

## Extreme weather events and primary school Curricula in Burkina Faso: Implications for climate adaptation and disaster risk reduction

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### Abstract

Climate change has intensified extreme weather events (EWEs) across Sub-saharan Africa. Yet little is known about how formal education systems integrate these risks into primary school curricula. This study examines the extent to which EWEs are integrated into the primary school curriculum in Burkina Faso and assesses their relevance in promoting Disaster Risk Reduction (DRR) awareness among pupils. A mixed research approach was adopted, combining content analysis of school curricula, a literature review and semi-structured interviews with teachers, pupils and educational supervisors. The findings reveal substantial gaps between policy intentions and classroom realities. More than 80% of pupils and more than 60% of teachers do not have access to climate-related teaching materials, while more than 90% of educational supervisors report a lack of institutional guidance documents. Although EWEs-Related topics appear sporadically in subjects such as geography, science and reading, their treatment remains fragmented and largely superficial, ranging from approximately 24 % in some subjects to less than 1 % in others. This limited curricular integration restricts pupils' ability to understand, anticipate and respond to climate-related risks. This study contributes to the literature on climate education and DRR by highlighting the need for context-specific, age-appropriate curriculum reforms that are aligned with students' cognitive abilities and local environmental realities. Strengthening climate education from primary school onwards is essential to increase long-term resilience and adaptive capacity in climate-vulnerable countries such as Burkina Faso.

**Keywords:** Climate Change education; Extreme weather events; Disaster Risk Reduction; Primary school Curriculum analysis; Burkina Faso

### 1. Introduction

Climate change (CC) is a problem which is global in nature, and whose effects go across a wide range of disciplines. It is therefore important that this theme is taken into account as part of teaching programs (Leal Filho et al., 2021). Climate change is a complex and wicked problem, which needs to be addressed through relevant climate change education (Sjöblom et al., 2022). Climate change poses a danger to the current and the future generations. According to Kariuki (2017) it sad to note though is the fact that although developing countries have contributed the least to the current mess, they will be more impacted due to their limited technology to adapt to the consequences. extreme weather events (EWEs) are increasingly disrupting schooling (Sergio et al., 2024). Education systems in West and Central Africa have

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not been exempt from these challenges. A UNESCO study conducted by (Chimier, 2016) estimated that disasters affect 100 million children and young people annually. Furthermore, a review of national curriculum frameworks across 100 countries revealed that nearly half (47%) lacked any reference to CC. While some countries included CC in their curriculum frameworks, the depth of integration was generally minimal. Countries most likely to address CC in their curricula are often those most vulnerable to its impacts rather than those primarily responsible for emissions. Efforts to integrate CC education predominantly focus on primary and secondary levels (90%), with fewer countries extending such frameworks to technical and vocational education and training (70%), higher education (70%), or teacher training programmes (55%). For UNESCO (2021) good practices exist, such as inter-ministerial collaboration between education, environment, and sustainable development ministries, which provide valuable inspiration for embedding CC at the core of educational policies and practices. Given the increasing impacts of CC, integrating it comprehensively into education systems remains an urgent priority (Septiani et al., 2024). The integration of emerging technologies and participatory learning methods is essential to enhance the effectiveness of ESD. And greater investment in teacher training and standardised teaching materials, as well as the promotion of international collaboration to share resources and best practice (Bonilla-Jurado et al., 2024). Foley (2020) unfortunately, the integration of ESD, especially in the education system is poor. This study examines the integration of extreme weather events (EWEs) into teaching resources within Burkina Faso's primary education curriculum. It aims to assess the current inclusion of EWEs in educational content, identify gaps in resource availability for students and educators, and propose enhancements to strengthen climate resilience and environmental awareness among primary school students in this region of Africa.

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## 2. Theoretical framework

### 2.1. Concepts

A theoretical framework underpins this study, providing clarity on the key concepts related to EWE, curriculum, primary education, and integration. EWEs refer to phenomena characterised by their intensity and their deviation from typical climatic patterns. Climate change education, in essence, climate change education is about learning in the face of risk, uncertainty and rapid change (Stevenson et al., 2017). Cook (2019) define features of climate change education. He considers climate change as an example of the wicked problems in the era of the Anthropocene. He ponders what kind of societal and cultural trans-formations, thinking and learning are needed.

According to OCE (2025) extreme weather events are phenomena that fall outside normal weather patterns for a given locality (e.g. very powerful hurricanes, torrential rainfall, droughts, heat waves). They are harmful in themselves, but their impact can be devastating. For (El-Astal, 2023) curriculum can be an attempt, a process, a medium, a methodology, a set of elements/issues/ activities/materials/courses/ or experiences, a series of choices, a rhetorical accomplishment, a document, an autobiographical text, a prescriptive content, a plan, a project, a blueprint, a design, a practice, a system, or a framework that illustrates the following commonplaces. For Innocent (Mulenga Mutale, 2018) Mutale Mulenga the curriculum is the set of selected, organized, integrative, innovative and evaluative educational experiences offered to learners, consciously or unconsciously, under the authority of the school, in order to achieve the designated learning outcomes, which are the fruit of growth, maturation and learning for best use in life within an ever-changing society. There are various types of curriculum that can be developed. In this study we are taught about Integrated curriculum. Hameed (2023) argues that this type there is integration at different levels i.e., different subjects, classroom with real life common purpose of education should be served.

