THE HEAT IS ON!
Towards a Climate Resilient Education System in Bhutan
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THE HEAT IS ON! TOWARDS A CLIMATE RESILIENT EDUCATION SYSTEM IN BHUTAN
Executive Summary

This Bhutan country study forms part of a UNICEF Regional Office for South Asia (ROSA) study on the impacts of and responses to climate change across education systems in South Asia. The overall aims of the regional study are:

- To generate evidence on how education systems in South Asia are monitoring, assessing and responding to the impacts of climate change
- To identify the main educational tools and mechanisms being employed in planning for and addressing climate risks
- To showcase the perceptions of key education sector stakeholders regarding further embedding climate change considerations and concerns into education tools and mechanisms.

The research methodology employed includes desk-based documentary review, national key stakeholder surveys, school-level focus group discussions (FGDs) and a U-Report process targeting youth from 14 to 24 years old.

Bhutan is the only carbon negative country in the world. Despite the country’s longstanding commitment to tackling climate change and protecting its rich and diverse natural environment, it is highly vulnerable to the adverse impacts of climate change. Bhutan is exposed to a wide range of hydro-meteorological hazards, especially floods. Rapidly melting glaciers and snow fields in the Himalayas due to rising global temperatures elevate the risk of glacial lake outburst floods (GLOFs) and pose a serious threat to settlements, infrastructure and agriculture lands concentrated along the main river basin. Risks of windstorms, forest fires and heatwaves are also on the rise. Heavy dependency on climate-sensitive agriculture and hydropower sectors aggravate Bhutan’s vulnerability to climate change. Localized water insecurity is already a serious concern. Rising water demand due to population growth, expansion of industries and urbanization in the context of diminishing water resources further exacerbates water insecurity. Bhutan ranks 111 out of 163 countries in UNICEF’s children’s climate risk index of 2021.

This study has examined the direct and indirect impacts of climate change on the education system in Bhutan. Since earthquakes have been the main cause of school infrastructure damage and destruction, earthquake proofing of schools has been prioritised, climate proofing lagging behind. Many schools situated on steep terrain or very close proximity to riversides expose students to, respectively, high landslide and flood risk. Clean water availability at schools is one of the strong concerns expressed by the stakeholders participating in this research.

Day school students (i.e., those who commute to school) who have to walk a long distance in difficult road conditions struggle in normal times but more so under increasingly severe weather conditions. Climate change-induced hazards and shocks have been adversely affecting Bhutan’s agrarian communities. Crop failures and a deteriorating household economy are key factors leading to school dropout as struggling families need support from their children.

In terms of student physical health and wellbeing, climate change-exacerbated water-borne and vector-borne diseases are on the rise. Skin diseases and allergies are also evident in increasing number of students. Climate change may very well also be affecting student psychosocial wellbeing. 81 per cent of Bhutanese youth U-Report respondents indicate that they are anxious about climate change and its implications for the future.
With regard to climate change impacts on education provision and learning quality, no evidence has been found concerning systematic monitoring of lesson time loss and effects on student academic performance due to climate change-induced hazards and shocks. Hot and crowded classrooms lacking cooling and ventilation facilities pose an increasing challenge to both teachers and students. Field-based experiential and inquiry-based learning, once very common among the teachers when they were young, is becoming less viable given increasing disaster and health threats posed by the changing climate.

This study has also examined education sector responses to climate change, exploring the seven key education system components (i.e., policies, plans and strategies; finance; curriculum, teaching and learning; teacher capacity development; communication, coordination and partnership; school/community student participation platforms; monitoring, evaluation and accountability). Main research findings include the following:

- The draft National Education Policy does not clearly spell out climate change risk reduction and resilience building considerations for education. Education policy alignment with key national climate change policy and strategy documents is lacking.
- The Ministry of Education currently does not have resource allocations earmarked for systemic and school-based climate change risk reduction and resilience building.
- Environmental Science is an exemplar secondary subject for learning about climate change-related topics through an interdisciplinary and holistic lens, but it has very limited reach and purchase among secondary students, being an optional subject.
- Systematic climate change-focused teacher training opportunities are overall lacking in Bhutan. Prevailing teacher-centred and exam-oriented pedagogical practices in the Bhutanese classroom are a huge obstacle standing in the way of implementing action-oriented and practical climate change teaching and learning.
- This research has not identified how and to what degree the Ministry of Education has been involved in the national cross-sectoral climate change decision-making and in coordination bodies such as the National Climate Change Committee and the Climate Change Coordination Committee.
- Student climate change and pro-environmental action opportunities outside of the classroom depend on the enthusiasm of individual teachers and schools. There are unique student engagement opportunities such as environmentally-oriented school clubs (e.g., nature clubs) and the HEROES project which explores climate change impacts on local biodiversity. However, the number of students involved in these remains small.
- There exist no mechanisms and tools in place to systematically monitor climate change impacts on school infrastructure, student and teacher health and wellbeing, education provision and learning quality.

Recommendations to make the education system in Bhutan more resilient in the face of increasing climate change risk are as follows:

### Climate Change Impact Monitoring and Assessment

- Consult with relevant stakeholders, consider developing climate change impact and vulnerability indicators and subsequently integrate them into the existing education sector data collection mechanisms/tools (e.g., EMIS and other school-level assessment tools) as appropriate.
- Develop inter-ministerial collaborative and partnership mechanisms between the Ministry of Education and relevant government Ministries/Agencies (e.g., Ministry of Health; Ministry of Labour and Human Resources; National Commission for Women and Children; National Disaster Management Authority; National Environment Commission) in gathering, sharing and analysing climate change impact data as it concerns children and schools.

### Policies, Plans and Strategies

- Incorporate climate change risk reduction and resilience building in the National Education Policy and the Education Roadmap for the 21st Century. In such a process ensure that the needs of children who are most vulnerable are met (e.g., children with disabilities, children in remote locations).
- Integrate education, health, nutrition, water, sanitation and hygiene (WASH) and child protection interventions more strongly to protect student health and wellbeing from the adverse effects of changing climate.
- Integrate lessons learned and strategy for learning continuity developed during the COVID-19 school closure period into the national education system as standard operating procedures for education in emergencies.

### Finance

- Raise awareness among Ministry of Education and Ministry of Finance officials at national level and among government officials and education personnel at sub-national (district and municipality) level regarding the benefits of financing climate change mitigation and adaptation activities in the education sector. Help them understand the synergies and co-benefits accruing from initiatives on disaster prevention and climate action in the education sector.
• Among education policy makers, create a shared understanding of what constitutes a ‘climate action’ budget in the education sector and how to utilize it effectively.
• Ensure equitable allocation and distribution of a ‘climate action’ budget in the education sector (once it is set up) across the country.
• Consider creating a financial tracking system for a ‘climate action’ budget in the education sector to better monitor budget allocation and utilization.
• Explore ways to better mobilize and share resources among relevant government Ministries and Agencies and other Ministry of Education partners, including the private sector, for climate change mitigation and adaptation activities in the education sector.
• Explore external climate funding opportunities (e.g., Green Climate Fund, Adaptation Fund) with a view to filling the current resource gap so as to enhance climate resilience in the education system.

Curriculum, Teaching and Learning

• Encourage secondary students to take the Environmental Science subject or, ideally, make the subject mandatory for all secondary students. In either case, help develop the capacities of secondary school teachers who teach Environmental Science to enable them to meet the increasing demand.
• Conduct a thorough curriculum audit at both primary and secondary levels to identify existing opportunities and gaps for climate change risk reduction and resilience building learning and action. Build on the opportunities and close the gaps.
• Ensure clear curriculum progression in terms of knowledge, skills and dispositional learning outcomes concerning climate change mitigation and adaptation; also forge cross-curricular and interdisciplinary links between treatment of climate change mitigation and adaptation in different subjects at the same grade level.
• Integrate life skills education opportunities that comprehensively address child protection, WASH, health and nutrition to better deal with multifaceted climate change crises. Help students develop critical and creative thinking skills, problem solving skills, self-management skills, advocacy and leadership skills, coping skills, and the skills and attitudes to live in harmony with nature in an age-appropriate manner.
• Provide students with opportunities, arenas and platforms to take concrete actions and fulfil change agency and advocacy roles in mitigating climate change impacts at school, in their local community and beyond.

Teacher Capacity Development

• Conduct a thorough teacher education curriculum audit for both pre-service and in-service training programmes to identify existing opportunities and gaps for climate change risk reduction and resilience building. Build on the opportunities and close the gaps.
• Provide periodical up-skilling trainings for in-service Environmental Science teachers on the subject content and pedagogies.
• Build teacher capacities in employing a wide range of active/participatory and child-centred pedagogies, such learning modalities being vital for action-oriented climate change education.
• Build teacher capacity in promoting environmentally sustainable practices at school and in the community that are most relevant to the locality (e.g., water conservation; tree planting; school-based agriculture programmes, waste management; awareness raising and advocacy techniques) through in-service teacher trainings/workshops.

Communication, Coordination and Partnership

• Ensure the education sector needs are represented in the national-level climate change decision-making and coordination platforms (e.g., the National Climate Change Committee and the Climate Change Coordination Committee).
• Examine whether and how the existing disaster management coordination bodies in the education sector (i.e., Ministry of Education’s Disaster Management Unit, school disaster management committees) address climate change-induced hazards and vulnerabilities. Based on the findings, broaden current remits as necessary. Ensure collaboration with National Environment Commission (NEC), Ministry of Finance and local governments in this regard.
• Ensure a multi-sector partnership approach to embedding climate change risk reduction and resilience building components in the curriculum, relevant education policy and strategy documents, education financing and in teacher capacity development programmes.

