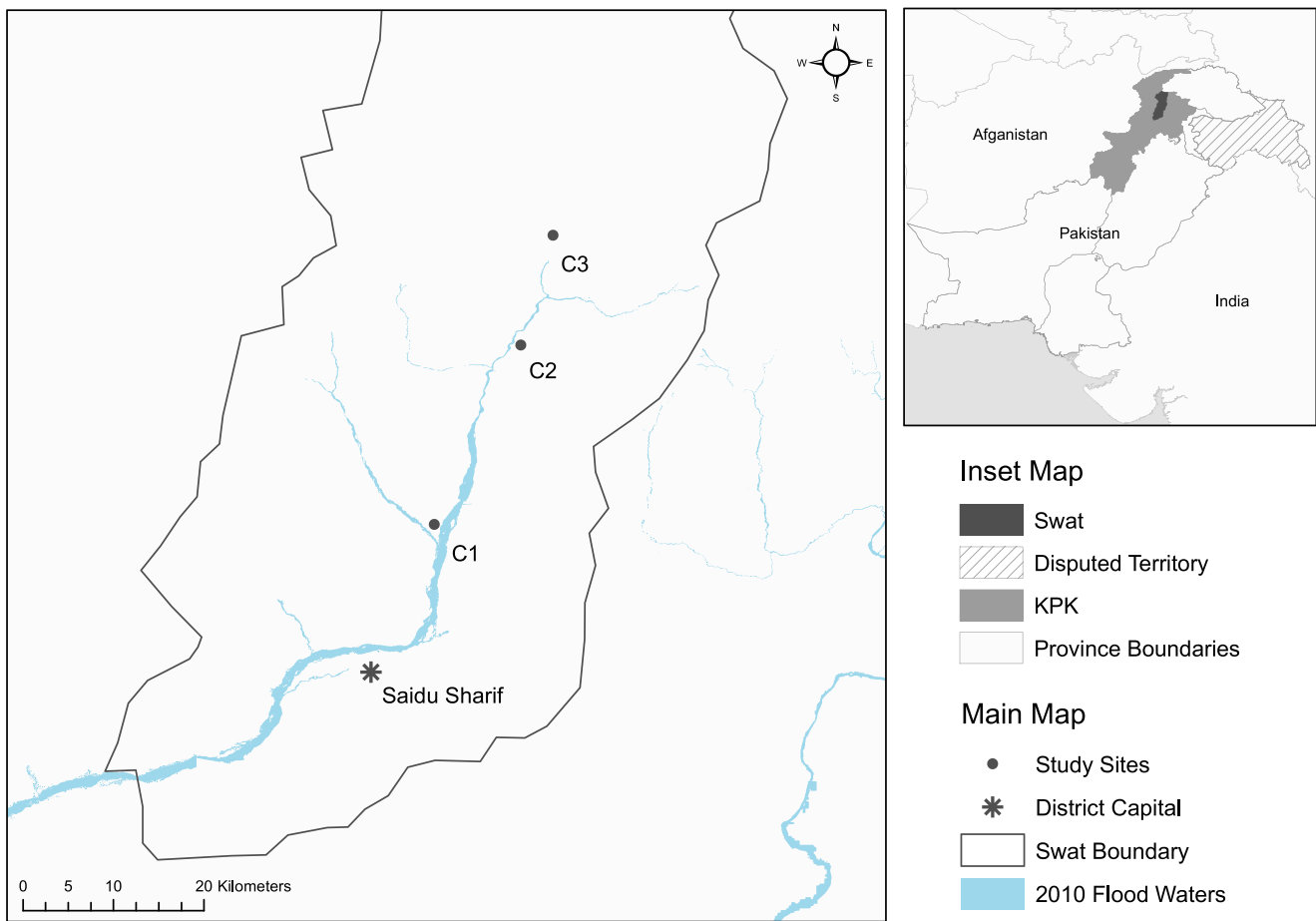


Fig. 1 The research location of Swat in Khyber-Pakhtunkhwa Province

from conflict and flooding on rural livelihoods. Community leaders identified previously provided community lists that served as a basis for selecting survey participants. Stratified sampling based on discussions with the community leaders was used to target participants across three levels of socio-economic status. In total, 108 households (36 per community) were interviewed in an oral, face-to-face manner, given high illiteracy rates. The survey consisted of 34 questions, covering topics ranging from the types and impacts of multiple stressors, including conflict, and the subsequent effects on livelihoods. All survey-based interviews were conducted in

Urdu with the help of three enumerators, trained for two days prior to data collection, and in the local dialects of Pashtu and Torwali, where appropriate. They took place in the study communities and extended for 45 to 60 min. Following local customs and traditions, interviews were conducted with the male head of household; if unavailable, an appropriate senior male member of the household (aged 25–100) was invited to participate. The authors concede an inevitably male bias in participant responses.

