

The health-related impacts of climate change faced by in-school adolescent girls in rural Zimbabwe

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Abstract

Climate change is among the biggest threats to human development systems, including education and health. A changing climate increases the frequency, intensity, and duration of extreme weather events such as droughts, floods, heat waves and cold spells – all of which contribute to water scarcity, food insecurity, loss of lives and livelihoods, and economic hardship. Several factors, including age, gender, and geography, influence the range of risks and challenges faced by marginalized communities as a result of climate change. Adolescent girls in rural regions find themselves at the confluence of all the above vulnerability factors and thus prone to experiencing a disproportionate share of the health impacts of the climate crisis, which in turn affect their education trajectory. Based on a qualitative research study, underpinned by gender, social and climate justice theories, and primarily aimed at exploring the link between climate change and adolescent girls' education in rural contexts, this paper highlights the health impacts of climate change faced by in-school adolescent girls which emerged from research in the study area: Ward 25 of Chivi District of Masvingo Province, an arid and remote rural region in the southwest part of Zimbabwe. The study population consisted of rural, in-school, adolescent girls aged 10-19 years, whose families reside in or originate from the study area. Data was generated through a *qualitative survey* administered to twenty-one adolescent girls; sixteen *key informant interviews* with stakeholders at village, ward, district, and national levels; and eight *focus group discussions (FGDs)* with adolescent girls, adolescent boys, teachers, and parents/caregivers. Data was also generated through *field notes*, *photography*, and *adolescent drawings*. The study found that in-school adolescent girls are experiencing climate induced health challenges related to physical illness, and mental health disorders which in turn contribute negative impacts on their education including absenteeism, lateness to school, punishment by school authorities, difficulties in concentrating and sleeping during lessons, as well as learning losses. Understanding the health impacts of climate change on in-school adolescent girls will contribute not only to the discourse on overall adolescent wellbeing but also to building a resilient climate risk informed education system in Zimbabwe.

Keywords: adolescent girls, climate change, education, health, Zimbabwe

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1. OVERVIEW

Climate change is among the biggest threats to human development and to natural ecosystems (Lee, Markowitz, Howe, Chia-Ying, & Leiserowitz, 2015; Holt, 2022). Climate change is evolving into a global crisis (Birkman, et al., 2022), affecting not only the physical environment, but also the functioning of human systems such as education and health (World Health Organisation, 2023). A changing climate increases the frequency, intensity,

and duration of extreme weather events such as droughts, floods, heat waves and cold spells (Chigwanda, 2016). Countries in the Southern African region are widely recognized as being more exposed to the impacts of climate change than other regions such as North America, mostly due to their dependency of climate related economic and other activities as well as limited adaptive capacity (Seyuba & Garcia, 2024).

Over the past decade, Zimbabwe has experienced several climate-induced extreme events such as droughts, floods, heat waves and cold spells. Zimbabwe is heavily dependent on climate sensitive sectors such as agriculture, water, and hydro-electric power. With the majority of the country's population resides in the rural areas at 61.4%, compared to 38.6% in the urban areas (Zimbabwe National Statistics Agency, 2022), more frequent, intense, and unpredictable droughts have heightened water scarcity and food insecurity, and have impacted the livelihoods of 45% of the country's rural population (International Atomic Energy Agency, 2021). Drought and mid-season dry spells were the most reported climate related shock by rural households (76%) and as having the most severe impact (Zimbabwe Vulnerability Assessment Committee (ZIMVAC) & Food and Nutrition Council (FNC), 2022). More recently, 85% of southern Africa, including Zimbabwe, has experienced dangerous day time heat stress between September and March, while 80% of the region experiences cold stress between May and August (Roffe, Van Der Walt, & Fitchett, 2023).

Chivi District is one of the rural regions of Zimbabwe facing the negative outcomes of climate change (Chikodzi & Mutowo 2012). Situated approximately 388km from the capital city of Zimbabwe, Harare and about 70 km southwest of Masvingo Urban, much of Chivi District is occupied by subsistence farmers. The district receives erratic and unreliable rainfall, hence it often fails to support rain fed agriculture resulting in persistent crop failures and food shortages (Mutekwa & Kusangaya 2006). Despite the drought conditions, rain fed farming continues to be the principal livelihood activity for farmers with agriculture forming the mainstay of the household economy (Mutekwa & Kusangaya 2006). Whilst droughts are a well as a recurrent phenomenon in Chivi District (Mudavanhu 2014; Bongo et al. 2013), in the past, the district received torrential rains which resulted in flooding (Savious 2014). In addition, one of the busiest highways (public road) in Southern Africa, connecting many countries in the region, including Zimbabwe to South Africa, runs through Chivi District – which adds migration to the district's socio-economic profile.

