

Empowering Children as Agents of Climate Resilience: Integrating Education for SDG 13

Nurul Hidayat Ab Rahman ^{1*}, and Yanti Rosli ²

¹ Centre of International Law and Siyar, Faculty of Law, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor Malaysia

² Centre for Toxicology & Health Risk Studies (CORE), Faculty of Health, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor Malaysia

Abstract. As the world faces the challenges of climate change, its extensive effects are experienced in many areas of human life, emphasizing the urgent need to acknowledge its frequently overlooked consequences on the most susceptible individuals, particularly children. This study examines the Convention on the Rights of the Child (CRC), which provides detailed guidelines on children's rights in this challenge, aligning with the Sustainable Development Goal (SDG) 13. Furthermore, this research emphasizes the pivotal role of children as agents of change, particularly through the integration of education as outlined in Target 13.3. Grounded in socio-legal research conducted qualitatively, all data were meticulously gathered through library research and subjected to thorough analysis using the content analysis method. The paramount considerations revolve around the child's best interests and developmental rights. The study affirms that children have the rights to a healthy environment, education, and participation in addressing climate change. However, their limited awareness hinders their ability to participate effectively, leaving them vulnerable and unprepared for the future. These findings underscore the imperative of taking proactive measures such as incorporating Education for Sustainable Development (ESD) into school curricula, involving children in decision-making processes, and fostering awareness of sustainable living practices.

1 Introduction

Climate change encompasses extreme fluctuations in global temperatures and weather patterns. Although it is a natural phenomenon, human activities, particularly greenhouse gas emissions, significantly contribute to its recent intensification. The greenhouse effect, induced by these gases, results in heat retention in the atmosphere. Pielke's 2004 comparison of FCCC and IPCC definitions elucidates differing perspectives on 'climate change.' The FCCC attributes climate change to human activities altering atmospheric composition, while the IPCC encompasses all climate changes, irrespective of origin. Both definitions highlight the pivotal role of human actions in climate change and acknowledge its temporal nature.

* Corresponding author: nhidayat@ukm.edu.my

Importantly, there exists a scientific agreement on the necessity of immediate and substantial measures to curtail greenhouse gas emissions to alleviate severe climate change impacts. Numerous studies have highlighted the extensive negative impacts of climate change on children's development. In the legal context, child development frequently refers to the diverse stages of growth and development that a child experiences, with the primary objective of securing that their rights, welfare, and protection are maintained in accordance with the law. Among the key aspects of children development are, physical, mental, emotional and social development. To ensure the protection of these rights, a variety of legal texts are drafted, including national laws, international conventions, and the governing policies of countries. Climate change increases the risk of extreme weather events, endangering children's safety, potentially causing harm and displacement. Furthermore, it intensifies environmental degradation, adversely affecting children's health through pollution and disease. Consequently, this leads to food and water supply disruptions, resulting in food insecurity that impacts children's development. Ultimately, climate change obstructs educational access by damaging infrastructure and exacerbating poverty, hindering children's learning opportunities and overall growth (McMichael, 2014).

Extreme weather events are increasingly prevalent globally due to climate issues. The onset of climate change is challenging to pinpoint due to its gradual nature. Furthermore, historical records lack clarity in differentiating natural climate variability from anthropogenic influences. The 2003 European heatwave, often cited as an early example of climate change's influence on natural disasters, caused severe dehydration and heat-related illnesses, resulting in an estimated 70,000 excess deaths across Europe, with a significant proportion being children and the elderly (Stott et al., 2004). Hurricane Katrina, which devastated the U.S. Gulf Coast in 2005, led to over 1,800 deaths and displaced 400,000 children. The storm surge and flooding caused widespread destruction, leading to various health problems like respiratory issues and high levels of post-traumatic stress disorder in children, interrupting their education and development. Typhoon Haiyan, known as Super Typhoon Yolanda in the Philippines, was the strongest tropical cyclone to ever hit land, causing 6,300 casualties and 4.1 million displacements, with 1.7 million being children (Emanuel, 2005).