School/Community Student Participation Platforms

• Create a sustainable support mechanism for school nature clubs (or other similar environmentally-oriented clubs) and school scouting programmes by identifying and integrating climate change specific terms of reference and stipulating minimum levels of action; also create a ‘green star’ recognition scheme for individuals and schools making a unique contribution to mitigating and adapting to climate change.
• Explore the ways in which to involve more students and schools in the HEROES project.
• Link Bhutanese students to national, regional and global climate change movements/networks through online platforms and/or face-to-face gatherings as appropriate.
Section 1
Introduction

1.1. Aims and Scope of the Study

This Bhutan country study is one of the eight country studies undertaken as part of a UNICEF Regional Office for South Asia (ROSA) study of the impacts of and responses to climate change across education systems in South Asia.

The overall aims of the regional study are threefold:

- To generate evidence on how education systems in South Asia are monitoring, assessing and responding to the impacts of climate change.
- To identify the main educational tools and mechanisms being employed in planning for and addressing climate risks.
- To showcase the perceptions of key education sector stakeholders regarding further embedding climate change considerations and concerns into education tools and mechanisms.

In examining the interface between climate change and education, this study focuses on three areas:

- Direct and indirect climate change impacts on education systems in terms of learning facilities, access to education, student health and wellbeing, education provision (including teacher health and wellbeing) and learning quality, each having significant implications for the quality of education.
- Education system responses to climate change, exploring seven key education system components (i.e., policies, plans and strategies; finance; curriculum, teaching and learning; teacher capacity development; communication, cooperation and partnership; student participation platforms; monitoring, evaluation and accountability).
- Key education sector stakeholder experiences, perceptions and needs concerning climate change education.

1.2. A Brief Note on Methodology

The methodology employed is a desk-based documentary review, combined with consultations with, and information gathered from, key stakeholders in Bhutan through national-level stakeholder surveys, school-level focus group discussions (FGDs) and a U-Report¹ targeting youth from 14 to 24 years old.

12 national-level stakeholders from Government, UN organizations, national NGOs and academic institutions were identified by the UNICEF Bhutan Country Office according to the criteria set for the study and each was invited to participate in national-level stakeholder surveys conducted via email. Seven survey contributions followed between 26 June 2020 and 19 July 2021. Email follow-up communications with selected survey respondents took place for further information gathering and clarification. The SWOT (strengths, weaknesses, opportunities and threats) analysis discussion in Section 5 was one element in the stakeholder survey.

Two school-level FGDs were conducted on 6 and 7 September 2021 using the Zoom platform. The six secondary school teachers (4 male, 2 female) involved were from different parts of the country: three from the western part (Paro, Thimphu), two from the central part (Punakha Sarpang) and one from the eastern part (Trashigang). The seven students that participated in the student FGD (3 boys, 4 girls) were from the same school that the teacher participants came from.

Before the FGD, student participants were asked to draw two images, i.e., one on ‘climate change in my village/locality’ and another on ‘climate change impacts on my education’. Drawings prepared by the students were presented individually for discussion at the FGD.

Analysis of the data gathered is integrated into the relevant sections of this report. The U-Report process was implemented and analysed by a UNICEF ROSA team leading to the completion of the publication, Rising to the Challenge: Youth Perspectives on Climate Change and Education in Bhutan (Lopez Rello & Ackers 2021)² upon which this report draws.

¹ U-Report, run by UNICEF and its partners, is a messaging tool that empowers young people around the world to engage with and speak out on issues that matter to them.
² For a full report, go to: <https://www.unicef.org/rosa/media/18906/file/Rising%20to%20the%20Challenge%20-%20Youth%20Perspectives%20on%20Climate%20Change%20in%20Bhutan.pdf>
Section 2
Climate Vulnerabilities in Bhutan

Located on the slope of the eastern Himalayas, the land locked least developed country\(^3\) of Bhutan is the only carbon negative\(^4\) country in the world due to its low carbon emissions and a high level of carbon sequestration or carbon sink capacity owing to its abundant healthy forests.

Despite the country’s longstanding commitment to tackling climate change and protecting and conserving its rich and diverse natural environment, Bhutan is highly vulnerable to adverse effects of global climate change owing to the fragile mountainous ecosystem and its socioeconomic conditions. The country is characterised by rugged mountainous terrain with altitudes ranging from 160 meters to over 7,500 meters above sea level. Bhutan has three distinctive climate zones. Southern plains and foothills with altitudes below 2,000 meters are sub-tropical with high humidity and heavy rainfalls especially during the monsoon. The central belt with altitudes from 2,000 to 4,000 meters is characterised by river valleys with cool winters, hot summers and moderate rainfall. The northern belt above 4,000 meters consists of snow-capped peaks and alpine meadows with extremely cold winters and cool summers (NEC 2020a; World Bank & ADB 2021).

Bhutan is exposed to a wide range of climate change-induced hazards, floods being the most frequent. The central, north western and southern regions face high flood risk. Due to rising global temperatures, glaciers in the Himalayas are experiencing an accelerated retreat rate, leading to the formation of new lakes and expansion of supra-glacial lakes, which exacerbates the risk of glacial lake outburst floods (GLOFs) carrying the potential to cause catastrophic floods in downstream areas.\(^5\) In the past, Bhutan has experienced a total of 21 GLOFs (National Centre for Hydrology and Meteorology 2021). As over 70 per cent of the settlements, infrastructures and agriculture lands are located along the main river basin, Bhutan is highly vulnerable to riverine flooding triggered by heavy monsoon rains and glacial melt (UNDRR & ADPC 2020; World Bank Group 2021; World Bank & ADB 2021). The country is susceptible to landslides due to earthquakes, its steep mountainous topography, changes in precipitation patterns and land use, among others. Bhutan is also experiencing more frequent and widespread windstorms. The risk of forest fires is particularly high during the dry winter season. It is projected that because of climate change heat and cold waves are likely to be intensified in coming decades. The sub-tropical southern belt is at higher risk of prolonged and more frequent extreme heat events (NEC 2020a; World Bank 2021a; World Bank & ADB 2021).

The country’s population is 734,374 (NSB 2021), young people between the ages of 10 and 24 years making up 26.6 per cent (UNFPA 2021). According to UNICEF’s first child-focused climate risk index, based on children’s exposure to climate and environmental hazards, shocks and stresses as well as children’s vulnerabilities to the shocks, Bhutan ranks 111 out of 163 countries (UNICEF 2021). The population is predominantly rural and 37.8 per cent of the total population live in the urban areas in 2017. It is

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\(^3\) Bhutan is to graduate from the list of Least Developed Countries by 2023 (Gross National Happiness Commission 2019).

\(^4\) Taking in more carbon dioxide than it produces.

\(^5\) According to National Centre for Hydrology and Meteorology (2021), there are 567 glacial lakes in Bhutan.
projected that half of the population will be residing in the urban areas by 2037 (NEC 2020a; NSB 2019). Rapid rural to urban migration in search for employment opportunities is on the rise, which puts pressure on urban infrastructure, social services, water availability and waste management. Urban dwellers in informal settlements are particularly prone to hazards (GNHCS & UNDP 2016). While Bhutan has progressed gender equality, vulnerability to climate change is differentiable by gender. A recent study highlights that more than half of the study participants agree that climate change impacts women more than men. This is due to increasing household and livelihood workload as men migrate for work. Women have limited decision-making powers and limited access to information concerning forest, water and waste management (National Commission for Women and Children 2020).

Bhutan’s vulnerability to climate change is further aggravated on account of its heavy dependency on a climate-sensitive agriculture sector. In 2015 the sector employed approximately 60 per cent of the total working population. Temperature rise, changes in precipitation patterns and unpredictable weather events and pest outbreaks affect agricultural yield, including farmer’s main cash crops such as rice and potatoes (NEC 2020a). Food insecurity and malnutrition are already serious concerns in Bhutan\(^6\), especially among children living in remote regions. Climate change is likely to exacerbate these problems as the majority of the population depends on subsistence agriculture (UNICEF ROSA 2020).

Bhutan’s economy is also driven by the highly climate-sensitive hydropower sector, which is a major source of government revenue. Almost all of the domestic electricity demand is met by hydropower and Bhutan exports hydropower electricity to India. Erratic precipitation patterns, dry months, reduced snowfalls and melting glaciers impact the volume and timing of the flow of the rivers, threatening hydropower generation. Increasing flash floods and landslides might damage hydropower and power distribution infrastructure (NEC 2020a; UNDRR & ADPC 2020).

Although water is one of the abundant natural resources in Bhutan, localized water scarcity and drying water sources are already a major concern. It is projected that dry areas will become drier and wet areas wetter so the risk of localized water scarcity and droughts is increasing (NEC 2020a). Pressure on water resources is further exacerbated due to increasing demand arising from population growth, changes in lifestyle and expansion of economic activities. A study forecasts serious water scarcity in the capital Thimphu by 2030 due to glacier melt and rapid urbanization (Tariq et al. 2021).

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\(^6\) According to the 2015 National Nutrition Survey, the rate of stunting under five children was 21.2 per cent. A higher percentage of children in rural areas, especially those in the Eastern region were stunted (29.1 per cent) (Department of Public Health 2015).
Climate Change in My Locality

Teacher and student FGD participants were asked about climate change impacts they have noticed and experienced in their locality.

Teacher FGD participants report temperature rises and unpredictable weather patterns as some of the key changes they experience due to climate change. A male teacher who has lived in Paro since the 1990s explains that no one has previously considered the provision and usage of fans at schools in Paro, located at high altitude (2,200m above sea level) but ‘fans have become necessities now’ to cope with heat in the summer. A male teacher in Thimphu (a capital city located at 2,334m above sea level), shares his great disappointment at not seeing snowfalls at his school in last 2 or 3 years, although continuous snowfalls in winter were common in a previous decade. Lack of snow, he says, ‘affects us psychologically’. A female teacher in Thimphu explains that they do not have rains when they expect and they have lots of unexpected rains for many days. ‘The weather is erratic, unlike before. When we were younger we had predictable seasons… but now things are changing.’ A male teacher says that Punakha, located at 1,200m above sea level and at the confluence of two big rivers, faces hotter summer and wetter monsoon seasons. Flash floods are more and more likely during the monsoon season, a great worry among his students. A female teacher from Sarpang, a city in the south of Bhutan describes experiencing continuous heavy rains during the monsoon season, leading to more frequent flash flooding and landslide events.