Adolescent girls in marginalised communities of Zimbabwe continue to 'fall through the cracks' of education – failing to attend school, to stay in school and to complete a basic cycle of education (Government of Zimbabwe, 2020). In addition, children living in rural areas experience higher levels of poverty and are less likely to go to school (Zimbabwe National Statistics Agency (ZIMSTAT) and UNICEF, 2019). In 2021 alone, 8,958 and 29,593 girls dropped out of primary and secondary levels respectively due to reasons such as absconding, death, expulsion, illness, marriage, pregnancy, financial challenges, learners with special needs, child labour and 'other' reasons (Ministry of Primary and Secondary Education, 2021). However, the aforementioned report makes no reference to the ways in which climate change might have influenced these dropout rates. Approximately 58% of the children who dropped out of school in Masvingo Province – where Chivi District is located – are girls (Ministry of Primary and Secondary Education, 2017). Mupa and Chinoeoka (2014) note that many children drop out of both primary and secondary school in Chivi District due to orphanage, poverty, pregnancy, early marriage, lack of fees, poor health, poor home background, lack of interesting subjects, religious beliefs, seeking employment in neighbouring countries, caring for sick parents and relatives, among other reasons (Mupa & Chinoeoka, 2014). According to Chikara (2022), Chivi District has recently reportedly experienced an increase in cases of child marriages resulting in adolescent girls dropping out of school as early as grade 6 (age eleven) (Chikara, 2022).

Thus, this study was designed to explore the ways in which climate change intersects with adolescent girls' education in a rural region of Zimbabwe. The engagements with study participants unearthed evidence of adolescent girls experiencing climate related health challenges which in turn affect their education in different ways as elaborated on in later sections of this article.

2. THEORETICAL GROUNDING

This article is based on a qualitative study, which draws upon feminist, human development, as well as actor-oriented theories. Collectively, these theories elevate the notions of human agency and of social, gender and climate justice as markers of how new knowledge has been processed.

The climate crisis is not affecting everyone equally, not in the same way and not at the same magnitude (United Nations Development Programme, 2019). Several factors increase a species or system's vulnerability to climate change, and these include age, gender, and geographic location (Office of the High Commissioner of Human

Rights, 2023), all of which influence the range of risks and challenges faced by the poorest and marginalized communities in developing countries. In particular, adolescent girls in rural regions find themselves at the confluence of age, gender, and geographic vulnerability factors and thus prone to experiencing a disproportionate share of the impacts of the climate crisis. Climate change is affecting many aspects of adolescent girls' lives including their education and health (Burns & Mutunga, 2024).

As a subfield of feminist theory, ecofeminism thus provides an opportunity to center the challenges that women and girls experience in relation to climate change and its impacts (Johnson, 2022). Ecofeminism posits that women have a connection with nature (Wangui-Stuhlhofer, 2021) and that those are least responsible for climate change are at the receiving end of the worst of its impacts. For instance, despite Africa's negligible emission of greenhouse gases, it is one of the most vulnerable continents to climate change (Steady, 2014). In addition, women, and girls in the rural parts of Africa are highly dependent on the environment and natural resources due to their reproductive and gender roles at household and community level – thus rendering them most vulnerable to climate change (Kangwa, 2020). Kangwa (2020) and Steady (2014) assert that even though women and girls are the major custodians and consumers of natural resources, their unequal participation in decision-making prevents them from contributing to the planning and implementation of climate action (Kangwa, 2020; Steady, 2014). Professor Wangari Muta Maathai, a Kenyan scholar, human rights and environmental activist, Nobel Peace laureate, and African Ecofeminist, personified women's leadership in environmental issues by founded the Green Belt Movement in 1977, a grassroots organization whose mission is to empower communities, particularly women, to conserve the environment (Wangui-Stuhlhofer, 2021).

It is important to note that education creates a better future for all children. Education is also a socio-economic determinant for good health – less education is linked to lower incomes which in turn results in poorer health outcomes (Tulane University, 2021). The importance of both education and health has been affirmed by the fact that being knowledgeable (education index) and living a long and healthy life (life expectancy index) are two of three global indicators that have been chosen to measure the human development of any given country together with a decent standard of living (gross national income index) (United Nations Development Programme, 2022). Climate change intersects with education, health, and other drivers of marginalization such as age, gender and geography to further increase poverty and vulnerability. Frequent climate and weather extremes also affect human health in a variety of ways, including causing both physical and mental health challenges.

While the literature points to climate change posing an unprecedented threat to adolescent girls' education, it also suggests the importance of adolescent girls' education as a potential solution to the climate crisis. This notion is in concord with Norman Long's actor-oriented theory – founded on the concept of human agency – which posits that even though certain important structural changes result from impact from outside forces, external interventions are shaped and mediated by the life experiences and perceptions of the individuals concerned (Long, 1990). As far as rural development is concerned Long's actor-oriented approach stresses the importance of how rural players, including adolescent girls, shape development themselves. Long notes that although rural populations are often limited by the lack of critical resources, they should not be seen as passive recipients or victims of planned change. A 2022 World Bank report emphasizes that education is an undervalued pathway and response to the climate crisis and its impacts: “education is the single strongest predictor of climate change awareness” (World Bank 2022, p.1).

3. METHODOLOGY

Chivi District has 97 primary schools (MoPSE (a), 2022) and 41 Secondary Schools (MoPSE (b), 2022). The study area – Ward 25 of Chivi District of Masvingo Province, an arid and remote region in southwest Zimbabwe (Figure 1) – has 3 primary schools and 1 secondary school. The study population consisted of rural, in-school, adolescent girls aged 10-19 years, enrolled in the 2 schools sampled for the study and whose families reside in or originate from the study area.

