



**Universiteit Utrecht**

# **Enhancing Children Resilience Through Climate Change Education in Pakistan**

**Perspectives of Indigenous Torwali Community Primary School Teachers**

Master thesis International Development Studies

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July 2024

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## Abstract

Education is a crucial resource to combat climate change. Climate change education provides the right knowledge, skills and tools to address the climate crisis. Integrating climate change education in formal education raises awareness among children, educate children to become climate advocates and minimize children vulnerability to the impacts of climate change. However, research on understanding of climate change education and role of education is limited in regard to raise awareness among children, educate children to become climate advocates and minimize children vulnerability to the impacts of climate change. The main objective of this research is to explore the perspectives of primary school teachers from Torwali indigenous community in Pakistan on climate change education and how they prepare indigenous Torwali children against climate change, enabling children resilience. Indigenous people and children are often disproportionately affected by the impacts of climate change. This study thus unfolds the vulnerability of indigenous children to the impacts of climate change and how climate change education can enhance resilience among Torwali children in Pakistan. The data collected from in-depth semi structured interviews is analyzed through the lens child ecology theory. Child ecology theory is employed to unfold the role of climate change education in addressing climate change, enhancing children resilience in the face of climate crisis and enabling children as an agent of change in climate change. The findings reveal Torwali children's vulnerability to climate change by highlighting floods disaster, land sliding and avalanches occurring in the region. Secondly, the findings indicate the role of education and climate change education specifically in addressing climate change. Finally, the findings suggest climate change education can play an integral role in enhancing children's resilience by providing them the right knowledge and skills to cope with climate change.

## Key Words

Climate change education, indigenous people, children, climate change, child ecology, children resilience, Torwali, Pakistan

## Acknowledgements

First and foremost, I would like to thank my supervisor Dr. Bishwajit Mallick for his generous support, guidance and advice. Thank you Bishwajit for believing in me.

Secondly, I would like to thank Dr. Mucahid Bayrak for the initial discussions on navigating my research interests and picking a research topic for the master thesis. Thank you, Muca, for your support in navigating this research topic.

I would like to express my gratitude to the participants from Torwali community who participated in this research. I am grateful for their time to take part in this study. Their insights have been a learning experience for me as well. And this research would not have been possible without their generous time.

I would also like to thank my classmates at Utrecht who provided their reflections while writing this thesis. Their feedback and insights have been of great support.

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## Introduction

Climate change has severe adverse effects to the world and South Asian countries are highly vulnerable to climate change. Recent data taken over the last 25 years reveals an increase in temperatures at a rate of 0.19 degree Celsius per decade which is associated with a rise in CO<sub>2</sub> emissions. These emissions were 40 percent higher in 2008 compared to 1990 (Allison et al, 2009; Ullah et al., 2018). Similarly, Marcott et al., (2013) study shows a significant warming of the world during the last 1500 years.

Common people in South Asian countries specifically Pakistan have very low awareness on adaptation and mitigation to cope with adverse effects of climate change which makes them extremely vulnerable to climate change impacts (Ullah et al., 2018). Pakistan is one of the South Asian countries with high vulnerability to climate change impacts such as droughts, floods, health problems, increased temperatures, and seasonal variation (Hussain et al., 2018). It is expected that the country will experience higher temperatures compared to the global average because of its geographic position (Ullah et al., 2018). Recent studies show that there has been an increase in the number of climate induced events that result in floods, extreme temperatures, droughts and storms (Atta-Ur-Rahman & Shaw, 2015). Floods, droughts and cyclones have recently become more severe and frequent in South Asia and in Pakistan specifically due to climate change. The 2010 floods in Pakistan were the worst in South Asia since 1929 which affected more than 20 million people in the country (Oxfam, 2009). This vulnerability to climate change has severely threatened Pakistan's food, water and energy security (Ullah et al., 2018).

South Asian countries and Pakistan in particular already face numerous socio economic challenges including poverty, hunger, inequality and health. Climate change is likely to worsen these challenges faced by Pakistan (Mbah et al., 2022). Pakistan is highly prone to the adverse impact of climate change and has been ranked fifth in 2015 by Aqueduct Global Flood Risk Rankings (WRI, 2015). Urgent actions are needed to respond to the looming threat of climate change.

Agenda 2030 for Sustainable Development appeals to address the adverse impacts of climate change. The 17 Sustainable Development Goals (SDGs) constitute the 2030 Agenda which seeks to transform the planet to a sustainable and equitable future. (UN, 2015). Target 13.3 of goal 13 of SDGs highlights the need to 'improve education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning' (UN, 2015). The crucial role of education to address climate change has also been highlighted in Article 6 of United Nations Framework Convention on Climate Change (UNFCCC) and in Article 12 of Paris Agreement with emphasis on promoting climate change education (UNFCCC, 2015; Mbah et al., 2022).

Similar to other South Asian Countries, Pakistan endorses the role of education to address climate change challenges and aid climate change adaptation (Mbah et al., 2022; Atta-Ur-Rahman & Shaw, 2015). Pakistan has pledged to include climate change education (CCE) across all levels of its formal education sector and incorporate CCE in secondary and tertiary education curricula by 2030 (GOP, 2021; Mbah et al., 2022).

Similarly, Hyogo Framework for Action (HFA) 2005-2015 aims to reduce the disaster risks and has provided a framework for different actors in achieving that. A total number of 162 countries have adopted HFA in 2005 and Pakistan is one of the signatories. Priority action 3 of HFA emphasizes the role of knowledge, innovation and education in reducing disaster risks through formal, non-formal education and awareness raising (Atta-Ur-Rahman & Shaw, 2015; Zhou et al., 2014).

Zhou et al., (2014) argue the gaps in the provision of knowledge, education and innovation to reduce disaster risks and stress on the importance of integrating disaster resilience education.

The government of Pakistan following HFA 2005-2015 has adopted climate change policy in 2012 which established the need for disaster and climate change education. The policy also stresses the development of certain curricula with more emphasis on disaster and climate change and introducing such curricula in the education system at all levels.

In the wake of mainstreaming climate literacy, Pakistan's ministry of climate change in partnership with WaterAid has launched Clean Green School Program in the capital city Islamabad to provide action based learning in schools on climate literacy (WaterAid, 2019). Under this initiative, students in schools and colleges are provided with knowledge on climate change, disaster risk reduction and environmentally friendly practices. This program is limited to the capital city only leaving students in the rest of country from climate literacy and climate adaptation (Mbah et al., 2022)

Furthermore, studies related to climate change are primarily dominant in inquiring about the biophysical understanding of climate change and its impact on water, energy and biodiversity over the last two decades (IPCC, 2007). Little work has been conducted on perceptions of individuals beliefs, attitudes and values towards climate change. Perceptions of people towards climate change have recently taken the attention of climate experts and scholars to understand human compliance with climate change (Chaudhary & Bawa, 2011). Numerous studies over the last two decades explored how individuals and communities make sense of climate change in the Global North but there is little research in Global South on climate change perceptions (Vignola et al., 2013; Ullah et al., 2018). Perceptions of individuals and communities on climate change can be considered crucial to environmental problems and their solutions (Weber, 2010). Similarly, people perceptions about climate change in Pakistan is under researched. How people perceive climate

change, how their lives and livelihoods are impacted, and how to cope and adapt to the new reality (Ajani & van der Geest, 2021).

Moreover, adequate environmental and CCE provide the right knowledge to address environmental and climate change problems. Integrating environmental and CCE in the education sector provides awareness, information and conscience to students. CCE is considered fundamental in preparing future citizens with a sense of ecological awareness and environmental problems. Components of effective environmental and CCE such as knowledge and awareness play a crucial role in children behavior towards environment and climate change (Sukma et al., 2020). One of the important aspects of ensuring an effective CCE is teachers (Alagoz & Akman, 2016). Teachers' role in educating children is influential for children to become the future leaders in climate advocacy. Children consider their teachers as role models and thus teachers attitudes and actions related to climate change are important since their behavior influences student's behavior. Furthermore, teachers can be the leaders in CCE because of the multiplier effect of influencing their peers and other school community members with the aim to promote climate informed education to children (Sukma et al., 2020).

Perspectives of indigenous communities on climate change is crucial since indigenous communities are the worst victim of climate change. This situation is alarming for indigenous people living in remote and distant rural geographies. Indigenous communities living in distant mountains geographies have been referred as peripheral communities. Peripheral communities are subject to multiple forms of deprivation. They live at the intersection of multiple disadvantages. They are marginalized and historically neglected which can be reflected in prevalence of poverty, poor health, low literacy and poor infrastructure development (Torwali, 2015)

The impacts of climate change are not the same for everyone and will affect indigenous people disproportionately. Indigenous communities already living at the crossroads of multiple forms of disadvantages because of their distant geographies and historical neglect are more vulnerable to these disproportionate impacts.

Furthermore, children vulnerability to climate change and how integrated climate education can minimize their vulnerability to impacts of climate change and enable them to play an active role of advocacy and leadership in addressing climate change in the future.

Existing studies that documented the perspectives of people related to the impacts of climate change in Pakistan have recorded the perspectives of farmers, fishermen, pastoralists, schoolteachers, community health workers and social workers (Ajani & van der Geest, 2021; Ullah et al., 2018; Qasim et al., 2015)).