There are changes happening in my locality. In the spring time, I have noticed that crops are not growing well. Farmers are facing a lot of problems. In summer, usually it is really green and we have only little rainfalls but now due to climate change, we have lots of heavy rainfalls and farmers are losing crops due to landslides. In autumn, normally it is green but suddenly the tops of trees are drying up. In winter, usually we have snowfalls but we no longer have them. I feel sad about these changes as I don't have opportunities of seeing what I have seen before. I really like snow but now I no longer see it.

Sonam Chokey, Class 10, Thimphu

Bhutan is a small and mountainous country. We face a lot of problems due to global warming. People in the southern parts of the country cut down a lot of trees. During the monsoon season, people are affected by landslides, heavy rainfalls and floods. Roads are blocked and damaged. Main water sources are washed away, so we face water scarcity. We do not have clean drinking water. Children face a lot of challenges. Sometimes they have to cross the rivers or streams. In summer, children tend to be absent from school due to high rainfalls and floods.

Kinzang Deki Selden, Class 12, Sarpang
In Paro there are a lot of people who do not care for their waste. They burn their waste directly, which causes pollutions and changes the climate. The air is warming up a lot at a higher rate than we have experienced before. Last year we received no snow. A major problem in our community is low farming productivity, which causes poverty. We face water shortages in Paro due to climate change temperatures increase, which make streams and ponds evaporate more and make them dry. In summer, we are having more floods in our community. When temperatures increase, mountain glaciers start to melt faster, which causes floods. Floods destroy crops in our community. In Paro there are a lot of sawmills. People do not follow rules regularly and cut more trees than what they have been given permission to.

Thinley Norbu & Chencho Lham, Class 10, Paro

Due to global warming we are experiencing very hot weathers. Because of that we have less availability of water and farmers are facing lots of problems. They are not able to get good crop production because of irregular rain patterns. In the last few weeks it rained continuously. Farmers are complaining that their crops were damaged after they put in so much hard work.

Sonam Choki, Class 11, Punakha

We are in far eastern part of Bhutan. We have moderate temperatures. During the monsoon season, we experience very heavy rainfalls and we cannot do normal outdoor activities. Water is mostly contaminated and we do not have safe drinking water. People in our locality cannot do our daily work as we do not get nutritious food. On top of that we cannot visit other places due to floods and landslides along the roadside.

Ugyen Dorji, Class 5, Trashigang
Section 3  
Climate Change Impacts on Education System

While the impacts of climate change in the education sector have not been researched and data has not been gathered systematically in Bhutan before, the national-level stakeholders participating in the survey (n=7) consider climate change impacts to be ‘serious’ or ‘extremely serious’ in the following areas: clean water availability (6 responses), student physical health and safety (5 responses), student mental health and wellbeing (5 responses), student retention (5 responses) and Ministry of Education finance and resources (5 responses). According to the U-Report survey conducted for this study, 62 per cent of Bhutanese youth respondents (n=337) claim that their education/studies have been affected by climate change (Lopez Rello & Ackers 2021).

3.1. Learning Facilities

In terms of school infrastructural damage and destruction in Bhutan, earthquakes have been the main concern. According to a school-level hazard, vulnerability and capacity assessment conducted in 2015, the surveyed schools identified earthquakes as the highest priority hazard, followed by storms (windstorms, thunder storms), fires and flooding (Ministry of Education 2016). While earthquake proofing of school infrastructure has been the main focus, climate proofing of schools lags behind overall (National Stakeholders 1, 4).

The available data indicate that windstorms have been a recurring hazard. Between 2011 and 2015, over 100 schools and early childhood care and development centres across the country reported damage from windstorms (Ministry of Education 2016). In a survey of the status of disaster risk reduction (DRR) in Bhutanese schools, 19 per cent of teachers and 14 per cent of students reported that they felt the school building was not safe. The low quality of building materials, the absence of a maintenance budget and quality control reinforcement are some of the key points raised by teacher participants concerning unsafe buildings (Dupka et al. 2018).

Many schools in Bhutan are set in precarious locations such as on steep terrain or by riversides so making them highly prone to landslides and flooding. In the case of GLOF incidents, schools are very likely to be swept away downstream, exposing children to life-threatening danger (National Stakeholder 3). Old community-built schools which do not adhere to building standards are vulnerable to all hazards, including increasing floods and storms (National Stakeholder 5).

In Bhutan 68 per cent of water sources in schools are piped water and other sources include protected or unprotected springs (15.3 per cent and 7.6 per cent respectively) and stored water (7.6 per cent). On average, 77.2 per cent of schools have access to adequate drinking water, while 65.8 per cent and 51.7 per cent of schools have adequate water to meet handwashing and sanitation needs respectively (Ministry of Education 2021). According to 2018 research, lack of water and facilities at school for washing and changing during menstruation is the reason for one quarter (24.9 per cent) of adolescent schoolgirls missing school (Ministry of Education & UNICEF 2018).

Both teacher and student FGD participants from Sarpang highlight water scarcity as already very serious in summer since their main water sources are damaged by flash floods. Due to lack of clean drinking water, students suffer from dehydration, which in turn negatively affects their ability to concentrate on study. A teacher explains that her school tries to harvest rainwater to address the water scarcity, but they face water quality issues. In the words of the teacher, ‘Rainwater is not drinkable. We are next to India. Water is acid and polluted even though our country does not produce pollution. It is not preferable for our students to drink rainwater directly.’ This clearly suggests the importance of cross-border and regional efforts to tackle climate change and pollutions.
3.2. Education Access

In Bhutan access to education has improved significantly in recent years and the country is close to achieving universal primary enrolment. In 2021 the net enrolment rates for primary and secondary education are 93.5 per cent and 75.3 per cent respectively. Provision of free school meals and boarding facilities has contributed to significant improvements in school enrolment over a short period of time (Ministry of Education 2021). Out-of-school children are assumed to be those who live in remote and hard-to-reach areas, children of nomadic communities and migrant populations, and children with learning difficulties and special needs (Gross National Happiness Commission 2019).

In the U-Report survey conducted for this study, 28 per cent of Bhutanese youth respondents (n=337) report that climate change has affected their journey to school (Lopez Rello & Ackers 2021).

National stakeholders participating in the survey of this study point out that day school students who have to walk very steep and landslide prone roads and those who have to cross rivers face significant challenges due to heavy rains and snows, landslides, and flooding, among other hazards. Students living in remote areas struggle on account of difficult walking conditions in normal times but more so under harsh weather conditions. In the FGD, a female student reports that ‘in summer, day school students tend to be absent due to high rainfalls, and floods in southern parts of Bhutan such as Sarpang’. Similarly, a male teacher from Punakha points out the difficulties which day school students face: they are ‘always very stressed during the monsoon season due to the difficult road conditions between home and school’.

Due to rising temperatures and increasingly erratic and destructive weather events triggered by climate change, Bhutan’s agrarian communities are particularly affected, which negatively impacts children’s education. A male teacher attending the FGD explains that most of his students are ‘from humble family backgrounds’ and that the dropout rate increases when farmers cannot harvest and cannot support their children’s education. ‘Most of the students want to go back and support their families on the farm’. A previous Ministry of Education study on enrolment and retention strategies in Bhutan found ‘poverty’ to be the major cause of school dropout especially in rural areas (Ministry of Education undated a).

When we get wet, we become sick. When it is very hot, going to school is a challenge. In addition to going to school, studying is a challenge due to ever changing temperatures and weathers. Our school is very near the river, only about 100 meters distance. There is a growing concern that the school might be flooded. The bridge construction is not very stable but many students go through it. Unexpected and sudden rainfalls cause landslides so we face a higher risk of death. We are ok so far. Those who have to walk a long distance might face landslides. It is difficult to know when to expect landslides.

Wangchen Nyima, Class 10, Thimphu
3.3. Student Health and Wellbeing

Due to rising temperatures, changing levels of precipitation and humidity, vector-borne and water-borne diseases are on the rise in Bhutan. Changing climate is more favourable to the lifecycle of the vectors and the infectious agents that transmit water-borne diseases. Vector-borne diseases such as dengue and chikungunya have emerged in the last few years and their incidence is increasing. In 2019, Bhutan experienced dengue outbreaks in two locations, Phuentsholing and Duksum. It is projected that malaria and dengue as well as diarrhoeal disease will become more prevalent under current climate change projections (NEC 2020a; UNDRR & ADPC 2020; WHO & UNFCCC 2015).

Student and teacher FGD participants highlight that in addition to vector- and water-borne diseases, students are affected by allergies and skin disease. A male teacher notices that nowadays most of his students become allergic to pollen produced by invasive plants rapidly colonising the Punakha valley. As a result, his students miss some lessons when they have to go to hospital. A female teacher points out that boarding students face particular health challenges. When a few students become infected by water-borne or other virus diseases, ‘it spreads like a wild fire’ among boarding students. She goes on to explain that boarding students also suffer from various types of unknown skin diseases which happen annually, especially during the monsoon season.

In my school, due to increasing temperatures, students are feeling lazy. They lose concentration on their studies. During the class, one of my classmates sleeps most of the time, which negatively impacts her education.

Previously, we did not have much infectious disease and problems of mosquitoes in our communities but in recent years we have an increasing number of mosquitoes. We have not had malaria so far but we might have it in 10 or 20 years in our region.

We have a problem of excess rain which might cause flooding. The roads to school might be damaged and students might not be able to go to school.

Thinley Norbu & Chencho Lham, Class 10, Paro

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Asked how worried they were about climate change and what it means for the future, overall 81 per cent of Bhutanese youth U-Report respondents (n=243) indicate that they are ‘very/extremely worried’ (43 per cent) or ‘a little worried’ (38 per cent) (Lopez Rello & Ackers 2021, 16). Students in the FGD agree that they sometimes feel troubled as they consider the implications of climate change. In the words of a male student:

I sometimes feel fear and anxiety... Fear of getting diseases. Fear of flooding. Because of the fears, we might not be able to perform well at school and end up with low scores, which might affect our future negatively. Due to climate change, changes keep happening and do not stop. I hear about glaciers melting and if they all melt one day we might not have any fresh water and we might not be able to survive.