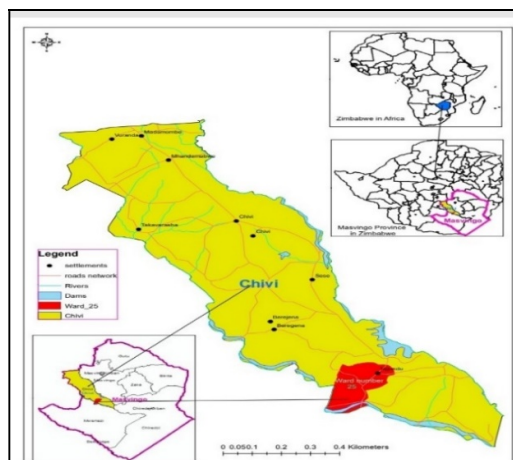


Figure 1 Map of Study Area (generated by ArcMap 10.8, Tinashe C. Chingwena 2022)

Data was generated via a multiplicity of methods to increase internal validity as well as to enrich the data set: a *qualitative survey* administered to twenty-one adolescent girls; eight *focus group discussions (FGDs)* with adolescent girls, adolescent boys, teachers, and parents/caregivers; and sixteen *key informant interviews* with stakeholders at village, ward, district, and national levels. Data was also generated through the *researcher's own field notes, observations, and photography* as well as through *drawings* by adolescents. Ethical considerations related to privacy, confidentiality, accuracy, and informed adult and parental consent as well as child assent were observed. In addition, ethical and other clearance procedures for conducting the research in the study area were completed at the university, national, provincial, district and school levels. During all cases of face-to-face interactions, Covid19 regulations including the use of hand sanitizers, wearing of facial masks, and observing physical distance were strictly adhered to as per the Government of Zimbabwe and World Health Organization guidelines. Other considerations such as appropriateness of venues for data collection, child protection as well as language were also taken into consideration. For instance, all tools were translated from English into the local language, Shona.

Basit (2023) argues that the analysis of qualitative data is onerous and demanding, mostly because qualitative researchers analyze data on their own drawing on his or her first-hand experiences with the setting, the informants, and the documents in order to determine categories and relationships as well as to interpret the data (Basit, 2003). Thematic analysis – a method used for analyzing qualitative data – was used to identify common themes, ideas, topics, and patterns of meaning that emerged across the data set (Adewusi 2020). Adewusi notes that thematic analysis is a method of analyzing qualitative data e.g. sets of thick texts, which involves the documentation of patterned meaning across a data set by identifying common themes, ideas, and topics that repeatedly come up in the data (Adewusi, 2020). Thematic analysis focusses on frequencies of occurrences of various themes and thus helps the researcher to create the most logical structure for the research (Anuradha, 2022).

4. RESULTS AND DISCUSSION

How is climate change affecting adolescent girls' health and ultimately their education? The study found that in-school adolescent girls are experiencing climate induced health-related challenges such as physical illness, mental health disorders, hunger, hygiene, risk of injury and or death, and gender-based violence and child abuse – which in turn affect their education with regards to school attendance, punctuality, ability to concentrate and alertness during class, learning and overall wellbeing.

4.1 Physical illness, diseases, and allergies

The study found that temperatures extremes – such as heat waves and cold spells – are heightening incidences of physical illness, diseases, and allergy flares. The adolescent girls who participated in this study highlighted that periods of extreme heat caused them to have headaches, nosebleeds, and dizziness. The adolescent girls further noted that during a heat wave, they sleep in the classroom whilst learning is ongoing:

"I got a headache. I kept getting headaches and felt dizzy. Others nosebleed and fail to come to school. They will just be sleeping continuously ... anywhere maybe in the classrooms at school, anywhere they just feel like

sleeping. [AQS3, Adolescent girl]

Teachers who participated in this study reported that the challenges associated with extreme heat seem to affect adolescent girls more than adolescent boys and that heat waves were not only affecting the adolescent girls but also the teachers as they become weak and find it difficult to teach:

“... the ones who sleep are mostly the girls, especially when there are heat waves, maybe because they are weak or what, I have noticed that they [girls] are mostly affected.” [KII9, Teacher]

“When it is very hot here at school, even for us as teachers, when it is very hot you cannot even get into the lesson to teach, you will be weak.” [KII2, Teacher]

The teachers added that due to the way some of the classrooms were designed with low windows, they are not well ventilated. A key informant who is also a mentor for girls at one of the schools highlighted that the month of October – one of the hottest months of the year in Zimbabwe (Weather Atlas, 2024) – is when some public examinations are written and that it is common to see learners putting their heads on their desks (sleeping) instead of writing the examination.

Adolescent girls also reported feeling very hot and experiencing excessive sweating during extreme hot conditions. In addition, the adolescent girls highlighted that during heat waves, their menses are more uncomfortable, and they get stomach aches more often as a result of menstrual cramps. Adolescent girls also reported that the combination of being on their menses without adequate sanitaryware, such as pads, and walking long distances to and from school under extremely hot conditions, results in sweating, increased body moisture, and friction between their legs after which they sustain painful bruises on their inner thighs. Adolescent girls were mindful that if they didn't bath during periods of extreme heat, whether they are on their menses or not, their bodies and their clothes would smell. It was also interesting to note that some study participants including adolescent girls and school officials were of the view that girls have bigger bodies than boys, that girls sweat more than boys and that girls' bodies are not as strong as those of their male counterparts, and thus more susceptible to fainting and to illness and disease:

“Girls' bodies are not as strong as that of boys. They can be affected by diseases. They can have stomach aches because there will be too little water.” [AQS8, Adolescent]