In 2017, Hurricane Maria struck Puerto Rico, causing catastrophic damage to homes, public facilities, and essential services like healthcare and education. Many families were forced to abandon their homes, with approximately 130,000 people relocating to the U.S. mainland, including a significant number of children. The Department of Education reported that around 400 schools closed permanently due to the displacement of thousands of students. In the same year, monsoon floods in Bangladesh affected eight million people, including children. Over 13,000 schools were used as shelters for displaced families. UNICEF reported that about 1.3 million children urgently needed humanitarian assistance due to filthy and congested living conditions, facing high risks of disease outbreaks and acute malnutrition. Even after the crisis ended, the impact on education persisted, with 1.5 million children dropping out of school as many facilities remained closed for extended periods. The following year, California experienced destructive wildfires that left over 50,000 people homeless. The wildfires severely degraded air quality, reaching hazardous levels in some areas. Children with pre-existing respiratory conditions like asthma were particularly affected; the American Lung Association noted a significant rise in respiratory distress cases among children during this time. Additionally, children's mental health suffered due to trauma from evacuation and loss of homes, leading to anxiety, depression, and symptoms of PTSD. These examples illustrate the profound and multifaceted impacts of climate change events on children's lives and rights. From physical harm and displacement to health crises and educational disruptions, the consequences are severe and long-lasting. Other significant events include the Australian bushfires, Cyclone Idai in Africa, Cyclone Amphan in India, and Typhoon Hagibis in Tokyo (UNICEF, 2020).

Henceforth, comprehensive disaster response and recovery are essential for supporting affected populations, particularly children. Further investigation into the challenges and rights of children under the CRC is necessary. Grasping these challenges and rights is vital for formulating effective strategies to alleviate climate change's negative impacts on children, thereby safeguarding their well-being and development, as emphasized by SDG 13 (Hellden et al., 2021). Additionally, exploring the ways in which the CRC can be leveraged to achieve SDG 13 goals can provide valuable insights into the intersection between children's rights and climate action.

2 Method and Materials

This article is based on socio-legal research conducted qualitatively. All data was gathered through library research and thoroughly analysed using the content analysis method. This study revolves around the principles of children's best interests and developmental rights. Article 3 of the CRC mandates that the principle of the child's best interests should be central to all actions affecting children. Decisions and policies must prioritize children's welfare and development. Addressing climate change necessitates the creation of policies that consider all facets of children's lives. Furthermore, it requires strategic planning to mitigate the negative impacts of climate change on children's environments. This approach is closely linked to developmental rights, which guarantee children's capacity to reach their full potential, including rights to education, participation, healthcare, and other provisions outlined in the CRC.

3 Results and Discussions

3.1 Children's Rights in Climate Change: Insights from the CRC

196 nations have endorsed the CRC, a pivotal human rights instrument delineating children's rights. The UN General Assembly adopted the treaty on November 20, 1989, effective September 2, 1990. Since its enactment, substantial legislative reforms have been instituted to enhance child protection against various crises. On February 17, 1995, Malaysia ratified the convention alongside other nations, committing to uphold children's rights. As a signatory, Malaysia is obligated to integrate the CRC's provisions into national legislation and ensure compliance within its jurisdiction (UNICEF, 2020).

All articles under the CRC are linked and co-dependent to each other. Almost all children rights listed under the treaty that are severely affected by climate crisis. For example, Article 22 of the CRC specifically addresses the rights of refugee children and asylum seekers. The article mandates that State Parties take appropriate measures to ensure that a child who is seeking refugee status or who is considered a refugee, either unaccompanied or accompanied by parents or by any other person, receives appropriate protection and humanitarian assistance in the enjoyment of applicable rights set forth in the CRC. Nevertheless, as climate change increasingly drives relocation, refugee children often face heightened vulnerabilities. These children may experience increased risks of exploitation, limited access to basic services, and disruptions to their resettlement processes as families flee from degraded environments or disaster-stricken areas. Ironically, climate change is also a major cause of displacement. Many children worldwide have been forced to endure climate displacement, undergoing significant adjustments in their lives to survive and thrive. There are 54 articles all together under the CRC, and several key articles are highly connected to the challenges posed by climate change crisis. Table 1 below show the analysis of CRC and Children's Rights in Climate Change: -

Table 1. Analysis of CRC and Children's Rights in Climate Change.