Other studies have highlighted role of education and teachers' perspectives on climate change and how they can play an active role in addressing climate change (Sukma et al., 2020; Mochizuki & Bryan, 2015)

This research contributes to the existing scholarship in two ways. Firstly, it records the perspectives of indigenous Torwali community primary school teachers on climate change (education) and secondly how they enhance Torwali children resilience through education amidst extreme climate events.

### Research Question

How do Pakistani primary school teachers prepare Indigenous Torwali children in preparing and coping with climate change through formal education system, and which factors influence this process?

### Sub questions

1. What are the perspectives of primary school teachers on climate change education?
2. What climate change related challenges indigenous children face?
3. How is primary school education teaching these children about these challenges?
4. How does this subsequently contribute to indigenous/inclusive development while simultaneously make children more aware?

## Conceptual/Theoretical Framework and literature review

### Climate Change Impact on Education and Children

Climate change poses an international challenge on a massive scale that the world has not encountered previously. Climate change impacts have implications for food, water and energy security along with peace and stability at both local and global level. The multidimensional nature of climate change needs an interdisciplinary and multifaceted approach for an effective response to address climate change.

A plethora of research on education and climate change is focused on climate change impacts on schooling. Reports by Save the Children (2008) and UNICEF UK (2008) demonstrated that children are highly prone to the impacts of climate change. Increase in extreme weather events such as floods, droughts and heat waves will have direct effects on maintaining educational services to children. Long term impacts of climate change that will be seen in variability in seasons, sea level rise, land loss, desertification, soil erosion may threaten people livelihoods which can influence parents' ability to afford schooling and balanced nutrition for children (UNESCO Bangkok, 2012; Bangay and Blum, 2010).

In the aftermath of recent devastating 2022 floods in Pakistan, 2 million children were not able to access to schools and 27,000 schools were damaged in the country (UNICEF, 2023). Millions of children in Pakistan lost their homes, family members, and access to education and undergone traumatic circumstances. They were left with uncertainty to return to schools, threatening their futures. This has further aggravated the plights of children in Pakistan which has already 22.8 million out of school children and ranked 2<sup>nd</sup> in the world in out of school children (UNICEF, 2024). Similarly in the aftermath of cyclone Sidr in Bangladesh in 2007, destroyed 74 primary schools and damaged 8,817 and affected 103,664 children were affected (Das, 2008; UNESCO Bangkok, 2012).

Such interruptions to children's education because of extreme climate events has implications for children learning outcomes and school retention which make it more difficult for children and young people to get out of poverty. The impacts of extreme weather events on children's school enrollment, retention and long term performance are under research and further research is needed to analyze that (UNESCO Bangkok, 2012).

### Climate Change Education

There is a growing awareness of climate change impacts on access to education and learning outcomes but education, both formal and informal, has also an important role in addressing climate change. Education is a key to enhance resilience. The literary scholarship on role of education in addressing climate change is traced back to 1960s when large bodies of research were produced to understand the relationship between economic growth and development concerns amidst increasing knowledge of environment. This yielded

new definitions and terms such as ‘environmental education’, ‘development education’, ‘education for sustainable development’. Education for Sustainable Development (ESD) remained popular over the years (Bourne, 2008; UNESCO Bangkok, 2012).

### Education for Sustainable Development (ESD)

*“Education, including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and development education, the latter needs to be incorporated as an essential part of learning.” (UNCED, 1992)*

Growing concerns for environmental protection and sustainable development lead to the emergence of ESD in 1980s and later on, Agenda 21 after United Nations Conference on Environment and Development in 1992 provided it further space. In line with this pursuit, UN Decade of Education for Sustainable Development (DESD; 2005-104) has given much importance to ESD. Its aims were to ‘integrate the principles, values and practices of sustainable development into all aspects of education and learning for sustainable and just society’ (UNESCO, 2006; UNESCO Bangkok, 2012).

### Climate Change Education (CCE)

Climate Change Education (CCE) has recently started developing its own identity as a distinct discipline (Læssøe et al., 2009). In the previous decades, it remained an integral part of environmental education and ESD. Even though the role of education to combat climate change has been recognized, the education sector has not tapped well enough as a resource to address climate change (Mochizuki & Bryan, 2015). Stakeholders in education around the world have yet to devise coherent frameworks to integrate climate change education. Article 6 of United Nations Framework Convention on Climate Change (UNFCCC) appeals to governments on the importance of education and public awareness raising to address climate change. Mochizuki & Bryan, (2015) highlights technological and financial solutions are no doubt important to address climate change but role of structural, cultural and behavioral shifts also need to be recognized. This could be achieved through education. Political agreements on regulating carbon emissions, green taxes and incentives, and technological solutions have remained less successful and are not the only panacea to climate crisis (UN Task Team on Social Dimensions of Climate Change, 2011; Mochizuki & Bryan, 2015).

Climate change education is about learning in the face of risk, uncertainty and rapid change (Stevenson et al., 2017). Climate change education through the formal education system is one of the effective ways to address challenges of climate change. This enables a multiplier effect where individuals share what they have learned with others benefiting entire families and communities as whole. Integrating climate change

in the education sector is not only effective but financially an efficient means to counter climate crisis because of its multiplier effect (Mochizuki & Bryan, 2015). Education for climate change is cost effective approach to address climate change and advancing sustainable development (UNICEF, 2016).

Furthermore, education provides a sustainable local capacity and knowledge to children to deal with climate change that can be passed down to future generations. Climate informed children are more able to engage in civil society and influence decision making, affecting them locally (Mochizuki & Bryan, 2015). Moreover, education can play a significant role in promoting ‘bottom up’ solutions to climate change that are often overlooked by the ‘elites’ (UNESCO/UNEP, 2011, p. 36).

(Stevenson et al., 2017) argues that climate change is not only a scientific problem but has a social aspect to it. Thus, climate change education requires more than the teaching content. Nicholls & Stevenson, (2015) study on Queensland teacher’s understanding of climate change and climate change education found that teachers do not have detailed understanding of climate change education which limits quality of education related to climate change and the future. Another study describes climate change education consisting of two parts i.e. climate and change. Climate part entails natural science whereas change appeals to social science engagement (McKeown and Hopkins (2010) cited in Stevenson et al., 2017).

Kagawa and Selby (2010, p.242) argue climate change education needs a ‘social holistic learning process’ which anchors learning with action as per the local community contexts. Furthermore, classrooms should facilitate critical thinking of the surrounding world and offer out of the box thinking (Kagawa and Selby, 2010). Wals (2011) describes climate change education appeals to an inquiry based learning that is reflexive, creative and participatory that supports students for uncertain situations.

CCE is recognized by a number of national governments but the implementation of CCE is in an early stage. Some governments around the world have made progress in advancing the CCE agenda but it is still a long way to go for mainstreaming CCE in education policy and practice

Integrating climate change education in education sector is also one of the mechanisms for countries to ensure and fulfill their commitments to national and international frameworks related to human rights, environment, education and sustainable development. Enhancing education sector response to climate change would not only fulfill countries obligation to UNFCCC but it will allow governments to advance Education for All (EFA) and contribute to Sustainable Development Goals (SDGs) by ensuring quality and inclusive education (Mochizuki & Bryan, (2015).

Moreover, climate change is a risk multiplier which disproportionately affects people and vulnerable groups in particular which has implications for human rights issues. Rigorous response to climate change through education will allow countries to fulfill their commitments under the UN Convention on Rights of the Child

which seeks education to be child centered, participatory, inclusive and protective (Mochizuki & Bryan, (2015). Child focused international organizations promote education that is used to safeguard and promote children rights to survival, development and protection. Children have a right to involve in decision making that affect their lives (UNICEF UK, 2008; UNICEF, 2016; Polack, 2010; Mochizuki & Bryan, 2015). Furthermore, recent scholarships on education sector response to climate change demonstrate synergies between climate change adaptation and disaster risk reduction (UNESCO/UNICEF 2012; UNICEF, 2016).

### Issues in integrating climate change education

Teachers are at the center of implementing an effective climate change education. According to a survey conducted in US involving secondary school teachers who were asked about their attitudes towards climate change education (NPR-IPSOS 2019, Borde et al., 2022). They listed a couple barriers they faced. It includes a mismatch between topics and prescribed curriculum, students too young to grasp these topics, teachers themselves do not understand the concept well enough. (Borde et al., 2022) states these findings would be closely the same in Europe but worse in developing countries because of teachers' inability to grasp the scientific complexity of the subject. Similarly, teachers lack expertise and low content knowledge in teaching climate change to children has been documented in surveys (Eilam, 2022).

### Analytical Framework

There has been an unprecedented rise in extreme climate events such as extreme floods, heat waves and extreme snowfall, in Pakistan. Torwali community located in Swat valley of Pakistan has endured devastating havoc of extreme floods happened in 2010 and 2022. Extreme floods, uncertain rainfall, heat waves and unusual snowfall has become a new normal for Torwali community. Against this backdrop, this research aims to explore how local primary school teachers make sense of these changes and communicate it with children. How do primary school teachers make sense of the new normal? What are their perspectives on climate change and change education? What are the challenges faced by Torwali children in schools and how education and climate change education specifically can play a role in enhancing children resilience?

### Climate Change Education within primary school education, Children Resilience and Child Ecology Theory

This section summarizes the role of education in enhancing children's resilience. In doing so, using child ecology lens, this section highlights how integration of climate change education within formal primary school education would enhance children resilience to cope with climate crisis

## Defining Child Resilience

Historically, research on child resilience evolved after World War II which affected millions of children. Children were injured, orphaned, traumatized by bombing and experienced loss and separation from families (Masten & Cicchetti, 2016). A plethora of research after the war was focused on children at risk from development psychology. There were studies on children at risk of mental illness and being at risk due to abuse, parent loss, and disasters (Masten & Cicchetti, 2016).