### 2.2. Impact of extreme weather events on primary schools

According to Kundzewicz (2016), the impacts of such climate-related extremes include alteration of ecosystems, disruption of food production and water supply, damage to infrastructure, schools and settlements, an increase in human morbidity and mortality, as well as consequences for human mental health and wellbeing. For countries at all levels of development from least developed to most developed, these impacts are consistent with a significant lack of education and preparedness for current climate variability. For Kennedy (2019) among extreme weather events, students ranked thunderstorms and wet weather as the most important extreme weather conditions that limit their arrival at school. Floods have significant impacts on the education system and students, disrupting learning and affecting attendance and motivation. Floods can demoralise children, leaving them unmotivated to study when classes resume. (Beer, 2018) finds that exposure to the weather shock significantly reduces the likelihood of being enrolled in mandatory school two to three years after the shock. Similarly, it significantly reduces the probability of completing basic education ten to eleven years after the shock. Both effects are driven by children from herding households. (Justine, 2017) notes that the destruction of teaching materials further exacerbates the situation, with some students reluctant to return to school. Additionally, many students are unable to attend school due to poor health, suffering from illnesses such as diarrhoea and cholera, or because they lack adequate food supplies. In the education sector floods leave

a trail of destructions which may result in children's education getting to a level where it cannot be salvaged. Schooling maybe cancelled, children may drop out of school and school absenteeism may occur if school buildings are used as evacuation centers (Buckner et al., 2020).

### **2.3. The importance of integrating extreme weather events into climate risk education**

For (Ducret, 2024) the primary schools provide an excellent opportunity to raise children's awareness of CC and its impacts. Education plays a pivotal role in fostering this awareness, equipping students with the understanding that CC is largely driven by human activities. By grasping this concept, students can begin to ask critical questions such as: What behaviours contribute to CC? What actions can we take to mitigate global warming? Climate risk education goes beyond raising awareness; it cultivates an understanding of vulnerability, prevention strategies, a culture of risk, resilience-building, and a civic approach to coexisting with risk. This multidimensional approach is essential in empowering students to navigate and address the challenges posed by extreme climatic events. Empirical studies support the value of integrating disaster mitigation into education. Nandi and Marlyono (2019) demonstrate that, in West Java, Indonesia, geography lessons embedded with disaster mitigation topics were shown to significantly influence students' disaster preparedness. The study revealed that this integration accounted for 39% of the preparedness level among senior school students in the province. Similarly, research by (Noviana et al., 2019), titled *Why Do Primary School Students Need Disaster Mitigation Knowledge?*, demonstrated that the use of KOASE comic strips effectively increased disaster mitigation knowledge among primary school students. KOASE is the name of the comic strip used to understand disaster mitigation. This approach ensured that students gained the essential knowledge needed to take informed and timely actions before, during, and after a disaster. These findings underscore the importance of integrating CC and disaster risk education into primary school curricula. Such efforts not only enhance students' understanding but also prepare them to take proactive measures in the face of climate-related risks.

### **2.4. Strategies for preventing and mitigating of extreme weather events in schools**

The Nations Unies (2014) systematic integration of natural disaster prevention into school curricula across all educational levels is essential for fostering long-term resilience. This integration should extend beyond basic knowledge of natural risks and safety measures, encompassing the prevention and reduction of disaster risks, vulnerabilities, and the capacity to withstand them. Education, particularly through classroom learning, plays a pivotal role in disaster mitigation efforts, including addressing flooding risks. Developing targeted learning modules on disaster mitigation, such as those focused on flooding, is particularly effective for primary school students (Rahmayanti et al., 2022). Miguel (2013) points out that flood-related disasters are influenced by a complex interplay of natural and human factors. However, the human dimension is often underestimated in flood management. To address this gap, it is crucial to emphasise human capacity development through education, training, and communication on water-related risks. Disaster mitigation involves both physical measures and efforts to enhance awareness and build the capacity to manage disaster threats. For primary school students, who are at a critical cognitive developmental stage, disaster mitigation education should be delivered in tangible and concrete forms to ensure comprehension and engagement (Noviana, Kurniaman, Munjiatun, et al., 2019). Soucy (2014) emphasizes that the strategies like New Brunswick's Flood Risk Reduction Strategy underscore the importance of integrating knowledge about flood-prone areas into decision-making related to living, working, and building. This approach helps protect people and property, improves public safety, and mitigates economic losses while fostering resilience. Vulnerability to disasters evolves over time, necessitating an understanding of the historical, economic, and social trajectories of affected regions. Societies adapt to environmental risks based on these factors, either reducing or accepting vulnerabilities depending on their context (Jouannic et al., 2017). In Burkina Faso, Ouagadougou exemplifies the socio-economic challenges of flood vulnerability due to its high population density, the prevalence of settlements in marshy areas, and insufficient resilience infrastructure, such as rainwater drainage systems (Karambiri et al., 2015). Addressing these vulnerabilities requires a multi-faceted approach that combines infrastructure development with robust education programmes to prepare communities for managing and mitigating extreme weather events.

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## **3. Methods**

In this study, a comprehensive methodological approach was employed to explore the integration of EWEs into the primary school curriculum in Burkina Faso. The first phase involved a detailed review of relevant literature to establish a theoretical foundation and contextual understanding of CC education and EWEs in primary education. This was followed by an in-depth analysis of the existing primary school curriculum in Burkina Faso to evaluate the extent to which it addresses issues related to extreme climatic events, such as floods, droughts, and heatwaves. To complement the curriculum analysis, semi-structured interviews were conducted with key stakeholders, including teachers, educational supervisors, and students. These interviews aimed to gather qualitative insights into the availability of teaching materials, the inclusion of environmental education topics, and the practical challenges faced in integrating CC

content into classroom learning. The combination of document analysis and stakeholder interviews provided a holistic understanding of the current state of CC education in Burkina Faso. This approach highlighted gaps in the curriculum and also shed light on the perceptions, experiences, and needs of educators and learners in addressing the challenges posed by EWEs. The findings aim to inform recommendations for strengthening the curricula and promoting resilience through targeted educational interventions.