Article	Forms of Children Rights	Analysis of CRC and Children's Rights in Climate Change [†]
2	Right to Equality	Climate change affects children variably, influenced by socioeconomic status, residence, and other factors that increase vulnerability. It has the capacity to intensify existing inequalities. The principle of equality mandates equal protection and support for all children, including adaptability to climate change. Climate change also can disrupt the daily lives of children. Natural disasters like wildfires and floods can damage homes and schools, thereby hindering access to education and healthcare. Displacement may lead to relocation to temporary shelters, resulting in social stigma or exclusion. In summary, the sudden onset of climate-related challenges can expose all children to various forms of exclusion or discrimination.
6	Right to Life, Survival and Development	Climate change threatens children's right to life by heightening the occurrence of extreme weather and environmental shifts. Children's health, education, and well-being are profoundly affected by climate change, disrupting their survival and developmental conditions. Thus, it is crucial to implement strategies that mitigate these effects, enhance disaster preparedness, and support affected families for their survival and growth.
12	Right to Participation	Accurate information enables children to articulate their climate-related concerns and solutions. Access to diverse national and international information sources is essential for a comprehensive understanding of climate issues. Media should facilitate the dissemination of relevant climate information, taking into account sociocultural contexts. Educational resources must elucidate climate challenges and necessary actions for resolution. Information distribution should be inclusive, addressing age and linguistic needs, particularly for marginalized groups. Such resources should enhance children's overall well-being, encompassing social, spiritual, and health dimensions. Therefore, children possess the right to seek and disseminate climate change information, fostering informed viewpoints and opinions. Their perspectives on climate policies warrant acknowledgment, commensurate with their developmental stage. They must also be afforded opportunities to participate in legal or administrative matters pertinent to climate change impacting their lives. Nonetheless, this right may face restrictions under national laws aimed at safeguarding others' rights and public order. Any such limitations must be judiciously implemented to preserve children's engagement in climate advocacy.
13	Right to Expression	
17	Right to Information	
19	Right to Safety and Protection	Climate change increases risks to children's safety and health due to natural disasters causing physical and mental harm. Robust disaster preparedness and response strategies are vital to protect children and ensure their access to health care services. This is especially refers to education on climate risks and safety protocols for parents and children, which is necessary to build resilience and comprehension. Other than that, it is important to establish procedures for early detection and intervention is crucial to mitigate neglect or exploitation stemming from climate effects. Governments must enact regulations and programs to safeguard children in disaster-prone regions and create emergency plans for their support. This encompasses the development of resilient primary health care systems adept at addressing climate-related health challenges. Lastly, climate-
24	Right to Health	

[†] The analysis of the CRC and its implications for children's rights in the context of climate change in this schedule is original work by the author and not sourced from elsewhere.

		sensitive health care should be universally accessible, particularly for pregnant women. Health care services that incorporate climate-related considerations must include preventive care and family planning.
27	Right to an Adequate Standard of Living	The climate crisis can negatively impact children's physical, mental, spiritual, moral, and social development by disrupting access to essential resources such as clean water, nutritious food, and safe housing. Parents and caregivers face climate challenges in providing children with necessary development conditions, including increased costs and resource loss. In addition, States Parties should promote climate resilience by supporting parents and carers with material assistance and programs for nutrition, clothing, and housing to better protect children.
28	Right to Education	Climate change may impact education access, but States Parties must ensure primary education free and mandatory. Secondary, vocational, and higher education must be accessible to all, even in climate-affected areas. Measures to encourage regular school attendance and reduce dropout rates should consider the impact of climate change. It includes temporary learning spaces or online education options. Children must also be helped to adapt to changing circumstances and explore new opportunities, scholarships or financial assistance should be provided to help them make informed decisions about their education and career paths. Education should foster children's talents and abilities while upholding human rights, climate justice, and environmental protection. It should respect cultural identities and traditional environmental knowledge, teach children peace and tolerance, and emphasise environmental awareness and protection.
29		

In sum, the CRC provides a comprehensive framework for safeguarding children’s rights across various domains, including equality, survival, development, participation, expression, information, safety, health, living standards, and education. Climate change presents significant challenges to these rights by exacerbating existing inequalities, threatening survival and development, and disrupting essential services and resources. Nonetheless it is vital for the States Parties to take proactive measures by including climate resilience in their policies and practices to ensure that children fundamental rights are continued to be respected.