“If it's hot, the body of a woman is a body that does not really do well with high temperatures, it's a body that requires moderate temperatures, so you find that girls are affected the most than boys.” [KII7, School Development Committee Chairperson]

Adolescent girls also reported feeling thirsty and dehydrated during periods of extreme heat. In the case of one of the schools selected for this study, the hot conditions were compounded by the fact that at times the borehole, shared between the community and the school, was rusty and/or broken down, dry with no water coming out and that there were often too many people, including community members, competing to fetch water from the borehole during the window of opportunity available for learners to leave the school premises to fetch water i.e. during the lunch hour and after school. Adolescent girls reported feeling that they are not physically able to compete for water from the borehole with their male counterparts and other adult members of the community. The adolescent girls highlighted that at times the school authorities encourage the learners not to drink water from the borehole until it has been fixed as they may get stomach ailments due to the water being contaminated by rust. The same school has a water reticulation system inside its premises which is designed to receive water from the national water authority. However, the adolescent girls reported that more often than no water comes out from the tap (Figure 2).



Figure 2 A tap at one of the participating schools indicates the existence a water reticulation system. However, the adolescent girls reported that availability of water via this system is erratic. [Photo Credit: Ellen Chigwanda]

On the other hand, during periods of extreme cold weather (cold spell), the adolescent girls reported that sometimes they get frost bites and respiratory illnesses such as colds and the flu. The adolescent girls further highlighted that their fingers become so numb due to the cold weather that they cannot even hold a pen or pay attention during lessons:

“I only know that if you get very cold you might catch a flu or you might even fail to hold your pen to write, those are some of the things.” [AQS1, Adolescent girl]

The adolescent girls also shared that because of the intra distribution of household chores, they are expected to wake up very early to go and fetch water as well as to perform water intensive tasks such as cooking, washing dishes and cleaning the house. Chores such as washing dishes and clothes, looking after children, cooking, and sweeping the house are the responsibility of women and girls. The adolescent girls who participated in this study talked about having to shift the times that they perform certain chores such as washing dishes to the evening instead of the morning to mitigate the effects of the morning cold weather; they also talked about the need to complete most preparations in the evening so that they don't have touch the cold water in the morning. Shifting times of performing chores entails shorter sleeping hours which results in fatigue which causes adolescent girls to feel sleepy in class (during lessons) and during examinations as reported by some of the adolescent girls and teachers who participated in the study. In addition, during cold spells, adolescent girls are exposed to the elements at home, on their way to and back from school and during lessons and thus are at risk of becoming ill or contracting diseases.

The adolescent girls reported that while some families can afford to buy the regulated protective school wear to guard against cold spells, such as jerseys, socks, scarfs, hats and tracksuits, other learners who come from poorer households are unable to do the same. Consequently, learners who cannot afford the required school wear resort to wearing casual clothing from home, which attracts punishment from school authorities and in any case, which they will be asked to remove upon arrival at the school gate, leaving them feeling extremely cold. One of the teachers interviewed for this study highlighted that compounding the challenge of children not having the regulated protective school clothing to wear during the harsh cold season, some of the classrooms have broken windows and no doors, which further exposes learners to the extreme cold:

“Some of our windows are broken, which means when there are those cold spells, that also causes problems, even when you are in the class the children will be shivering, if those things are fixed, I think we can do better in terms of some of the negative effects of climatic changes.” [KII9, Teacher]

The adolescent girls interviewed for this study also recounted that excessive rain acts as a trigger for allergenic reactions:

“[When there is too much rain] ...others have problems if they are rained on, they will have a problem or the others who may have allergies, if they are rained on, they will not be able to walk.” [AQS10, Adolescent girl]

Thus, this study found that temperature extremes present a variety of health issues related to physical illness, disease, and allergy flares – all of which affect adolescent girls’ education including attendance, attentiveness, and learning. According to an allergy expert at the Bayer College of Medicine, frequent weather changes – cold front, warmer days, excessive rain, and thunderstorms – worsen allergy symptoms (Dusang, 2022). Pollen, mold, and changes in humidity are the main triggers of allergies especially for those who suffer from seasonal allergies and those who have underlying conditions such as asthma (Dusang, 2022). The adolescent girls also pointed out that cold spells result in frost bites, colds, and flu, which affected their ability to hold a pen and to be attentive during lessons. The adolescent girls emphasized that heat related challenges such as headaches forced them to visit the hospital in order to seek medical attention or to stay at home thus leading to absenteeism and losing out on classes.

The impacts of health-related challenges posed by temperature extremes on adolescent girls’ education have been exacerbated by the fact that sometimes learners have to take turns to attend school – some attend lessons as from 7am to 12.30 and others attend lessons from 1pm to 4pm – otherwise referred to as ‘hot sitting’. ‘Hot sitting’ is a term used to describe the double-shift or double-session model of education where half the learners attend classes in the morning and the other half in the afternoon (Moyo & Mazvarirwofa, 2021). This system – which emerged in 1980 when Zimbabwe gained independence – was designed to provide free and compulsory primary and secondary education for all children irrespective of race, sex, or class, and thus increase access to education after decades of racial discrimination and colonialism (Nhundu, 1992; Moyo & Mazvarirwofa, 2021).