Finally, three focus group discussions were conducted, with the help of community leaders identified in Phase One,

Table 1 Community parameters

	C1	C2	C3
Location	Lower Swat near district headquarters (rural-urban interface)	Transition between Lower and Upper Swat (rural), partially relocated after the flood (2010)	Upper Swat (rural-urban interface)
Tehsil (all near the River Swat)	Matta	Khuwazkail	Bahrain
Proximity to forest	No	Yes	Yes
Native languages	Pashtu	Pashtu	Kohistani, Pashtu
Past violence	High	Medium	Low

four weeks after the surveys, with six to nine participants per community. Focus group participation did not succumb to repeated sampling, except in one instance, and again targeted individuals directly or indirectly affected by both conflict and the flood. The groups consisted of farmers, small shopkeepers, community school teachers, handymen/labourers, merchants and youth (again all men), representing a cross-section of socio-economic status and livelihoods. Themes revolved around the impact of key stressors, community livelihoods, coping capacities and barriers to risk reduction of future stressors, particularly in the context of conflict. Focus group discussions lasted between 60 and 90 min and were conducted in Pashtu and Torwali, again with the help of enumerators, with one leading the discussion and others taking notes. All conversations were audio-recorded, with consent, transcribed by the enumerators and translated into Urdu.

Data analysis

Quantitative data generated through the surveys were analysed with the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics provided for an examination of frequencies, percentages, means and standard deviations (Bernard 2012). Analysis of qualitative data generated through the focus group discussions and key informant interviews involved transcription and translation of field notes and audio recordings, identification of themes and sub-themes, rigorous coding and triangulation with key questions (Guest et al. 2011; Braun and Clarke 2006), using Alas.ti version 8.4.15.

Results

To provide context to the landscape of vulnerability in post-conflict Swat, we begin with an account of the Taliban upheaval and historic land disputes providing a background to conflict in the region. We then describe how deforestation, directly linked to conflict in Swat, heightened exposure to flooding, as narrated by key informants. Next, we introduce the concepts of key stressors and vulnerabilities (research question 1) followed by a discussion of the impacts on livelihoods resulting from conflict and flooding (research question 2). This is then followed by an examination of the barriers to risk reduction in relation to future stressors (research question 3).

Vulnerability landscape of post-conflict Swat

Swat was a semi-autonomous princely state until 1969. The conflict in Swat has roots in the inter-connected historic, political, religious, and socioeconomic characteristics of the region brought to light after the merger of Swat with Pakistan in 1969. In the post-merger period, the government of Pakistan

declared all forested lands as state property (designated as protected forests), although they were previously managed by local landowners according to local customs (*rivaj*). Ownership disputes between the state and local communities resulted in turmoil across the valley. All key informants highlighted that land disputes were one of the main reasons behind the rise of militancy (the Taliban insurgency) in Swat. Though previous landowners were given some rights in forest use and shares in the sale of timber (royalty), the state's forest management continued to be criticized and the forests deteriorated rapidly.

Over time, land disputes became further aggravated after the establishment (later burned in protest) of local schools by the KPK government, in the 1980s, in an attempt to boost literacy in the region. Influential people (*Khuwanins*) endowed lands on which to build schools in exchange for job entitlements for their people in the new schools. However, in the early 1990s, the supreme court of Pakistan ruled against these entitlements and declared the arrangement discriminatory—a decision that exacerbated resentments among the people of Swat.