3.2 Empowering Children as Agents of Climate Resilience

The CRC emphasizes children's rights to express their thoughts and participate in decision-making, linking these rights to their access to accurate information. This empowerment enables children to voice valid perspectives on significant issues in their lives. The current World Agenda 2030 recognizes children as "agents of change," defined as individuals or groups that influence social or systemic transformations. They challenge the status quo and drive strategic changes to adapt systems to emerging needs or opportunities. (McAdam & Tarrow, 2001). Therefore, recognizing children as agents of change continues to acknowledge their rights to express their valuable views and promote their significant role in actively participating in decision-making, a right established by the 1989 treaty.

Greta Thunberg from Sweden is a prominent young climate activist who began her journey by skipping school to protest outside the Swedish parliament, sparking the global "Fridays for Future" movement. Her powerful speeches urging immediate action from global leaders have inspired millions to advocate for climate justice. Another notable activist is Isra Hirsi, co-founder of the United States Youth Climate Strike. She has played a key role in organizing student strikes across America and emphasizes the intersectionality of climate change, particularly its disproportionate effects on marginalized communities, inspired by the Flint water crisis (Patel & Taylor, 2021). Xiuhtezcatl Martinez, an indigenous environmental activist and youth director of Earth Guardians, has been fighting climate

change since he was six. He has spoken at major venues like the United Nations and sued the U.S. government for inaction on climate issues. Martinez also uses his music to raise awareness and inspire action. These activists exemplify the vital role young people play in advancing the climate change conversation and driving meaningful change in their communities and beyond (Johnson, 2021).

To safeguard children's participation rights and enhance their roles as catalysts for change, empowering them with quality education on climate change is essential. This knowledge enables them to advocate for sustainable practices and mitigate climate impacts. Recognizing children's pivotal role, especially through education as outlined in SDG 13, is crucial. Goal 13 targets urgent actions against climate change with five main objectives:-

Table 2. Five targets under SDG 13.

Target	Explanation
Target 13.1	Strengthen resilience and adaptive capacities against climate-related hazards.
Target 13.2	Integrate climate change measures into national policies and planning.
Target 13.3	Enhance education, awareness, and institutional capacities for climate change mitigation and adaptation.
Target 13.a	Mobilize funds from developed nations for climate mitigation in developing countries.
Target 13.b	Improve planning and management capacities in least developed countries, focusing on marginalized groups.

These targets collectively aim to empower children and communities to effectively respond to climate challenges (United Nations, 2015). Children can play their role as agents of change across targets of SDG 13 in various impactful ways. Children can participate in resilience-building activities such as community drills, educational workshops on disaster preparedness, and climate adaptation projects. Schools and youth organizations can facilitate their involvement in planning and executing small-scale mitigation projects, such as planting trees or setting up rain gardens, which contribute to reducing the impact of natural disasters. Furthermore, vulnerable children can participate in cultural exchange programs or global communication networks that share local experiences with climate change. This promotes global solidarity and action by raising awareness of the unique challenges faced by children in least developed countries and small island developing states. Youth advisory panels or councils may collaborate with local governments to ensure climate policies consider youth needs and rights. Such forums allow children to discuss climate change's effects and advocate for inclusive solutions. All of these strategies emphasise education as the most important solution.