Similarly, a female student in Punakha is concerned that one day local rivers might dry out and she feels worried that her generation will face many challenges due to global warming. In her words: ‘our children will face much more challenges than us.’

The Ministry of Education has been working to institutionalize a school guidance and counselling system with a view to providing more effective support for student development, health and wellbeing in all schools. As of 2021, 146 full-time counsellors are in place across the country (Ministry of Education 2020a, 2021). A national stakeholder points out that counsellors are currently available only in middle and higher secondary schools and there is a dearth of counsellors in lower secondary and primary schools. In the face of increasing climate change-induced hazards and shocks and their negative impact on students, psychosocial support by school counsellors should be enhanced and made available more widely (National Stakeholder 4).
3.4. Education Provision and Learning Quality

Climate change brings multiple changes, including more extreme weather conditions. In the northern Alpine zone of Bhutan with extremely cold winters, schools already have a shorter academic year (about 7 months) than schools in other parts of Bhutan. This is because schools in the higher altitudes are closed longer as heavy snows disrupt student journeys and schools lack facilities to cope with very cold temperatures in winter (National Stakeholders 2, 7). Schools in the southern lowlands tend to be closed for a few days or even a few weeks due to flooding threats. Affected schools normally look for alternative education provisions and follow education in emergency protocols prepared by the school disaster management committees supported by the Ministry of Education’s Disaster Management Unit (National Stakeholder 7).

Teachers in the FGDs indicate that teaching time reduction due to school closures and students’ inability to commute to school creates an extra burden for teachers since they have to provide remedial or extra lessons. A male teacher working at a school for visually impaired children explains that his class with children with multiple disabilities is very small with only 2 or 3 students. ‘So, if one child is absent due to illness, we cannot teach until the child recovers and returns.’

The Ministry of Education has established formative and summative assessment mechanisms to measure student’s learning achievements, but the existing mechanisms do not particularly consider climate change impacts on student learning outcomes (National Stakeholder 2).

A hot and crowded classroom without cooling and ventilation facilities presents a challenge for both students and teachers. Student FGD participants commonly state that when they feel hot, they feel ‘lazy’, ‘sluggish’ or ‘sleepy’ and find it difficult to concentrate in the lessons, which, as a result, affects their academic performance.

According to the teacher FGD participants, similar to the classrooms, teachers’ rooms do not have cooling and warming facilities. They thus find it difficult to work. Under the harsh weather and difficult road conditions, they cannot go to school either, especially during the monsoon season.

Teachers at the FGD point out that today’s students lack opportunities for experiential and discovery learning in nature, which were once common when the teachers were young. A female teacher says, ‘We blended with nature. Learning by going out in the field and conducting research and surveys by ourselves.’ But she states today’s student generation does not have the same opportunities that her generations had. She goes on to say that:

Now due to climate change we never know when flash floods might happen. So we cannot think of aquatic ecosystems as learning spaces. Just a few days ago we lost three children to the river because of flash flooding. We now have restrictions and do not allow children to go near the water for projects, discovery and experience. We also keep children away from hikes and trail walks. We never know what insects, hazards and disasters might be there. This generation does not get to explore nature. This restriction affects the learning of our children.

Similarly, a male teacher points out the vital importance of outdoor field-based learning to help students deepen their understanding of climate change and other related topics under the Environmental Science subject. He says, ‘our students need to go deeper into nature, working with and learning from nature and sharing experiences.’ However, he explains that due to policy restriction, it is not easy for teachers to take students on field-based learning.

Due to hot weathers, all the students and teachers are facing problems. Our classrooms are not very big. Two small fans do not cool down the high temperatures in the classroom. As my drawing shows, most of the students are feeling drowsy and falling asleep due to the heat. We face such a condition from April to September.

Sonam Choki, Class 11, Punakha
Section 4
Education Sector Responses to Climate Change

4.1. Policies, Plans and Strategies

Since 1972 Bhutan’s development philosophy has been guided by a holistic and sustainable development concept called Gross National Happiness (GNH), which seeks to achieve equitable economic development while protecting the country’s rich natural environment, preserving its unique cultural heritage and ensuring good governance. GNH is a fundamental paradigm shift away from a prevailing development model based on Gross Domestic Product (GDP), which overemphasizes ever-increasing production and consumption at any cost. Covering nine GNH domains (i.e., living standard; health; education; ecological diversity and resilience; cultural diversity and resilience; community vitality; time use; psychological wellbeing; good governance), Bhutan developed a comprehensive GNH index with 33 indicators for holistic and integrated policy development, resource allocation, progress measurement and reporting (Thinley & Hartz-Karp 2019).

The 2008 Constitution of the Kingdom of Bhutan states that ‘every Bhutanese is a trustee’ of the environment and highlights that it is ‘the fundamental duty of every citizen’ to contribute to environmental protection, biodiversity conservation, and prevention of all forms of ecological degradation. Maintaining a minimum of 60 per cent of total land under forest cover in perpetuity is one of the constitutional mandates (Kingdom of Bhutan 2008). As of 2016, 70.77 per cent of the country is under the forest cover (NEC 2020a).

After resolving to remain carbon neutral in 2009, Bhutan has maintained its strong commitment to stay carbon neutral and enhance its capacity to respond, mitigate and adapt to climate change in a number of key national policy and strategy documents. In the Twelfth Five Year Plan 2018-2023, carbon neutrality, climate and disaster resilience are key components of one of the 17 key deliverables referred to as National Key Result Areas (NKRA):s (Gross National Happiness Commission 2019). The Climate Change Policy of the Kingdom of Bhutan 2020 reiterates the country’s strong commitment to carbon neutrality and to ensuring ecologically balanced sustainable development as well as climate change resilience building by protecting the health, lives, livelihoods and happiness of the people in Bhutan (NEC 2020b). The policy’s means of implementation broadly include education as follows:

Increase public awareness and understanding on climate change among different groups of people at all levels through education and outreach programmes including through use of print, broadcast and online media (ibid., 8).

The policy takes a strong cross-sectorial approach to combatting climate change and indicates that all government ministries and institutions should integrate appropriate gender responsible climate change actions in their mandates, policies and programmes. Such climate change actions are to be informed by situation analyses of gender gaps and should address the identified gender considerations. A specific action indicated for the Ministry of Education includes curriculum development on the environment and climate change (ibid.). While the policy highlights the importance of meaningful participation of all relevant stakeholders in climate change actions, there is no specific mention of children and young people.

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The country’s commitment to carbon neutrality is the foundation of the Bhutan’s Nationally Determined Contribution (NDC) documents (NEC 2015; Royal Government of Bhutan 2021) which highlight priority areas for meeting both mitigation and adaptation needs. Except for a fleeting reference, the education sector is overall absent from Bhutan’s NDC documents.

Further to the mandate of the Disaster Management Act of Bhutan 2013, the Ministry of Education has developed the Education Sector Disaster Management and Contingency Plan laying out comprehensive disaster management plans for the education sector at all levels. The overall goal of the plan is ‘to ensure safety, plan for education continuity during disasters, and strengthen risk reduction and resilience through education’ (Ministry of Education 2016, 18). While this policy aims at addressing all actual and potential hazards in Bhutan, fast-onset hazards (i.e., flooding, fires, landslides, earthquakes, storms) are the focus and slow-onset hazards such as drought and other climate change-induced events such as cold and heat waves are not encompassed by the policy.

In other key education sector policy and strategy documents such as the Bhutan Education Blueprint 2014-2024 (Ministry of Education 2014) and the National Education Policy (draft) (Ministry of Education 2019), climate change considerations are not explicitly spelled out. Without making any references to climate change mitigation and adaptation, the National Education Policy proposes school-based agricultural programmes linked to the local food production systems. Such programmes help students enhance their understanding of climate change impacts while giving them hands-on experiences of sustainable agricultural practice, thereby contributing to climate change adaptation and mitigation actions. The same policy states that all education institutes ‘shall provide safe, supportive, inclusive, and learner-friendly environment that is conducive to holistic learning, intellectual engagement and growth’ (ibid., 14), thus providing a fertile ground for fostering student capacities that address multifaceted climate change crises.

The Guidelines for School Design reminds those who are engaged in new school building development to consider current and projected climate conditions (Ministry of Education 2020b).

According to the U-Report survey conducted for this study, 54 per cent of Bhutanese youth respondents consider that the government should be taking most action to address climate change, followed by children (19 per cent) and teachers (13 per cent) (see Box 1). 81 per cent of Bhutanese youth respondents also think that it is at least ‘likely’ that the government will take action to address climate change in the wake of the COVID-19 pandemic, the percentage being the second highest in the region (Lopez Rello & Ackers 2021). The Royal Government of Bhutan recognizes that a green recovery from the pandemic is ‘entirely in tune with Bhutan’s GNH philosophy’ (Gross National Happiness Commission 2021, 100).

4.2. Finance

The Royal Government of Bhutan places the highest importance on education and allocates a substantial proportion of its resources to the education sector. In the fiscal year (FY) 2021-22, about 19 per cent of the total government budget was allocated to the education sector, the highest proportion of national budget allocation (Ministry of Finance 2021). Public education provision in Bhutan is built upon the principle of free education and primary and secondary students are provided with free tuition, textbooks, sports-items, learning materials including stationary as well as boarding facilities and food on a needs basis (Ministry of Education 2021).