(.....) before that there was peace and *Khuwanins* and locals were happy. Local people found jobs as watchmen and religious teachers through their *Khuwanin*. But after the decision of the court, ousted religious teachers (Mullahs) and expelled watchmen poisoned the minds of their *Khuwanins* and allegedly burnt the schools. The foundation of Tehreek-e-Nafizay Sharia Muhammad (TNSM²) had been laid down 'at the lawn' of the commissioner's office of the Malakand Division between 1992 and 94 with twenty-nine members. Among them were influential people i.e. *Khuwanins* who gave their lands. Most of the members/leaders of Tehreek Taliban Pakistan (TTP) were the off-springs/relatives of members/leaders of TNSM (key informant).

After 9/11, the USA declared 'war on terror', and a shift in policy took place in Pakistan with federally administered tribal areas (FATA) becoming the front line, with Swat at the forefront. The religious schools (*madrassa*), including those of TNSM, had been earlier promoted to defeat the USSR in Afghanistan and became the focus of the government's more recent crack-down. At that time, the supreme leader of TNSM, Sufi Muhammad, went to Afghanistan with hundreds of his students to fight alongside the Afghan Taliban. The government of Pakistan later arrested him, and his son-in-law, Mulla Fazal ullah, took control of TNSM. In 2007, Mulla Fazal ullah joined TTP³ as head

² Tehreek-e-Nafizay Sharia Muhammad (TNSM) provided ideological inspiration to the Afghan Taliban in 1990 and the organisation was strongly allied with the Afghan Taliban.

³ TTP was an alliance of various militant groups (Rome 2011).

(Ameer) of its Swat faction. Herein, the Taliban and TNSM became one and the same.

The Taliban, under the leadership of Mulla Fazal ullah, started airing propaganda on an illegal FM radio station. This platform cultivated unresolved social issues, including forest and land disputes, and criticized the expensive and slow judiciary system as well as shortcomings in health care, education and employment. When a following developed, the Taliban openly challenged the writ of the government, mainly through the burning of schools (especially female schools) and attacking police stations. Historic disputes over access to land and forests in the region, and decades of grievances, provided a foundation for the Taliban insurgency in Swat. The Taliban began ordering residents to donate to the construction of their offices (*markaz*). All sections of society gave donations and provided accommodation, food and money, in return for quick resolution of their land disputes. The government of Pakistan started military operations in 2007 to re-establish its control over the region which displaced tens of thousands of people to adjoining districts. Consequently, the government regained control of Swat in 2009, completely ousting the Taliban, after a series of vicious battles.

Flooding, conflict, deforestation and vulnerability

The conflict in Swat severely affected the lives of local people and intensified deforestation in the region, which in turn exacerbated the impacts of the 2010 flood. Together, these three aspects (conflict, deforestation and flood) constituted key stressors that, following the IPCC definition, are best understood as ‘events and trends, often not climate-related, that have an important effect on the system exposed and can increase vulnerability to climate-related risk’ (Oppenheimer et al. 2014, p. 1048). Here, vulnerability is defined as ‘the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt’ (ibid). Indeed, key stressors identified by our study participants intersect with systemic vulnerabilities, pre-existing and emerging from the conflict and extreme flooding event, to produce the current high-risk environment (Fig. 2). As such, we analyse how changing circumstances due to the conflict and flood have in turn amplified the vulnerabilities of local residents.

To further explain the relationship between key stressors and vulnerabilities in the region, we draw on key informant interviews and focus group discussions in the narrative below.

In the first instance, all key informants and focus group participants drew attention to forest degradation under the Taliban, with land disputes magnifying vulnerability. In Swat, hundreds of square kilometres of land were deforested by the timber mafia. Illegal loggers financed the Taliban to sustain their arsenal through extracting timber. The Taliban also allowed locals to cut trees in exchange for a commission, although often not without coercion, as explained by a key informant:

I was threatened by the Taliban when I denied to give them a share of woodlot harvested under the judicious utilization policy. I was a member of the JFC (Joint Forest Committee), we did marking for tree cutting as planned. The Taliban gave me a call and demanded *Ushur* (taxes sanctioned by Islamic law) and, in case of disobedience, threatened to burn the forest completely.

The conflict also damaged ecosystems, biodiversity and air quality as security forces targeted the forests with Taliban hide-outs and training camps. Participants reported dense smoke and widespread forest fires having caused collateral damage while heavy artillery aggravated air pollution levels causing negative health effects, in addition to destroying crops and orchards. One interviewee explained:

Ammunition was another factor in addition to deforestation for the changing climate. You cannot imagine how many operations were led by security forces in this area. The side effects of these operations are now observable. There is low production of crops with change in growth periods. Rain, drought and everything has reached severe levels.