### 3.1. General document review

The general documentary review involved reading documents (theses, master's theses, scientific articles, reports) related to CC and climatology in order to seek information on the impacts, adaptations and prevention of flooding; also the gaps. This information helped to take stock of the integration of EWEs into teaching resources for primary education in Burkina Faso.

### 3.2. Interviews with inspectors, teachers and students

The interview with the educational supervisors revolved around questions such as in your Basic Education District (BED), do you have any documents on climate change issues? In your BED, do you have any documents on the risks of natural disasters? Do you have any documents on environmental education? As for the teachers, they were asked about what subjects are taught in Burkina Faso's public and private primary schools in the official curricula. Were they trained in climate change issues? Do you have any documents on environmental education? In your school, do you have any documents on the risks of natural disasters? For the students we ask; what types of natural disaster are we exposed to in the Ouagadougou commune? Have you ever been made aware of extreme weather events? Do you have any documents on environmental education?

### 3.3. Population and sampling

For this study, data were collected through surveys involving 12 pedagogical inspectors, 61 head teachers, and 387 students from grades 4, 5, and 6 (**table 2**). **Table 1** shows the age corresponding to each class level surveyed. The sampling approach was guided by the administrative structure of Ouagadougou, which is divided into 12 districts, each hosting a BED. To ensure representative coverage, one inspector was selected from each BED, accompanied by five head teachers and five schools per district. Within each school, six students were surveyed, comprising two students from each of grades 4, 5, and 6. However due to fieldwork constraints the final validated dataset consists of 387 students with complete and usable responses which were retained after data cleaning and quality control procedures. Data quality control procedures included consistency checks, removal of incomplete responses and verification of duplicates to ensure robustness of the final dataset. This systematic sampling framework was designed to provide balanced insights across the various districts and educational levels within the municipality.

**Table 1** Students respondents' class and age

Class	Students Age	Absolute frequency	Relative frequency
grade 4	8-10	127	32.82
grade 5	9-13	125	32.30
grade 6	10-15	135	34.88
Total	in years	387	100

Source: authors

**Table 2** Characteristics of respondents to the surveys (%)

Gender	Students	Directors	Inspectors
Male	193 (49.87)	36 (59.01)	10 (83.33)
Female	194 (50.12)	25 (40.99)	2 (16.67)
Total	387	61	12

### 3.4. The 1989/1990 Primary School Curriculum (1993 edition) in Burkina Faso

The study utilised the 1989/1990 primary school curriculum from the 1993 edition in Burkina Faso, as it remains the curriculum currently in use. However, it is important to note that this curriculum is presently undergoing revision. Within this framework, the teaching subjects for grades 1 and 2 have been modified, while the curriculum for other grades remains unchanged.

Curriculum content taught in grade 1 to 6 classes in Burkina Faso. **Table 3** below shows the subjects taught.

**Table 3** Curriculum content from grade 1 to grade 6

Subject	grade 1	grade 2	grade 3	grade 4	grade 5	grade 6
Language	●	●	●	⊗	⊗	⊗
Reading	●	●	●	●	●	●
Writing	●	●	●	●	●	●
Numeracy	●	●	●	●	●	●
Sensory exercises	●	●	⊗	⊗	⊗	⊗
Recitation	●	●	●	●	●	●
Singing	●	●	●	●	●	●
Moral and civic education	●	●	●	●	●	●
Speaking	⊗	⊗	⊗	●	●	●
Vocabulary	⊗	⊗	●	●	●	●
Grammar	⊗	⊗	●	●	●	●
Conjugation	⊗	⊗	●	●	●	●
Spelling	⊗	⊗	●	●	●	●
Written expression	⊗	⊗	●	●	●	●
Observational science	⊗	⊗	●	●	●	●
History	⊗	⊗	●	●	●	●
Geography	⊗	⊗	●	●	●	●

Source: authors ; Legend; ● The subject is taught at this grade level ⊗ The subject is not taught at this grade level