The Ministry of Education is committed to equitable distribution of resources by considering the geographical location and needs of schools serving socioeconomically disadvantaged communities and providing emergency contingency funding (Ministry of Education 2019). The School Feeding Programme, initially supported by the World Food Programme from 1974 and solely funded by the government

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**BOX 1. UNICEF ROSA U-Report: Who should be taking the most action to address climate change? (n= 314 in Bhutan; n= 13,532 in the region) (Lopez Rello & Ackers 2021, 21)**

<table>
<thead>
<tr>
<th></th>
<th>Response</th>
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<tbody>
<tr>
<td></td>
<td>Governments</td>
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<tr>
<td>Bhutan</td>
<td>54%</td>
</tr>
<tr>
<td>Region</td>
<td>62%</td>
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</tbody>
</table>
from 2019, has had multiple benefits for school-going children. These include increasing enrolment and attendance rates and the improved health and wellbeing of children. As of 2021, there are 101,782 students benefitting from the school feeding programme (Ministry of Education 2021).

As per the Twelfth Five Year Plan the disaster prevention programme in the education sector (e.g., emergency plan and guideline development, stockpiling of emergency materials, training for disaster focal teachers, review of the Disaster Management and Contingency Plan) is to be funded (Gross National Happiness Commission 2018). District (dzongkhag) and municipality (thromdes) governments have education sector-related responsibilities such as school infrastructure development and renovation, disaster preparedness/prevention activities in schools (ibid.). Whether these disaster-related activities include climate change mitigation and adaptation is a moot point.

Some national-level stakeholders participating in the survey are concerned that climate change will further impact the Ministry of Education’s finances that are already under constraint. Schools need to have climate resilient infrastructures and facilities to cope with increasing hydrometeorological hazards, and severe cold and heat waves. More psychosocial support for students will be also required so that they can better cope with the traumas and stresses triggered by climate change-induced hazards and shocks (National Stakeholders 2, 4, 7).

In order to develop a holistic understanding of the environmental systems among students, the Environmental Science curriculum takes an interdisciplinary approach by drawing essential concepts and principles from a number of disciplines such as biology, geography, physical science, social science, mathematics, history and economy. The Environmental Science syllabuses are logically structured according to the following four strands:

- **Strand 1: Systems in Nature** (learning about ecosystem function, carrying capacity and interdependency)
- **Strand 2: Environmental Issues and Concerns** (learning about interactions between human societies as well as ecological imbalance/environmental problems caused by human actions)
- **Strand 3: Natural Resource Management** (learning about how to conserve and manage the environment, including changing own consumption patterns)
- **Strand 4: Sustainable Development** (understanding the importance of the environment in relation to development and understanding concepts of sustainable development and GNH) (ibid., x-xii).

4.3. Curriculum, Teaching and Learning

An overall majority of the national-level stakeholders participating in the survey conducted for this study considers that climate change-related topics are overall ‘limited’ in both the primary and secondary curriculum. However, the Environmental Science subject is a notable exception. Introduced in 2015 as an optional subject for Classes 9 to 12, its goal is:

- to build a cadre of young people equipped with knowledge, skills and values to engage them in the conservation of natural heritage, promoting sustainable and equitable use of natural resources, preventing all forms of environmental degradation in the pursuit of GNH (Royal Education Council 2016, 2018a, 2018b, 2019a).
The *Environmental Science* curriculum puts a strong emphasis on employing participatory, interactive and inquiry-based pedagogical approaches such as discussions, outdoor activities, hands-on experience, experiments and team work and community engagement (ibid.). At the teacher FGD a male *Environmental Science* teacher states that ‘through this subject, our students get to know the basics of climate change and they think differently about how they can create a difference in society.’ Importantly, he goes on to say that students understand that ‘we human beings are the crux of the problem as well as the problem solvers.’

See Box 3 for the indicative list of climate change-related topics in other subjects indicated by the national-level stakeholders: *Science, Social Studies and Geography.*

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**BOX 2. Environmental Science: Textbook Chapter Titles and Subtitles Relevant to Climate Change**

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<tbody>
<tr>
<td>9</td>
<td>Ecosystem (Organization &amp; Types)</td>
<td>Natural Resource Degradation (Disturbance of Natural Resources; Natural and Anthropogenic Causes; Pressure on Natural Resources)</td>
<td>Fundamentals of Watersheds Management (Key Features of a Watershed; Watersheds of Bhutan &amp; Their Management)</td>
<td>Environment &amp; Development (Development Perspective of Bhutan- GNH)</td>
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<td></td>
<td>People &amp; Environment (Human Dependence on Natural Resources)</td>
<td>Disaster Risk &amp; Environment (Hazard, Vulnerability &amp; Risk)</td>
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<tr>
<td></td>
<td>Biodiversity (Importance of Biodiversity; Biodiversity in Bhutan)</td>
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<tr>
<td>10</td>
<td>Ecosystem (Ecological Interactions)</td>
<td>People &amp; Environment (Ecological Footprint; Overharvesting of Natural Resources)</td>
<td>Biodiversity (Biodiversity Conservation in Bhutan)</td>
<td>Environment &amp; Development (Sustainable Development Initiatives in Bhutan)</td>
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<tr>
<td></td>
<td>Balance in Nature (Carrying Capacity; Ecosystem Stability)</td>
<td>Natural Resource Degradation</td>
<td>Land Use &amp; Management (Waste Management)</td>
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<td></td>
<td>Biodiversity (Flora and Fauna Diversity in Bhutan)</td>
<td>Disaster Risk &amp; Management (Environmental Degradation &amp; Disaster)</td>
<td>Energy Resources (Methods of Conserving Energy)</td>
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<td></td>
<td></td>
<td>Pollution &amp; Climate Change (Global Warming; Climate Change; Phenology)</td>
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<tr>
<td>11</td>
<td>Structures &amp; Functions of Ecosystem (Spheres of the Earth; Biomes &amp; Ecosystems)</td>
<td>Natural Resources Degradation (Natural Resources &amp; Its Exploitation)</td>
<td>Biodiversity &amp; Measurement (Measuring Biodiversity)</td>
<td>Development &amp; Environment (Relationship – Development &amp; Environment)</td>
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<tr>
<td></td>
<td>Balance in Nature (Carrying Capacity of the Ecosystem)</td>
<td>Pollution (Natural Resources &amp; Its Pollution)</td>
<td>Biodiversity Conservation</td>
<td>Sustainable Development (GNH &amp; Sustainable Development)</td>
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<tr>
<td></td>
<td>People &amp; Environment (Interdependency of Humans &amp; Environment)</td>
<td>Climate Change (The Climate Systems; Phenology &amp; Climate Change)</td>
<td>Water &amp; Land Waste Management (Water Conservation; Entrepreneurship &amp; Waste Management)</td>
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<td></td>
<td></td>
<td>Disaster &amp; Environment (Hazards &amp; Disasters)</td>
<td>Energy Conservation (Energy Management &amp; Efficiency)</td>
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</tr>
<tr>
<td>12</td>
<td>Structures &amp; Functions of Ecosystem (Ecosystem Services)</td>
<td>People &amp; Environment (Ecological Footprint; Urbanization, Industrialization &amp; Environmental Change)</td>
<td>Climate Change (Mitigation &amp; Adaptation to the Climate Change)</td>
<td>Sustainable Development (Future Policies &amp; Alternatives)</td>
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<td></td>
<td>Balance in Nature (Ecological Succession)</td>
<td>Natural Resources Degradation</td>
<td>Disaster Management (Disaster Management System)</td>
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<tr>
<td></td>
<td></td>
<td>Pollution</td>
<td>Biodiversity Conservation (Biodiversity &amp; Poverty Alleviation; Efforts to Manage Biodiversity)</td>
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<td></td>
<td></td>
<td>Climate Change (Phenology &amp; Climate Change)</td>
<td>Biodiversity Management</td>
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<td>Water &amp; Land Management</td>
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<td></td>
<td>Energy Conservation</td>
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<td></td>
<td></td>
<td></td>
<td>Environmental Management (Green Economy)</td>
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### BOX 3. Climate change-related Topics: Indicative List

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Textbook Chapter Titles (Subtitles)</th>
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<tbody>
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<td><strong>Primary Education</strong></td>
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</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Class 4</strong></td>
<td>Living Things &amp; Their Environment (Plants and Animals in Their Habitat)</td>
</tr>
<tr>
<td></td>
<td>Green Plant (Effect of Temperature and Water on the Growth of Plant)</td>
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<td></td>
<td>Our Earth (Seasons in a Year)</td>
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<td><strong>Class 5</strong></td>
<td>Energy (Forms of Energy; Saving Energy)</td>
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<tr>
<td></td>
<td>Living Things &amp; Their Environment (Disappearing Forest; Protecting Habitat)</td>
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<tr>
<td><strong>Class 6</strong></td>
<td>Living Things &amp; Their Environment (Human &amp; Animals Affecting Habitat)</td>
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<tr>
<td><strong>Social Studies</strong></td>
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<tr>
<td><strong>Class 4</strong></td>
<td>Weather (Types of Weather; Traditional Knowledge on Weather)</td>
</tr>
<tr>
<td></td>
<td>Forest (Importance of Forest; Types of Forest)</td>
</tr>
<tr>
<td></td>
<td>People &amp; The Environment (The Environment; Human Activities; Pollution and Its Types; Waste and Its Types; Conservation of Environment)</td>
</tr>
<tr>
<td></td>
<td>Hazard &amp; Disaster (Types of Hazard and Disaster)</td>
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<tr>
<td><strong>Class 5</strong></td>
<td>Forests (Community Forest; Protected Areas)</td>
</tr>
<tr>
<td></td>
<td>Rivers (Importance of Rivers)</td>
</tr>
<tr>
<td></td>
<td>People &amp; The Environment (Human Activities; Impacts of Pollution; Waste Management; Conservation of the Environment)</td>
</tr>
<tr>
<td></td>
<td>Hazard &amp; Disaster (Windstorm; Flood; Landslide)</td>
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<td><strong>Class 6</strong></td>
<td>Climate (Factors Affecting Climate; Climatic Zones; Climate and People)</td>
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<td></td>
<td>People &amp; the Environment (Hydropower; Urbanization; Climate change)</td>
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<td></td>
<td>Hazard &amp; Disaster (Lightning; Glacial Lake Outburst Flood)</td>
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<td><strong>Secondary Education</strong></td>
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<tr>
<td><strong>Geography</strong></td>
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<tr>
<td><strong>Class 7</strong></td>
<td>Physical Environment (Atmosphere; Weather and Climate)</td>
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<tr>
<td></td>
<td>People &amp; Environment (Environment; Natural Resources; Hazard and Disaster)</td>
</tr>
<tr>
<td><strong>Class 8</strong></td>
<td>Physical Environment (The Atmosphere; Weather and Climate; Soil)</td>
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<tr>
<td></td>
<td>People &amp; Environment (The Environment; Natural Resources; Hazard and Disaster)</td>
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<tr>
<td><strong>Class 9</strong></td>
<td>Atmosphere (Composition of the Atmosphere)</td>
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<td>Natural Environment (Ecosystem Change)</td>
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<td>Hazard &amp; Disaster (Common Disasters in Bhutan; Disaster Management)</td>
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<td><strong>Class 11</strong></td>
<td>Atmospheres (Climate Change)</td>
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<td><strong>Science</strong></td>
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<td><strong>Class 7</strong></td>
<td>Living Things &amp; Their Environment (Ecosystem and Its Components)</td>
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<tr>
<td><strong>Class 8</strong></td>
<td>Human Organisms (Environment, Lifestyle and Health)</td>
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<td><strong>Class 9 (Biology)</strong></td>
<td>Organisms in Its Environment (Human Impacts on the Environment)</td>
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<td><strong>Class 10 (Biology)</strong></td>
<td>Living Things in Their Environment (Ecosystem; Biodiversity and Sustainability)</td>
</tr>
</tbody>
</table>