The focus group discussions provided additional details (although not always empirically substantiated):

The war left very bad impacts on the environment. We had never seen cannon shells, mortars and gunship missiles before, but all these weapons were used at the time of the war. The temperature has increased due to the use

Fig. 2 Interactions between stressors and vulnerabilities (■ = high risk, □ = low risk). G = government officer | N = NGO member | J = journalist | A = academic | P = politician | C = community activist

	Vulnerability aspects	Land ownership disputes	Illiteracy	Encroachment	Population/urbanisation	Poverty/unemployment	Extremism	Water-/food-insecurity	Corruption
		G N J A P C	G N J A P C	G N J A P C	G N J A P C	G N J A P C	G N J A P C	G N J A P C	
Key stressors	Flood of 2010	■		■	■			■	
	Conflict	■	■			■	■		
	Deforestation	■		■	■	■			

of ammunition effecting crop production. Now, crop diseases have become common.

The forests of Swat suffered too much due to the war. The forests were targeted specifically and we saw fire many times with smoke emissions. The army considered these forest areas as safe havens of the Taliban and used indiscriminate shelling which damaged the forest. The smell of gun powder polluted our environment. The environmental pollution due to heavy bombing also created health problems for the local people, i.e. skin diseases, eye infections and cancer.

However, participants in the three communities that were part of this study cited an even larger cast of actors responsible for over 20 years of deforestation, with the State Forest Department, forest-dependent communities, and illegal loggers (timber mafia) as the main culprits, according to community members across the three sites (~40–80%), with few significant differences. In comparison, the Taliban's role was considered less detrimental (~40–50%).

Although the causal link between deforestation and climate change as identified by a number of study participants has not been empirically justified, the role of deforestation in magnifying the impacts of flooding has been established in a number of instances (e.g. Bradshaw et al. 2007; Cedar 2011). As such, the extensive deforestation in the region triggered massive destruction from landslides during the 2010 flood, further intensifying the force of flood waters. Focus group participants acknowledged the value of forests in flood mitigation, preventing soil erosion while regulating the flow of flood waters. Echoed by key informants, deforestation was identified as one of the reasons for the devastating impacts and damage associated with the 2010 flood. Areas with intact forests experienced less flood damage, as explained:

In our area, there had been thick forests and we had intact soil which prevented the risk of flooding, therefore we never before had a flood like in 2010. But the continued deforestation over decades, and especially in later years from 2006-2007 (the Taliban era), ultimately brought about high risk, with the worst kind of flood in 2010 (focus group participant in C3).

In the near future, as anticipated by a man in C2, “there will be double loss ... even with half the intensity of the 2010 flood. Because the new forest cover that is the first line of defence against the flow of water will not yet have recovered, it is still immature”.

However, not all key informants agreed with the connection between deforestation and the severity of the 2010 flood. One politician argued that forest cover in KPK had increased compared to other provinces, when measured as the ratio of

deforestation to plantation lands. One NGO member spoke of the suffering of forested areas due to trees uprooted by the flood, creating blockages that diverted water to settlements and caused havoc for the people. However, one academic identified benefits from the flood, declaring that “people caught the wood from the water and used it for making their homes. Those who were homeless became home owners”.

Our results further illustrate how community members understood deforestation and climate change as confounding elements in the 2010 flood. When asked whether climate change was responsible for the flood, the majority answered affirmatively (66.6%, 83.3% and 88.8% in C1, C2 and C3, respectively). When asked if they believed that deforestation over the previous 15 to 20 years had been responsible for climate change, an even larger percentage declared that it had (72.2%, 91.6% and 97.2%, respectively). The above highlights a perception that deforestation was a driver of increased flood risk in the valley, but also a driver of change even though the latter has not been empirically substantiated. Interviewees also pointed to illegal encroachment (i.e. for hotels) and clearcutting (to increase line of sight) along the Swat River, as additional reasons for mass deforestation and aggravated flood impacts (details in the barriers section).