### 3.5. Ethical statement and informed consent

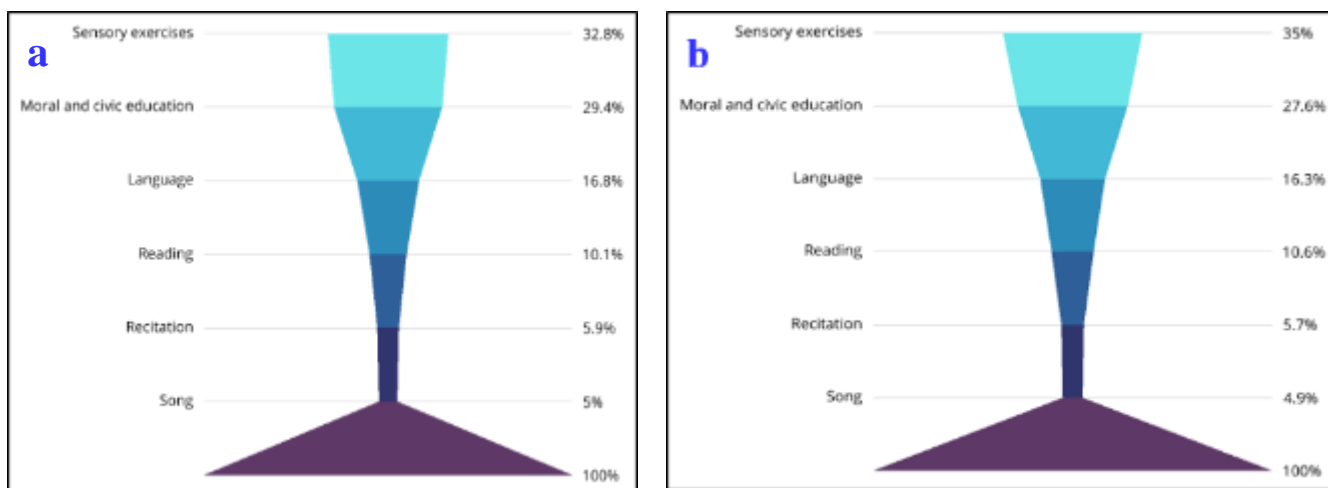
This study involved collecting data from men, women and, in particular, children. The objectives of the research and its scientific and socio-economic implications were clearly explained to all participants. Before data collection began, informed consent was explicitly obtained from all participants after they had been informed of the study's objectives, the voluntary nature of their participation, and their right to withdraw at any time without consequence. No personal data that could identify individuals was collected or stored. The data was processed and analyzed in a strictly anonymous manner.

This study was approved by the Ministry of National Education, Literacy and Promotion of National Languages (MENAPLN) of Burkina Faso, through the Directorate General for Access to Formal Education (DG\_AEF), under number **2023-002506/ MENAPLN/SG/DG\_AEF/DEPrim dated 13 November 2023**. The study was conducted in accordance with the ethical principles set out in the Declaration of Helsinki.

## 4. Results

### 4.1. Curriculum content dealing with Extreme Weather Events in primary school in Burkina Faso

In the Grade 1 and 2 curricula, environmental topics such as CC, floods, rainfall, and disasters are partially addressed across various subjects, although the coverage remains limited. In Grade 1, these topics are mentioned primarily in sensory exercises (33%) and civics and ethics (29%), with smaller proportions in language (17%), reading (10%), recitation (6%), and singing (5%). Similarly, in Grade 2, the integration of these topics follows a comparable pattern, with sensory exercises (35%) and civics and ethics (28%) again being the most prominent subjects, while language (16%), reading (10%), recitation (6%), and singing (5%) also feature these environmental issues to a lesser extent. While these subjects provide some exposure to environmental themes, the frequency and depth of their inclusion are insufficient to fully equip students with the necessary knowledge and skills to understand and respond to the challenges posed by CC and related disasters. This highlights a need for further development and integration of comprehensive CC education across the curriculum to ensure a more holistic approach to environmental awareness at the primary education level. In the language lessons, the curriculum includes activities focused on helping students describe their environment and identify various elements of nature within it. These lessons aim to enhance students' understanding of the world around them through the exploration of natural surroundings. At the reading level, the curriculum incorporates thematic topics such as the prevention of bushfires, the formation of rain, and the impact of rainfall on the environment. These lessons seek to raise awareness of environmental issues and promote critical thinking about the natural world. Furthermore, in sensory and observation exercises, several themes related to nature and climate are introduced. These include the study of the sky, clouds, and wind, as well as the changes that occur before and after rainfall. The curriculum also touches on the concept of marshes, providing students with an opportunity to observe and understand different natural environments. These activities aim to foster sensory awareness and develop students' observational skills, laying the foundation for a deeper understanding of environmental processes and their connection to EWEs. The figure 1 shows in graph a the subjects taught in the grade 1 curriculum and graph b the subjects taught in the grade 2 curriculum.

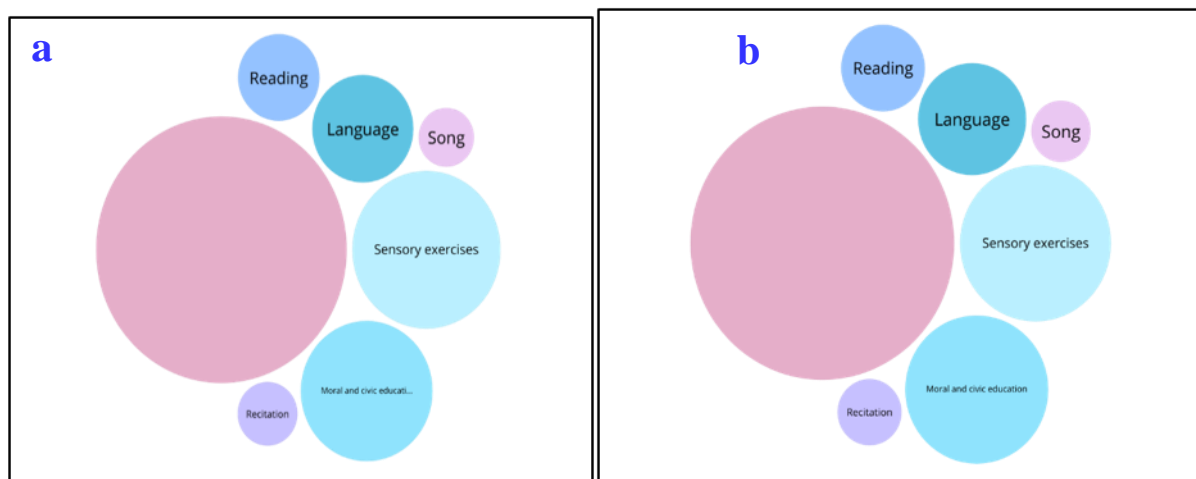


**Figure 1** Proportion of subjects including the environment, climate change, floods, rain, disasters, wind in grade 1 a and grade 2 b