Contemporary definitions of child resilience are focused on the process of adaptation and integrates theory and ideas from child ecology theory, system theory and development system theory, family system theory, and development psychopathology (Masten & Cicchetti, 2016). Child resilience as a process of adaptation from the lens of these theories include eight principles.

*“1. Human adaptation and development—in both low-and high-risk environments—arise from continuous interactions across levels of function within individuals and between individuals and their environments.*

*2. Many interacting systems shape the course of development and the processes involved in resilience.*

*3. The capacity for adaptation can be conceptualized at multiple levels.*

*4. The capacity for adaptation in challenging circumstances (resilience) depends on many interacting systems.*

*5. Manifested resilience emerges from many interacting systems and always reflects the current context as well as the history of the child (or system).*

*6. Living systems are self-organizing with emergent properties that can be surprising or unpredictable from lower levels of analysis.*

*7. Resilience is dynamic—always changing—because the systems involved in the capacity for adaptation are developing and changing.*

*8. Resilience—potential or manifested—should not be construed as a trait, although many traits could influence resilience.” (Masten & Cicchetti, 2016)*

For the purpose of this thesis, which is focused on enhancing children’s resilience by integrating climate change education within formal primary school education, I use definition provided by Masten & Cicchetti, (2016).

*“Resilience is the potential or manifested capacity of an individual to adapt successfully through multiple processes to challenges that threaten the function, survival, or positive development.”*

Child resilience is thus adaptation that involves many systems. These systems are interconnected and a change in one system influences other systems. A child’s life and development is embedded within these systems and change in these systems influences a child resilience. Integrating climate change education in the face of climate crisis can be viewed as a change in immediate systems surrounding a child. This can be better explained by child ecology theory and will be discussed below.

### Child Ecology Theory

Child ecology theory explains a series of interconnected and overlapping systems surrounding a child that influence a child’s development. Bronfenbrenner provided this framework of overlapping systems in 1979 and categorized them into five ecological systems based on the severity of each system on a child’s development, resilience and wellbeing (Bronfenbrenner, 1979). They are microsystem, mesosystem, exosystem, macrosystem and chronosystem. Bronfenbrenner framework describes the dependency of one system over others and how a change in one system has ‘ripple effects’ for the other systems that surround a child (Mathews, 2022).

The microsystem is the immediate and closest system around a child and includes a child’s relationship with family, parents, classmates, teachers and neighbors. These relationships are bi-directional where a child is not only a passive recipient but shapes a child’s behavior and development (Guy-Evans, 2022). An example of such a relationship is parents reading to their children shape their children cognitive and language skills (Guy-Evans, 2024).

Mesosystem involves interrelations of different microsystems around a child that assert influence upon one another. Microsystem do not function independently but are interconnected. For example, communication between a child’s parents and teachers. It provides consistency when both teachers and parents are on the same page but negatively affects a child if parent blame teacher for poor grades. Teacher and parents represent two separate microsystems.

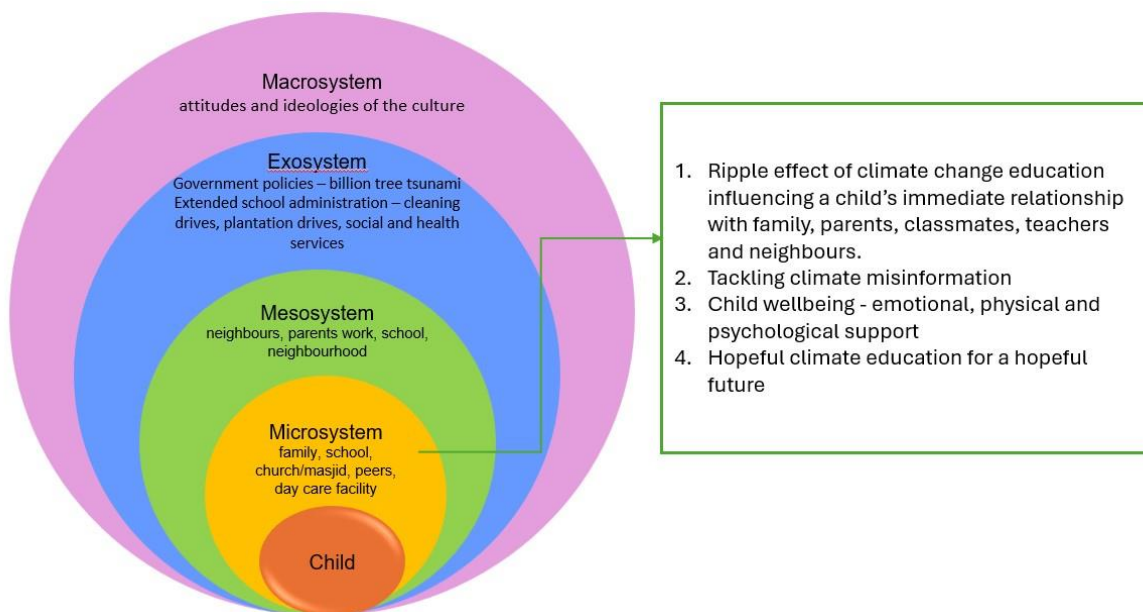
The exosystem involves formal and informal social structures that do not directly influence and interact with a child but shape a child microsystem. For example, government policies and mass media influence a child’s microsystem. Another example is cuts in education funding affect quality education a child receives.

The fourth is macrosystem which focuses on how cultural elements influence child’s development such as ideologies, beliefs and social norms in which a child grew up. This is well established system in which a child grew up contrary to exosystem which varies. A change in government policy lies in exosystem.

Finally, the fifth chronosystem refers to shifts and transitions a child go through over time in its life. Such transitions are either predicted such as starting schools or unpredicted such as moving to new place, parental divorce, or changing schools and may cause stress to a child (Guy-Evans, 2022). Bug events such as recession and climate disasters also fall in chronosystem. A child family may have limited resources during recession or during disasters. Children response to such predicted or unpredicted transitions depends on the support of their ecological system.

Education plays an important role in child development. Children spend a lot of time in schools after being at home with their families (Eccles & Roeser, 2012, Masten & Cicchetti, 2016). Similarly, introducing and integrating climate change education in children’s primary school education is equivalent to a change in the microsystem of a child. Teaching and informing children about climate change in the face of climate crisis in primary school influences their development and resilience. Iwasaki (2022) study in Japan found that Eco Experience Education Program for Early Childhood has increased water saving behaviors in children. The study further suggested that environmental education programs in early childhood influence long term pro-environmental behavior among children (Iwasaki, 2022).

### Theoretical Framework



*Author's own construct based on Bronfenbrenner's child ecology theory*



## Methodology

This chapter provides an overview of the steps taken to answer the research questions following social science research methods. This research intends to explore the perspectives of indigenous Torwali community primary school teachers on the role of climate change education in primary school education in Pakistan. And in doing so how they prepare Torwali children to cope with impacts of climate change and hence reducing their vulnerability to climate impacts and enhancing their resilience. Furthermore, how teaching Torwali children about climate change enhance their resilience for future uncertain climate challenges.

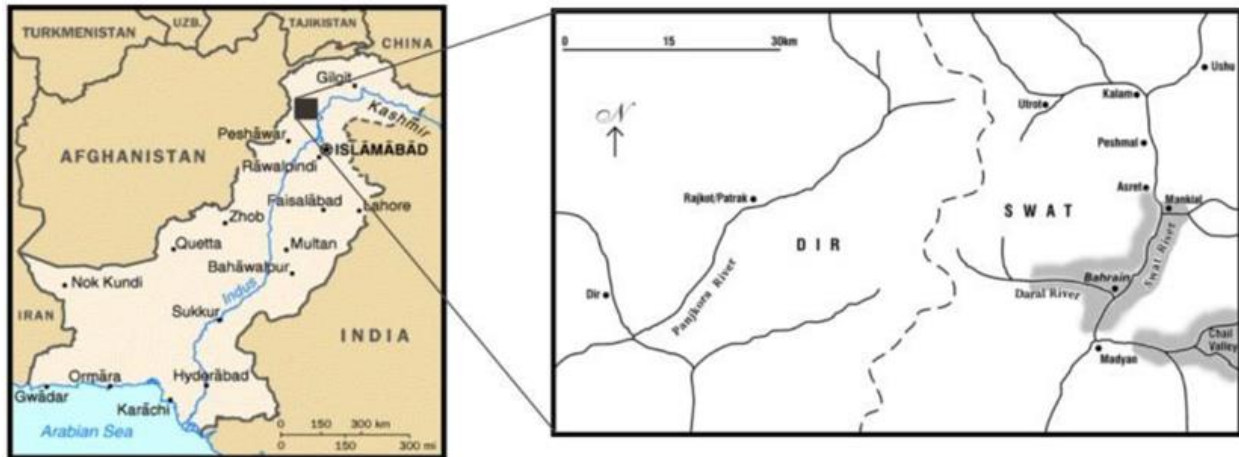
## Research Design

A research design provides a structure to guide the implementation of the research methods and analysis of data (Bryman, 2016). This study employs a qualitative research design to answer the main research questions and sub questions. The decision to utilize a qualitative approach is informed from the viewpoint that social reality is complex and shaped by external factors (Mack, 2015). According Snape and Spencer (2003), qualitative research tends to unfold an in-depth understanding of social world of research respondents by recording their perspectives; participants selection is purposive with small sample size;; data collection methods between the researcher and the participants are interactive which allow new issues and themes to be explored. Data collection is detailed and extensive; data analysis accommodate new ideas and identify patterns to develop explanations, and findings interpret social meaning collected from participants (Ormston et al., 2014).