Key stressors, vulnerability and livelihoods

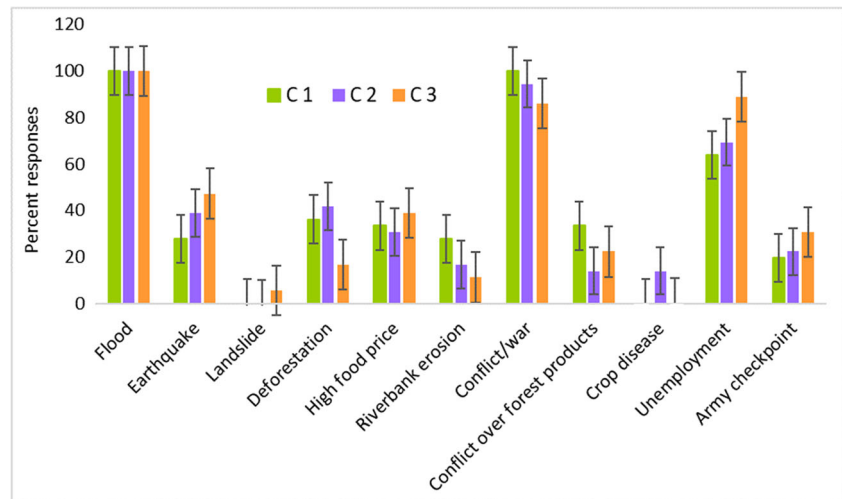
Interviewees identified a range of pressures and vulnerabilities affecting local livelihoods in Swat (Fig. 3). These include the three key stressors discussed above alongside a range of systemic vulnerabilities including conflict over natural resources, the high price of goods and multidimensional poverty, including unemployment. These key stressors and vulnerabilities intersect to affect the quality of life and rural livelihoods in Swat. More specifically, the 2010 flood, conflict (mirroring differential levels of violence as listed in Table 1), and unemployment emerged as the three most destabilizing factors. In the case of unemployment, the people of hilly Upper Swat suffered more as a result of confinement to their homes due to curfews and were often unable to work.

One single stressor in itself, or the confluence of two or more stressors (in this case flooding and conflict), had detrimental effects on the livelihoods of the people of Swat:

The flood which passed through the agricultural fields, we still see the signs. It brought toxins which stopped the growth of crops and farmers are unable to cultivate crops. Even the trouts are suffering from diseases and now people prefer not to eat this nutritious food (journalist).

Our people became homeless as a result of the flood. They already had been facing disastrous circumstances

Fig. 3 Pressures (key stressors and aspects of systemic vulnerability) eroding household livelihoods in the three study communities ($n = 36$, in C1, C2 and C3, respectively)



due to the war with the Taliban. The flood further repressed them (NGO member).

However, the direct link between stressors and livelihoods is often more nuanced. For example, a number of key informants suggested that increased exposure through the illegal encroachment of hotels, farms and houses had significantly increased the impacts of the flood, with pronounced influences on livelihoods in Swat:

The losses were not only due to the naturally occurring calamity (flood). People who encroached on the river with their illegal structures were also responsible for their devastation. When these constructions fall due to flooding, they create a blockage in flow of water that ultimately builds up a pressure. This pressure created mayhem all along the river and even changed its direction (academic).

Flooding and a change in direction of the river devastated agricultural crops and forestlands. The majority of standing crops were washed away and resulted in acute food insecurities (often through high food prices). Flood losses were especially severe in the hilly areas of Upper Swat where irreversible damages were reported due to permanent loss of land as a result of landslides and riverbank erosion. People did not have vast landholdings in these areas with cultivation occurring in close proximity to the banks of the river.

Interviewees also noted aspects of vulnerability that had increased or were exploited by the Taliban, including poverty, unemployment, food insecurity, displacement, unplanned urbanisation, illiteracy and extremism, all eroding local livelihoods. For example, most interviewees identified that migration from rural to urban areas, due to unemployment and poverty, caused haphazard expansion of cities and towns and had created problems for the government in providing basic necessities, i.e. drinking water, education and health facilities. In

addition, this influx of population resulted in a strain on livelihood options which the Taliban exploited, steering the local youth down a path of militancy:

The youth were a soft target for the Taliban to feed their ideas. The Taliban took advantage of this situation and made them ready for conflict in exchange of monetary incentives (community activist).