The study also found that rural livelihoods are heavily water dependent. Livelihoods are important as they enable families to earn income which in turn supports adolescent girls’ educational expenses such as food, school fees and uniforms, transport costs, stationery, textbooks, and other school requirements. Livelihoods are also an important part of both short- and long-term resilience i.e. the ability to bounce back from external shocks and stresses, without which individual, household and community resilience is threatened. Therefore, when households and communities experience droughts and water shortages, this increases pressure on women and girls to walk longer distances to find water to meet their needs and those of their families. This increased pressure of household chores contributes to time poverty, which is the phenomenon of being financially poor and having to work long hours and still not having enough time in a day to complete their tasks, as well as to care for themselves (World Bank, 2013), which results in physical illness. Time poverty is caused by the ever-increasing burden of reproductive roles and of care on women and girls. There are increased calls by donors, governments, and other influencers to spotlight care work and its implication of women and girls’ development, their education, their health, and their overall wellbeing. With the advent of climate change, which appears to be worsening the burden of care on women and girls as a result of the effects of extreme climate and weather events, there is need to further explore this nexus.

4.2 Mental Health Disorders

A mental disorder *“involves disturbances in thinking, emotional regulation and behaviour”* associated with significant distress (World Bank, 2022). Globally, it is estimated that 1 in 7 adolescents (10 – 19-year-olds) in the world live with a mental health disorder (World Health Organisation, 2021). Further, adolescents with a mental health disorder are especially vulnerable to physical ill-health and educational difficulties. This study found that droughts and floods are increasing mental health issues for adolescent girls including stress, depression, and anxiety associated with the fear of crossing flooded rivers, fear of walking in the dark, fear of corporal punishment if they get to school late, separation from families due to climate-driven migration as well as reduced access to nutritious food:

“When it is cold someone may wake up late, and often it will be dark, like we leave home when it is still dark because we leave home around 4, so we will be scared to walk in the dark that is why we end up being late for school.” [AQS9, Adolescent girl]

“Abandonment during a flood, people can run for their lives and abandon you. Your mind will be troubled thinking of how you do not have food at home, and you question your poverty.” [AQS19, Adolescent girl]

This study found a strong theme on climate-induced cross-boarder population movements, especially to neighbouring South Africa as the study area is located within the corridor to South Africa along the busiest highway in Zimbabwe, the Harare-Beitbridge Road, which also connects central and eastern African countries to South Africa. Rural to urban migration in search of better employment, entrepreneurial and income generating options is also quite prevalent in the district. Climate change is forcing parents and guardians to be on the move, which entails leaving their children behind and in the care of one parent or extended family. Migration data from the Zimbabwe Statistics Agency (ZimStat) show that there 773,246 and 47,928 Zimbabweans in South Africa and in Botswana respectively (Zimbabwe Statistics Agency (ZimStat), 2022). This has contributed to child neglect, child headed households and children living along without adult supervision and care – all of which lead affect the mental health of adolescent girls, among other challenges:

“The problems that the girl child come across, most of these children, looking at this area we are from, their parents go to south Africa, so the children are left alone, and the girl child is the eldest in the home. If a child does not have an adult to encourage them, they can just lose interest, or lack of food to eat to go to school, or they will be looking after others.” [KII2, Teacher]

When it rains heavily, adolescent girls indicated that they are afraid to cross flooded rivers due to the risk of being swept away by the river, which forces them to find alternative routes to school which they said are difficult to navigate and increases the amount of time it will take them to get to school and back home after school. Further the adolescent girls reported that the alternative routes are often muddy: which not only makes them feel unsafe as they will not be seeing where they are stepping, but also that their shoes are also filled with mud - which would make them heavier and also make them unrepresentable when they get to school. One of the adolescent girls specifically described such an experience as "disturbing", which points to potential mental health issues. An interview with a schoolteacher at one of the schools revealed that lateness attracts corporal punishment, leaving the adolescent girls feeling anxious and distressed and having to make the decision to proceed to school, to abscond or to return home:

“So, what these children do right, if they are late, they are beaten at that gate, so if a child is beaten, they will not want to come to school, they will end up saying it's better to go back home, or if they wake up late they will not go because they will be late, they just say better to go back home. So, those are some of the challenges that they encounter, especially girls.” [KII2, Teacher]

4.3 Hunger

The adolescent girls who participated in this study indicated that one of the challenges that keeps girls from coming to school or enjoying school is hunger, adding that when there is no food at home due to poor harvests, some girls will not get enough meals at home and will not carry a lunch box to school and that sometimes they faint due to hunger:

“[During drought periods, there will be no food so...] some fail to go to school due to hunger; if they go to school, when they come back from school some will be having a stomachache, and their stomachs will be grumbling.” [AQS17, Adolescent girl]

The adolescent girls shared that if one has a friend who has brought food to school, she may be willing to share the food but those without friends will have no one to give them food. In addition, the adolescent girls at one of the schools which participated in this study highlighted that while there is a school feeding program which provides one nutritious meal for every learner, sometimes the community volunteers from different villages within the study area who take turns to come to the school to prepare the meals do not show up as expected:

“You might come from home without eating anything then you come here and fail to find anything to eat as well. When you ask others, they refuse to give you. You can faint from hunger if you do not find anything to eat. You would have also failed to fetch water from the borehole because it's difficult as school children will be fighting to fetch water.” [AQS7, Adolescent girl]

“...the people from Jairos Jiri cook sadza for us ... when the people who cook are available”. [AQS17, Adolescent girl]