This research adopts a case study design as it analyzes a single case of indigenous Torwali community primary school teachers in a detailed manner while acknowledging the complexity of the case (Bryman, 2016). Drawing upon best known studies from sociology, case studies include research on a single community, a single school, a single family, a single organization, a single person, and a single event (Bryman 2016). This study employs the case of a single Torwali community in Swat Pakistan.

## Study Area, Participants and Sampling

This study is carried out in Bahrain valley located in Swat district of Khyber Pakhtunkhwa (Fig. 1). Torwali community resides in the areas between Madyan town and Kalam town in Swat district in Khyber Pakhtunkhwa province of Pakistan (Torwali & Troy, 2023; Lunsford, 2001).



*Fig. 1 Torwali speaking area in Swat Pakistan. Bahrain town is shown in the right picture, adapted from Lunsford, (2001)*

The case of Torwali community in Pakistan has been selected. The researcher himself belongs to Torwali community. Torwali community is highly vulnerable to the impacts of climate change and incurred devastating losses in the floods of 2010 (Ali et al., 2011). Recently another massive flood happened in 2022 causing devastating damage to Torwali community (SDC, 2023).

The reason to choose a primary school in Bahrain town is because it is the biggest and main town of Torwali people. It offers a big market, private schools along with government schools and other medical care facilities.

A sampling plan is concerned with the planning of choosing participants for your study (Tracy, 2019). Qualitative researchers often opt for ‘purposeful sampling’ as it enables choosing to acquire specific data that answers the research questions (Tracy, 2019). The researcher employs purposeful sampling. A number of 15 participants are contacted, selected and interviewed to collect qualitative data. A brief pager of the research will be shared with the participants for their information about the research project.

### Data Collection & Analysis Methods

There are a number of ways to collect data in qualitative research design. They include interviews, focus group discussion, and observation. One of the most common methods used to collect data in qualitative studies is interviews which enable the researcher to record detailed opinions and perspectives from participants. Interviews are a more familiar and practical way to interact with participants for their perspectives on a research problem (Moriarty, 2011).

A total of 15 participants are contacted and interviewed for this research. Semi structured interviews are conducted, allowing the participants to share in a comfort flow. Interview guide and a brief introduction about the research is shared with the participants before the commencement of each interview. All the participants are male primary school teachers. Most of the primary schools in Torwali speaking region has male teachers with a few exceptions of some primary schools where female teachers teach.

The interviews are conducted online through phone calls since internet connectivity in the region is limited because of its remote geography. Semi structured interviews are selected to ask a series of questions related to existing extreme climate events occurring in the region and role of climate change education to gain in-depth understanding from the teachers' perspectives. Interview are conducted in Torwali language and then translated into English for transcription. The research utilized thematic analysis which allow to identify themes and patterns in the data. The researcher used color coding to categorize theme and pattern which is convenient to organize the data to navigate key themes. The interviews are then systematically organized after color coding to draw detailed analysis from the data.

### Positionality as researcher

It is imperative to reflect on one's positionality while conducting research and collecting qualitative data. A researcher's position could influence the research process and hence the results and outcome of the study (Holmes, 2020). This research involves Torwali indigenous community and Torwali teachers' perspectives on climate change education in building children resilience amidst extreme climate events. My own background belonging to Torwali community and growing up witness the extreme climate events in the region is an important part of my positionality. I am aware of my own privilege of understanding the research problem while studying in prestigious Utrecht university which might give the impression that my understanding is better than participants when interviews were conducted. While asking the interview questions the participants would bring it up to the researcher whether they have given the right answers or not. I reduced this power dynamic by ensuring them that their opinions are valued and would not be judged.

Furthermore, the participants participated in this study were young teachers and had better understanding of climate change. But this is not the case in the area since the majority of teachers were recruited years back and they have limited understanding of climate change. This was also shared by the participants as one of the obstacles in teaching children about climate change since the majority of the teachers do not understand it themselves.

The interviews were conducted in Torwali language and later I translated them into English. English is not my first language, and I might have poorly translated nuanced details embedded in cultural understanding

of the participants. Another limitation of the study is conducting the interviews online over an audio call which limits noticing participant impressions while responding to interview questions.

### Ethical Consideration

Ethical consideration is a major concern in social science research. In order to ensure ethical considerations regarding this study I comply with the ethical guidelines provided by Utrecht University. Furthermore, it is the responsibility of the researcher to minimize any potential harm to the participants and ensure their anonymity, privacy and safety (Bryman, 2016). I shared consent form with the participants, briefly shared about the study before taking the interview and took consent while making the recording. The participants are informed that they can participate voluntarily in the study and can withdraw their participation at any moment of time from the study. To maintain the anonymity of the participants, the quotes mentioned in the research are anonymized, so they are not identified within the study. The interviews are recorded digitally and stored electronically in Utrecht University One Drive and accessed through password protection.

## Geographical contextual framework

### Regional Context

The official name of Pakistan is The Islamic Republic of Pakistan. It has a population of 247 million as of 2023 and ranks five in the world most populous countries (CIA Factbook, 2024). The climate is diverse, mostly hot in the South and temperate in the Northwest and chilly in the further north. The geographical landscape is divided into three main areas: the northern highland, Indus River plain in center and east, and Baluchistan plateau in South and West (CIA Factbook, 2024).

The people living in Pakistan are identified as Pakistani, but Pakistan is not a homogenous country. It is diverse in terms of languages and culture. There are more than 65 languages spoken in Pakistan (Torwali, 2015). The country is divided into four provinces, two independent territories and the capital. The four provinces are Punjab, Khyber Pakhtunkhwa, Sindh and Baluchistan. Azad Jammu and Kashmir and Gilgit Baltistan are independent territories. Islamabad is the country capital.

The national language of Pakistan is Urdu along with English as the co-official language. Tamim (2014) study lists down the spoken languages in Pakistan in terms of speakers stating that Punjabi in the Punjab region is spoken by 44.15%, Pashto in KP by 15.42%, Sindhi by 4.10% and Balochi by 3.57%. They are considered as regional languages. Other minority languages including those spoken by indigenous communities have historically been ignored and still in need of State recognition (Tamim, 2014). Literacy rate is 58 percent, and the country spends 2.4 percent of its GDP on education (CIA Factbook, 2024).

### Pakistan Vulnerability to Climate Change

Pakistan is highly vulnerable to the negative impacts of climate change. Pakistan ranks 16 among 170 countries on Maplecroft Vulnerability Index to climate Change (Maplecroft, 2010). Germanwatch Global Climate Risk Index of 2012 ranks Pakistan at 8 out of 180 countries in 2012 (Hamering, 2012). Khan et al., 2016 describe climate change impacts on Pakistan that will influence all aspects of sustainable development including economic, social and environmental.

### **Economic**

Pakistan economy is prone to impacts of climate change and has implications for its food, water and energy security. Pakistan economy is primary based on agriculture (Rehman et al., 2015) which is highly climate sensitive. Recent events of extreme floods and droughts and unpredictability of monsoon rains have further jeopardized the country's agriculture and thus to economy and food security (Ullah et al., 2018). Major rivers in Pakistan provide a lifeline to agriculture which are mainly fed by glaciers located in northern

Hindukush Karakoram Himalayan (HKH) region which are also melting due to climate change and global warming (Ullah et al., 2018). Furthermore, a major concern for the country's policy makers is to estimate the cost towards adaptation measures to minimize the risks to the key sectors (Khan et al., 2016).

### **Water Security**

Pakistan experiences freshwater scarcity. Maplecroft Water Security Risk Index has placed Pakistan as an extremely high risk country and ranks it 7 out of 165 countries in 2010 (Maplecroft, 2010). Rainfall and melting glaciers water are the two primary sources for water in Pakistan. The country receives 60 billion cubic meters of water from rainfall brought by monsoon and almost 174 billion cubic meters from snowmelt and glaciers from HKH region (Commission Planning, 2010; Khan et al., 2016). Both of these water sources are highly threatened from climate change.

### **Food Security**

Maplecroft Food Security Risk Index ranks Pakistan 30 among 163 countries and classify as a high risk country (Maplecroft, 2010). The country's food security is likely to worsen because of reduced agriculture and crop productivity due to declining water that fed the irrigation system. Pakistan agricultural sector is highly dependent on canal irrigation which is diverted water from rivers already experiencing climate impacts. Variability in rainfall patterns has also deteriorated cultivated land facing issues of water logging and salinity. Livestock productivity is also prone to impact of climate change. Increasing temperatures resulting in physiological stress on animals will lower milk and meat production (Khan et al., 2016).

### **Energy Security**

Climate change has both direct and indirect impacts on Pakistan's energy sector which is highly reliant on hydropower generation. Direct impacts include water availability for hydropower generation and thermal power cooling, thermal power plants low production due to increased temperatures, and damage to energy infrastructure because of climate induced disasters (Khan et al., 2016). Indirect impacts include increase in energy demands because of population growth and space cooling because of increased temperatures (Khan et al., 2016).