An overall majority (78 per cent) of Bhutanese U-Report participants (n=397) state that they have learned about climate change through Geography (Lopez Rello & Ackers 2021). From Classes 7 to 10 Geography is one of the compulsory subjects and for Classes 11 and 12, it is one of the elective subjects in the humanities strand, thus enjoying a wide reach among students. In contrast, Environmental Science, an optional subject, has very limited reach among the students. Since 2015, approximately 35 per cent of secondary schools have been offering the subject (National Stakeholder 2). Among the schools offering the subject, the percentage of students who opt for Environmental Science varies significantly from school to school. According to the teacher FGD participants, in one school less than 10 per cent of students choose it, while in two other schools more than 50 per cent of students take it. There is a school where no one in Class 11 takes the subject.

As a response to the need to integrate disaster preparedness and disaster risk reduction into formal and non-formal education curriculum, the Royal Education Council developed the Disaster Risk Reduction Curriculum Framework. Guided by five principles (i.e., Safety and Resilience, Inclusive Approach, Gross National Happiness, Developmental Approach; Place-based Education), it lays out learning standards as well as learning outcomes and objectives (Royal Education Council 2019d). The Framework broadly acknowledges that DRR overlaps with climate change adaptation measures.

The National Education Policy lays down that curriculum delivery should employ pedagogical approaches that promote active student participation, communication, collaboration, creativity and critical thinking, among others (Ministry of Education 2019). On the same token, national stakeholders highlight the importance of employing more problem-based, project-based, place-based and interactive approaches for climate change education so that children can internalise the importance of nature. In terms of student assessment for climate change learning, the same stakeholders put an emphasis on formative assessment focused on actions and changes in behaviours, values and attitudes (e.g., observation of student behaviours and demonstration, project-based assessment).

In the U-Report, 51 per cent of Bhutanese youth respondents (n=501) report that they are unable to explain what climate change and global warming are about. When asked about what they most wanted to learn about climate change, 29 per cent of Bhutanese youth participants (n=390) report that they would like to learn about all aspects of climate change, followed by learning about local actions (26 per cent) and learning about climate change causes and impacts (16 per cent) (see Box 4).

**BOX 4. UNICEF ROSA U-Report: What do you most want to learn about climate change? (n=390 in Bhutan; n=18,266 in the region)**

(Lopez Rello & Ackers 2021, 18)
As the section above mentioned, Environmental Science is the most prominent curricular subject when it comes to teaching and learning about climate change in the formal school system. In introducing this new subject, teachers were given orientation sessions, including practical phenology techniques (National Stakeholders 2). At the teacher FGD, those who teach Environmental Science explain that they have received only a very short training. As the subject covers ‘a vast amount of content’ and ‘teachers do not have an environmental science background’, one female teacher thinks that there should be more professional development opportunities focusing on both subject content and pedagogical approaches. A male teacher points out that lack of key equipment (e.g., geographical information systems or GIS, water testing kits) at school is another obstacle to providing hands-on experience for his students. Currently, individual teachers have to make their own efforts to mobilize the resources (e.g., borrowing water testing kits from a NGO).

According to the national survey on DRR status in Bhutanese schools, training opportunities for teachers on DRR are limited. Trainings are short and usually a one-off event without further follow-up and reinforcement support (Dukpa et al. 2018).

In Bhutanese classrooms, didactic and examination-focused teaching is predominant. In the pre-service teacher training programmes, lecture-based teaching remains common and student teachers are not trained to become reflective practitioners (Ministry of Education 2014).

### 4.5. Communication, Coordination and Partnership

The National Environment Commission (NEC) is the highest and multi-sectoral decision-making body on all matters concerning the environment in Bhutan. Serving also as the high-level National Climate Change Committee (NCCC), NEC considers all policy and regulatory matters concerning climate change and ensures implementation of the Climate Change Policy across all sectors (NEC 2020a, 2020b). The Climate Change Coordination Committee (C4) offers a further national-level multi-stakeholder forum to discuss and coordinate climate change-related matters in Bhutan and makes recommendation to the NCCC and NEC. C4 consists of 15 high-level members representing different government agencies, private sector and civil society organizations (ibid.; World Bank Group 2021).

Disaster risk management coordination mechanisms are better established within the education sector. There is the Ministry of Education’s Disaster Management Unit, which is tasked with systematically reducing disaster risks, enhancing disaster preparedness, establishing functional coordination mechanisms, building disaster risk management capacity at all levels, and ensuring implementation of disaster management policies within the sector (Ministry of Education updated b). The Unit implements education in emergencies whenever the situation arises such as in the COVID-19 pandemic. More than 90 per cent of Bhutanese schools have established a Disaster Management Committee (National Stakeholder 3) and an overall majority of schools have a Disaster Focal Teacher (Dukpa et al. 2018). To what degree disaster management arrangements in the education sector also take on board climate change mitigation and adaptation requires further research. One national stakeholder points out that disaster risk management activities at the school level are very much focused on earthquakes and no platform exists to address climate change impacts and vulnerabilities (National Stakeholder 7).

### 4.6. School/Community Student Participation Platforms

Primary and secondary schools in Bhutan offer a wide range of school clubs to help students develop new skills,
pursue their interests and advance their potentials. More than one fifth of schools have nature clubs which offer children a platform to explore, learn about and protect the local natural environment. Nature clubs in Bhutanese schools were initially established with the support of Royal Society of Protection of Nature more than a decade ago. There are other clubs focused on raising environmental awareness building: environment clubs, bird watching clubs, waste management clubs, to name a few. School nature club membership number ranges from 10 to 100 depending on the size of the school (National Stakeholders 2, 3). Common activities conducted by nature clubs include competitions on environment-related topics, tree planting, cleaning and beautification campaigns at school and in the community, celebration of World Environment and Water Days and awareness raising campaigns, among others (Royal Education Council 2018c). There is a general concern about the viability of nature clubs, however, as schools do not receive any grant or funding from the government, development partners or the private sector (National Stakeholder 2).

In addition to school clubs, some schools organize competitions and exhibitions on environmental themes and attached to community clean-up campaigns, while others conduct river and water protection, waste management and awareness raising programmes throughout the school year.

The Ministry of Education promotes scouting activities designed for the holistic development of children and young people. In 2021, there are 74,680 male and female students across the country participating in the scout movement (Ministry of Education 2021). While this research has not found details of what scouting activities involve, the movement could be galvanized behind climate change action to build school and community resilience and contribute to carbon neutrality.

According to the U-Report survey conducted for this study, 92 per cent of Bhutanese youth respondents express that they would like to do something to address climate change if given the necessary support. ‘Teaching own community the impact of climate change’ (35 per cent) is the most dominant wish expressed, followed by ‘joining an organization that addresses climate change’ (24 per cent) and ‘helping my family and community to suffer less from the impacts of climate change’ (15 per cent) (see Box 6). See also Box 7 for some noteworthy child and youth engagement opportunities aiming to raise awareness of climate change and empower young people to exercise their agency in pursuance of positive change.

BOX 6. UNICEF ROSA U-Report: If you had the necessary support, what would you like to do to address climate change in the future?
(n=273 in Bhutan; n=11,607 in the region)
(Lopez Rello & Ackers 2021, 26)
4.7. Monitoring, Evaluation and Accountability

Overall, in Bhutan disaster and climate-related data collection has been done in an ad-hoc manner by various institutions and government agencies. Absence of key disaster and climate data is among major challenges in developing risk-informed policies, finance and sectorial interventions (UNDRR & ADPC 2020, 17). The data generated by school children participating in the HEROES project (see Box 7) make an important contribution to filling in current climate change impact data gaps and brings some understanding of how and to what extent climate change is impacting the ecosystem in Bhutan.

Box 7. Child and Youth Engagement and Action

**Himalayan Environmental Rhythms Observation and Evaluation System (HEROES) Project**

Established in 2014, the Himalayan Environmental Rhythms Observation and Evaluation System (HEROES) project implemented by the Ugyen Wangchuck Institute for Conservation and Environmental Research (UWICER) is a school- and community-based citizen science initiative to monitor climate change impacts. HEROES involves 21 schools representing different ecological zones in Bhutan. Students in the participating schools gather phenological data on seasonal lifecycles of plants and wildlife in their school vicinity over 10 months per year. Annually, 103 plants are observed. So far more than 1,500 students and 110 teachers were trained on phenology monitoring protocols. The project also collects weather data (i.e., temperature, humidity, snowfall, wind speed) in a weather station established in the school. The data generated through the HEROES project feed into the national climate data repository maintained by UWICER and the data gathered helps professionals and the general public understand how and to what extent climate change is impacting on the ecosystem in Bhutan (HEROES 2015, Yandon 2019).