For grades 3 and 4 in primary schools in Burkina Faso, the subjects taught are distributed across a range of disciplines, with varying emphasis on topics related to the environment, CC, floods, rainfall, and disasters. These subjects are integrated within the broader curriculum, with some disciplines offering more direct relevance to climate and environmental issues than others. The subject with the highest proportion dedicated to these topics is Geography, accounting for 24.47%, followed by Observational Sciences at 23.40%. Moral and Civic Education, which may include content on environmental responsibility and resilience, contributes 18.62%. Subjects such as Reading (7.98%) and Written Expression (6.38%) are also part of the curriculum, though their direct connection to CC education is more indirect. Other subjects, including Language (5.85%), Recitation (4.26%), Singing (3.72%), History (1.06%), Vocabulary (1.60%), Grammar (0.53%), and Conjugation (0.53%), feature less direct content related to environmental issues, though they may offer opportunities for integrating relevant themes through reading materials and discussions.

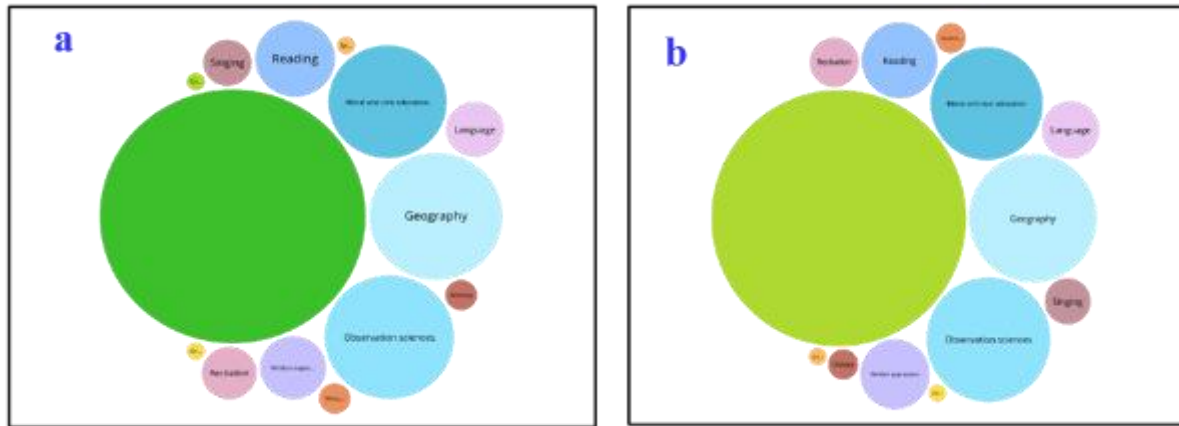
In the third year of the curriculum, students are introduced to a theme on weather in geography, which explores key aspects of climate and natural environments. This theme covers the dry and rainy seasons, various types of vegetation

such as savannah, desert, and forest, as well as local waterways, including rivers and streams. In science lessons, the curriculum includes a focus on natural phenomena, specifically wind, clouds, and rain, allowing students to develop a foundational understanding of atmospheric processes. Additionally, vocabulary lessons incorporate terms related to environmental and climatic concepts, such as "drought", "wintering", "seasons", and "the fight against drought". These terms are designed to expand students' linguistic repertoire while reinforcing their understanding of environmental challenges. In the reading curriculum, topics such as "wintering", "drought", "the first rain", and "combating drought" are integrated, helping students engage with these critical environmental issues through literary and informational texts. This comprehensive approach aims to build both knowledge and awareness of the weather, climate, and related challenges, fostering, again, a deeper understanding of the natural world and the importance of addressing environmental concerns. The figure 2 shows in graph a the subjects taught in the grade 3 curriculum and graph b the subjects taught in the grade 4 curriculum.



**Figure 2** Proportion of subjects including the environment, climate change, floods, rain, disasters, wind in grade 3 a and grade 4 b

**For grades 5 and 6**, the teachers surveyed reported that a range of subjects within the curriculum integrates knowledge about the environment, CC, and natural disasters to help raise students' awareness of these issues and encourage responsible action. According to the teachers, the following subjects incorporate these topics to varying degrees: geography (24.47%), observational science (23.40%), moral and civic education (18.62%), reading (7.98%), written expression (6.38%), language (5.85%), recitation (4.26%), singing (3.72%), history (1.06%), vocabulary (1.60%), grammar (0.53%), and conjugation (0.53%). In middle school, the curriculum includes several course modules that touch on EWEs and environmental topics across various subjects. For example, in reading lessons, students encounter modules on the rainy season, the forest, tornadoes, the first rain, hurricanes in the Sahara, and drought. These topics aim to raise awareness of natural phenomena and their impacts. In geography, the curriculum covers key aspects such as watercourses ranging from ponds and rivers to seas and oceans along with global climate zones and vegetation regions. This provides students with an understanding of the world's diverse ecosystems and the environmental factors influencing them. Civics and moral education also integrates themes of national solidarity, where topics related to natural disasters, including floods, fires, and droughts, are explored. These lessons help students understand the collective responsibility in addressing and mitigating the effects of such events. Science lessons explore the water cycle in nature and the study of pond water, fostering an understanding of essential ecological processes. Together, these modules contribute to the development of environmental awareness and resilience in students, equipping them with knowledge to better understand and respond to EWEs. These subjects aim to equip students with the knowledge and understanding necessary to grasp the environmental challenges facing their communities and the world at large. The integration of climate-related themes into these areas of study not only raises awareness but also fosters a sense of responsibility among students, urging them to take part in efforts to mitigate the impacts of natural disasters and CC. However, the degree to which these issues are covered within each subject varies, with some areas offering more in-depth exploration than others. This highlights a need for a more consistent and comprehensive approach across the curriculum to ensure that all students are effectively prepared to respond to environmental challenges. The figure 3 shows in graph a the subjects taught in the grade 5 curriculum and graph b the subjects taught in the grade 6 curriculum.