### **Social Impacts**

Social impacts due to climate change include negative effects on health, involuntary mobility of people and loss of livelihoods due to extreme events such floods and droughts. This has further implications for loss in jobs, inflation in food prices resulting in food insecurity and unaffordability, and civil unrest. Pakistan has significant number of people living in poverty and climate change impact will severely experience by disadvantaged and marginated people (Khan et al., 2016). Oxfam (2009) reports finds 'Poor and

marginalized communities tend to be most vulnerable to climate change and least be able to cope with weather-related disasters because of lack of access to information and resources to reduce their risk. The predicted impacts of climate change will increase further existing vulnerabilities, inequalities and exposure to hazards' (Oxfam, 2009).

### **Environmental Impacts**

Pakistan's coastal environment, forest and biodiversity and other vulnerable ecosystems such as rangelands and mountain ecosystems are more prone to climate change. Pakistan has a coastline of 1000 km which is vulnerable to sea level rise. This has further implications for coastal agriculture land and habitats due to erosion. Islands in the Indus delta is highly eroded because of sea level rise.

Pakistan has 5 percent of the area under forest cover. Climate change impacts can threaten forest covers in two ways. First, the rapid change in climate may not permit the forest to adjust because of the change in tree species migration to favorable climate areas. Secondly, increased temperatures and precipitation can increase insects and weeds which may deteriorate the forest (Khan et al., 2016).

## Thematic chapter – Results

### Making sense of the floods and extreme events

This chapter presents the perspectives of indigenous primary school teachers. Questions were asked to gain an understanding of how they make sense of the extreme climate events occurring in the region. How do they view the increased number of floods and how do children make sense of these extreme floods? How do they understand climate change and its relationship with the changes occurring in the region? Furthermore, the participants were asked whether climate crisis should concern schoolteachers and how education could be utilized as a resource for climate adaptation through a child-centered climate-informed education. How could teachers and climate change education play a part in enhancing children's resilience amidst the climate crisis in the region?

Most of the participants shared similar responses on the increased number of floods and other extreme climate events occurring in the region such as extreme rainfall, unusual amount of snowfall in the winter and sudden heat waves during the summer. All the participants linked it with climate change whereas only 1 participant shared it as a punishment from God for the wrongdoings of the local people along with climate change. The participants emphasized that this phenomenon was not normal in the region a couple of years back.

*“In my opinion, it has a direct relation with climate change. These events have frequently been occurring in our northern region.” Participant 3*

*“I think there is a general perception here that the number of floods has increased due to climate change.” Participant 4*

Torwali people reside in mountainous valleys with lush green forests and rivers flowing along the valleys. The rivers are fed with glacier water from the mountains. During summer and hot weather, the rivers receive more water because of melting glaciers. In winter, the rivers have less water in them. More than half of the participants shared how rising population, demand for more housing infrastructure and deforestation are exacerbating the global climate impacts on local people. The local people are already highly vulnerable to climate shocks because of longstanding marginalization, poverty and lack of resources to deal with climate shocks.

While the majority of the participants shared how local factors are contributing to the frequent occurrence of these floods, a few of them strongly expressed their association with global carbon emissions and global warming. Every single participant mentioned deforestation as one of the significant factors causing these



floods. The reason to frequently mentioning deforestation is because of the fact that the region used to dense forest cover which has reduced over time.

*“We had lots of forests previously in our area, but they have been cut down ruthlessly. Our people have cut down the nearby forests to make fields for themselves to grow food and build houses. Also increases in population is a reason [deforestation and increased in floods]. People’s reliance on wood fuel in also a reason.” Participant 1*

*“I strongly believe that climate change is a cause of increased floods but locally in our region, immense deforestation is a big reason as well. previously we had dense forests but now forests are replaced by population. Urbanization has happened. Thus, deforestation also contributes to climate change. Then there are timber mafias locally. We receive plenty of rainwater but now we don't have enough trees to absorb it. When it rains it results in sliding. Our rivers are now filled with stones and gravel from the sliding.” Participant 2*

*“As a primary school teacher, I strongly link this phenomenon with climate change, and I can share the reasons for that. I have come across a survey on Pakistan forest cover which was conducted in 1940. There were 35 percent forests in Pakistan back then. Comparatively, according to the current UN survey, there are only 5 percent forests left in Pakistan. But local forest committees in Pakistan claim it is merely 2.5 percent. You can see how rapidly the forests are vanishing. Thus, deforestation can be one of the causes for climate change and the floods occurring in our region.” Participant 8*

Most of the villages in the region are situated close to streams that are fed by glaciers. These streams have more water in the summer because of melting glaciers whereas they are dry in the winter. Participant 9 shared how certain villages are more prone to floods compared to others because of protected forests along the valleys. The villages which have more forests observe less floods and even if there is flooding due to excessive rainfall, they are not impacted severely because the forests minimize excessive landsliding that results in destruction of the houses, roads and schools situated along the stream.

*“Yes, it is due to climate change and deforestation. Recently, we were having discussions about that an area is more prone to floods where more forests have been cut down. For Example, Daral River has more every year because there have been excessive forests cutting along the Daral valley. Compared to our village, we haven't seen extreme floods in our village river because our forests are more protected. We are worried that if this forest is gone in our village, we might face severe floods.” Participant 9*

Moreover, some participants strongly mentioned that global carbon emission by developed countries have much more devastating affect them than the local factors. Even though the local factors are concerning but one should not overlook the global impact of climate change on local people in the region.

*“... I think global emissions by developed countries also affect local climate. Pakistan has many glaciers, and our area is in that glacier zone. Countries like China and USA are contributing to global carbon emissions, and they indirectly affect the climate in our region, resulting in melting of glaciers and thus devastating floods.” Participant 01*

Participant 3 again stressed the global aspect of climate change which affects local people around the world who are more vulnerable to the impacts of climate change.

*...I also think these drastic changes in our local climate have a lot to do with global climate change compared to the local causes. For example, deforestation in our local region is significant for these climate changes but heavy rains or flash floods have more severe consequences for our forests compared to manmade deforestation. Participant 3*

Participants were then asked how children in their school make sense of the floods. The participants had mixed responses to children making sense of the floods. But most participants shared children’s parents and home environment influence children’s understanding about extreme events occurring in the region. Most children understand it as the wrath of God, others associate it with some conspiracy theories.

*“Some children are told at home that the floods are happening because of our sins. I was told by a student of class 3 that his grandmother said that the floods are because of our sins.” Participant 2*

*“Interestingly I once asked children in class 3 that why floods occur. They said that it is because of an increase in our sins. and people's misconducts.so we have a wrath of God.” Participant 4*

*“Overall, there is a religious perception found in the region. They link it with the wrath of God. Sometimes it is a challenge to change a child's mind when they believe in these religious explanations for floods occurrence. Children in our school don't see it in a scientific way that it is a process of changes happening in the climate.” Participant 5*

However, most participants shared how their teaching and the role of primary school counter such notions among children by raising awareness. In doing so, they teach and educate children on climate change from a scientific viewpoint. Furthermore, it also enhances children’s resilience and enables climate adaptation. One of the participants shared how their primary school teaching enhances children’s resilience to deal with extreme weather events such as floods. Secondly, how primary school can play a role in climate adaptation.

*“Then we teach them how deforestation and pollution can cause depletion of the ozone layer. This results in more heat from the sun which melts our glaciers at a fast rate”. Participant 6*

*“Then I explained to them that due to climate change now the rate of melting glaciers is higher than before which causes more floods.” participant 4*

*“Our region is surrounded by mountains and forests so we teach them how cutting off these forests has harmful consequences for us.” Participant 3*

*“... yes, there are benefits. children would be more aware of climate change. It can also reduce anxiety and worry about extreme weather events among children when taught properly. They can then face such events better. It also enables children to take safe refuge during extreme weather incidents and share this information with their peers in their neighborhood.”*

Furthermore, one of the participants shared how political leaders’ priorities influence initiatives in their schools. These are significant initiatives to address climate change but are not sustainable when government changes.

*“... we also engage children during spring to plant at least 10 plants. This initiative was more active during the previous government of Imran Khan when he launched the billion-tree tsunami project.”*

It has been unfolded that participants having a background in science education are more passionate about climate change and have better understanding of the phenomenon. A few participants shared how a teacher’s own education background shapes their opinion about climate change. This is important for the kind of education the teacher would deliver to children while making sense of these floods to children.

*“Not all teachers think the same about floods and climate change. If a teacher has a science background then he responds in a more scientific and deep manner compared to a teacher who is more inclined to religious mentality. They then associate it with God's wrath and sins of people. Teachers have different approaches.” Participant 1*

### Children schooling, children wellbeing and climate change

Children are most vulnerable to the impacts of climate change. According to the World Health Organization children will observe more than 80 percent of illness, injuries and deaths due to climate change (Sanson et al., 2019). Children are also prone to indirect consequences of climate change which includes food insecurity, migration and poverty (Akresh, 2016). Climate related extreme weather events such as floods affect children's psychological and mental wellbeing because of their dependence on their parents. Such extreme climate events cause distress to parents emotional and physical wellbeing and disrupt parents' livelihoods and family functioning (Sanson et al., 2019). Furthermore, extreme weather events greatly disrupt children daily normal routines that they are used to and likely expose them to child labor to support their family, early marriage and physical and sexual violence (The Child Protection Working Group, 2015). Similarly, such extreme climate events have psychosocial consequences for children which includes stress, depression, learning problems and anxiety disorders (Garcia & Sheehan, 2016).