The adolescent girls also reported that hunger not only affects them at school but also inhibits their ability to carry out chores at home, such as watering and weeding the garden, as well as income generating activities, such as selling their produce, due to low energy levels. The adolescent girls recounted that the combination of hunger and sweltering temperatures made the situation even worse for them. Zimbabwe's food security situation

remains fragile due to poor weather conditions, erratic rainfall, and long dry spells (United States Agency for International Development (USAID), 2024). In addition, hunger is also a challenge facing rural communities in arid regions of Zimbabwe. It is estimated that 26% of rural households in Zimbabwe were cereal-insecure during the peak hunger period January to March 2024 (World Food Programme (WFP), 2023), which militates against the achievement of SDG1. Research has shown that hunger and malnutrition affect the physical and cognitive development prenatally, during the early years of life and these effects can continue into adolescence and adulthood (Jepkomboi, 2018). Further, effects of hunger on physical development include stomach aches, signs of worry and anxiety and behaviour problems while the challenges presented by hunger to cognitive development include inability to engage fully in school (Jepkomboi, 2018). Adolescence is an important period in human development as girls start to experience puberty. There are also age and gendered dimensions of intra distribution of food which typically prioritize the men and the boys ahead of women and girls (Harris-Fry, Shrestha, Costello, & Saville, 2017). These further limit girls' access to food, especially during crisis situations. Thus, as climate change contributes to crop failures which leads to hunger and food insecurity, this affects adolescents' ability to learn due to hunger and diminished cognitive development in earlier years:

"... you find that some children may drop out of school because of hunger, because hunger can affect them, when children are learning and they are hungry, it can affect their attendance, listening span, because they will be lacking food." [KII10, District Education Official]

"The droughts also, especially in region 5 of the country, lead to food insecurity, starvation, children can't come to school because they are hungry, those who can afford to come to school can't stay alert because they are hungry, so retention and drop out levels are at times a result of those things." [KII14, National Education Official]

Hungry children cannot learn, and this increases their chances of either dropping out of school completely or experiencing learning losses. In addition, adolescent girls are withdrawn from school in order to support alternative livelihoods. During periods of stress, household adopt negative coping mechanisms such as withdrawing children from school to support alternative livelihoods and income-generating options and research has shown that girls tend to be withdrawn first (Huang, 2021). Other negative coping mechanisms include selling household and productive assets, marrying off daughters in exchange for grain and migration to the cities and towns (urban areas) and/or to other countries.

4.4 Hygiene Challenges

The theme of hygiene and general cleanliness was clearly very important to adolescent girls and thus featured dominantly during the qualitative survey. Being neat and tidy before, during and after school appears to be a very important consideration for in-school adolescent girls.

"I will check if my uniform is in a good condition... then wipe my shoes." [AQS1]

However, adolescent girls expressed great concern about not having consistent water supplies or availability. They stressed that not having water and therefore not being able to bath leads to sweating and smelling, which creates discomfort for them when the teacher asks them to stand in front of the class during lessons. This discomfort influences adolescent girls' experiences of the classroom, and the school more broadly and consequently impacts upon their attendance and participation:

"As girls we need to properly bath if there is water. If you do not bath and it's very hot you will be sweating and smelling in front of everyone one in class." [AQS1]

School authorities – teachers, class monitors and prefects – expect all learners to practice good hygiene and to be neat and presentable when they come to school. Learners are also expected to conform to the regulated school dress code as guided by the School Leadership Handbook (Ministry of Primary and Secondary Education, 2021). The same handbook also provides guidelines on effective water and sanitation standards for primary and secondary schools. The adolescent girls who participated in this study noted with concern that when there is no water at home, they and some of their peers are forced to go to school without bathing, and that other adolescent girls will not wash their uniforms. They stated that during their menses, some adolescent girls will not find water to bath at school which leads to both discomfort and embarrassment. The adolescent girls reported that in the event that they have soiled their uniforms with menstrual flow, they are told to go home and that they just have to walk home in that embarrassing and demeaning state.

Adolescent girls place high value on health hygiene which includes bathing. In addition, adolescent girls are expected to support the female figure in the home in meeting the daily household hygiene as well as daily water needs. Thus, during periods of water scarcity due to drought, adolescent girls highlighted that they are forced to wake up very early in the morning to travel to faraway places in search of water with no guarantee of finding it; sometimes when they do find an alternative water point, there will be long queues and/or the water will "hardly be coming out":

"The girl child becomes also even more vulnerable, because they are the ones who at times, at home especially are expected to do household chores, so they are going to look for firewood, they are going to look for water, and they are the ones who become more exposed even more than the boys." [KII14, National Education Official]

4.5 Risk of injury and/or death

One of the themes which emerged from the study is the risk of injury and/or death for adolescent girls on their way to and from school due to flooding:

"...the difficulties that might disturb us [adolescent girls] from coming to school can include flooded rivers." [AQS6, Adolescent girl]

The adolescent girls who participated in the qualitative survey described how they risk slipping on muddy roads after excessive rains and also how difficult it is for them to cross some of the small bridges especially after heavy rains and flooding as the bridges will be submerged under the water. The adolescent girls highlighted that when they cannot cross a river, they have to go back home as there will be no other way to get to school. They stated that in some cases it takes up to three days for the water to subside to a level that is safe enough for them to cross – which results in absenteeism and thus learning losses. The adolescent girls reported that there is a river called Marugwe, and other river called Chivake in the study area – both of which are "uncross-able" when it rains heavily. During data collection, the researcher observed that the river has a small bridge, which has already been partially destroyed by incessant rains in previous rainy seasons.