At the FGD, a female teacher from a school participating in the HEROES project explains that her school has 10 plants to observe - when they develop buds, burst into flower, produce fruits and their leaves colour and fall, all giving important biological indicators of climate change impacts. The HEROES project has provided nature club and Environmental Science students with opportunities to better appreciate how climate change is unfolding and how climate change is impacting upon local biodiversity. Using the data gathered, students at her school took some actions to curb climate change such as community awareness raising campaigns and study of solar energy.

**National STEM Olympiad**

The National STEM (Science Technology Engineering Mathematics) Olympiad is an annual competition organized by the Ministry of Education in collaboration with the Royal Education Council to encourage scientific innovation and creativity among middle and higher secondary school students. Each year it has a specific focus. The theme for 2020 was ‘Science and Technology for Sustainable Waste Management’. The proposals submitted by schools are evaluated by a team of evaluators, out of which the 30 best proposals are selected. The initiators of the 30 proposals receive a small amount of seed funding to develop their innovation. Then the 15 best innovations are selected to exhibit their innovative work in the national STEM Olympiad. Cash prizes and certificates are awarded according to the competition results (Delma 2018; National Stakeholder 2).

**Youth Advocacy Network Bhutan (YAN Bhutan)**

Youth Advocacy Network Bhutan is one of the largest youth networks organized and run by Bhutanese youth volunteers. It aims at empowering young people to bring about positive change through advocacy and meaningful engagement in policies and programmes related to young people. One of their recent initiatives is the Local-Eco Action Initiative. Targeting college students, this initiative helps participating youth develop meaningful and tangible local solutions to address present and future environmental issues that concern them most (Youth Advocacy Network Bhutan 2021).

National stakeholders participating in this study confirm that there are no monitoring tools and systems with respect to climate change impacts in the education sector. They suggest that likely climate change impacts should feature in the existing monitoring tools and systems (National Stakeholders 2, 4, 7). The Education Management Information System (EMIS), in place since 2011, does not capture data concerning climate change impacts in the education sector. While EMIS has been reviewed recently and upgrading work is on-going (Ministry of Education 2020a), there is no evidence of progress towards considering gathering climate change impact and vulnerability data in the education sector.
Section 5
Discussion and Recommendations

Box 8 below synthesises the perspectives of national and state stakeholders participating in this study. It indicates the overall strengths and weaknesses of the education system’s response to climate change in Bhutan as well as opportunities presented and threats/obstacles to be faced.8

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Centrally-driven education system</td>
<td>• Difficulties in making systematic changes in a centralized system</td>
</tr>
<tr>
<td>• <em>Environmental Science</em> in the curriculum (Classes 9-12)</td>
<td>with the ever-present prospect of reservations at top management level</td>
</tr>
<tr>
<td>• Nature clubs as a platform for environmental education and action</td>
<td>• The limited reach of the optional <em>Environmental Science</em> subject</td>
</tr>
<tr>
<td>• Education being one of the biggest sectors, having a multiplier effect</td>
<td>• The small proportion of students involved in school nature clubs</td>
</tr>
<tr>
<td>• The Education Sector Disaster Management and Contingency Plan</td>
<td>• Insufficient cross-sectorial collaboration and coordination</td>
</tr>
<tr>
<td>• Royal support and patronage for environmental issues</td>
<td>• Resource and budget constraint on teacher training</td>
</tr>
<tr>
<td>• Existing environmental conservation initiatives in Bhutan</td>
<td>• Limited resource/reference materials for teachers and schools</td>
</tr>
<tr>
<td>• Environmental conservation as one of the pillars of Bhutan’s development philosophy, Gross National Happiness and built into the Constitution</td>
<td></td>
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<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats/Obstacles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• With adequate resources and support, the education system could drive sustainable development</td>
<td>• Lack of implementation capacity, expertise and funding</td>
</tr>
<tr>
<td>• Natural bounty of Bhutan which provides the real time context for studying climate change</td>
<td>• Sustainability and efficacy of the <em>Environmental Science</em> subject</td>
</tr>
<tr>
<td>• Easy dissemination of climate change information across what is a small population</td>
<td>and nature clubs without external technical and financial support</td>
</tr>
<tr>
<td>• Building on the existing <em>Environmental Science</em> subject, mainstreaming environmental and climate change education from the early grades</td>
<td>• Addressing competing priorities in a crowded curriculum drawing on limited resources</td>
</tr>
<tr>
<td>• Climate Studies and Environmental Science courses offered by the Royal University of Bhutan could be used as platform for awareness raising</td>
<td>• Climate change not a priority in the curriculum</td>
</tr>
<tr>
<td>• As a carbon neutral country, the scope for attracting international funds to help the education sector implement climate change-related curriculum</td>
<td>• Different education priorities put forward by successive governments, leaving a lack of consistency and continuity</td>
</tr>
<tr>
<td></td>
<td>• Complacency among citizens (including children) and lack of climate change awareness, especially among those who are illiterate</td>
</tr>
<tr>
<td></td>
<td>• Accelerating consumerism in both urban and rural areas and resultant waste management problems</td>
</tr>
</tbody>
</table>

Note: SWOT entries indicate participants’ own placement of ideas but some entries are open to different interpretation as to where they should be placed.
Climate Change Impact Monitoring and Assessment in the Education System

Overall, in Bhutan availability of disaster and climate change-related data is very limited. There are no mechanisms and tools in place to systematically monitor climate change impacts on school infrastructure, education access, student and teacher health and wellbeing, education provision and learning quality. The Education Management Information System is not designed to capture climate change impact data.

Recommendations

- Consult with relevant stakeholders, consider developing climate change impact and vulnerability indicators and subsequently integrate them into the existing education sector data collection mechanisms/tools (e.g., EMIS and other school-level assessment tools) as appropriate.
- Develop inter-ministerial collaborative and partnership mechanisms between the Ministry of Education and relevant government Ministries/Agencies (e.g., Ministry of Health; Ministry of Labour and Human Resources; National Commission for Women and Children; National Disaster Management Authority; National Environment Commission) in gathering, sharing and analysing climate change impact data as it concerns children and schools.

Policies, Plans and Strategies

Predicated on the country’s holistic development philosophy of Gross National Happiness, Bhutan’s commitment to remain carbon neutral and build climate change resilience is strongly articulated in a number of key national policy and strategy documents, including the Twelfth Five Year Plan, the Climate Change Policy and the Bhutan’s Nationally Determined Contribution. While the Climate Change Policy takes a clear cross-sectorial approach involving the education sector, the role of education sector is yet to be fully recognized and articulated in relation to Bhutan’s climate change actions.

The education sector has advanced disaster management plans with a strong emphasis on earthquake risk reduction, but climate-induced slow-onset hazards and shocks require more attention. Overall, climate change actions are yet to be translated into actuality in the education sector. The draft status of National Education Policy and the emerging Education Roadmap for the 21st Century provides an opportunity to closely align these key education sector policy and strategy documents with the above-mentioned national climate change policy/strategy documents so that climate change vulnerability, risk reduction and resilience building are strongly integrated in the education system.

When education access is likely to be disrupted by recurring hydro-meteorological hazards and oftentimes gradual but sometimes rapid environmental degradation, alternative learning pathways and greater cross-sectoral planning involving health, nutrition, WASH and child protection become vital in efforts to ensure education access, retention and quality of learning.

Key lessons learned from the COVID-19 responses should inform developing standard operating procedures for education that can be implemented in other emergencies.

Recommendations

- Incorporate climate change risk reduction and resilience building in the National Education Policy and the Education Roadmap for the 21st Century. In such a process, ensure that the needs of children who are most vulnerable are met (e.g., children with disabilities, children in remote locations).
- Integrate education, health, nutrition, WASH and child protection interventions more strongly to protect student health and wellbeing from the adverse effects of changing climate.
- Integrate lessons learned and strategy for learning continuity developed during the COVID-19 school closure period into the national education system as standard operating procedures for education in emergencies.

Finance

The Ministry of Education currently does not have a resource allocation specifically earmarked for climate change risk reduction and resilience building. An allocation for the disaster prevention programme exists in the education sector but this research has not unearthed details. There should be discussions and consensus building around

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8 The Education Roadmap, under development during the time of research, is a framework providing guidance and advice on pedagogical strategies for curriculum improvement and innovation (Bhutan Times Editorial 2021).

10 The Royal Education Council created the Education in Emergency (EiE) curriculum by modifying the curriculum. During the school closures the ‘adapted curriculum’ (focusing on literacy and numeracy from Pre-Primary to Class 6, theme-based curriculum from Class 7 to 12) was delivered using remote learning modalities (i.e., TV and radio, online lessons, social media, self-learning printed materials). Self-instruction materials were adjusted for students with special needs. After the school re-opening, the ‘prioritized curriculum’ focused on key and fundamental subject ideas were delivered for Class 9-12 (while lower classes continued to use the adapted curriculum) (Ministry of Education 2020a; UNICEF & UNESCO 2021).
what a climate change relevant budget would look like for the education sector in Bhutan.

Bhutan’s free public education provision and the School Feeding Programme play an important role in ensuring universal access to education. As climate change disproportionately affects those who are experiencing the most severe multiple disparities, equitable resource allocation becomes more important. In this sense, it is timely that there is a specific emphasis on equitable resource distribution in the National Education Policy, which opens up an opportunity to embed climate change vulnerability considerations concretely in resource allocation formulas and mechanisms.

In the context of the government’s decentralization agenda, resource allocations for local government are on the rise (Gross National Happiness Commission 2019). It is therefore important to enhance awareness among district and municipal level government personnel and education officers about the benefits of financing climate change actions in the education sector.