During the conflict, parents had no control over their young children. There was vast poverty and enormous unemployment at that time. The youth were attracted to the movement of the Taliban who persuaded them to follow their agenda in the name of religion, and were provided with the privilege of authority and monetary benefits (focus group participant in C1).

Lack of education, often identified as an indicator of vulnerability (Cutter et al. 2003), was preyed upon by the Taliban magnifying the conflict's impact on household livelihoods. For example, one NGO member commented:

My driver came to me and shared fears about his illiterate wife who was drawn to the extremist agenda disseminated through illegal radio stations run by the Taliban. The driver told me that his wife donated all their precious household items, including jewellery, to support the Taliban's movement. Then, she tried to undermine his job (as he was driving for an NGO and the Taliban were against NGOs). His wife had intended to kill him if he did not leave the job, and she even showed an interest in being a suicide bomber. Later, she was treated to return from the mental trap set by the Taliban.

Further, with the end of the conflict, internally displaced persons (IDPs) began moving back into the region. Many ad-hoc restoration and rehabilitation activities took place which

increased the purchasing power of local residents, according to one governmental employee, but, as stated by one community activist, left many no better off once the economic stimulus was over.

However, this relationship between conflict, vulnerability and livelihoods is not always unidirectional. For example, several government employees, politicians and NGO members described the attenuation of some aspects of vulnerability that enhanced some livelihoods, particularly where the Taliban helped to resolve land disputes unsettled by the formal judicial system. One NGO member commented:

16,000 cases of land disputes were pending in our local courts. The people had been waiting on decisions for over 40-50 years. When the Taliban raised a slogan of quick and affordable justice, the people found it very attractive..... The Taliban decided the matter within days... (but)...The people were bound to agree with their decisions because the Taliban were armed (...).

In addition, some interviewees emphasized the positive effects of flooding, including the accretion of new lands due to changes in the river channel (one academic) as well as a renewed fertility of agricultural lands (one community activist):

[...] after eight years, you will not see any effects of the flood because the people have recovered. In my point of view there is no negative effect of floods as floods and flood waters bring fertile cover for the land. The year after the flood we had a huge production of cereals. We had an excellent production of sugarcane. The flood improved the condition of riverine forests in the plain areas of the Punjab Province [...] (government official).

Barriers to risk reduction

The above illustrates the intersection between vulnerability and flooding, conflict and deforestation and how this confluence has magnified risk and affected rural livelihoods in Swat. In a similar vein, efforts to reduce risk and exposure to key

stressors have faced a number of barriers. Figure 4 depicts the top barriers to risk reduction, as discussed by key informants.

In the first instance, the poor security situation and extremism emerged as barriers directly or indirectly linked to conflict (in blue, Fig. 4). All interviewees commented that the political turmoil after 9/11 became the main priority of the State, which left public life largely un-administered (Waseem 2011). The Pakistani security forces were focused on fighting the Taliban and, with police driven from the region, illegal logging could not be stopped. The poor security situation forced many international organisations to leave the area, undoing previous gains in flood mitigation, and biodiversity and forest conservation. Even after the end of the military operations, the government made it difficult for organisations to resume their previous directives due to ongoing security concerns. One focus group participant stated: “There was no writ of the government during the war. Everything was under the control of the Taliban. Officials from the forest department ran away to save their lives at that time”.

Extremism may also be interpreted as an indirect barrier to reduce future risks associated with floods. For example, women’s lack of free access to markets for shopping (without legal escorts) was highlighted as an impediment to effective action during and after the flood (journalist). Furthermore, the rigid behaviour of religious men (*Mullahs*), claiming everything that happens is an act of Allah (God), concedes little worry to floods and climatic extremes (politician, NGO member) and can be construed as a catalyst for inaction. The role of religious men dispelling scientific phenomena has remained relevant in both the pre- and the post-conflict context of Swat.