"There is a river near here. It is called Marugwe. If it gets full and you are on your way to school, if we do not find anyone to help us cross, we go back home. We then skip school [for] three or two days." [ASQ3, Adolescent girl]

"If it rains there is a river that we cross, it is called Chivake. There is no other road that we can use to go to school. We do not come to school. We wait until the water has subsided. It can take three days." [AQS7, Adolescent girl]

Adolescent girls also recounted that sometimes when it rains, they do not go home directly but rather that they play in the rain and also swim in the river when it has water. The adolescent girls acknowledged that as children they can be naughty and that they have low risk perception with regards to flooded rivers, which can lead to injury and/or death. They further highlighted that swimming in the flooded river posed a risk of being swept away by the water and of drowning:

"We are very naughty children. Sometimes when it rains, we do not go home directly, and we start playing in the water and get rained on. If the rivers have water, we go and swim. Children might drown or might be swept away by the water." [AQS19, Adolescent girl]

One key informant was of the view that boys develop swimming skills much earlier in life and therefore have lesser challenges with crossing flooded rivers, *albeit* unsafe. The key informant added that boys are stronger than girls which makes it easier for them handle stressful situations such as encountering a flood river – which in itself points to toxic masculinities which further expose adolescent boys to risk of injury or even death during flooding:

"So, the girl child might have a challenge that lets say they want to cross a flooded river, the girl might drown; the boy would have developed skills earlier; you might find that the girl drowned and yet the boy child had tactics. Physically boys are strong that the girls, when it comes to panic women panic faster than the men." [KII7, School Development Committee Chairperson]

4.6 Gender-based Violence and Child Abuse

Adolescent girls who participated in the qualitative survey reported that climate change is contributing to gender-

based violence in the form sexual abuse, child marriages and child labour. They highlighted that during periods of extreme heat, adolescent girls feel sleepy and often resort to sleeping either in an empty classroom or sometimes at the school grounds, which exposes them to abuse by the cattle herders:

“For example, they (adolescent girls) can just sleep at the grounds then the boys who will be herding cattle will see them there and abuse them.” [AQS3, Adolescent girl]

Child marriage also featured as another challenge that contributes to adolescent girls aged 10-19 dropping out of school in the study area. The adolescent girls who participated in the study stated that:

“[girls] rush into marriage when parents fail to secure money for school fees.” [AQS6, Adolescent girl]

“...[when] there is no money for them to go to school, others just stop going to school because they will be focusing on their boyfriends, others get into early marriage.” [AQS2, Adolescent girl]

In Zimbabwe, girls in rural areas are twice as likely to be married before 18 (44%) compared to girls in urban areas (21%) (Zimbabwe National Statistics Agency (ZimSTAT) and United Nations Children's Fund (UNICEF), 2019). A recent study conducted by Plan International in Zimbabwe in Masvingo Province – one of the most food insecure regions of Zimbabwe and the province within which the study area for this research is located – highlighted that 41% - 50% of adolescent girls are married before the age of 18 and that food insecurity due to climate change is “both a driver and a consequence of child marriage” (Plan International in Zimbabwe, 2022). Child and early marriages negatively affect the education, health, and mental wellbeing of adolescent girls due to increased risk of isolation, depression, sexually transmitted infections as well as pregnancy related complications (Nour, 2009).

During the qualitative survey, adolescent girls reported that during drought periods, they are forced to seek employment in order to augment household income at the expense of their schooling. They also reported experiencing mental health disorders such as anxiety as they will not be in school and focusing more on the problems at home:

“[During drought periods] ...we can say that we will end up going to do part time work because they will be drought. It will disturb us from going to school. It will disturb us from coming to school because of thinking about our home problems.” [AQS6]

“... for example, in this community there is gold panning along Runde River so if there is a heatwave or there is a drought or if there is too much rainfall and no food, children will be asked to go and help with the gold panning processes so that on Saturday when the buyer comes the family will have money to buy food, so this is affecting the children.” [KII School Development Chairperson, School B]

Climate change is pushing both boys and girls in the global South into exploitative and hazardous forms of child labor to contribute to household income, which in turn disrupts their education and development (Myers & Theytaz-Bergman, 2017). Further, in rural areas where families’ livelihoods are dependent on the environment, droughts and floods result in increased poverty due to crop failures and loss of livestock which pushes families to send children to work (Myers & Theytaz-Bergman, 2017). In Zimbabwe, adolescent girls often become maids or nannies where they face health related issues such performing heavy age-inappropriate domestic chores, experience physical and mental abuse as well as working long hours.

As highlighted in other parts of this article, a sizeable number of adolescent girls interviewed for this study indicated that either one or both parents or close relative who used to look after them have migrated to South Africa in search of better employment prospects.