Curriculum, Teaching and Learning

While the integration of climate change-related topics is overall limited in the school curriculum in Bhutan, Environmental Science is an exemplar subject. Taking a holistic and interdisciplinary approach, Environmental Science helps students develop their understanding of the multi-faceted human causes of climate change as well as promoting human agency behind positive individual and collective actions to tackle the climate crisis. Its commendable content and approach notwithstanding, it has very limited reach and purchase among secondary students being an optional subject. Teachers at the FGD point out that if there are more demands for green and sustainable jobs in the Bhutanese society, more students will be motivated to opt for the subject.

Field-based experiential and inquiry-based learning, which was once very common among the teachers as youngsters is becoming less viable and practicable given increasing disaster and health risks (e.g., flash floods, landslides, insect bites) posed by the changing climate. Stricter school rules and regulations mean that nowadays it is very difficult for individual teachers to offer first-hand nature immersion learning and experiences for their students. Schools and teachers need to consider creative ways to teach about their unique local environment.

Multidimensional climate crises require broad life skills to address mutually reinforcing issues of child protection, WASH, health and nutrition holistically. Students need to develop and hone critical and creative thinking skills, problem solving skills, self-management skills, coping skills for difficult emotions and uncertainties, advocacy and leadership skills as well as skills and attitudes disposing them to live in harmony with nature, among others.

Recommendations

- Raise awareness among Ministry of Education and Ministry of Finance officials at national level and among government officials and education personnel at sub-national (district and municipality) level regarding the benefits of financing climate change mitigation and adaptation activities in the education sector. Help them understand the synergies and co-benefits accruing from initiatives on disaster prevention and climate action in the education sector.
- Among education policy makers, create a shared understanding of what constitutes a ‘climate action’ budget in the education sector and how to utilize it effectively.
- Ensure equitable allocation and distribution of a ‘climate action’ budget in the education sector (once it is set up) across the country.
- Consider creating a financial tracking system for a ‘climate action’ budget in the education sector to better monitor budget allocation and utilisation.
- Explore ways to better mobilize and share resources among relevant government Ministries and Agencies and other Ministry of Education partners, including the private sector, for climate change mitigation and adaptation activities in the education sector.
- Explore external climate funding opportunities (e.g., Green Climate Fund, Adaptation Fund) with a view to filling the current resource gap so as to enhance climate resilience in the education system.
Towards a Climate Resilient Education System in Bhutan

Teacher Capacity Development

Systematic climate change-focused and DRR teacher training opportunities are overall lacking in Bhutan. Predominantly teacher-centred and exam-oriented teaching and learning practices in the Bhutanese classroom are a huge obstacle standing in the way of implementing action-oriented and practical climate change teaching and learning.

Enhancing teacher development and support is one of the programmes indicated under the National Key Result Area 7 (quality education and skills) of the Twelfth Five Year Plan. As the programme aims to provide 80 hours of professional development for each teacher every year, climate change-related knowledge, skills, attitudes and behaviours can be integrated in the anticipated in-service trainings and workshops at national, district and school levels.

Communication, Coordination and Partnership

The 2020 Climate Change Policy calls for a coordinated national approach to climate actions by promoting synergies arising from active cooperation between relevant agencies and stakeholders. While the Ministry of Education is one of the agencies listed in the policy, this research has not identified how, in very concrete terms, the Ministry of Education has been involved in the key national climate change decision making and coordination platforms such as the National Climate Change Committee and the Climate Change Coordination Committee.

In the education sector, there exist established disaster management coordination mechanisms, including the Ministry of Education’s Disaster Management Unit and school disaster management committees. Whether and to what extent these disaster management bodies address climate change-induced hazards, shocks and vulnerabilities is a moot point and requires further research.

Recommendations

- Encourage secondary students to take the Environmental Science subject or, ideally, make the subject mandatory for all secondary students. In either case, help develop the capacities of secondary school teachers who teach Environmental Science to enable them to meet the increasing demand.
- Conduct a thorough curriculum audit at both primary and secondary levels to identify existing opportunities and gaps for climate change risk reduction and resilience building learning and action. Build on the opportunities and close the gaps.
- Ensure clear curriculum progression in terms of knowledge, skills and dispositional learning outcomes concerning climate change mitigation and adaptation; also forge cross-curricular and interdisciplinary links between treatment of climate change mitigation and adaptation in different subjects at the same grade level.
- Integrate life skills education opportunities that comprehensively address child protection, WASH, health and nutrition to better deal with multifaceted climate change crises. Help students develop critical and creative thinking skills, problem solving skills, self-management skills, advocacy and leadership skills, coping skills, and the skills and attitudes to live in harmony with nature in an age-appropriate manner.
- Provide students with opportunities, arenas and platforms to take concrete actions and fulfill change agency and advocacy roles in mitigating climate change impacts at school, in their local community and beyond.

Recommendations

- Conduct a thorough teacher education curriculum audit for both pre-service and in-service training programmes to identify existing opportunities and gaps for climate change risk reduction and resilience building. Build on the opportunities and close the gaps.
- Provide periodical up-skilling trainings for in-service Environmental Science teachers on the subject content and pedagogies.
- Build teacher capacities in employing a wide range of active/participatory and child-centred pedagogies, such learning modalities being vital for action-oriented climate change education.
- Build teacher capacity in promoting environmentally sustainable practices at school and in the community that are most relevant to the locality (e.g., water conservation, tree planting, school-based agriculture programmes, waste management, awareness raising and advocacy techniques) through in-service teacher trainings/workshops.
**School/Community Student Participation Platforms**

Students in Bhutan have opportunities to raise their environmental awareness and take positive local actions through the extra-curricular school club activities. Those who are in the environmentally-oriented clubs (e.g., nature clubs) are only a small percentage of students as there are many other school clubs to opt for. Other than environmentally-oriented school clubs, student climate change-related engagement opportunities outside of the classroom very much depend on the enthusiasm of individual schools and teachers. Scouting activities, as promoted by the Ministry of Education carry great potential for enhancing student change agency and advocacy capacities in general but also for fostering climate change awareness and action.

The HEROES project provides unique hands-on opportunities for participating students to understand climate change impacts on local biodiversity. The phenological data generated by the participating students feed into a national scientific data repository. The hands-on experience of observing lifecycle events of plants help students feel more connected with the surrounding natural environment, which in turn motivates them to take pro-environmental action. This innovative HEROES project benefits only a small number of selected schools, i.e., 21 out of some 500 schools in Bhutan.

**Recommendations**

- Ensure the education sector needs are represented in the national-level climate change decision-making and coordination platforms (e.g., the National Climate Change Committee and the Climate Change Coordination Committee).
- Examine whether and how the existing disaster management coordination bodies in the education sector (i.e., Ministry of Education’s Disaster Management Unit, school disaster management committees) address climate change-induced hazards and vulnerabilities. Based on the findings, broaden current remits as necessary. Ensure collaboration with NEC, Ministry of Finance and local governments in this regard.
- Ensure a multi-sector partnership approach to embedding climate change risk reduction and resilience building components in the curriculum, relevant education policy and strategy documents, education financing and in teacher capacity development programmes.

- Create a sustainable support mechanism for school nature clubs (or other similar environmentally-oriented clubs) and school scouting programmes by identifying and integrating climate change specific terms of reference and stipulating minimum levels of action; also create a ‘green star’ recognition scheme for individuals and schools making a unique contribution to mitigating and adapting to climate change.
- Explore the ways in which to involve more students and schools in the HEROES project.
- Link Bhutanese students to national, regional and global climate change movements/networks through online platforms and/or face-to-face gatherings as appropriate.
Section 6
Conclusion

Limitless economic growth and overconsumption at any cost are root causes of the human-induced climate crisis. Around the world, rapid transformation to low- or zero-carbon society is needed more than ever to sustain a liveable world. Bhutan is the only carbon negative country in the world. Promoting Gross National Happiness (GNH) over Gross Domestic Product (GDP) since the 1970s, Bhutan's path-finding development thinking, policies and practice are a clear reminder that it is possible to pursue meaningful societal progress while protecting the health and wellbeing of the environment and people. While Bhutan is not free from consumerism and it might face increasingly destructive economic activities especially when the country graduates from the list of Least Developed Countries in 2023, underpinned by a robust GNH philosophy, Bhutan has the fertile ground to build an innovative climate resilient education system by addressing the root causes of the climate and associated environmental crises.

This study has highlighted some examples of climate change impacts on the education sector as experienced in Bhutan: school locations on steep terrain and by riversides exposing students to increasing flood and landslide risks; interrupted education access due to natural hazards and increasingly harsh weather conditions; a growing incidence of student ill-health due to water- and vector-borne diseases and allergies; difficulties in concentrating in a hot and crowded classroom lacking cooling facilities; loss of outdoor experiential learning activities due to disaster and health concerns.

Key recommendations included in this study are: developing and integrating climate change impact and vulnerability indicators for the education sector; integrating climate change considerations in key education sector policy and planning documents; developing climate change education curricula more systematically; developing teacher capacity development programmes that incorporate both climate change-related content and facilitation of active pedagogies; ensuring a multi-sector partnership and collaboration approach in mainstreaming climate change considerations in education policies, financing, curriculum, and capacity building programmes; developing functioning student participation platforms for climate change learning and action for a greater proportion of students.

The education sector has a critical role to play in protecting children and preparing present and future generations of children to face the full consequences of the climate crisis and in helping them to play a proactive part in finding solutions to the multi-pronged threats we face. It is hoped that this report helps stimulate the discussion and action that is urgently needed to make the Bhutanese education system more climate change resilient and to empower Bhutanese students – both girls and boys – to become advocates and agents of change possessing the knowledge, skills and dispositions to actively contribute to building a greener, happier and safer future for their communities and country, and beyond.
THE HEAT IS ON! TOWARDS A CLIMATE RESILIENT EDUCATION SYSTEM IN BHUTAN

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References


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