More specifically, one focus group participant stated that “the Mullah sermons favour capitalists and influential people. These people cut trees and the Mullahs declare climate change and disasters as a curse by God”. These religious men seldom preach, in Friday sermons, that tree plantations are an everlasting charity in Islam. In fact, religious clerics and their teachings can be a solution to these problems, but, unfortunately, the lack of wisdom in religious and scientific knowledge has become an obstacle to risk reduction efforts. Given the strong communication networks and many followers of these religious leaders, several interviewees suggested that

Fig. 4 Barriers to reduce risk associated with exposure to future stressors (blue = barriers related to conflict; brown = barriers related to flooding)

Barriers to risk reduction	Journalist (n=2)	Politician (n=2)	Government officer (n=2)	NGO member (n=2)	Academic (n=2)	Community activist (n=2)
Poor security situation	●	●	●	●	●	●
Extremism	●	●	●	●	-	-
Lack of awareness	●	●	●	●	●	●
Lack of implementation	●	●	-	●	-	●
Exclusion of local voices	●	●	●	●	●	●
Corruption	-	●	-	-	●	●
Encroachment	●	-	●	●	●	●

the Mullahs should be recognised as a valuable conduit for risk reduction messaging.

Further, lack of awareness, limited implementation of mitigation measures, exclusion of local knowledge and opinions, corruption and encroachment on protective vegetation were also identified as barriers to risk reduction (in brown, Fig. 4). Illegal construction to improve panoramic views and removal of vegetation within the flood plain made the 2010 flood more ferocious, increasing the rate and volume of water runoff in the Swat River. The violation of numerous development regulations was seen as an impediment to effective flood mitigation measures, by several participants. The local authorities were identified as responsible for lack of awareness and failed implementation of laws regarding construction near the river. In addition, gravel and sand harvesting from the river bed for use in the illegal construction of houses has gone unchecked, with residents all but ignoring lessons learned from the 2010 flood.

Opinions were split regarding the use of protection walls and embankments to reduce flood risks along the Swat River. While constituting potentially powerful engineering solutions, their construction nonetheless invites improper management and corruption. Encroachment of land with high commercial value under the guise of safety has become common, with contractors being cited for poor quality work during the construction of embankments.

Remarks from two focus group participants reinforced the arguments put forth by key informants concerning barriers to reducing flood risk:

We had been humiliated in the name of aid provided after the 2010. The quality of work in construction of protection walls was not good, they used low quality material which cannot stand up to the intensity of floods.

The responsibility lies on the part of the government as well as the community. If I make a house near the river, it is my fault. However, I will construct my home along the river if I do not have alternative land to do so. There should be mechanisms by the government to stop me from constructing my home there.

Discussion

This study highlights the role of the Taliban and conflict in magnifying the impacts of the 2010 flood in Swat, Pakistan. By focusing on one single yet devastating flood event, we have shown how the Taliban and counter-insurgency operations contributed to environmental degradation (deforestation, decline in crop production and air pollution followed by health problems) which exacerbated flood impacts and further

increased the already high vulnerability of local populations. We make inference and seek justification for our findings in the IPCC AR5, specifically Chapter 13 ‘Livelihoods and poverty’ (Olsson et al. 2014) which corroborates that, when acting in unison, conflict and underlying social, political, and economic tensions provide space for insurgence, as was the case in Swat. However, we advance this understanding by establishing a link between conflict (armed and terrorism) and extreme climatic events (the 2010 flood) and highlight how people’s systemic vulnerabilities were amplified through direct and indirect erosion of rural livelihoods.

Furthermore, our work contributes to this growing body of knowledge by shedding light on how environmental impacts such as deforestation (caused by conflict) can exacerbate the impacts of climate change. As identified, there is limited consensus concerning the link between incremental and rapid-onset climate change and conflict (e.g. Karna et al. 2010; Westing 2011, 2013; Gleick 2014; Theisen 2017; Selby et al. 2017; Froese and Schilling 2019). For example, the IPCC’s Special Report on Global Warming of 1.5 °C (2018, p. 245) highlights the inconsistent links between climate change, migration and conflict and warns that a warming of 2–4 °C could increase the risk of conflict. The body of literature has been largely unidirectional while overlooking how conflict can magnify the adverse impacts of climate change, particularly conflict in the form of terrorism. Recently, Mach et al. (2019) assessed the relations between climate change and conflict and described the former as a low-level driver of conflict with other socio-economic factors proving a greater impetus.