“In our family, my father is in South Africa.” [ASQ3]

The study found that more fathers or male family figures had migrated than mothers and female figures. As a result of this climate-induced weather extremes and population movements, adolescent girls reported that they are now mostly in the care of their mothers, grandmothers, and aunts, who depend on remittances from South Africa as well as on climate sensitive and on water intensive livelihoods such as farming, gardening, and poultry production. In some cases, caregivers and guardians resort to placing the adolescent girls in paid lodgings closer to school so that they don’t have to walk long distances to school and to minimize exposure to the elements –

where they live alone or with other children without adult supervision – a growing phenomenon known informally as “bush boarding”. Unfortunately, these facilities are usually private homes or other such buildings where parents pay monthly rentals for their children to live there during the school term – with no adult supervision, care, and support. Therefore, whilst in some cases, migration does provide alternative livelihood options for families it exposes children to various forms of harm and abuse. Bush boarding exposes adolescent girls to harmful behaviours and practices, sexual violence and other forms of abuse. The location of the study area – Ward 25 of Chivi District – is also precarious as it is along the major Harare-Beitbridge Road, with increased presence of long-distance truck drivers who are notorious for luring adolescent girls and young women with money and food in exchange for sex. Dzvimbo, Ncube, Zhanda & Mutanana (2022) note that female headed households in Zimbabwe are adopting coping strategies which perpetuate the inter-generational transfer of climate induced poverty including offering domestic services and vending of fruits and vegetables (Dzvimbo, Ncube, Zhanda, & Mutanana, 2022). The adolescent girls reported that because their parents, caregivers or guardians will be so far away, there will be no one to care them when they fall sick and/or to meet their other emerging needs, and sometimes they will have no means to call their parents.

All these risks collectively hamper girls’ development and negatively impact their prospects of getting a good education and of a healthy and successful future.

5. CONCLUSION

Many of the adolescent girls and other stud participants who were involved in this study seemed to be aware that education is a right and also recognized the importance of being educated. The study participants associated a good education with future success, high income, being respectable, and looking after oneself as well as parents and siblings. Adolescent girls also indicated that education is important for adolescent girls because it enables them to become knowledgeable about different things in life and to “have the brains to think”.

It is important to note that although the remit of this study did not specifically include research questions relating to adolescent girls' health vis-a-vis gender, education and climate change, health-related issues emerged as part of the challenges which in-school adolescent girls are experiencing in the face of a changing climate change. For in-school adolescent girls in Ward 25 of Chivi District in Zimbabwe, climate change is having far reaching impacts beyond their physical environment. The study found that extreme events such droughts, flooding, heat waves and cold spells are creating as well as exacerbating health-related challenges which in turn affect adolescent girls’ education in different ways that contribute to absenteeism, lateness to school, punishment by school authorities, difficulties in concentrating and sleeping during lessons, and learning losses as depicted in Figure 3.

Understanding the links between adolescence, gender, education, health, and climate change is important not only for the learners themselves to be able to recognize the risks and challenges for themselves and their peers, but also for in-school adolescent girls to exercise agency by acting upon their knowledge and experiences of climate change to become non-negotiable participants and contributors to climate action at different levels. Adolescent girls indicated that they are exposed to content on climate, climate change, daily weather patterns and hazards as well as which areas receive high rainfall or experience high temperatures during geography and agriculture classes. Thus, education enables adolescent girls to learn about climate change, its impacts, and the ways in which the in-adolescent girls themselves can be involved. It is also important for teachers, parents, guardians and caregivers, community leaders and policy makers alike to understand the health-related challenges of climate change faced by in-school adolescent girls so that measures are put in place to contribute to climate action towards more resilient education and health systems.

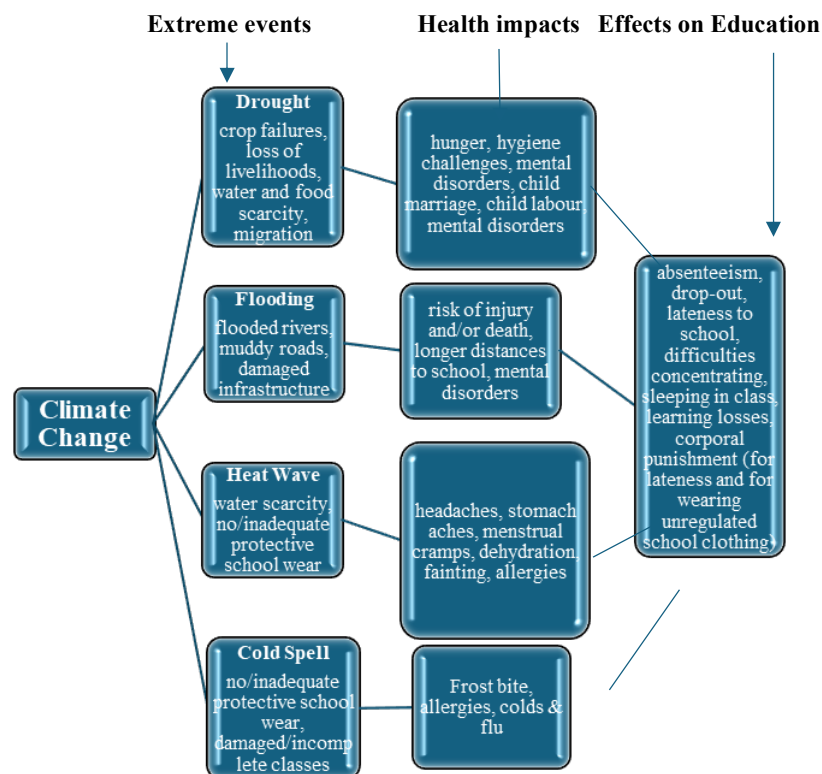


Figure 3 Summary of the health-related challenges of climate change faced by in-school adolescent girls in the study area

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