Participants highlighted similar responses regarding children's wellbeing and disruptions in their learning and schooling in the face of these extreme floods occurring in the region. The frequent extreme floods in the summer and extreme snowfall during winter have consequences for Torwali children's educational attainment and wellbeing. Schools remain closed for long duration in extreme floods. Some schools are washed away because of the floods causing disruption to schooling. When children's academic year is disrupted because of extreme events it affects the whole lesson plan which results in insufficient delivery of educational content to children. This led to skipping lessons by teachers in the textbooks which were planned for the academic year. Furthermore, in the aftermath of floods, teachers have noticed that children are quiet and stressed in the class when they resume schooling. The participants shared examples of how extreme floods affect children's wellbeing and their learning performance in the class.

*“The more uncertain the climate becomes, the more frequent these emergency unplanned vacations are announced which affects the whole academic year of the children [which has implications for children's educational attainment].” Participant 3*

*“It poses danger to a child's safety because of unsafe passages/routes to school. School infrastructure including school buildings is exposed and vulnerable to floods and disasters. Weak school building could also endanger a child's life when it rains a lot on a weak school building. Children's school attendance is disrupted because of sliding.” Participant 1*

*“There is also a psychological aspect to it. Children get scared because of disasters such as intense rain turning into flash floods. Children are told that water would be raised in the rivers, and it affects children psychologically, making children more worried.” Participant 1*

*“The increased number of floods each year has created a terrifying experience that whenever it rains and sliding happens then no children come to school. Children are terrified because of extreme rains.”*

*Participant 2*

Participant 3 shared such extreme floods often children into child labor so that they can support their families since floods have destroyed their houses and livelihood of their parent.

*“Often children end up being wage laborers in local restaurants to support their families. And the children living along the narrow valleys start working as wood sellers.”*

A few participants shared the impacts of extreme climate events are series of events on children wellbeing and their learning. When a child family loses their house during floods, it disrupts child routine, family functioning and child schooling. Child routine is disrupted when the family migrate to a new place. Children leave behind the routine they used to and the friends and neighbors they were familiar with. Family functioning is disrupted when parents are going through mental stress when they loss their house and agricultural land which is often their source of income in the region. Child schooling is disrupted either the school is closed, or they move to a new place. Participant 3 and 9 highlighted school closure because of floods.

*“The effects of these disasters unfold among children over time not just once. There a series of events happen which affect the children in a follow up manner. Firstly, a child’s house is affected/demolished. impact on the house has implications for emotional and psychological effects on the family. Furthermore, priorities are also changed in the family, both family head and their children which in turn also affect care of the children.” Participant 3*

Participant 9 shared that children are less attentive in class after going through extreme floods. They show less interest in schooling and worry about supporting their parents. What happens is some children drop out of the school later on and work in local restaurants to support their families.

*“Yes, children's wellbeing also affects them. I have seen children's behavior change and they are not very attentive in the classroom. Furthermore, such incidents further push children into poverty. Often their parents lost their lives because of floods and then they support their parents by working in local restaurants. This often leads to children being school dropouts.” Participant 9*

Furthermore, children’s schooling is affected by lack of teacher’s availability in schools. Many schools have teachers from other towns, and they do not come to school when extreme floods destroy and wash away bridges and roads.

*“Teachers’ mobility is also disrupted along with teachers when floods occur because of destruction to bridges and passages due to sliding and flooding in the rivers.” Participant 1*

*“Children's schooling is impacted because teachers themselves are not able to come to school since most of the teachers come from far away towns.” Participant 4*

Participant 5 explained how children’s mental health is affected from these extreme events by sharing the case of two children in his school. The two children moved to the school from another village since their house and school has been washed away during the recent floods. They live with their uncle now in this village.

*“When the two wo children moved they had nothing - no school bag, no clothes and no books. When we received those two kids they were really disturbed. First they moved to a new place and were adjusting to the new area. Besides, they had financial loss since everything was washed away in the floods. This loss has shifted their priorities, and they were not interested in education but worried about building a house again and to support their parents in building a new house. How they would go back to their village and build a house. It's been a year now and they are always quiet and silent in the class. They are stuck and getting them out of crisis face challenges to teachers and their family.” Participant 5*

### Education as climate adaptation – enhancing children resilience

Education helps people and communities understand the impacts of the climate crisis, empowers them with knowledge, and nourishes values and attitudes to act as agents of change (UNESCO, 2023).

To explore the role of primary school education concerning the climate crisis faced by children in Torwali community, questions were asked from the participants to explore the advantages and urgency of teaching children about climate change and the perceived barriers to realizing an effective climate change education. All the participants agreed on the benefits of teaching children about climate change. Some participants shared the urgency of teaching climate change education in schools since their region is more vulnerable to the impacts of climate change and extreme climate events has become a new normal for them.

However, participants provided different responses on teaching and educating children about climate change. And how lessons in existing primary education textbooks are relevant to climate change. The responses to teaching children about climate change have also varied among participants. Teachers having background in environmental education were more passionate about teaching children about climate change compared to teachers who have background in social sciences and humanities. The teachers in primary school are recruited based on the requirement of having a bachelor's degree irrespective of the subject consideration. Thus, there are primary schools with more science background teachers and other schools with fewer teachers in science background. This poses significant challenges for teaching climate change related topics in the curriculum. Participant 1 shared what they teach to children and how it is relevant to climate change.

*“We teach children about atmosphere and climate change. There are lessons related to climate change in science textbooks.”*

*“From 2021 onwards, we have a new syllabus and in the science textbook we have lessons related to climate change. Now we teach children how floods happen. Why does the water level increase in the rivers? benefits of afforestation and reforestation. We also teach them about pollution. We have General Knowledge in class 3 and Science in class 4 and 5.” Participant 2*

Participant 3 highlighted the need to include visual aid lessons related to climate change and disasters. This will enable children to make more sense of extreme climate events.

*“Yes, extra material is needed to teach children how flash floods originate. How heavy rain causes flooding. how landsliding happens. Yes, the existing lessons on climate change in primary schooling is enough but I believe visuals aid with teaching is more effective.” Participant 3*

Some participants expressed dissatisfaction with the existing lessons related to climate change. They shared the content is not enough, but they provide more explanation to children on their own.

*“We don't have enough content in the school curriculum, but I personally teach about climate change related topics. We don't have many topics on floods but there are topics on deforestation and afforestation and on pollution.” Participant 4*

*“In primary school, there is not enough content but afterwards in middle school there are topics related to climate change and global warming and disaster management, but they are not very detailed.”*

*Participant 5*

Participant 7 shared that there are lessons on conservation of plants and biodiversity in science textbook of class 3, 4 and 5 which are relevant for climate change. Participant 8 shared that there are topics on greenhouse effect and climate change in science textbook, but they are not in detailed manner and expressed the need to include more topics or whole chapters on climate change.

*“There are lessons which are related to climate change. In the science textbook of class 3, 4 and 5 there are lessons on conservation of plants and biodiversity which has a big role in climate change. This enables an understanding among children about endangered species.” Participant 7*

Moreover, participants shared how education and their teaching is raising awareness and enabling them to cope with extreme climate events.

*“We guide and train the children about precautionary measures during floods. Especially when they have to cross a river and there is more water running in the river because of extreme rain.” Participant 6*

Every single participant agreed on the benefits of teaching children about climate change. It raises awareness among children about climate extreme events and enhances their resilience to face them. Children can share this information with their peers and family at home and in their neighborhoods. This will create a chain of awareness within the community. One of the participants shared it his way.

*“Every year we are witnessing floods, or abnormal and unusual snowfall, or unusual extreme rainfall and they have become a new normal in our region. Children see them and I believe teaching children about climate change would enable them to make more sense of what's happening in the surroundings.*

*The need for climate change education has never been more urgent than today.” Participant 9*

Interestingly, some schools organize initiatives once a year on plantations and keep the environment pollution-free. This has not been the case with every school. A few participants shared that these initiatives are also influenced by governments that prioritize the environment.



*“We also engage children during spring to plant at least 10 plants. This initiative was more active during the previous government of Imran Khan when he launched the Billion Tree Tsunami project. During such plantation drives, we teach children the importance of planting a tree and how important it is for us.”*

### Perspectives on climate change education

The overarching question of understanding climate change education. Questions were asked on whether the participants are familiar with the concept of ‘climate change education’. Every participant devised a way of linking it with climate change. The responses differed among participants based on their previous educational background. Participants with a background in environmental education had a better understanding and were found to be more passionate about incorporating climate change-related content into the existing primary school education.

*“In my opinion climate change education is about the impacts of climate change and awareness about climate change. how we define climate change. How can we cope with the impacts of climate change?”*

*Participant 1*

Participant 3 shared climate change education includes teaching children about the surrounding ecosystem and how our actions can positively and negatively influence the surrounding ecosystem. This enables children to be more responsible when they have an understanding of actions that are harmful for the environment and actions that can preserve it.

*“We humans are part of the ecosystem we live in. I think climate change education with regard to children means teaching children about how our actions positively influence the surrounding ecosystem or disrupt it. Thus the factors that lead to deterioration or preservation of the surrounding nature should*

*be part of climate change education for children. Participant 3*

Participant 4 shared they are not aware of the concept of climate change education, but they have training about disasters once a year in which they are told how to deal with disasters happening in the region with special focus on floods. But this has not been the case in every school. Other participants shared they do not hold any such training. This highlight inconsistency across schools regarding training teachers on disasters.