Thereupon, Target 13.3, which emphasizes children's education, must be the foundation of the solution to the climate crisis. Climate change education must be integrated into school curriculums at all levels, from primary to higher education. The goal is to ensure that every student understands the causes and consequences of climate change, as well as the steps they can take to mitigate its effects. This might include practical knowledge about sustainable practices and the importance of conserving resources. It also aids in raising awareness about the crisis through multiple efforts such as public information campaigns, community workshops, and media coverage. As for the next step, it is expected that individuals, including children and communities, will respond effectively to the challenges posed by climate change. For example, recycling and waste reduction programs, energy conservation workshops, water conservation, and tree planting activities, among many others. As for older children, educational institutions can include more detailed curricula that teach children environmental science studies, meteorology, and information technology. Youth involvement in related dialogues and participation in awareness campaigns can also be initiated. The absence of active participation by children may lead to overlooking valuable

perspectives and contributions, hindering progress in addressing issues like climate change. This lack of participation could impede achieving sustainable development goals, denying children their rights under the law.

4 Recommendation

4.1 Captions/numbering

ESD has evolved over several decades, beginning with the Stockholm Conference on the Human Environment in 1972. This pivotal event brought global attention to environmental issues and laid the groundwork for integrating environmental education into curricula. This was followed by the Belgrade Charter, published in 1985 at the International Workshop on Environmental Education in Belgrade, Yugoslavia. The Charter defined environmental education and set goals for its integration into education systems. The approach continued to develop with the Earth Summit in 1992 in Rio de Janeiro, which led to the creation of Agenda 21. This document emphasized the role of education in achieving sustainable development, with Chapter 36 specifically focusing on education, public awareness, and training. It highlighted the crucial role of education and public awareness in promoting sustainable development and empowering people to make informed decisions. Further key events include The World Summit on Sustainable Development (2002) and the UNESCO World Conference on ESD (2005), which launched the United Nations Decade of Education for Sustainable Development (DESD) (2005-2014). The conference emphasized the need for education systems to adapt to promote sustainability and encourage transformative learning (Zhang & Wang, 2022). The necessity of integrating ESD into school curricula, engaging children in decision-making processes, and promoting awareness of sustainable living practices was reaffirmed with the adoption of the SDGs in 2015. Goal 4 emphasizes quality education and includes a specific target for ESD (Target 4.7) to ensure that all learners acquire the knowledge, and skills needed to promote sustainable development. Most recently, the UNESCO World Conference on ESD in Berlin (2019) evaluated the progress of ESD and stressed the need for increased focus on climate change and global citizenship education (United Nations, 2015). Several countries have been recognized for their proactive efforts to integrate ESD into their national education policies and curricula. These nations are actively engaging in shaping future generations to better understand and address global challenges such as climate change, biodiversity loss, and sustainability.

Japan has been a leader in integrating Education for Sustainable Development (ESD) into its educational framework, establishing various programs from early childhood to tertiary education, such as the Eco-Schools Program. This initiative encourages schools to commit to sustainability and address environmental issues through student-led, hands-on learning, culminating in the awarding of a Green Flag for environmental commitment. Another significant initiative is Disaster Preparedness Education, which includes drills and lessons on sustainable rebuilding and community resilience, aligning with ESD principles by combining environmental education with practical skills. In Germany, schools and universities engage students in projects that tackle real-world environmental challenges, promoting critical thinking and problem-solving related to sustainability. The Schools for Future program encourages schools to develop their own sustainability projects, fostering active participation and the creation of sustainable school policies (Blum et al., 2013). Finland is recognized for its innovative educational system that broadly incorporates ESD into its curriculum. Notable programs include Sustainability Week, which features workshops, project-based learning, and guest lectures from experts, providing comprehensive exposure to sustainability issues. Many schools also implement the Outdoor

and Forest Schools program, where students learn about local ecosystems, sustainability practices, and conservation importance.

Multiple qualitative studies and reports demonstrate that children's active participation in climate education and initiatives positively impacts their knowledge, behavior, and community resilience. In Barcelona, two programs featuring non-formal educational activities increased student awareness and led to behavioral changes toward sustainability, enhancing community resilience. Similarly, preliminary research in rural Tajikistan, as reported by the World Bank, showed that students gained a deeper understanding of climate issues, benefiting both the children and their communities. A 2023 scoping review analyzing 48 papers from six reliable databases found that programs engaging young people in climate action effectively raised climate awareness and encouraged proactive environmental behavior. Other successful initiatives include the NOAA Environmental Literacy Program in the U.S., Florida Atlantic University's Climate READY program, and projects funded by the Adaptation Fund in countries like Seychelles and Chile, all demonstrating similar positive outcomes (Wellman et al., 2024 & Hohenhaus et al., 2023).