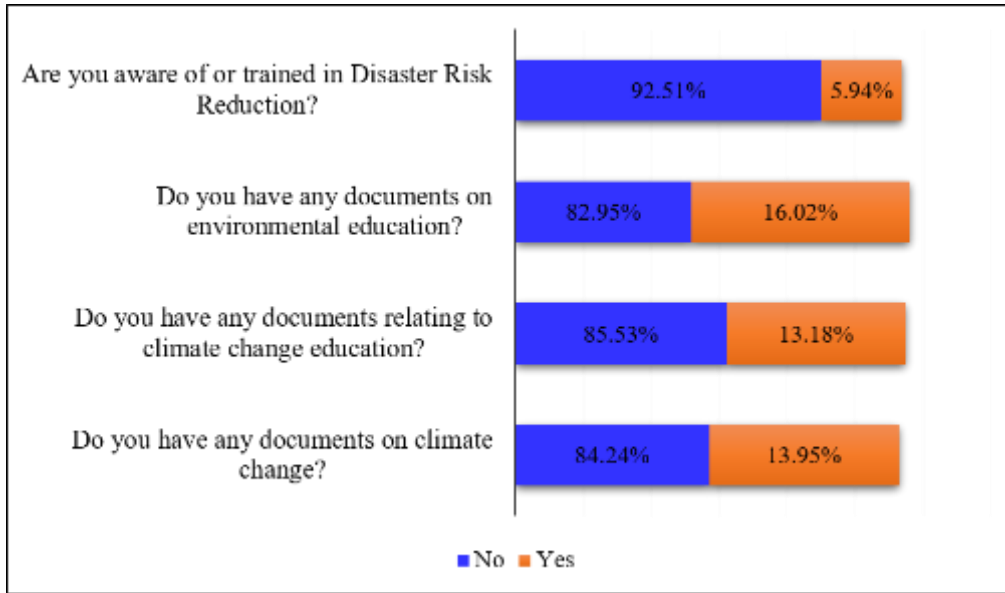
**Figure 3** Proportion of subjects including the environment, climate change, floods, rain, disasters, wind in grade 5 a and grade 6 b

#### 4.2. Links between subjects taught and extreme weather events

At all educational levels in Burkina Faso, from grade 1 to grade 6, many subjects address environmental themes, including aspects of climate, floods, rainfall, and various natural disasters such as droughts and violent winds. These topics encompass a wide range of EWEs, such as floods, droughts, and violent winds, which are integrated into several subjects across the curriculum. For example, in geography, students learn about various seasons and their impacts on life in rural and urban settings. Topics covered include the dry, cold season, the dry, hot season, and the rainy season, all of which provide opportunities to explore how different climatic conditions affect daily life. Additionally, in civic and moral education, subjects related to EWEs, such as floods, droughts, and fires, are incorporated. The primary aim of civic and moral education is to raise students' awareness about these environmental challenges, cultivate responsible attitudes, and foster a sense of social responsibility. By engaging with these topics, students are encouraged to develop both individual virtues and behaviours that promote the well-being of society as a whole. These lessons not only help students understand the immediate impacts of EWEs but also aim to instil a deeper appreciation of the importance of preparedness, resilience, and sustainable living practices. Through these interdisciplinary approaches, curricula play a crucial role in shaping the next generation's awareness of environmental issues and their capacity to act in the face of climate-related challenges.

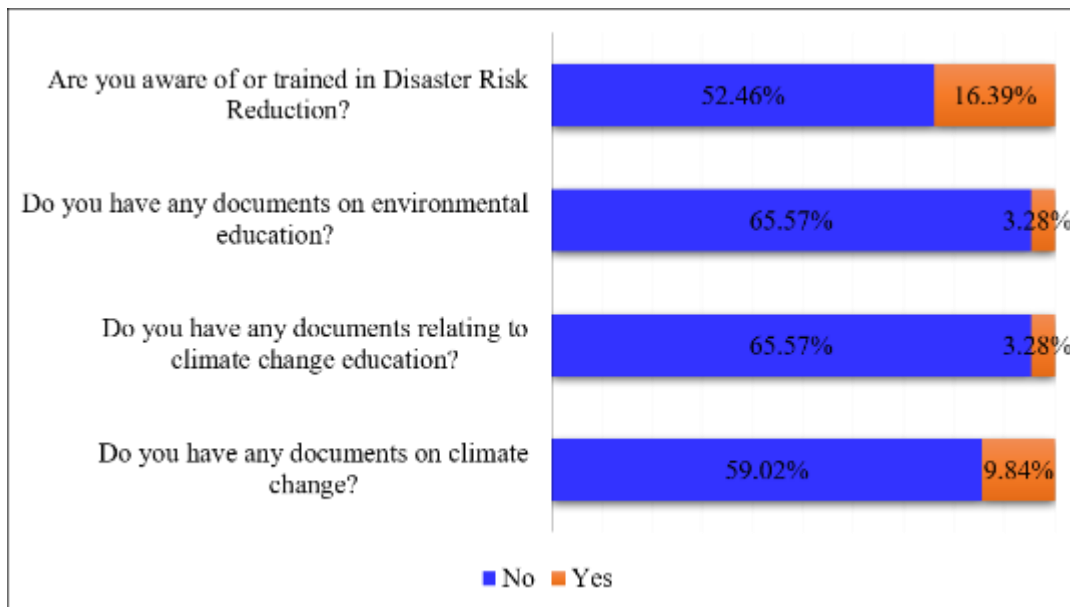
#### 4.3. Students, teachers and inspectors understanding of extreme weather Events and disaster risk reduction