*“As primary school teachers we are not that aware of these terms. We have training annually related to the disaster in our region, but climate change education has not been discussed as such.” Participant 4*

Participant 4 shared climate change education understanding among teachers varies given their own educational background and interest in climate change.

*“My own understanding of CCE lies in its understanding and how we can mitigate it.”*

Similarly, participant 6 expressed that climate change education is about teaching children about the causes of climate change and how it affects them.

*Climate change education: I think of causes and effects of climate change. Participant 6*

Participant 7 having a background in science shared his awareness of the concept of climate change which include teaching children about changes in global temperatures due to global warming and how it affects peoples living in climate vulnerable regions across the world.

*“Yes, I am well aware but when I teach children, I mostly focus on changes in global temperature patterns.”*

Participant 1 expressed dissatisfaction with the existing lessons related to climate change in primary schooling and suggested to incorporate climate change as a subject while reducing another unnecessary subject. This view is supported by a few other participants who shared that existing textbooks have minimal content related to climate change.

*“...I think it should be a proper subject. The Science or General Knowledge textbook content in primary school is minimal and insufficient...”*

Similarly participant 9 stressed the need to incorporate climate change education due to frequent increase in the number of climate extreme events in the region. Children would have a better understanding and awareness of what’s happening around them.

*“Every year we are witnessing floods, or abnormal and unusual snowfall, or unusual extreme rainfall and they have become a new normal in our region. Children see them and I believe teaching children about climate change would enable them to make more sense of what's happening in the surroundings.”*

## Discussion

This chapter discusses the findings by drawing upon the literature and theoretical framework of this research. The findings of this research are aligned with existing research on climate change education being in its infancy as a discipline (Læssøe et al., 2009), role of education as an untapped sector in combating climate change (Mochizuki & Bryan, 2015; Anderson, 2010), and preparing children for uncertain future through knowledge and skills that are not technical but socially transformative (Stevenson et al., 2017).

### Climate Change Education; an evolving discipline

As discussed in the theoretical framework, climate change education has not emerged as a distinct field, but it has been associated with environmental and disaster education (Læssøe et al., 2009). This is evident in participant responses when they were asked on their familiarity with the concept of climate change education. Most of the participants responded and associated it with environment and disaster education. However, only a handful of participants had in-depth knowledge and understanding of climate change education who had their own educational background in environmental studies. This suggests that the concept of has not yet established its own identity in education in Pakistan.

*“If I was part of curriculum experts, I would have introduced climate change as a small subject. I think it should be a proper subject.” Participant 2*

However, the research findings highlighted that participation in this research study has provided them a venue to reflect on ‘climate change education’. Participants shared this study has enabled them getting exposure to ideas that they never thought of regarding employing education as resource to prepare children in addressing climate change.

Climate change education has recently started to develop an independent field and is in its infancy period (Læssøe et al., 2009). This development is pushed by certain governments’ climate change related initiatives faced by their countries. For example, China climate change action plan includes specific education initiatives by incorporating relevant knowledge in primary and higher education with the aim to raise awareness and participation (Læssøe et al., 2009). Similarly, Pakistan has adopted climate change education policy in 2012 which includes guidelines to incorporate climate change in education sector and to develop curricula with emphasis on climate change (Atta-Ur-Rahman & Shaw, 2015). The findings indicated that new lessons related to climate change has been added in the curriculum in recent years since climate extreme events happening in the country remained a top concern in the previous government.

The previous government has introduced other initiatives including plantation drives in schools and community cleaning drives with school children. Such initiatives can be seen as development towards better

recognition of climate change education. The findings revealed some schools had organized initiatives once a year on plantations to keep the environment pollution-free. This has not been the case with every school. A participant shared that these initiatives are also influenced by governments that prioritize the environment.

Furthermore, Læssøe et al., (2009) described that climate change education is a ‘peripheral’ topic in education and often situated within environmental education (p.14). But growing interest in climate change education can bring it to the central focus and establish it as an independent concept. The findings of this study also indicated CCE being peripheral in primary school education, but growing concern of climate change could bring more attention to CCE.

### Education as an untapped sector in addressing climate change

The findings of this research align with existing research on the education sector being a missed opportunity to combat climate change (Mochizuki & Bryan, 2015; Anderson, 2012; Deeb et al., 2011). An integral response to climate change is in raising public awareness and through education and training. Political agreements on reducing carbon emissions and other technological solutions to address climate change are not enough to address climate change and transformative shift is needed involving behavioral, cultural and perceptual shifts in how we think and act. And education has a greater role to play here for effective climate response (Mochizuki & Bryan, 2015).

The findings reveal the crucial role of education in raising awareness among children through climate education, teachers through training, parents and general public through the multiplier effect of education. The theme of raising awareness and the multiplier effect of knowledge shared by children with their peers, family, and neighbors has remained dominant in the findings. This is consistent with previous research that stress on the multiplier effect of education sector in addressing climate change

The findings also indicated the role of education in enabling children with key knowledge and skills necessary for making sense of climate extreme events. And the role of education in shaping children’s behaviors which are pro-environment and also reduce their vulnerability against extreme events in the future. This will lead to building adaptive capacity and resilient societies (Anderson, 2012).

*“Climate education can “bring a community change. It would create a chain that would yield long lasting sustainable impacts. It would take years, but it would create an awareness even among ordinary people because of the climate informed children of today. They would know what climate change is. What are the impacts and harms of climate change? how climate change is caused. It can bring a sustainable change, but it would take a long time.” Participant 1*

*“It would generate a chain of knowledge propagation and it would be widely discussed.” Participant 5*

Another theme in the findings revealed climate misinformation and conspiracy theories to describe extreme climate events. Children associate extreme floods with the wrath of God and they are told this way by their parents and other people around them. Such conspiracy theories influence ordinary people who can play a role in climate change (Douglas & Sutton, 2015). Ordinary people in the region can play a more active role in discouraging deforestation and influencing people to conserve and plant more forests. The findings highlighted the crucial role of education to address climate misinformation among the common people by raising awareness among them about the importance of local forests.

*“This would then challenge existing fake and misinformation on climate change and disasters.”*

*Participant 5*

### Climate change education for sustainable development

The findings align with existing research on children’s safety and wellbeing amidst extreme changing climate which also disrupts children’s education. Thus, it has implications for the provision of quality education to children and young people. Anderson, (2012) describes that climate induced disaster damage schools, threaten physical safety and psychological wellbeing of children and disrupt continuity of children schooling. Such disasters also reduced children enrollment in schools who end up supporting their parents’ livelihoods by working in child labor. The findings significantly highlighted this aspect of extreme floods on Torwali children’s schooling.

Education can enable children to be responsible citizens and their role in redefining lifestyles to address sustainability issues while encouraging others surround them due to the multiplier effect of education. Education has key integral role in enabling children behavior change as part of climate mitigation. The findings indicated how climate change education in primary schools enables Torwali children to adopt environment friendly behavior and engage them in plantation and community cleaning drives.

*“When we teach children about the benefit of a tree then they show more interest in planting new trees.”*

*Participant 11*

Furthermore, education is central to enhance adaptative capacity of children to address uncertain climate futures. Adaptation involves both reducing vulnerability and providing the right knowledge and skills to address disasters. The findings revealed the role of primary school in providing Torwali children the right knowledge protecting themselves amidst extreme floods and overcoming the intensity of floods disaster by involving children in forestation efforts. The way children and young people are educated, and relevant climate education can provide knowledge necessary for informed decisions regarding adapting to changing environment (Anderson, 2012).

### Towards children resilience – child ecology and climate change education

This final section of the discussion chapter presents that the findings can be viewed through the lens of child ecology framework for an effective climate change education in primary schools. Drawing upon the child ecology framework, the findings reveal climate change education in primary schools and teaching children about climate change can enhance their resilience in the face of climate crisis. One of the most effective ways of improving children’s resilience is through climate change education which provides knowledge and builds skills (Treichel, 2020; Anderson, 2010)). Child resilience is the potential to adapt to challenges that threaten their function, survival and development (Masten & Cicchetti, 2016). The findings revealed Torwali children vulnerability to extreme flooding and how such extreme climate events threaten their functioning, survival and development. Children physical, emotional and socio-psychological functioning are disrupted when extreme floods happen. Participants shared incidences where children do not have access to enough nutrition and safe drinking water in the aftermath of extreme flooding. Children emotional wellbeing has been highlighted repeatedly in findings. Children become quiet in the class. They show less interest in learning and pursuing education. They do not engage much with their peers. They are worried and often drop out of school. These findings are well aligned with existing research on children’s wellbeing in the face of extreme climate events (Kousky, 2016; Akresh, 2016; Sanson & Burke, 2020; Treichel, 2020).

*“Often children end up being wage laborers in local restaurants to support their families.” Participant 3*

Involving children in climate action provides them with confidence and self-assurance which can be viewed as resilience building (Treichel, 2020). However, such child centered initiatives are short lived, and the outcomes are not well integrated into community (Brown and Dodman, 2014). Child centered adaptation long term benefits are uncertain when they are not integrated into community (Treichel, 2020).

Primary school education is situated in a microsystem surrounding a child. Microsystem involves the child surrounded by family, school, church/mosque, and peers. A child microsystem is integral in realizing a robust climate change education that has far reaching implications for individual and community level climate adaptation and resilience building. This provides an integrated venue involving children and community to reap the benefits of climate education. The findings of this research highlighted the importance of multiplier effect of climate education, and it can be described as a ripple effect influencing not only children immediate relationship with family, parents, and peers in the microsystem but influence the overlapping mesosystem, exosystem and macrosystem over time.