The historical milestones and initiatives highlight the importance of integrating ESD into children's education. ESD provides young people with the knowledge, skills, and values necessary to address global challenges like climate change, resource depletion, and social inequality. Studies show that children's participation in climate education leads to greater awareness, behaviour change, and community resilience, while also supporting the effective implementation of environmental policies. Educated children are more likely to understand the importance of environmental conservation, adhere to relevant laws, and advocate for sustainable practices in their communities. These findings should guide the development of national policies to ensure the next generation is equipped to tackle climate challenges and work towards a sustainable future.

5 Conclusion

This study illustrates that children could play a crucial role in promoting climate resilience, but only if given the required tools and knowledge through comprehensive education. Through the incorporation of ESD into school curricula, children can gain the knowledge and skills needed to actively engage in efforts to reduce the effects of climate change and adjust to its consequences. The study's conclusion asserts that protecting children's rights and encouraging their active participation in climate action are crucial for constructing a resilient and fair future. Policymakers, educators, and communities must collaborate and provide support to ensure that children are equipped to contribute to a sustainable world. By upholding children's rights, their potential to generate significant change toward achieving Sustainable Development Goal 13 can be harnessed.

References

Journal articles

1. Blum, N., Nazir, J., Breiting, S., Chuan Goh, K., & Pedretti, E. (2013). Balancing the tensions and meeting the conceptual challenges of education for sustainable development and climate change. *Environmental Education Research*, **19**(2), 206–217.
2. Emanuel, K. (2005). Increasing destructiveness of tropical cyclones over the past 30 years. *Nature*, **436**(7051), 686-688.
3. Hellden, D., et al. (2021). Climate change and child health: a scoping review and an expanded conceptual framework. *Lancet Planet Health*, **5**, e164.

4. Hohenhaus, M., Boddy, J., Rutherford, S., Roiko, A., & Hennessey, N. (2023). Engaging young people in climate change action: A scoping review of sustainability programs. *Sustainability*, *15*(5), 4259. <https://doi.org/10.3390/su15054259>
5. Johnson, A. (2021). The power of youth in environmental activism: Xiuhtezcatl Martinez and the fight for climate justice. *Journal of Environmental Law*, *33*(2), 123-145. <https://doi.org/10.1093/jel/eqaa017>
6. McMichael, A. J. (2014). Climate Change and Children's Health. *Current Environmental Health Reports*.
7. Patel, M., & Taylor, R. (2021). Youth climate strikes and the role of intersectionality: The activism of Isra Hirsi. *Youth & Society*, *53*(1), 44-64. <https://doi.org/10.1177/0044118X20983919>
8. Stott, P. A., Stone, D. A., & Allen, M. R. (2004). Human Contribution to the European Heatwave of 2003. *Nature*, *432*(7017), 610-614.
9. Wellman, R. L., Henderson, A., Coleman, R., Hill, C., & Davey, B. T. (2024). Climate READY: A three-semester youth empowerment program. *EGUsphere* [preprint]. <https://doi.org/10.5194/egusphere-2024-139>
10. Zhang, Y., & Wang, P. (2022). Detecting the historical roots of education for sustainable development (ESD): A bibliometric analysis. *International Journal of Sustainability in Higher Education*, *23*(3), 478-502.

Books

1. McAdam, D., & Tarrow, S. (2001). *Dynamics of contention*. Cambridge University Press.
2. Pielke Jr., R. A. (2004). *Climate change: The challenge of communicating science*. In *The Social Impact of Climate Change* (pp. 9-23). Routledge.

Reports

1. UNICEF. (2020). The Convention on the Rights of the Child: A guide for children. Retrieved from <https://www.unicef.org/documents/convention-rights-child-guide-children>

Websites

1. United Nations. (2015). Agenda for sustainable development. Retrieved from <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>