Our study in Swat, Pakistan, is among a few illustrating how conflict (in our case through the Taliban insurgency) can indeed heighten the devastation of extreme climatic events—in this case resulting in flooding—through indirect consequences such as land ownership disputes and environmental degradation, as extensive deforestation (before and during the conflict) combined with fires from heavy artillery caused irreparable damage to the region’s forests. Land cover change and loss of vegetation from fire have been identified as key drivers of increased runoff (Doerr et al. 2000), thereby exacerbating damage from flooding. We have found this relationship also reflected in the on-the-ground experiences of our study participants.

An underestimated aspect of conflict has been the impact of munitions on the environment. Exploding ordinances have implications on air and water quality and reduce vegetation cover in both forests and on agricultural lands. The effects of bombing and artillery on agricultural land have threatened food security in our study area, also identified by others (e.g. Suleri et al. 2016). The impacts of exploding ordinances on land, air, and water are well documented (Al-Shishani 2006; Baral and Heinen 2005; Eniang et al. 2007) with similar effects identified in Iraq and Afghanistan (Crawford et al. 2011).

Further, we have demonstrated how systemic vulnerabilities and those amplified through the conflict and the flood in Swat have become barriers in reducing exposure to further stressors. Easily overlooked were the relaxed land-use planning in the region and the encroachment on the Swat River during the period of Taliban control. During this period, not only was the state unable to enforce land use planning laws but it was also incapable of promoting forest conservation. As other studies have shown, institutional frameworks and governance structures are extremely important for conserving natural resources, particularly in the context of conflict (Baral and Heinen 2005; McNeely 2003; Allnut et al. 2013). Funding cuts exacerbated the state's inability to uphold conservation efforts. This is comparable to past situations in Ethiopia and the USA where conflict (including the war on terror) had compelled the respective state to reduce forest conservation budgets and increase allocations for military expenditures (Michael et al. 1992; Daly 2008). Similarly, the failure in environmental governance, limited resources for environmental protection and a general lack of information, as reported by Solomon et al. (2018), confounded the environmental impacts of the war in the Horn of Africa.

In passing, our findings reveal the complicity of (some) religious leaders and cultural norms as barriers to risk reduction. The role of *Mullahs* as a barrier to reducing risks associated with climate-related stressors calls into question the current emphasis on mainstreaming mitigation and risk reduction strategies through religion when, in the case of strict religious teachings, there may be limited tolerance of new or outside views. This is in contrast to studies that have shown the importance of religion in supporting risk reduction efforts (Hope and Jones 2014; Schuman et al. 2018).

Finally, this study expands upon existing climate-conflict scholarship through an in-depth analysis of the current context and historic background of ownership disputes in Swat. The dynamic politics of the region resulted in unequal access to resources and reinforced pre-existing political and social vulnerabilities (including contested powers), creating space for conflict. Previously, Taylor (2014), using a political ecology lens, had scrutinised the Pakistani government's technology-driven approach to climate change adaptation, including hydrological engineering of the Indus River watershed. This important analysis, however, overlooked other equally relevant dynamics that came to shape the political climate of the region, namely armed conflict. Here, we have attempted to address this lacuna by highlighting the role of conflict in exacerbating impacts from an extreme event which, to date, has received limited attention (see Mach et al. 2019). To this end, our work provides an important next step in laying the foundation for future research into the role of conflict and extreme climatic events as well as slow emergencies and widening the narrow narrative of climate change as a catalyst for conflict.

Conclusion

We have examined the intersection of conflict, deforestation, vulnerability and the flood of 2010 as an extreme climatic event and how this confluence had affected the rural livelihoods and coping capacities of three communities in Swat, Pakistan. As such, this paper provides a novel contribution to the climate-conflict nexus by directly linking deforestation (caused by conflict) with the magnification of flood impacts in Swat. Although Mach et al. (2019) acknowledge climate change as a low-risk driver of conflict, the mechanisms by which conflict exacerbates climate change impacts remain poorly understood. To this end, our findings show that risk reduction cannot be effective without first understanding the social, economic and political histories and entrenched vulnerabilities of a place. In the case of Swat, these histories provided a platform from which the Taliban insurgency evolved and, in turn, heightened the systemic vulnerabilities in the region. We conclude that understanding the complex historical and political context of a place is a prerequisite for informing climate change policy that enhances livelihoods, wellbeing and governance while reducing systemic vulnerabilities and strengthening adaptive strategies in anticipation of future crises.

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