## Conclusion

The impacts of climate change are acute for children. Children are disproportionately affected by climate change and children's safety, wellbeing and survival is at risk in their childhood, but they will experience the worsening impacts of climate change in the future when they become adults (Treichel, 2020). Moreover, the role of education in addressing climate change is underutilized. Education can be used as a resource to mitigate and adapt to climate change (Mochizuki & Bryan, 2015).

The findings of this research have highlighted the vulnerability of Torwali children in Pakistan to climate extreme events such as extreme floods occurring frequently in the region. Extreme floods have become a new norm, and they affect Torwali children's physical and emotional wellbeing and educational attainment. They face disruptions in their schooling when their schools are closed for a long duration in the aftermath of floods. When they experience floods, they often lose their houses and social connections with their neighbors and peers. The findings reiterated that children face emotional and psychological challenges when they get back in schools. They remain quiet and do not engage in learning. Some children drop out of schools and end up working in restaurants to support their families.

Secondly, the findings highlight the role of climate change education at primary school level in enhancing Torwali children resilience to cope with extreme climate events in the region. Climate change education is an evolving discipline and participants shared the relevance of their teaching and existing climate related content in the textbooks as part of climate change education in primary schooling. There was no uniform definition of climate change education obtained from the findings. Furthermore, the findings stressed the role of education in addressing climate change. Education is central to raising awareness about climate change among children and the community. Education provides right knowledge to tackle climate misinformation and encourage the involvement of children and community in activities that contribute in preservation of local environment and reducing the impacts of extreme events.

Finally, Children are often assumed to be passive victims of climate change, but they have agency and can play an active role in addressing climate change when provided with right knowledge and skills (Treichel, 2020). The findings indicated how climate change education can enhance the resilience of children and their role as the founding paving stone in raising awareness that they can share with their parents, neighbors and peers. Often children's parents are illiterate or less literate about climate change. Children play a crucial role in changing their parents' beliefs about climate change and become an active agent in raising awareness.



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## Appendix 1:

### **Certificate of Consent**

**Title of the research project:** Integrating climate change education into primary school education in Pakistan – perspectives of indigenous Torwali community primary school teachers

**Objectives of the study:** This study is conducted as part of completion of my master’s in International Development Studies at University of Utrecht, Netherlands. The research is focused on the perspectives of primary school teachers on climate change education who belongs to indigenous Torwali community in Swat, Pakistan. This study aims to understand what indigenous primary school teachers think about climate change education and how integration of climate change education into primary school education can prepare indigenous children to cope with the rising climate induced disasters in the area. The relevance of the study to the participants is embedded in their understanding of the issue.

Broadly, this study addresses climate change education in primary school. This study will be conducted online by taking interviews on platforms that are convenient for the participants. It could be Team video/audio call, WhatsApp video/audio call or regular mobile phone voice call.

**Researcher/research team:** Nafees Ahmad, University of Utrecht

#### **Consent:**

**The participant orally confirms that he/she has:**

- received and read the information sheet, or it has been read to him/her
- understands that the location of the project will be known and that he/she will be referred to as “a member of the community” or similar in publications (or more detailed information will be used according to your preference)
- has had the opportunity to ask questions and that any questions have been answered to the participant’s satisfaction.
- understands that his/her participation is voluntary and that he/she can withdraw from the study at any time without any need to justify the decision.
- understands the information provided related to data privacy, data storage, and publication
- understands the rights associated with the information provided.

#### **A: Oral consent to participate:**

- The interviewee consents voluntarily to participate in this study

**B: Oral consent to use personal data**

The interviewee consents voluntarily that the following personal data may be publicly used:

- Name \_\_\_\_\_
- Name of organization \_\_\_\_\_
- Job title / status in community \_\_\_\_\_

**C: Confirmation of age**

- The interviewee is either over 18 years old or above 16 years old and a guardian gave consent to participate in the interview

**Participant number** \_\_\_\_\_

**Print Name of Researcher/person taking the consent** \_\_\_\_\_

**Signature of Researcher /person taking the consent** \_\_\_\_\_

**Date** \_\_\_\_\_

Day/month/year

Appendix 2:

**INTERVIEW PARTICIPANT INFORMATION SHEET**

**Integrating climate change education into primary school education in Pakistan – perspectives of indigenous Torwali community primary school teachers**

Version date: 20 April 2024

**Researcher / research team:** Integrating climate change education into primary school education in Pakistan – perspectives of indigenous Torwali community primary school teachers

**Objectives of the study:** This study is conducted as part of completion of my master's in International Development Studies at University of Utrecht, Netherlands. The research is focused on the perspectives of primary school teachers on climate change education who belongs to indigenous Torwali community in Swat, Pakistan. This study aims to understand what indigenous primary school teachers think about climate change education and how integration of climate change education into primary school education can prepare indigenous children to cope with the rising climate induced disasters in the area. The relevance of the study to the participants is embedded in their understanding of the issue.

Broadly, this study addresses climate change education in primary school. This study will be conducted online by taking interviews on platforms that are convenient for the participants. It could be Team video/audio call, WhatsApp video/audio call or regular mobile phone voice call.

**Your participation:** You are being invited to take part because you are teacher and have been teaching to indigenous children. The selection of participants is opportunistic, and you are selected while considering that. There are 15 participants in total.

**Duration:** The interview will take about 40 to 60 minutes.

**Voluntary participation:** Your participation in this study is voluntary and you may withdraw from the study at any time without having to say why.

**Data privacy:** The study looks out on potential ethical issues of honesty and integrity, objectivity, confidentiality, responsible publication, anonymity, and inform consents. The researcher is mindful about them and makes sure to comply with them. To ensure anonymity and confidentiality, no personal details such as email address, phone number or address will be collected throughout the research process. The researchers will make sure that data collected cannot be traced to the participants by coding all participants, as opposed to using names.

The transcript of the interview will be accessible to the researcher. If you give permission to audio record the interview, the recording will be password protected and deleted after it has been transcribed.

**Data publication:** The researcher is conducting the study as part of completing his master's degree. The results obtained will serve only the academic purpose of the study. The researcher has not decided on publishing the results of the study but if published they will be shared with the participants if they wish to read. Information that could disclose your identity will be removed to respect your choices for data privacy.

**Data safety and storage:** The data will either be stored on the researcher computer with secure password protected vault. If necessary, the primary data will be destroyed following conferment of the award subject to the timeframes determined by University of Utrecht policies.

If you agree to have the interview recorded, the recording will be deleted after transcribing, which will be no later than 3 months after recording. As mentioned it is your choice what personal data we record but for data privacy and safety we will always store the information that could identify you separate to the transcript of your interview.

**Potential risks:** Given the nature of the study, the researcher does not identify any potential risk to the participants for taking part in the study.

**Benefits:** Participants will not be paid to participate in the study. There are no possible benefits realized by taking part in the study, but your input will further elaborate on the issue that the study is exploring and open pathways for future research.

**Your rights:**

- Be fully informed about the study and about how your data is processed.
- Request access to your data
- Change your answers
- Request deletion of your data

- Restrict how your data is used
- Ask us to transfer your data to someone else

**Please note:** If you do not give us permission to record your name, our data will also not be linked to your name. Because of this, we may be unable to identify which data within the dataset comes from you. Hence, unless you can give us additional information that may help us to identify your responses, we may be unable to comply with (some of) the rights above.

**Contact information:** If you have any questions, comments, or concerns about this study, you may contact the main researcher at [n.ahmad@students.uu.nl](mailto:n.ahmad@students.uu.nl) You may also contact the main researcher if you wish to make use of your rights above.

### Appendix 3:

#### Interview Guide

Hello my name is Nafees Ahmad. This study is conducted as part of completion of my master's in International Development Studies. The research is focused on the perspectives of primary school teachers on climate change education who belongs to indigenous Torwali community in Swat, Pakistan. This study aims to understand what indigenous primary school teachers think about climate change education and how integration of climate change education into primary school education can prepare indigenous children to cope with the rising climate induced disasters in the area. The relevance of the study to the participants is embedded in their understanding of the issue.

#### Interview Schedule

1. I am interested to hear how you make sense of the increased number of floods occurring in the area/village?
  - a. Prompt: do you think a relationship between climate change and increased in the floods in the area/village?
2. How does the children in school make sense of the increased number of floods occurring in the village?
3. Do you think the climate crisis (floods) should be a concern for schoolteachers and experts? Why? Why not?
4. What do you think is the impact of increasing floods due to climate change on children?
  - a. Prompt: and their schooling?-Can you share an example? [disruptions of studies both for children and teacher]
5. I am interested to hear what you teach to children and how it is relevant to climate change?
6. What you think the advantage of teaching children about climate change? Do you think teaching children about the risks of disasters can better prepare to cope with disasters due to climate change?
7. Are you aware of the concept 'climate change education'? (Other terms that are used to describe this area of work are environmental education/disaster education? Can you tell me what you understand by 'climate change education'?)
8. How is climate change education part of the teaching/curriculum at your school? Can you share examples as how climate change education is practiced in the school?
9. I am interested to hear what you think the barriers of climate change education in formal primary education?

10. What would change in the village after CCE?
11. Is there anything that we have not talked about in relation to climate change education that you would like to tell me?