When asked about the availability of documents related to CC, CC education, environmental education, or EWEs, the findings revealed a significant gap in resources among students. A substantial majority of students (84.24%) reported having no access to documents on CC, with only 13.96% indicating they did. Similarly, 85.53% of students stated they lacked materials specifically addressing CC education, compared to just 13.18% who had such resources. Regarding environmental education, 82.95% of students reported an absence of relevant documents, with only 16.02% affirming their availability. The situation was even more critical for disaster risk reduction awareness and training: a mere 5.94% of students had been exposed to any form of education or training in this area, while an overwhelming 92.51% had not. These results underscore the lack of educational materials and training on critical environmental and disaster-related topics within the student population, highlighting the urgent need for a more comprehensive integration of such content into the curricula and classroom practices. Here **figure 4** the proportion of the respondent.



**Figure 4** Documentation and training on climate change 2024-2025

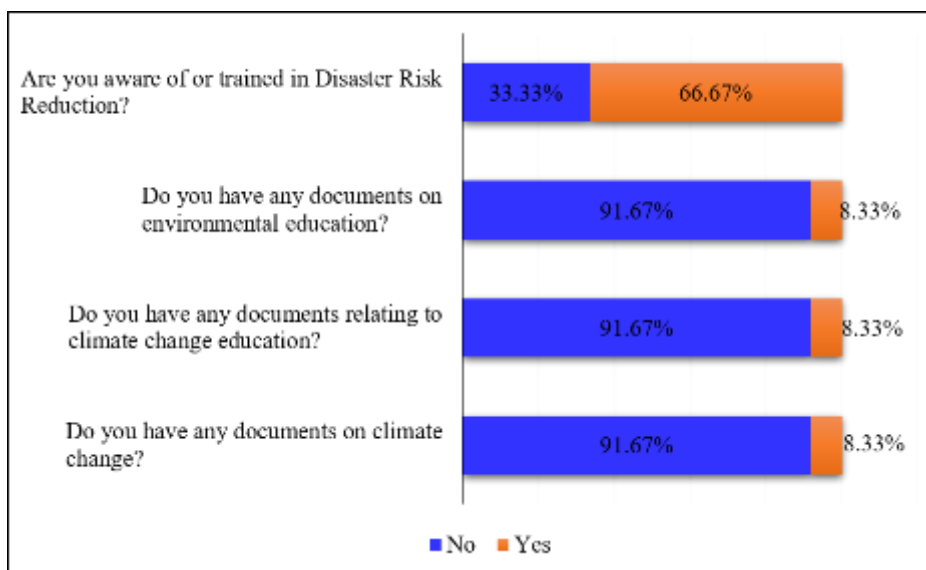
Teachers were asked whether they had access to any materials related to CC, CC education, environmental education, or EWEs. The findings (**figure 5**) revealed that a significant number of teachers lacked such resources. Specifically, 59.02% of teachers reported not having any documents on CC. In terms of CC education materials, 65.57% indicated that they did not have access to such resources, in contrast to only 3.28% who affirmed that they did. Similarly, 65.57% of teachers stated they did not possess any documents on environmental education, while only 3.28% confirmed having access to such materials. Furthermore, the study explored students' awareness of EWEs training. The results showed that only 16.39% of teachers were familiar with or had received any training related to EWEs. This stands in stark contrast to 52.46% of students who had no such knowledge or training. These findings highlight a significant gap in the availability of relevant educational resources for both teachers and students, particularly in critical areas such as CC education and disaster preparedness.



**Figure 5** Documentation and training on climate change

Education inspectors were asked whether they had access to any documents related to CC education, environmental education, and EWEs. The findings (**figure 6**) revealed a significant lack of resources in these areas. Specifically, 91.67% of education inspectors reported not having any documents on CC, while only 8.33% confirmed they did. Similarly, when asked about CC education materials, 91.67% responded negatively, and only 8.33% had access to such resources.

Regarding environmental education, the results were similar: 91.67% of the respondents indicated they did not possess relevant documents, while 8.33% affirmed they did. However, when it came to EWEs, a notable difference emerged. 66.67% of the inspectors reported having received training or being familiar with EWEs strategies, whereas 33.33% had not received any related training. These findings underscore the gap in CC and EWEs resources available to education inspectors, which could potentially hinder the effective integration of these critical topics into school curricula and educational practices.



**Figure 6** Documentation and training on climate change

## 5. Discussion

The results indicate that extreme weather phenomena are formally addressed at all levels of primary education in Burkina Faso, particularly in geography and observational sciences. However, this integration remains uneven and largely superficial. Although references to climate, floods, droughts, and severe storms appear in many subjects, their discussion lacks conceptual depth and pedagogical progression. The study by (Masocha et al., 2025; Tyas et al., 2025; Banks & Taylor, 2025; Eilam, 2025) emphasize that the integration of DRR remains symbolic included in the curriculum, its superficial treatment prevents the development of real resilience skills among students. This suggests that EWEs education is perceived as fragmented thematic content rather than as a structured learning pathway aimed at building skills in climate literacy and resilience. This finding suggests a token rather than transformative integration of climate-related risks into the curriculum, a trend also observed in other low- and middle-income countries. However, in the case of Burkina Faso, this superficiality is exacerbated by the country's high exposure to climate risks, making the limited depth of the curriculum particularly problematic. A key explanatory factor emerging from this study is the severe lack of teaching materials and specialized training on climate change and extreme weather events. The lack of dedicated textbooks, maps, and pedagogical guides limits teachers' ability to translate curriculum objectives into effective classroom practices. Furthermore, limited access by education inspectors to climate-related resources hinders curriculum implementation and pedagogical oversight. These findings are consistent with previous research highlighting the crucial role of teacher competencies in climate education (Tuladhar et al., 2014; Mohebi et al., 2018). However, this study extends existing knowledge by demonstrating how resource deficits operate simultaneously at the classroom, school, and supervisory levels to create a systemic barrier to effective environmental and social literacy education also noted in previous studies (Apollo & Mbah, 2021; Ibourk et al., 2025; Mbah et al., 2025; Meekaew & Saenkum, 2025).

International research, particularly from China and other emerging economies, suggests a more structured approach to integrating CC into geography curricula, incorporating action-oriented and participatory dimensions (Gong et al., 2021). In contrast, the curriculum in Burkina Faso remains primarily content-based, with limited emphasis on competencies, critical thinking, or practical preparation. This contrast highlights the importance of contextual factors such as institutional capacity, funding, and teacher education systems. While African scholars rightly advocate for stronger integration of CC into curricula (Twinomugisha Rwobusiisi et al., 2021; Munasi, 2019), this study demonstrates that integration alone is insufficient without a coherent pedagogical framework and sustained institutional support.

From a theoretical perspective, the findings contribute to the literature on Education for Sustainable Development and Disaster Risk Reduction by illustrating the limits of curriculum-based approaches when they are not supported by resources and capacity-building. The study reinforces the argument that effective climate education must move beyond awareness-raising towards competency-based learning aligned with local risk contexts. From a policy standpoint, the results call for a comprehensive revision of curricula at all educational levels, with particular emphasis on teacher training, the development of context-specific teaching materials, and the integration of local knowledge. Embedding future-oriented risk scenarios and adaptive strategies, as suggested by (Baraki et al., 2024;Tshabalala et al., 2025; Lautensach et al., 2025) would enhance the relevance and effectiveness of climate education in Burkina Faso.

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## 6. Conclusions

This study examined how extreme weather events are integrated into the primary school curriculum in Burkina Faso, in a context of increasing climate-related risks. The results indicate that, although extreme weather events are formally recognized in several subjects and school levels, their integration remains fragmented and largely superficial, thus limiting the development of climate risk awareness and adaptation capacities among pupils. More than 84% of the pupils reported having no access to climate related documents, while 92.5% had never received any training in disaster risk reduction. Although 66.7% of education inspectors declared having received training on extreme weather events, over 91% lacked institutional documentation, and few than 17% of teachers had been trained. This gap highlights a discrepancy between national climate and education policy ambitions and their concrete translation into educational content. By combining curriculum analysis with empirical data collected from teachers, students and educational supervisors, this research contributes to the literature on climate change education and disaster risk reduction by providing rare evidence from a climate-vulnerable West African context. The results suggest that curricular inclusion alone is insufficient if it is not accompanied by coherent pedagogical progression, adequate teaching resources and ongoing teacher training. Unlike the more integrated approaches observed in other regions, climate education in Burkina Faso remains largely content-focused rather than skills-based. The study highlights the need for context-specific and age-appropriate curriculum reforms that go beyond mere awareness-raising to focus on developing practical knowledge and resilience skills. Policy implications include strengthening teacher training on climate change and extreme weather events, developing locally relevant teaching materials, and ensuring continuity of climate education between primary, secondary and higher education. Despite these contributions, the study is subject to limitations related to resource constraints and gaps in teacher capacity. Future research should evaluate the effectiveness of reformed curricula in improving students' adaptive behaviours and explore how local knowledge and lived environmental experiences can be systematically integrated into climate education. Longitudinal studies would also be valuable in assessing the long-term impact of school-based climate education on community resilience in climate-sensitive regions.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors of this article declare no conflicts of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

### *Statement of ethical approval*

This study was approved by the Ministry of National Education, Literacy and Promotion of National Languages (MENAPLN), Burkina Faso, under authorization number 2023-002506/MENAPLN/SG/DG\_AEF/DEPrim dated 13 November 2023.

### *Data availability statement*

The data cannot be made available to the public; readers should contact the corresponding author for further details.

*Author Contributions*

**Halidou KAFANDO** contributed to data collection, study design and structuring, documentary research, methodology and writing of the article; **Vincent N. OJEH** participated in manuscript design, methodology and supervision; **Blaise OUEDRAOGO** participated in the methodology and correction of the manuscript.

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